EXPLORING THE INTERRELATION BETWEEN OPQ, 15FQ+ AND THE SDS QUESTIONNAIRE

by

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ABSTRACT

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Orientation

In this study the interrelationship between specific personality and interests measures were explored to improve understanding of the respective constructs and their interrelations. A literature study and empirical research was conducted to serve the purpose of this study.

Research purpose

The purpose of this study was to explore the interrelationship between personality and interests using the measures of the OPQ, the 15FQ+, and the SDS.

Motivation for study

Much research has been done on the importance of the use of personality and interest questionnaires for career guidance and other purposes. However, a correlation between the SDS and OPQ and between the SDS and 15FQ+ has not been researched. As such, this study was intended to provide valuable insight into the interrelation between the personality and interests as measured by the OPQ, the SDS and the 15FQ+, which should enhance the interpretation of the respective constructs.

Research Methodology

An exploratory research method was used, as it was a systematic investigation of the relationship among two or more variables. A quantitative strategy of inquiry was used for this study.

Main findings

A canonical correlation analysis showed moderate to strong interrelationship between personality traits and vocational interest. The interrelation of the OPQ, the SDS and the 15FQ+ are significant. The findings indicated how personality and interests differ and converge for enhancing interpretation purposes.

Practical/managerial implications

Holland's theory of vocational interests focuses on the application of the SDS for career purposes, as well as for measuring job fit and job satisfaction. A better understanding of the interrelationship between personality and interests help practitioners to optimize the use of the measures within various contexts.

Contributions/value additions

The study will enable practitioners to more effectively utilize the personality and interest measures, combined or separately, as the interrelationships are now better known and construct validity is enhanced.

Conclusion

The objective of this research was successfully achieved, as satisfactory evidence was provided to address the overarching research purpose.

Key Terms: Occupational Personality Questionnaire (OPQ), Fifteen Factor Plus (15FQ+), Self-directed Search (SDS), personality, interests, Big Five, Five Factor Model (FFM), RIASEC.

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DECLARATION

I, Andrea Wynbergen, declare that Exploring the interrelation between OPQ, 15FQ+ and The SDS questionnaire is my own unaided work both in content and execution. All the resources I used in this study are cited and referred to in the reference list by means of a comprehensive referencing system. Apart from the normal guidance from my study leaders, I have received no assistance, except as stated in the acknowledgements.

I declare that the content of this thesis has never been used before for any qualification at any tertiary institution.

I, Andrea Wynbergen, declare that the language in this thesis was edited by Teresa Kapp.

Andrea Wynbergen Date: 31 July 2014

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Signature

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CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

This dissertation studies the interrelationship between the Occupational Personality Questionnaire (OPQ), the Self-directed Search (SDS), and the Fifteen Factor Questionnaire Plus (15FQ+). Chapter 1 outlines the background to and motivation for the study. An explanation of the problem statement is given, and the purpose of the study is discussed. The chapter outlines the general objectives, the research questions, as well as the benefits and margins of the study. Thereafter, an overview of the structure of the study is given, and the key definitions are provided. The chapter concludes with a layout of the chapters to follow.

In the field of psychology, interests and personality are two main, non-cognitive, and distinct variance domains (Mount, Barrick, Scullen, & Rounds, 2005). Both dimensions are imperative, as they effect several aftermaths connected with career- and life victory. A commonality linking personality and interests is that they impact behaviour through motivation procedures (Mount, Barrick, Scullen, & Rounds, 2005). In other words, they have an influence on the choices individuals make in terms of which duties and actions to engage in in the different spheres of their lives. Much research has been done on one or both of the dimensions, but the exact nature of the relationships amid them stays uncertain and contentious (Mount, Barrick, Scullen, & Rounds, 2005).

Holland's theory of career choice is extraordinary amidst vocation development theories, due to its usability in research and practice (Rayman & Atanasoff, 1999).

> "The theory explains natural events in terms of a system of concepts and laws that relate those diverse concepts to each other. From a scientific perspective this is important because if a theory can explain a phenomenon, it serves to describe events, predict consequences, and identify interventions to modify

results. For practitioners concepts of a good theory translate easily into intervention." (Rayman & Atanasoff, 1999, p. 114).

The present study will aim to explore the relationship between personality and interests as represented by the OPQ, the SDS, and the 15FQ+. Many studies have been conducted on the interrelation between personality and interests, such as those by Barrick, Mount, and Judge (2001), Campbell and Borgen (1999), Tokar and Swanson (1995), and Prediger (1982), to name a few. Most of these studies yielded a number of statically significant findings, suing Holland's RIASEC codes and the Five Factor Model (FFM) to find these linkages (Watson Foxcroft & Allen, 2007).

The present study will provide information on the interrelationship between personality and interest by analysing the links between the OPQ, the 15FQ+, and the SDS. An overview of validity will be discussed. In terms of the practical implications, the application of interest and personality in terms of career guidance, selection, and training and development will be discussed.

1.2 PROBLEM STATEMENT

Much research has been done on the importance of the use of personality and interest questionnaires for career guidance and other purposes, but only a few meta-analyses have been done on the overlap between interests and personality (Larson, Rottinghaus, & Borgen, 2002). Through meta-analysis, it has been found that there are strong relationships between certain personality dimensions and some interest types (Larson, Rottinghaus, and Borgen, 2002). However, a combination of these three tests (OPQ, 15FQ+, and SDS) has not been researched.

Over and above determining the construct validity, correlational studies also determine how instruments interrelate in terms of the constructs that are measured. Construct validity is a prerequisite for valid interpretation within various contexts of use. Inter-correlation studies also help identify and confirm unique scales that reside

in specific measures only. By understanding the interrelationship between interests and personality, practitioners can better apply tests for specific situations, depending on the aim of the assessment (Hogan et al., 1999), for example, for purposes of career guidance, selection, or development. Furthermore, such an understanding will also assist practitioners/counsellors to make an informed decision when selecting test batteries for practical application in the course and scope of their assessments.

The aim of this exploratory study will be to explore the interrelationship between the OPQ, the 15FQ+, and the SDS. Construct validity indicates that the properties of a test measure the constructs that they were designed to measure (McBurney, 1994). Once construct validity has been established, the researcher can continue on to proving predictive validity. Since this will be a single study on these tests, construct validly will not be established, but it will be possible to gather evidence of construct validity. If it is found that there is a strong correlation between the OPQ and the SDS, and between the 15FQ+ and the SDS, and it corresponds with theory, it will provide significant evidence of construct validity.

A correlation will be done between the OPQ, the 15FQ+, and the SDS, to determine if an interrelationship exists between the three tests. According to theory, there is a moderate correlation between Holland's RIASEC types and the Five Factor Model (Mount, Barrick, Scullen, & Rounds, 2005). Should the findings in the present study show moderate or stronger relationships between the variables, it will provide strong evidence of construct validity. The aim of construct validity is to establish the relation to other variables; in other words, it would indicate whether there is a positive or a negative relationship, or no relationship at all (Westen & Rosenthal, 2003).

Through this exploration of the interrelationship between the OPQ, the 15FQ+, and the SDS, practitioners will obtain an improved comprehension of the construct validity of the three instruments, and will be able to choose the best test batteries for specific purposes, for example; career guidance, selection, or development.

Understanding the measures of and the interrelationship between the OPQ, the 15FQ+, and the SDS will add value, as the practitioner will be able to understand the construct of the tests better in terms of interpreting results and giving feedback to clients.

Much research has been done on personality and interests, and how they influence job performance and job satisfaction. Personality and interests also have an influence on the vocational choices that an individual is likely to make. This is supported by studies done by Holland (1997), Ackerman and Heggestad (1997), Barrick, Mount, and Gupta (2003), and Mount, Barrick, Scullen, and Rounds (2005).

1.3 GENERAL OBJECTIVES

The objective of this study is to determine the interrelation between the OPQ, the 15FQ+, and the SDS.

1.3.1 Sub-objectives

To achieve this aim, the following objectives were set:

- To clearly define which dimensions of the SDS, the OPQ, and the 15FQ+ are interrelated, by conducting a literature study of the theory and previous research on the interrelationship between measures of interest and personality; and
- To explore how the personality dimensions of the OPQ and the 15FQ+ interrelate with the SDS types (RIASEC).

1.4 RESEARCH QUESTIONS

After this study has been completed, the question of how the OPQ and 15FQ+ interrelate with the SDS types (RIASEC) will have been answered.

1.5 IMPORTANCE AND BENEFITS OF THE PROPOSED STUDY

Copious amounts of research has been done on the interrelationship between personality and interests. However, a combination of three tests under discussion — the OPQ, thee 15FQ+, and the SDS — has not been researched. As such, the present study will provide valuable insight to the interrelationship between these three tests. Furthermore, from a practical application point of view, this study will aim to provide practitioners with a better understanding of the relationship these three tests have with each other. This study will also assist practitioners and counsellors to make an informed decision when selecting test batteries for specific assessment purposes.

According to Barrick, Mount, and Gupta (2003), there are significant relationships amongst some FFM personality variables and some RIASEC types. The foci of the FFM and RIASEC are different; however, from research it is apparent that personality characteristics and work- and career interests are related to some degree (Barrick, Mount, & Gupta, 2003). It should be noted that, even though many studies have investigated this relationship, the results have been somewhat ambiguous.

From the studies cited above, it is evident that research has been performed on the interrelation between personality and interests, but not specifically on the OPQ, the 15FQ+, and the SDS. Also, previous research results have been somewhat equivocal. Therefore, the present study will contribute to the existing knowledge on the relationship between personality and interest, and give specific information on the three questionnaires under discussion. In order to establish construct validity, the interrelationship between the OPQ, the 15FQ+, and the SDS will need to be explored.

1.6 DEFINITION OF KEY TERMS

Occupational Personality Questionnaire

The OPQ is a concept-analytic-based self-report questionnaire, and is used as an assessment tool in selection and career guidance at managerial and professional level. The questionnaire measures personality factors (Swinburne, 1985). There are 30 substantiative subscales, as well as a social desirability scale (Visser & du Toit, 2004).

Self-directed Search Questionnaire

The SDS is an extensively used inventory, and is generally applied to assess the domain of a person's vocational interest (Conneran &Hartman, 1993). This interest questionnaire was developed by Dr John Holland, and is based on his principle that individuals and work settings can be categorised according to six basic types: (1) *Realistic*, (2) *Investigative*, (3) *Artistic*, (4) *Social*, (5) *Enterprising*, and (6) *Conventional* (RIASEC) (Reardon & Lenz, 1999).

The Fifteen Factor Questionnaire Plus

The 15FQ+ is a normative personality test, and is an update of the 15FQ. Cattell developed 16 core personality dimensions, and the 15FQ utilises 15 of the 16 dimensions. The 15FQ+ applies Cattell's personality dimensions to the workplace, thus providing an alternative to the Sixteen Personality Factor Questionnaire (16PF). The measure of Factor B (intelligence) is included in the 15FQ+, which differentiates it from the 15FQ version (Tyler, 2003).

The Big Five or Five Factor Model

The terms *Big Five* and *Five Factor Model* are used interchangeably throughout this study, just as it is done in the theory researched. The Five Factor Model of

personality comprises of five dimensions: (1) *Neuroticism*, (2) *Extraversion*, (3) *Openness to experience*, (4) *Conscientiousness*, and (5) *Agreeableness*. This model is arranged in a hierarchical structure of personality.

Personality and interests

According to Dawis (1991, cited in Barrick, Mount & Gupta, 2003), "interests are specific activities and objects through which to attain values and meet needs" (p. 838), and, according to Barrick, Mount and Gupta (2003), "personality traits are ways of acting to meet needs." It can therefore be deduced that interests reflect our predisposition, and that personality portrays our behavioural inclinations.

1.7 CHAPTER LAYOUT

The chapters of this study will contain the following:

Chapter 1 gave a background to the study, and explained the importance of the study. The definitions of focal facets of the study were given.

Chapter 2 will provide a review of the literature researched on the topic, and provides information on the OPQ, the 15FQ+, and the SDS. Furthermore, in this chapter, Holland's theory will be discussed, as well as validity, and the practical implications for practitioners in terms of administering the tests and interpreting them . A brief section on career guidance, as well as selection and development, will follow, in order to gain further insight to the practical application of this study.

Chapter 3 will discuss research methods, the measuring instruments, the rationale for using such instruments, and their validity and reliability. The methodology for collecting data and the analysis of the data in the present study will be explained.

Chapter 4 will give a synopsis of the results from the statistical analysis conducted. The results will be related to the theoretical rationale of the applicable literature.

Chapter 5 will cover the implications of the findings, recommendations, limitations, and contribution of the study. Thereafter, areas of future research will be suggested, and conclusions will be drawn.

1.8 CONCLUSION

This chapter provided a brief exposition of the background to the study, the problem statement, objectives, research questions, hypothesis, significance of the study, and definitions of the terms used in the study, as well as an overview of each chapter to follow.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

In order to explore the interrelationship between the OPQ, the 15FQ+, and the SDS, various studies were researched. In these previous studies certain correlations were found. As such, it would be expected that the correlational analysis conducted in this study would produce similar findings to those of past studies (Westen & Rosenthal, 2003). To understand the theory behind the interests and personality, an overview of Holland's theory and the Five Factor model will be discussed.

Holland's theory still has an immense effect on vocational interest testing and research (Spokane, Meir, & Catalano, 2000, cited in Leung, 2008). The Big Five vocational theories were all developed in the United States of America (USA), but it is apparent from previous research that these have contributed to vocational guidance practice and research worldwide (Leung, 2008). It is essential to understand the correspondence between the Big Five factors and the dimensions of the OPQ and the 15FQ+. This correspondence will be used to compare the previous studies and theories to the current study. There are many studies that indicate the benefits of using psychometric tests for career guidance, selection, and development; examples include Holland (1997), Ackerman and Heggestad (1997), Barrick, Mount, and Gupta (2003), Barrick and Mount (2005), and Mount, Barrick, Scullen, and Rounds (2005). In terms of the practical implications of a relationship between interests and personality, the following will be briefly discussed: career guidance, selection, and development. By determining the interrelationship between the OPQ, the 15FQ+, and the SDS, we can gain a better understanding of the constructs, for practical and theoretical purposes.

2.2 AN OVERVIEW OF VALIDITY

Validity refers to how well a test measures what it purports to measure. Validity and reliability are related to the way in which scores from psychometric instruments are interpreted (Cook & Beckman, 2006). According to Cook and Beckman (2006), there are five sources that support validity:

- the matter;
- reply process;
- internal structure;
- relations to other variables; and
- consequences.

To determine the validity of an instrument, one would usually examine the construct, content, and criterion-related concepts (DeVon et al., 2007), although it should be noted that there are many other methods that can be applied to confirm validity (Hansen & Leuty, 2007).

There are different measures of validity. Predictive validity is the extent to which a result on a scale or assessment tool should theoretically be able to predict scores on some criterion measure. A high interrelationship between scores would yield proof of predictive validity — it would indicate that the measure can accurately forecast something that we theoretically consider it able to foresee.

Construct validity is an all-encompassing type of validity, and the extent to which a psychometric tool is measuring the intended construct (Hansen & Leuty, 2007). In a study by Hansen and Leuty (2007), the three methods focused on were: convergent, divergent, and concurrent validity. Concurrent validity is used to evaluate the operationalisation's capability to differentiate between the clusters that it ought theoretically to be able to differentiate. Two aspects of construct validity are: convergent validation — this is when the measure compares exceedingly well with the variables it should correlate with according to theory, and, secondly, discriminant

validation — when it is observed that constucts relate to each other but in fact according to theory should not relate (Erasmus, 2005).

Convergent and discriminant validity are subtypes of construct validity. Convergent validity can be determined if two comparable constructs correspond with each other. *Divergent validity* is a term used interchangeably with *discriminant validity*, and examines if certain constructs that not supposed to be related are in fact unrelated.. When *convergent validity* and *discriminant validity* criteria are met, then construct validity is assumed to have been satisfied (Agarwal, 2011). To measure convergent and discriminant validity, a correlation of the variables is analysed. Once the correlation has been done, the findings from the analysis should correlate according to the theory on the measures. According to Trochim (2006), for convergent validity to be satisfied, "measures of constructs that theoretically should be related to each other (that is, you should be able to show a correspondence or convergence between similar constructs)." Regarding discriminant validity, Trochim (2006) stated that the measurments for contrrcts that should according to theory be unrelated are in fact not related to each other.

In the studies done by Barrick, Mount, and Gupta (2003) and Mount (2005), their findings on the correlations between the constructs of interests and personality are consistent with theory on the constructs. For example, the *Extraversion* type showed a moderate relationship with the *Enterprising* type, and that the *Realistic* type showed very little overlap with personality traits. Studies by Costa et al. (1984), Gottfredson and Jones (1993), Sullivan and Hansen (2004), Ozer and Benet-Martínez (2006), and Staggs et al. (2007) found similar results, which indicates that their findings have discriminant and convergent validity. In order for a study to have construct validity, by satisfying the criteria for convergent and discriminant validity, the findings will have to be supported by the theory of previous studies — in this case, on the interrelationship between personality and interests.

Construct validity studies usually focus on a single inventory, and the structural validity findings are customarily placed in test manuals by the test publishers (Woods & Hardy, 2012). According to a broad unanimity in previous research, the literature suggests that the universe of trait-descriptive terms can be depicted by the factors of the Big Five Model (Woods & Hardy, 2012). Furthermore, in the study done by

Moutafi et al. (2005) on the construct validity of the 15FQ+ and the OPQ, the evidence of construct validity resulted from the comparison between the 15FQ+ and other personality inventories; for example, correlation between the NEO (Big Five) and the 15FQ+ shows that the elements of the 15FQ are constant with comparable measures.

2.3 PERSONALITY AND INTERESTS THEORIES

In this section, theories on personality and interests are explored. These theories are the foundation for the research conducted in the present study. Holland's theory explains how interests, according to the RIASEC types, are related to personality. The Five Factor Model is the most commonly used theory and model of personality when assessing the interrelationship between interests and personality. As such, these two theories provide a background to how personality and interests are related. Furthermore, we will examine at the correspondence between the Big Five personality factors and the 15FQ+ dimensions of personality, as well as the correspondence between the OPQ personality dimensions and the Big Five personality factors.

2.3.1 Holland's theory

Over the last few years, the theory of John Holland has directed vocational interest testing, both in the United States of America and world-wide (Leung, 2008). In 1966, Holland's theory was developed, and improvements were made in 1973, 1985, and 1992 (as cited in Jigău, 2007). Due to the fact that his theory of vocational choice provided counsellors with a framework that is easy to apply, the theory was an instant success. This framework gave counsellors an understanding of how environmental and personal factors interrelate, and how this process assists decision-making (Jigău, 2007), which could be utilised in career counselling and guidance (Leung, 2008).

There are two questionnaires that backs the way in which Holland's theory is applied, namely the Vocational Preference Inventory (VPI) and the Self-directed Search (SDS) Questionnaire. Holland hypothesised that career interest is a

manifestation of one's personality, and that career interests could be perceived according to six typologies (RIASEC):

- Realistic (R);
- Investigative (I);
- Artistic (A);
- Social (S);
- Enterprising (E); and
- Conventional (C).

Table 1

RIASEC Types and their Descriptions

Type	**Description**
Realistic	This personality type shows a definite preference for working with objects, tools, and machinery.
Investigative	The investigative type is characterised by a preference for the systematic investigation of physical, biological, and cultural phenomena.
Artistic	This type shows a preference for achieving his/her creativity in a free environment.
Social	The social type shows a definite preference for working with people by forming and training them, or by caring for them.
Enterprising	This personality type shows a preference for manipulating people, for taking the lead, and for acting in an enterprising manner in the business world or in public life.
Conventional	The conventional type shows a preference for ordered activity that includes the manipulation of data.

Holland's theory asserts that occupational interests are a vital manifestation of personality. Although this systematic classification is not accepted by everyone, it has been generally confirmed in the career literature (Barrick et al., 2003). Through cross-cultural analysis, it has been found that the generalisability of the RIASEC typology is widely supported (Foutche et al., 2014). People who fall under *Realistic*

tend to prefer partaking in activities that involve the systematic manipulation of tools and machinery. Individuals who are *Investigative* are inclined to be precise, analytical, and systematic. *Artistic* individuals show tendencies of non-conforming; they are expressive and introspective. People who resort under *Social* prefer dealing with individuals and providing them with assistance, but avoid systematic, ordered, and mechanical activities. Individuals who are classified under *Enterprising* like convincing others and taking the lead to attain a specific goal; however, they tend to abstain from activities that are emblematic and orderly, and usually lack scientific ability. People who are *Conventional* are fond of the systematic manipulation of data, and tend to avoid artistic activities (Barrick et al., 2003).

RIASEC is an acronym that describes the six Holland interest typologies, and the correlation between the types in the instances of likeness and unlikeness are represented by the distance between corresponding types in the hexagon (Leung, 2008).

The types that have the topmost amount of resemblance in terms of personality properties and vocational orientation are adjacent to each other in the hexagon, and the types with the least degree of similarity are opposite one another in the hexagon. Types that are split by one interval have a medium amount of likeness. The most simplistic way of determining the consistency of Holland's interest codes is to examine the space between the first two letters of the code in the Holland hexagon (high, moderate, or low consistency) (Leung, 2008 and, McGowan, 1982,). This hexagon is two-dimensional, and depicts relationships (correlations) among the six types, and therefore indicates that these relationships can be summarised by two dimensions (Prediger, 1982). The hexagon in Holland's theory has a central role, and, as such, the two dimensions may be foundational to career development and career choice (Prediger, 1982). Many empirical analyses have been conducted over the years to determine the degree to which the hexagon can be used to summarise the correlations amid career interests, and although there has been support for the hexagonal model, it has generally agreed that scarce scrutiny has been given to the dimensions underlying the hexagon (Prediger, 1982).

Holland's RIASEC model of vocational interest and the Five Factor Model are two of the most widely used models for classifying individual differences (Barrick et al., 2003). "Personality and vocational psychologists have sliced up the world of individual differences with their unique concepts, but they are often looking at the same world" (Borgen, 1986, p. 108). Holland's model of vocational personality types and the Five Factor Model of personality are possibly the most notable and tenacious attempts to organise the realms of interests and personality traits (Tokar & Swanson, 1995).

The Five Factor Model is a classification of the main personality dimensions, and evidence has shown that these main personality traits underlie most personality constructs (Tokar & Swanson, 1995), whereas the assumption of Holland's theory is that interests are a vital manifestation of personality. Thus in content, the Five Factor Model and Holland's theory should have a meaningful correspondence. However, up until the research conducted by Tokar and Swanson (1995), the link between personality traits and vocational interests has been unclear. In 1984, the authors of the NEO and SDS took their first look at the convergence, and found that there was a substantial overlap (Larson et al., 2002). Since then, numerous studies have been performed to investigate the overlap, and findings from these studies have shown fairly consistent moderate covariation between the two models, but also independent variance in each set of scales (Larson et al., 2002).

In order to advance theory and practice in vocational psychology, an understanding of the overlap and distinctiveness is crucial (Larson et al., 2002). Several studies have been done on interests and personality individually, and these studies have contributed to the literature; however, the findings from these studies do not display a clear unanimity regarding the extent or the nature of the overlap of the Big Five and the SDS (Bullock-Yowell et al., 2011). As such, Larson et al. (2002) suggested that a sequence of meta-analyses investigating the correlations of the Big Five and the SDS would empirically integrate the findings.

The difference between the two models is that the RIASEC types concentrate on a person's interests and preferences, whereas the FFM personality dimensions concentrates on people's typical ways of acting, thought processes, and feelings

(Barrick et al., 2003). In terms of the findings on how strong the relationships between the two models are, the results have been ambiguous, due to opposing findings in some instances. However, a methodical approach and quantitative way of assessing the magnitude of the relationship was provided by a meta-analysis done across studies. The results from the meta-analysis showed that some of the career interest types are somewhat correlated to personality characteristics, particularly the *Enterprising* and *Artistic* types (Barrick et al., 2003). This therefore indicated that these occupational interests and preferences seem to coincide significantly with personality. The other career types have only slight overlaps with personality types. Furthermore, in terms of the *Realistic* interest type, it was shown that there are only minor relationships with personality variables (Barrick et al., 2003). Ackerman and Heggestad (1997) found that *Realistic* interests are mostly connected with abilities, incorporating rational thinking, mathematics, crystallised intelligence, and visual perception, therefore supporting this finding. In the meta-analysis done by Barrick et al. (2003), it was found that, when there was correspondence between personality and interests, larger correlations where found. An instance of this was the correlation between the two vocational types of *Enterprising* and *Social*, which are the two largest social components. It was found that there was a correlation between *Enterprising* and *Extraversion*, and the *Social* type indicated a correlation with *Agreeableness* (Barrick et al., 2003). These results emphasise the role of congruence, as individuals who tend towards social and reward-seeking behaviour show a preference for a working environment where there is a lot of social interplay, and they are specifically drawn to these roles when they are provided with opportunities for a leadership position and material rewards. Highly *Agreeable* individuals show a preference for being in a work environment where there is significant social dealings of a co-operative nature (Barrick et al., 2003).

Larson et al. (2002) found the following links from previous studies conducted individually on the six dimensions of interests and Big Five personality dimensions:

- *Artistic* related moderately (0.40 to 0.50) to *Openness to experience*; this was found in the studies done by Costa et al. (1984), De Fruyt and Mervielde (1999), Gottfredson, Jones, and Holland (1993), Holland, Johnston, and Asama (1994), Tokar and Swanson (1995), and Tokar et al., (1995).

- *Enterprising* related by 0.20 to 0.50 with *Extraversion* in the studies done by Costa et al. (1984), De Fruyt and Mervielde (1999), Holland et al. (1994), Tokar and Swanson (1995), and Tokar et al. (1995).
- *Social* related to *Extraversion* (0.30 to 0.40) in the studies by Costa et al. (1984), De Fruyt and Mervielde (1999), Holland et al. (1994), Tokar and Swanson (1995) and Tokar et al. (1995).
- *Investigative* overlapped by 0.20 to 0.60 with *Openness to experience* in studies conducted by Costa et al. (1984), Gottfredson et al. (1993), Holland et al. (1994), Tokar and Swanson (1995), and Tokar et al. (1995); and
- *Social* corresponded by 0.20 with *Agreeableness* in studies by De Fruyt and Mervielde (1999), Tokar and Swanson (1995), and Tokar et al. (1995).

Regarding the results above, one would expect a meta-analysis to demonstrate these relationships empirically. The meta-analysis conducted by Larson, Rottinghaus, and Borgen (2002) showed the mean correlations, as well as 95% confidence intervals, for each of the 30 interrelationships between the six interest dimensions of the SDS and the five personality dimensions. The following correlations were found: “Artistic and Openness r = 0.48, Enterprising and Extraversion r =.41, Social and Extraversion r =.31, Investigative and Openness correlated .28, Conventional and Conscientiousness correlated .25, and Enterprising and Conscientiousness correlated .22” (Larson, Rottinghaus, & Borgen, 2002, p. 224). The meta-analytic findings are particularly constructive in recognising moderate but positive correlations between the large dimensions of interests and personality. In another meta-analysis, done by Barrick et al. (2003), it was found that there are significant relationships between some FFM personality dimensions and some of the SDS types. It was found that the strongest relationship was between *Enterprising* (from the RIASEC types) and *Extraversion* from the FFM (0.40), as well as between *Artistic* (SDS) and *Openness* (FFM) — 0.39 (Barrick et al., 2003). However, it was found that the *Realistic* type was not related to any FFM personality dimensions, but that three other SDS types had a moderate relationship with FFM personality dimensions. The concluding finding is that, even though there is a relationship between the FFM personality traits and SDS types, these are not mere substitutes for each other.

It is evident from both meta-analyses conducted by Larson, Rottinghaus and Borgen (2002) and Barrick et al. (2003) that there are significant relationships between the FFM personality dimensions and SDS types.

2.3.2 Five Factor Model/Big Five theory and its correspondence to the OPQ and 15FQ+ dimensions

Personality variables have always predicted important behaviours and outcomes in organisational psychology. The Five Factor Model of personality has emerged and achieved wide acceptance over the past two decades. The Big Five factors are "Emotional Stability, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness" (Anderson & Ones, 2003, p. 49).

When considering the trait method, it is important to note that the labels *Big Five* and *Five Factor Model* (FFM) are often used interchangeably. According to the research done by De Fruyt, McCrae, Szirmák, and Nagy (2004), the Big Five is derived from the lexical approach associated with Allport and Odbert (1936), Fiske (1949), Tupes and Christal (1961), Norman (1963), and Goldberg (1981) (as cited in De Fruyt, McCrae, Szirmák, & Nagy, 2004, 1993, p. 208), whereas the FFM is, in essence, connected with the rise of the importance of personality elements through the questionnaire method, as seen in the work of Costa and McCrae (1985). For the purpose of the current study, the terms will be used interchangeably (Tyler, 2003).

The FFM has been ultilised in a considerable amount of studies across different countries worldwide, and using an extensive range of original resource inventories has amassed a large bulk of literature providing evidence that the FFM of personality can be used across different theoretical frameworks (Anderson & Ones, 2003).

The Five Factor Model of personality is a graded organisation of personality characteritics in terms of "five basic dimensions: *Extraversion* (E), *Agreeableness* (A), *Conscientiousness* (C), *Neuroticism* (N), and *Openness to Experience* (O)" (McCrae & John, 1992, p. 179). Furthermore, the FFM portrays the simple

dimensions of personality at a universal level (Barrick et al., 2003). The table below illustrates the Big Five:

Table 2

The Big Five

N	**E**	**O**	**A**	**C**
Anxiety	Warmth	Fantasy	Trust	Competence
Angry hostility	Gregariousness	Aesthetics	Straightforward-ness	Order
Depression	Assertiveness	Feelings	Altruism	Dutifulness
Self-consciousness	Activity	Actions	Compliance	Achievement striving
Impulsiveness	Excitement-seeking	Ideas	Modesty	Self-discipline
Vulnerability	Positive emotion	Values	Tender-mindedness	Deliberation

Since the present study focuses on the interrelationship between the OPQ, the 15FQ+, and the SDS, it is important to understand the correspondence between the Big Five personality factors and the personality dimensions of the OPQ and the 15FQ+. The 15FQ+ is an untimed questionnaire, and measures 15 bipolar personality dimensions (Moutafi et al., 2005). The dimensions measured by the test are (1) *Stable*, (2) *Enthusiastic*, (3) *Outgoing*, (4) *Conscientious*, (5) *Suspicious*, (6) *Socially bold*, (7) *Assertive*, (8) *Intuitive*, (9) *Conceptual*, (10) *Restrained*, (11) *Radical*, (12) *Self-doubting*, (13) *Self-sufficient*, (14) *Tense-driven,* and (15) *Disciplined* (Moutafi et al., 2005). Five wide-ranging underlying traits can be derived from the 15FQ through factor analysis (Murphy, 2005). In the study conducted by Moutafi et al. (2005), these characteristics were positively compared to the Big Five dimensions of personality. The findings indicate that *Extraversion* corresponds to the Big Five's (NEO) *Extroversion* (r = 0.77), *Control* corresponds to NEO *Conscientiousness* (r = 0.36), *Anxiety* corresponds to NEO *Neuroticism* (r = 0.71), *Independence* corresponds to NEO *Agreeableness* (r = 0.55), and *Tough-mindedness* corresponds to NEO *Openness* (r = 0.64) (Moutafi et al., 2005). The table below illustrates the 15FQ+'s loadings on the Big Five dimensions.

Table 3

15FQ+'s Loadings on the Big Five Dimensions

Big Five factors	**15FQ+ corresponding factors**	**15FQ+ dimensions**
Extraversion (E)	Extraversion	Empathetic, enthusiastic, outgoing, self-sufficient, socially bold, and group-orientated
Neuroticism (N)	Anxiety	Self-doubting, affected by feelings, tense–driven, and suspicious
Openness (O)	Tough-minded	Empathetic, tender-minded, abstract, radical, and conceptual
Agreeableness (A)	Independence	High intelligence, accommodating, suspicious, and radical
Conscientiousness (C)	Control	Conscientious, self-disciplined, and restrained

As illustrated in the above table, we can see that the 15FQ+ dimensions do correspond with the Big Five factors.

Barrick et al, (2003) conducted a study to examine the magnitude and nature of the relationship between the FFM and Holland's RIASEC types by conducting a meta-analytic review of the correlations between them. Their findings were as follows:

- *Extraversion* had a positive relationship with *Enterprising* and *Social;*
- *Agreeableness* had a positive correlation with *Social;*
- *Conscientiousness* had a positive correlation with *Conventional* and *Investigative;*

- *Emotional stability* (*Neuroticism* reversed) revealed a positive relationship with *Investigative*; and
- *Openness to experience* had a positive correlation with *Artistic* and *Investigative.*

By means of a meta-analysis, Larson et al. (2002) established what empirical studies have shown individually. This meta-analysis showed strong relationships between some of the personality domains and vocational interests. There are at least five meaningful links that stand out. The most strongly related (0.48) is *Artistic* and *Openness*, and this overlap has emerged in multiple studies. There are also an overlaps between *Extraversion* and *Social* and *Enterprising* interests: 10% between *Extraversion* and *Social*, and 17% between *Extraversion* and *Enterprising*. Though there might be slightly weaker overlaps with certain dimensions, it is clear that there is a relationship between interests and personality. It should be noted that, when using the SDS with the FFM, there are some strong correlations, but when other instruments, such as the Strong Interest Inventory, were used, the relationship between the interest types and personality dimensions were lower in some cases.

It is evident that there is a relationship between interest and personality. However, it would appear that the instruments used to measure these correlations play an important role and, depending on the instrument used, the correlations between interests and personality can differ. Meta-analyses have shown meaningful overlaps between certain interest types and certain dimensions of personality (Larson et al., 2002). Even though an overlap exists, there is convincing substantiation that most occupational interests are different from personality.

Barrick et al. (2003) did a study on the interrelationship between personality dimensions and the RIASEC interest types, and found that there is a moderately strong correlation between the RIASEC types and *Extraversion.*

The format of the OPQ32r is blocks of three statements, instead of blocks of four. This improvement has made the test less time-consuming and less cognitively challenging. The difference between the OPQ32r and previous versions (OPQ32i and OPQ32n) is the way in which the new forced-choice questionnaire is scored. The new scoring method enables the administrator to have access to all items that are considered to uncover latent traits through probabilistic estimation, rather than operating on the scale-by-scale basis. The scores obtained are no longer ipsative (Brown & Bartram, 2009). For further descriptions of the three versions of the OPQ, please see Section 3.4.1. With regard to the correspondence between the dimensions of the OPQ and the Big Five, 25 of the 32 OPQ scales are used with positive or negative loadings. This is illustrated in the table below (Bartram, 2013).

Table 4

OPQ32 Scales Used to Produce Each of the Big Five Measures

Big Five scale	**OPQ scales with positive loadings**	**OPQ scales with negative loadings**
Emotional stability (N) (Neuroticism reversed)	Relaxed, tough-minded, optimistic, socially confident	Worrying
Extraversion (E)	Outgoing, socially confident, affiliative, persuasive, controlling	Emotionally controlled
Openness to experience (O)	Variety-seeking, innovative, conceptual, behavioural	Conventional
Agreeableness (A)	Caring, democratic, trusting	Competitive, independent-minded
Conscientiousness (C)	Conscientious, detail conscious, vigorous, forward-thinking, achieving	None

Source: Scalar Equivalence of OPQ32 Big Five Profiles of 31 Countries. Journal of Cross-Cultural Psychology, by Bartram, D. (2013), p. 67.

The Big Five personality factors are explained by about 50% of the variance in the OPQ's primary scale scores (Bartram, 2013). The OPQ measures a broader domain, which is indicated by the fact that some of the OPQ's scales are not strongly related to the Big Five (Bartram, 2013).

2.4 THE IMPLICATION OF CORRELATIONS BETWEEN OPQ, 15FQ+, AND SDS FOR PRACTITIONERS

Much research has been done on the interrelationship between personality and interests. However, none of the studies utilised all three tests (OPQ, 15FQ+, and SDS); rather, the research speaks of each test individually. However, there have been quite a few studies on the Big Five and Holland's Big Six (RIASEC). The research discussed in the previous sections of this literature review provides conclusive evidence that interests and personality do interrelate with each other — some dimensions just have higher correlations than others.

When selecting which test battery to use, for example for guidance purposes, it is clear from the research that the counsellor should select instruments that target the needs of the client, as well as other factors, such as age, education level, and ethnicity. The OPQ, the 15FQ+, and the SDS are generally accepted to be, for the most part, fair across cultures, and would be applicable in the South African context. The SDS's target population is high school pupils and adults with limited reading skills (Deller, 1997). The SDS uses basic language, and is available in English, French, Spanish, and braille (Deller, 1997). According to the 15FQ+ technical manual, the 15FQ+ items avoid cultural, age, and gender bias, and have been written in a clear and concise manner, using only business English. The duration of the assessment is short, and the questionnaire consists of 12 items per scale. However, Meiring, Van de Vijver, and Barrick (2005, cited in Moyo & Theron, 2011) and Meiring, Van de Vijver, and Rothmann (2006, cited in Moyo & Theron, 2011) found that for some of the African languages groups there was a lower internal consistency on some of the sub-scales of the 15FQ+ when they were compared. The OPQ32n was developed internationally, and adapted for the South African context. Foe a British sample, the 32 sub-scales yielded alpha coefficients ranging from 0.63 to 0.87 (Saville & Holdsworth, 1999). The internal consistency for the South African sample was found to be satisfactory. The alpha coefficients for the various subscales ranged from 0.71 to 0.89 (Moyo & Theron, 2011).

According to Jigău (2007), when counsellors are deciding on which method and test batteries to use, the following should be considered:

- There should be an awareness of personal skills or knowledge, aptitudes, and ability; and
- They should identify occupational substitutes corresponding to their structure of interests, aptitudes, and dominant personality characteristics.

It should be borne in mind that a counsellor makes use of certain assessment tools and inventories to assist individuals in getting to know themselves, and to enable them to make decisions and plan their own occupations. In other words, the assessment instruments can help individuals with making a career choice (Reardon & Lenz, 1999).

In the study conducted by Larson et al. (2002), their results for interest-personality correspondence showed potential for strengthening counselling practice. "In particular, the substantial shared variance among many of Holland's Big Six and the Big Five personality traits provides synergy to enhance the meaning of traditional assessment in counselling" (Larson et al., 2002). It is important to note that Gottfredson (1993) concluded that the overlap of interests with personality traits is not strong enough to suggest that they can be substituted for one another. Therefore, it is important to consider both the additive and redundant information provided by these measures of individuality. The results of the meta-analysis conducted by Larson et al. (2002) indicated that the link between personality and interests is stronger for some pairs than for others. An example of this is the case of the interrelationship between *Realistic* interests and the five personality dimensions showing a minimal overlap, which could not be interpreted beyond Holland's theory (Larson et al., 2002). The Big Six and the Big Five are indeed related to one another in important ways applicable to counselling, but not universally. There are considerable relationships between *Enterprising* and *Extraversion*, and between *Artistic* and *Openness*, but weaker relationships between *Social* and *Extraversion,* and between *Investigative* and *Openness* (Larson et al., 2002). Substantial independent variance is also present, which highlights the importance of the joint assessment of these domains. By contemplating aspects of each model that do not overlap, both the scientist and the practitioner could gain important insights.

Additional research is needed to strengthen our understanding of potential implications for practitioners (Larson et al., 2003).

"Historically, personality psychology has done a poor job of clarifying what it has to contribute to applied psychology, and as a result it has an ambiguous status among practitioners" (Hogan et al., 1999). With the development of the Five Factor Model, the question of what needs to be measured has been largely resolved (Hogan et al., 1999). This model suggests that personality can be defined by five wide-ranging dimensions: *Adjustment*, *Extraversion*, *Conscientiousness*, *Likeability*, and *Curiosity* (Hogan et al., 1999). Personality assessment has become an aid in interest measurement. To obtain information on the fit between a person's interests and her/his vocational interest, measures are used, and a personality questionnaire informs us about the individual's potential to advance once he/she has chosen a career (Hogan et al., 1999). This ultimately signifies that there should be a stable interrelationship between personality and job performance (Mount, Barrick & Stewart, 1998).

2.5 PRACTICAL APPLICATION OF THE OPQ, 15FQ+, AND SDS

It is important to look at the uses of the SDS and other interest assessment tools in a practical application. Holland's theory of vocational interests focuses on the application of the SDS for career purposes, as well as job fit and job satisfaction. In the section below, a brief discussion on career guidance is given, as well as other interest assessment tools and other available personality tests (McCrae & Oliver, 1992). "Personality assessment becomes a natural adjunct to interest measurement. Vocational interest measurement tells us about the fit between a person's interests and the interests of his/her potential co-workers; personality assessment tells us about a person's potential to get along and get ahead once they have chosen a career they like" (Hogan et al., 1999). Therefore, there should be a relationship between personality measures and job performance.

2.5.1 Background on career guidance

In over 100 years of career guidance and counselling in the Western world, an all-inconclusive system of theories and intervention strategies has been developed (Leung, 2008). Career guidance started out as a trait-factor approach in the early 20th century (Betz, Fitzgerald, & Hill, 1989; Zunker, 2002), and has since evolved into a relatively established discipline with a robust theoretical and empirical base, and has the capability to further cultivate into a more universal discipline in the future (Leung, 2008).

Due to the current volatile and changing environment in which career counselling is developing, it is essential that counsellors and others stakeholders in career guidance develop new evaluation and intervention models able to respond to these needs (Jigău, 2007). Career guidance should be seen as a universal approach to all aspects of individuals' personal, professional, and social lives and in the development of their careers (Jigău, 2007). Historically, career guidance mainly consisted of using psychological tests, but has evolved to using mostly questionnaires and inventories of interests, preferences, aptitudes, attitudes, and values.

Career guidance research in South Africa (SA) is relatively limited, and, as such, most of the research until now has been dependent on career theories and research originating from the United States (Stead & Watson, 1998). The career theories of Holland (1985) and Super (1990) have mostly been accepted by researchers and counsellors (Stead & Watson, 1998). The Western approach of career psychology has also been applied by other population groups, as it has been assumed that imported theory, constructs, and instruments had similar meaning and relevance for different ethnic groups. In the SA context, a theoretical perspective characterises the research of career guidance, as little effort has been made to examine whether the Western perspectives are applicable to the South African context. South Africa is still a developing country, and career guidance theory is still in the beginning stages of development. It should, however, be noted that Brand, van Noordwyk, and Hanekom (1994) found significant positive relationships between Holland's (1985) SDS and the Vocational Interest Questionnaire among Black Grade 12 students

(Kimball, Sedlacek & Brooks, 1973). This is indicative that Holland's SDS can be applied to most cultures.

Jigău (2007) is of the opinion that career counselling can be defined as "the process of attaining the maximum compatibility between the resources, requirements, aspirations or interests of an individual and the real offer in the field of education, training and social and vocational integration" (Jigău, 2007, p. 16).

An evaluation of the conceptual literature in career development proposed that very few career development theories have emanated from counties outside of the USA (Leung, 2008). More 'indigenous' efforts will need to be made in the future if we are to develop theories and practices that meet the needs of diverse geographic locations.

2.5.2 How personality and interest measures enhance career guidance, selection, and development

> "Since its inception, the RIASEC model has generated international interest among both practitioners and researchers and has been quite influential in the fields of educational, occupational, and career counselling, especially as a consequence of its appealing and explicit assumptions on person-environment relations and outcomes" (de Fruyt & Mervielde, 1999, p. 702).

Much research has been done on how personality- and interest measures influence development, career guidance, and the selection process. Several integrative models have arisen due to the need to answer the question of how individual differences contribute to important career products (Staggs et al., 2007), and how these differences interact and mutually determine career decision-making and development (Sullivan & Hansen, 2004). Personality and interests are two central constructs in such models. Research done by E. K. Strong Jr. in the 1950s hypothesised that interests and abilities interact to shape an individual's career, because interests relate to the direction individuals take, and abilities determine how quickly they progress (Sullivan & Hansen, 2004). For example, a model proposed by Ackerman and Heggestad (1997) proposed that interests are the incentive for the

selection of tasks, and personality and abilities determine the accomplishment of those actions (Staggs et al., 2007). In a model described by Lubinski and Benbow (2000), individuals are drawn to educational and occupational activities by their interests, personality, and abilities over a period of time, and, through these stable predispositions, occupational niches are created (Staggs et al., 2007). Attempts to construct broad-scale combinations include theoretical, literature-based reviews, for example those of Holland (1999) and Walsh and Eggerth (2005), and meta-analytic reviews, such as those of Barrick, Mount, and Gupta (2003) and Larson, Rottinghaus, and Borgen (2002).

The groundwork for theory development and counselling applications in the area of career- and educational outcomes is provided by existing empirical and conceptual reviews (Staggs et al., 2007). An example of this is provided by Staggs et al. (2007), who stated that the overlap between *Extraversion* and *Enterprising* gives the career guidance practitioner information about two clients: one is introverted and the other is an extravert, but both have enterprising interests, and may consider a career in advertising. From the information provided, it can be said that the client who is extraverted is more probable to relish a career in advertising than the client who is introverted. This is a broad-level application, and is useful for providing general direction; however, this broad application lacks the specificity that is possible and necessary for more complex career counselling and theory development (Staggs et al., 2007).

The studies done by “Ackerman and Heggestad (1997) and Lubinski and Benbow (2000) reflect an emerging model of the way that stable dispositions, including individual differences in interests and personality, may shape career decision making and behavior” (Sullivan & Hansen, 2004). This emanating model suggests that interests and personality direct the development of skills and knowledge, by supplying the drive to participate in specific kinds of tasks (Sullivan & Hansen, 2004). Moreover, definitive personality characteristics are presumed to participate in work success within connected domains, which is a premise that is gaining increasing support by empirical evidence obtained in numerous studies (Sullivan & Hansen, 2004).

Knowing the patterns of association between the Holland types (SDS) and personality measures (OPQ and 15FQ+) can assist practitioners in understanding how certain combinations of interests and personality may conflict with one another (Baugh & Sullivan, 2005). A deeper understanding of these relationships will also help the practitioner/career counsellor identify and recognise the nuance and intricacy of individuals as they gain insight into the source of career-related problems such as incongruous interests, and are able to generate career option recommendations that match with the individual's interest and personality description (Sullivan & Hansen, 2004). Moreover, recognising that *Enterprising* and *Introversion* are not characteristically connected can assist the procedure of finding an occupation that would be a sound fit for the individual. Additionally, gaining a better understanding of the interrelationship between personality and interests has implications for the use and design of the psychometric tests that practitioners use to measure the individual differences and on which they base their predictions and recommendations. Sullivan and Hansen (2004, p. 10) stated:

> "Most major interest inventories include personality traits in the materials developed to describe the constructs that interest scales measure. A thorough understanding of the nature of the interrelationship between personality and interests will enrich the understanding of interest constructs and further interpretation of scores on interest inventories."

Over the last twenty odd years, a renewed interest in the use of non-cognitive predictors for selection has emerged (Van Iddekinge, Putka, & Campbell, 2011). According to Van Iddekinge et al. (2011, p. 13), "Much of this attention has focused on the Big Five personality factors." An example of such a study is that of Barrick and Mount (1991) "and, more recently, on facets of the Big Five" (Van Iddekinge et al., 2011, p. 13), for example the findings by Dudley, Orvis, Lebiecki, and Cortina (2006). It has been found that there is much less selection literature on vocational interests. However, empirical research, as well as theory outside the mainstream of selection literature, indicates that interest may be pertinent to relevant selection criteria, such as job performance and retention (Van Iddekinge et al., 2011). Furthermore, due to it being rooted in work projects and environments, interest offers a way to address the need to integrate the business framework into the measure of

non-cognitive constructs. Van Iddekinge et al. (2011, p 14) performed research aimed at creating "awareness concerning the potential usefulness of vocational interests for selection."

Holland's RIASEC types link individual interests to work environments. Individuals who are the *Realistic* type are likely to prefer work activities that require a hands-on approach and are practical in nature. Scholarly, intellectual, and scientific types of work will appeal to individuals who fall within the *Investigative* type (Van Iddekinge et al., 2011). Another example of the six interest types is the *Enterprising* type. These individuals likely to enjoy work that involves being assertive and persuasive, and which includes leadership-orientated activities (Van Iddekinge et al., 2011). These types are directly linked to work environments. Examples of work environments include a construction environment, which can be described as realistic. A teaching environment can be described as sociable, whereas administrative clerical environments can be described as conventional (Van Iddekinge et al., 2011).

According to Rothstein and Goffin (2006), there has been a rise in the application of personality measures by managers and human resource professionals for the purpose of evaluating the suitability of candidates for positions in organisations. The newfound use of this employee selection method undoubtedly emanates from a sequence of various meta-analytic research studies that were conducted in the early 1990s (Rothstein & Goffin, 2006). In these studies, personality measures revealed "a level of validity and predictability for personnel selection that historically had not been evident" (Rothstein & Goffin, 2006, p. 155). Substantial support for the FFM contributed new motivation to explore the operation of personality characteristics in the professional place of work (de Fruyt & Mervielde, 1999). Industrial and organisational psychologists now have at their disposal the RIASEC model and the FFM, which are two person-descriptive models (de Fruyt & Mervielde, 1999).

The relationship between personality and interests has been studied by "Gottfredson, Jones, and Holland (1993), Tokar and Swanson (1995), Tokar, Vaux, and Swanson (1995), Schinka, Dye, and Curtiss (1997), De Fruyt and Mervielde (1999), Merman and Heggestad (1997), and Tokar and Fischer (1998)" (de Fruyt & Mervielde, 1997, p. 706). The results of these studies are convergent, and illustrate

that each of the Big Five is related to one or more RIASEC types, but that the *Realistic* type and, to a lesser extent, the *Investigative* type "are not represented in the Big Five" (de Fruyt & Mervielde, 1997, p. 704).

Meta-analytic validity studies frequently emphasise the validity of personality traits in predicting career decision outcomes (de Fruyt & Mervielde, 1999). In the study by Dunn, Mount, Barrick, and Ones (1995), it was found that when evaluating if a candidate is employable, personality traits are perceived to be an important factor by practitioners (de Fruyt & Mervielde, 1999). In a study by Van Dam (1996, cited in de Fruyt & Mervielde, 1999), she "investigated how selection psychologists' impressions of the personality of job applicants were related to their actual decisions to employ" (de Fruyt & Mervielde, 1999, p. 704). She found that there was a correlation between *Emotional stability*, *Openness*, *Conscientiousness*, and the last hiring decision (de Fruyt & Mervielde, 1999).

Therefore, when it comes to selecting an individual for a job within an organisation, it will be beneficial to know what RIASEC type category they are categorised in, as this will have an impact on the incumbent's work performance, work success, and job satisfaction. By understanding the relationship between personality and interests, an employer can make better and more informed decisions about who they employ.

NQF/CAS (n.d., p. 12) reported that:

> "According to Baer, Flexer, Luft and Simmons (2008) an individual's career development is a lifetime process that encompasses the growth and change process of childhood, the formal career education at school, and the maturational processes that continue throughout a person's working adulthood and into retirement."

Holland's theory gives us insight into the theoretical component of career development, and the SDS can be seen as the tool he invented to deliver that understanding and knowledge (Rayman & Atanasoff, 1999). The SDS is the translation of Holland's theory into practice. The SDS is a unique interest measure when compare to other interest measures. There are several aspects that make it

unique, one of which is that it can be retained by the kept by the end-user, and can be utilised continuously as a career development resource (Rayman & Atanasoff, 1999). The SDS can be used as an individual- or a group career-development tool. It works as a career development tool by providing the individuals with self-understanding, career alternatives that can be considered, and with satisfaction with their current career aspirations and knowledge of their typology (Rayman & Atanasoff, 1999). By following Holland's taxonomies, the organisation, counsellor, or practitioner can with ease easily combine career information into education, training, and development programmes.

Studies by Holland (1997), Barrick, Mount, and Judge (2001), and Beddie, Lorey, and Pamphilon (2005) have reported on how inextricably personality and interest are linked, but that they are not mutually exclusive. One can therefore deduce that personality forms an important part of career development.

2.6 CONCLUSION

Little research has been done on combining all three tests under discussion (OPQ, 15FQ+, and SDS). There are, however, numerous studies on the tests individually and their interrelation, as well as their usefulness with regard to career guidance, selection, and development. As seen from the research mentioned above, personality is important in the workplace, and personality testing is becoming the norm in selection processes. Holland's theory and the Big Five/FFM have had a great impact on the discovery of the interrelationship between interests and personality. From the studies conducted by Barrick et al. (2003), Moutafi et al. (2005), and Bartram (2013), there is evidence that there are dimensions of the 15FQ+ and the OPQ that are similar to those of the Big Five theory.

It can be seen from the literature that there is clearly a link between personality and interests. There are some strong overlaps between Holland's RIASEC interest types and the Five Factor Model. However, some dimensions of interests and personality are not linked at all (Larson et al., 2002). On a practical application level, this will have implication for practitioners, as this means that different Holland interest codes

will have different personality implications (Watson Foxcroft & Allen, 2007). For example, an individual with a clear *Enterprising* interest code may tend to be extroverted, and an individual who is a clear *Artistic* type is more likely to be open to new experiences.

Gaining a better understanding of the interrelationship between the OPQ, 15FQ+, and SDS will help practitioners in deciding which instruments are better suited to the purpose of their assessment. Understanding the interrelationship between personality dimensions and interest types can assist researchers and practitioners with the practical implications of the application of test batteries with regards to their choice of test batteries.

CHAPTER 3: RESEARCH AND DESIGN METHODS

3.1 INTRODUCTION

The purpose of this chapter is to explain the method of investigation of the present study. The purpose of this study was to investigate the interrelation between the OPQ, the 15FQ+, and the SDS. If there is no or a limited interrelationship, both divergent and convergent validity add value in understanding measured constructs. In terms of theory, it will improve the construct validity, and assist with valid decision-making when deciding on which test batteries to use. This study contributes to a better understanding of the constructs of these three tests, which will enable practitioners to select the correct instruments for a specific purpose, for instance, career guidance and selection. It will also assist practitioners when they have to give feedback to clients.

An exploratory method was used, as is the present study was the orderly investigation of the interrelation among two or more variables. The purpose of an exploratory method is to (Creswell, 2009):

- define relationships;
- predict the effects of one variable on another; and
- examine connects that are supported by theory.

3.2 DESCRIPTION OF INQUIRY STRATEGY AND BROAD RESEARCH DESIGN

A quantitative strategy of inquiry was used in this study, the choice of which was supported by previous studies that have also used quantitative approaches to study the interrelation between personality and interests (Barrick, Mount, & Judge, 2001; Costa, McCrae, & Holland, 1984; Gottfredson, Jones, & Holland, 1993; Kiani, 2010; Mount, Barrick, Scullen, & Rounds, 2005; and Staggs, Larson, & Borgen, 2007). Quantitative studies are performed when we wish to ascertain whether a relationship exists between variables, and the objective is to test or verify a theory, rather than developing one (Creswell, 2009).

Quantitative research is a method by which theories can be tested objectively by investigating the interrelationship among variables. Theories are tested deductively, methods are built in to prevent bias and to control alternative explanations (McEvoy & Richards, 2006). This strategy of enquiry ensures the generalisability and replication of findings (Creswell, 2009). Examples include experimental designs, when it needs to be determined if a specific treatment influences an outcome, and non-experimental designs, such as surveys. Quantitative research makes use of statistical information to analyse, process, and summarise findings, whereas qualitative research examines and comprehends the meaning persons or groups assign to a social or human problem, and data is collected inductively (Creswell, 2009).

Non-experimental research is a quantitative research approach, and there are different types. The type of non-experimental design that was used in the present study is correlational. Correlational research tests for statistical relationships between variables. In exploring the interrelationship between the OPQ, the SDS, and the 15FQ+, correlational analysis provided the results needed to interpret the relationship.

3.3 SAMPLING

A sample is a subgroup of the population for which information is calculated. The sample was composed of honours Human Recourses students and the candidates whom they were required to assess as part of their curriculum. The total number in the sample was 632. The results from the OPQ, the 15FQ+, and the SDS of the students and their candidates were used. The mean age of the sample was 27.16 years. The data from the tests were kept in an archive at the University of Pretoria.

The sampling method that was used was convenience sampling. Convenience sampling is a non-probability procedure where subjects are chosen for their convenient accessibility and immediacy to the researcher. This method was used because the data was archived at the university, and was easily accessible and already available for use in this study.

Descriptive statistics was done on each scale, to see how the data were distributed on each scale in terms of the standard deviation, the mean, skewness, and kurtosis. The biographical data were analysed to get a better picture of the sample.

The process of recording and storing the data included various steps. The biographical data — the candidate's name and surname, gender, age, ethnicity, highest level of education, and occupation — were recorded on an Excel spread sheet, which was saved on an external hard drive, with backups on a server.

3.4 DATA COLLECTION

Secondary data that had been collected by the psychometrics lecturer were used in this study. The data consisted of honours-year students' assignments, in which students and their candidates had to fill out several standardised psychometric tests as part of their course work. This assignment is conducted every year for the Human Resources honours students, and, as such, the data were collected from assignments from 2005 until 2012. For the purposes of the present study, only the results of their OPQ, 15FQ+, and SDS questionnaires were used.

3.4.1 The Occupational Personality Questionnaire (OPQ)

3.4.1.1 Background

The OPQ was developed in the UK by Saville, Holdsworth, Nyfield, Cramp and Mabey (Matthews & Stanton, 1994). It is a factor-analytic-based, self-report questionnaire (Swinburne, 1985). The OPQ is mainly used for selection and counselling in jobs at a professional and managerial level, where personality factors are often important variables in success (Swinburne, 1985). The OPQ comprises 30 substantiative scales, plus a social desirability scale.

Table 5

The OPQ32 Dimensions

Relationships with people			
Rarely pressures others to change their views, dislikes selling, less comfortable using negotiation.	Persuasive	Enjoys selling, comfortable using negotiation, likes to change other people's views.	Influence
Happy to let others take charge, dislikes telling people what to do, unlikely to take the lead.	Controlling	Likes to be in charge, takes the lead, tells others what to do, takes control.	
Holds back from criticising others, may not express own views, unprepared to put forward their own views.	Outspoken	Freely express opinions, makes disagreement clear, prepared to criticise others.	
Accepts majority decision, prepared to follow the consensus.	Independent-minded	Prefers to follow own approach, prepared to disregard majority decisions.	
Quiet and reserved in groups, dislikes being centre of attention.	Outgoing	Lively and animated in groups, talkative, enjoys attention.	
Comfortable spending time away from people, values time spent alone, seldom misses the company of others.	Affiliative	Enjoys others' company, likes to be around people, can miss the company of others.	
Feels more comfortable in less formal situations, can feel awkward when first meeting people.	Socially confident	Feels comfortable when first meeting people, at ease in formal situations.	
Makes strengths and achievements known, talks about personal success.	Modest	Dislikes discussing achievements, keeps quiet about personal success.	Empathy
Prepared to make decisions without consultation, prefers to make decisions alone.	Democratic	Consults widely, involves others in decision-making, less likely to make decisions alone.	
Selective with sympathy and support, remains detached from	Caring	Sympathetic and considerate towards others, helpful and	

others' personal problems.		supportive, gets involved in others' problems.	
Thinking style			
Prefers dealing with opinions and feelings rather than facts and figures, likely to avoid using statistics.	Data rational	Likes working with numbers, enjoys analysing statistical information, bases decisions on facts and figures.	Analysis
Does not focus on potential limitations, dislikes critically analysing information, looks for errors or mistakes.	Evaluative	Critically evaluates information, looks for potential limitations, focuses on errors.	
Does not question the reasons for people's behaviour, tends not to analyse people.	Behavioural	Tries to understand motives and behaviour, enjoys analysing people.	
Favours changes to work methods, prefers new approaches, less conventional.	Conventional	Prefers well-established methods, favours a more conventional approach.	Creativity and change
Prefers to deal with practical rather than theoretical issues, dislikes dealing with abstract concepts.	Conceptual	Interested in theories, enjoys discussing abstract concepts.	
More likely to build on than generate ideas, less inclined to be creative and inventive.	Innovative	Generates new ideas, enjoys being creative, thinks of original solutions.	
Prefers consistent routine, is prepared to do repetitive work, does not seek variety.	Variety-seeking	Prefers variety, tries out new things, likes changes to regular routine, can become bored by repetitive work.	
Behaves consistently across situations, unlikely to behave differently with different people.	Adaptable	Changes behaviour to suit the situation, adapts approach to different people.	
More likely to focus on immediate than long-term issues, less likely to take a strategic perspective.	Forward-thinking	Takes a long-term view, sets goals for the future, more likely to take a strategic perspective.	Structure

Unlikely to become preoccupied with detail, less organised and systematic, dislikes tasks involving detail.	Detail-conscious	Focuses on detail, likes to be methodical, organised and systematic, may become preoccupied with detail.	
Sees deadlines as flexible, prepared to leave some tasks unfinished.	Conscientious	Focuses on getting things finished, persists until the job is done.	
Not restricted by rules and procedures, prepared to break rules, tends to dislike bureaucracy.	Rule-following	Follows rules and regulations, prefers clear guidelines, finds it difficult to break rules.	
Feelings and emotions			
Tends to feel tense, finds it hard to relax.	Relaxed	Finds it easy to relax, rarely feels tense.	Emotions
Feels calm before important occasions, less affected by key events, free from worry.	Worrying	Feels nervous before important occasions, worries about things going wrong.	
Sensitive, easily hurt by criticism, upset by unfair comments or insults.	Tough-minded	Not easily offended, can ignore insults, may be insensitive to personal criticism.	
Concerned about the future, expects things to go wrong, focuses on negative aspects of a situation.	Optimistic	Expects things to turn out well, looks for the positive aspects of a situation, has an optimistic view of the future.	
Wary of others' intentions, finds it difficult to trust others, unlikely to be fooled by people.	Trusting	Trusts people, sees others as reliable and honest, believes what others say.	
Openly expresses feelings, finds it difficult to conceal how they feel, displays emotion clearly.	Emotionally controlled	Can conceal feelings from others, rarely displays emotion.	
Likes to take things at a steady pace, dislikes excessive work demands.	Vigorous	Thrives on activity, likes to be busy, enjoys having a lot to do.	Dynamis

Dislikes competing with others, feels that taking part is more important than winning.	Competitive	Has a need to win, enjoys competitive activities, dislikes losing.	
Sees career progression as less important, looks for achievable rather than highly ambitious targets.	Achieving	Ambitious and career-centred, likes to work towards demanding goals and targets.	
Tends to be cautious when making decisions, likes to take time to reach conclusions.	Decisive	Makes decisions fast, reaches conclusions quickly, less cautious.	
Is more self-critical in responses, is less concerned with making a good impression.	Social desirability	Is less self-critical in responses, is more concerned with making a good impression.	

Source: OPQ Technical Manual (2006, p. 4-68)

Two versions of the OPQ32 were administered to the present study's sample. A total of 75% the data was gathered from the OPQ32n, and a small proportion (25%) on the OPQ32r. It should be noted that the different versions essentially measure the same constructs. The normative version of the OPQ is the OPQ32n. The test consists of 230 items, and is rated on a five-point scale. Normative scales are viewed as the most favourable by traditional research, and are used extensively in personality testing (Brown & Bartram, 2009). The difference between the OPQ32i and the OPQ32n is how the items are shown. The OPQ32i comprises of 104 blocks of four statements that measures different traits and the respondent has to choose two options out of the four statements by selecting which statement they consider is "most like me" and which statement is "least like me" (Brown & Bartram, 2009). The OPQ32r is the latest version of the test. It is similar to the OPQ32i, in that it keeps the forced-choice composition, but has three instead of four items in each of the 104 sets of questions. The OPQ32i, OPQ32n, and OPQ32r all measure 32 facets of personality. As demonstrated in the OPQ32 technical manual, the Big Five factors of personality are all found in the normative version of the OPQ32 (Brown & Bartram, 2009); however, the OPQ measures wider personality domains than the FFM.

3.4.1.2 Reliability

The internal consistency reliability for the OPQ32n ranged from 0.65 to 0.87, with a median of 0.79 for the general population group. This indicates a high level of reliability (SHL Group Ltd, 2006).

The test-retest reliability of the OPQ32n ranged from 0.64 to 0.91, with a median of 0.79, which indicates that the scores remain stable over a period of time.

The internal consistency reliability of the OPQ32r ranged from 0.81 to 0.90, with a median of 0.84 for the general population group. This indicates a high level of reliability (SHL Group Ltd, 2009).

3.4.1.3 Validity

Numerous other test where compared to the OPQ to determine whether the OPQ measures what it was intended to measure. Two of these tests are the Big Five type indicator and the 15FQ+. These findings are presented in Tables 6 and 7.

Table 6

Correlation between the OPQ and 15FQ+

15FQ+ Scale	**Multiple correlation**	**OPQ Scales and the direction of the relationship**
ƒA Empathetic	0.69	Behavioural, rule-following, adaptable, vigorous, Low modest
ß Intelligence	0.69	Low conventional, low independent-minded, Low democratic, competitive, conceptual, behavioural, trusting
ƒC Emotionally stable	0.65	Data rational, low worrying, optimistic, emotionally controlled, relaxed
ƒE Dominant	0.82	Persuasive, outspoken, forward-thinking
ƒF Enthusiastic	0.78	Outgoing, socially confident, competitive
ƒG Conscientious	0.64	Detail conscious, low variety-seeking, modest,

		low emotionally controlled, low tough-minded
ƒH Socially bold	0.85	Low conventional, low variety seeking, low affiliative
ƒI Tender-minded	0.59	Worrying, low emotionally controlled, low innovative, behavioural
ƒL Suspicious	0.71	Low trusting, low conscientious, low relaxed, low controlling, low emotionally controlled, low socially confident
ƒM Abstract	0.65	Low conventional, conceptual, adaptable
ƒN Restrained	0.64	Low outspoken, rule-following, data rational, affiliative, conscientious
ƒO Self-doubting	0.67	Worrying, conceptual
ƒQ1 Radical	0.74	Low conventional, persuasive, low rule-following, outspoken
ƒQ2 Self-sufficient	0.74	Low affiliative, worrying, independent-minded, caring, relaxed, evaluative
ƒQ3 Self-disciplined	0.51	Rule following, low variety-seeking
ƒQ4 Tense driven	0.66	Evaluative, modest, low data rational, detail conscious

Source: 15 FQ+ Technical Manual (2002)

Table 7

Correlation between the OPQ32n and the Five Factor Model

Big Five factors	**Correlation**	**OPQ32 scales**
Extraversion	0.95	Outgoing
		Socially confident
		Affiliative
		Emotionally controlled (reversed)
		Persuasive
		Controlling
Agreeableness	0.95	Caring
		Democratic
		Independent-minded (reversed)

		Trusting
		Competitive (reversed)
Conscientious	0.98	Conscientious
		Detail conscious
		Vigorous
		Forward thinking
		Achieving
Emotional stability	0.98	Worrying (reversed)
		Relaxed
		Tough-minded
		Socially confident
		Optimistic
Openness to experience	0.97	Innovative
		Conventional (reversed)
		Conceptual
		Variety-seeking
		Behavioural

Source: Da Silva (2010)

3.4.2 The Fifteen Factor Questionnaire Plus (15FQ+)

3.4.2.1 Background

The 15FQ+ was developed as a substitute to the 16PF, and is used to measure the personality dimensions developed by Cattell and his colleagues. The latest version, developed by Psychtech, includes the additional measure of the Intelligence Scale ß (intelligence) (15FQ+ Technical Manual, 2002). The measure was initially excluded for theoretical and practical reasons. It is an untimed questionnaire that measures 15 bipolar personality dimensions. The dimensions in the 15FQ+ are presented in Table 8 as below.

Table 8

15FQ+ Factor Description

Description	
Distant aloof: Lacking empathy, distant, detached, impersonal	**Empathic:** Friendly, personable, participating, warm-hearted, caring
Low intelligence: Lacking confidence in own intellectual abilities	**High intelligence:** Confident of own intellectual abilities
Affected by feelings: Emotional, changeable, moody	**Emotionally stable:** Mature, calm, phlegmatic
Accommodating: Passive, mild, humble, deferential	**Dominant:** Assertive, competitive, aggressive, forceful
Sober serious: Restrained, taciturn, cautious	**Enthusiastic:** Lively, cheerful, happy-go-lucky, carefree
Expedient: Spontaneous, disregarding of rules and obligations	**Conscientious:** Persevering, dutiful, detail-conscious
Retiring: Timid, socially anxious, hesitant in social settings, shy	**Socially bold:** Venturesome, talkative, socially confident
Hard-headed: Utilitarian, unsentimental, lacks aesthetic sensitivity, tough-minded	**Tender-minded:** Sensitive, aesthetically aware, sentimental
Trusting: Accepting, unsuspecting, credulous	**Suspicious:** Sceptical, cynical, doubting, critical
Concrete: Solution-focused, realistic, practical, down-to-earth	**Abstract:** Imaginative, absent-minded, impractical, absorbed in thought
Direct: Genuine, artless, open, direct, straightforward	**Restrained:** Diplomatic, socially astute, shrewd, socially aware, restrained
Confident: Secure, self-assured, unworried, guilt-free	**Self-doubting:** Worrying, insecure, apprehensive
Conventional:	**Radical:**

Traditional, conservative, conforming	Experimenting, open to change, unconventional
Group-orientated: Sociable, group-dependent, a 'joiner'	**Self-sufficient:** Solitary, self-reliant, individualistic
Informal: Informal, uncontrolled, lax, follows own urges	**Self-disciplined:** Compulsive, fastidious, exacting willpower
Composed: Relaxed, placid, patient	**Tense-driven:** Impatient, low frustration tolerance
Extraversion: Need for social contact, orientated towards the outer world	**Introversion:** Social interaction is not needed, orientated towards the inner world
Low anxiety: Calm, resilient, and able to cope with demanding emotional behaviours	**High anxiety:** Sensitive, touchy, challenged by emotionally demanding situations
Pragmatism: Not open to new ideas, prefer hard facts	**Openness to experience:** Influenced by many ideas, open to possibility
Independence: Independent minded, strong willed	**Agreeableness:** Agreeable and tolerant
Low Self-Control: Low levels of restrain and self-control	**High Self-Control:** High levels of self-control

Source: 15FQ+ Technical Manual (2002)

3.4.2.2 Reliability

From the 15FQ+ manual, we can see the reliability of the test. All dimensions had reliability coefficients above 0.64, which is favourable in comparison to those of the 16PF.

The Cronbach alpha reliabilities for this questionnaire varied from 0.60 to 0.85. Test-retest reliabilities varied from 0.60 to 0.85. Therefore, it can be concluded that findings from this test are true, and could be used in the interpretation of results (Meiring et al., 2006; 15FQ+ Technical Manual, 2002).

3.4.2.3 Validity

Validity of a test refers to whether the test measures what it was intended to measure. The validity of the 15FQ+ was obtained by comparing it to similar tests, and it was found that the dimensions of the 15FQ+ were consistent with comparable scales of other tests (15FQ+ Technical Manual, 2002).

3.4.3 The Self-directed Search (SDS) Questionnaire

3.4.3.1 Background

Holland originally developed the Self-directed Search Questionnaire in order to fit the structure of his theory on career choice to a questionnaire, with the added purpose of making it useable in career guidance practice (Gevers et al., 1995). The first edition of the SDS appeared in 1970, and has since been revised a number of times. The SDS is recognised as one of the most efficient and successful vocational interest questionnaires. The aim of the SDS is to measure occupational interest, and it supports a correlation between personality and career information (for example the individuals preferred work environment and work activities) (Gevers et al., 1995). Individuals can be classified into one of six types: (1) Realistic (R), (2) Investigative (I), (3) Artistic (A), (4) Social (S), (5) Enterprising (E), or Conventional (C). "The internal structure of a personality type as well as the relationship between personality types and environment types can be represented by a hexagonal model" (Gevers et al., 1995). Refer to Figure 1 for Holland's hexagonal model of interest.

Table 9

SDS Scores (first five examples)

Realistic occupations	
People who work in a *Realistic* environment: • like to work with tools, objects, machines, or animals; • develop manual, mechanical, agricultural, and electrical skills; • prefer jobs in which they can build or repair things; and • Are usually down-to-earth people.	
Code	Occupation
RAC	Lithographer
RAE	Jeweller
	Signwriter
	Woodcarver
RCA	Diamond sawer
RCE	Artificial resin worker
	Billet provider
	Locksmith
RCS	Piano tuner
The other possible codes for the *Realistic* type are: RES, REC, RIA, RIC, RIE, RCI, RCS, and RSE.	
Investigative occupations	
People who work in an *Investigative* environment: • like activities that lead to learning more about the biological and physical sciences; • develop very good abilities in mathematics and science; • prefer jobs in scientific and medical fields; and • are described as curious, studious, and independent.	
Code	Occupation
ICA	Mathematician
	Statistician
ICE	Actuary
	Market researcher
IEC	Economist

	Public prosecutor
IES	Advocate
	Magistrate
IRA	Cartographer

The other possible codes for the *Investigative* type are:

IRC, IRE, IRS, ISA, ISC, ISE, and ISR.

Artistic occupations

People who work in an *Artistic* environment:

- like to feel free from scheduled routine, so that time can be used for creative activities;
- develop skills in language, art, music, drama, and writing;
- prefer jobs in which they can use their talent for creative activity; and
- are imaginative and appreciate beauty.

Code	Occupation
ACS	Editor
	Translator
AEC	Copywriter
AER	Floral arranger
AES	Actor/Actress
	Animator
	Fashion designer
AIR	Architect
	Landscape architect

The other possible codes for the *Artistic* type are:

ARE, ARS, ASE, and ASR

Social occupations

People who work in a *Social* environment:

- like activities involving informing, training, teaching, understanding, and helping others;
- develop an ability to work with people;
- prefer jobs such as teaching, nursing, and counselling; and
- like to be thought of as helpful and friendly.

Code	Occupation
SAE	Interpreter
	Music teacher
SCE	Pest control
SEC	Bartender
	Librarian
	Training officer
SEI	Beauty therapist
	Speech therapist and audiologist
SER	Cabinet attendant
	Detective
	Traffic officer
The other possible codes for the *Social* type are: SIE, SIR, SRE, and SRI.	
Enterprising occupations	
People who work in an *Enterprising* environment: • like activities that permit leading or influencing people; • develop leadership ability and other important skills relating to people; • prefer jobs such as salesperson or manger; and • are ambitious, outgoing, energetic, and self-confident.	
Code	Occupation
EAS	Fashion model
ECS	Salesman
	Travel agent
EIS	Attorney
ERI	Building contractor
ESC	Company secretary
	Marketing manager
	Sales manager
The other possible codes for the Enterprising type are: ESI and ESR.	

Conventional occupations	
People who work in a *Conventional* environment: • like activities that permit organisation of information; • develop office and arithmetical skills; • prefer jobs like preparing records, typing letters, and operating computers; and • like to be thought of as responsible and dependable.	
Code	Occupation
CEI	Chartered accountant
	Internal auditor
CER	Data typist
	Valuer/Appraiser
CES	Bank official
	Clerk
CRE	Bookkeeper
	Meter reader
	Calculating machine operator
CRS	Computer operator
The other possible codes for the *Conventional* type are: CSE, CSI, and CSR.	

Source: Manual for the Self-Directed Search Questionnaire (SDS), Gevers et al. (1995)

3.4.3.2 Reliability and validity

The cross-cultural validity of Holland's hexagonal structure of career interest (Leung & Hou, 2001) has mainly been the focus of validity studies on the. Over the years, more attention has been given to the construct validity of the SDS than the predictive and concurrent validity of the SDS (Leung & Hou, 2001). It should be noted, however, that the empirical data on the concurrent and concurrent validity of the SDS reported by Holland, Fritzsche, and Powell (1994) were collected exclusively from the United States samples. The findings of Holland et al. on predictive validity ranged from 0.36 to 0.61 for men, and from 0.56 to 0.79 for women. Their findings

for concurrent validity for men ranged from 0.48 to 0.62, and from 0.48 to 0.76 for women (Holland et al., 1994). The internal consistency coefficients ranging from 0.90 to 0.94 indicates substantial reliability for the summary scales on the SDS, and test-retest reliability coefficients ranged from 0.76 to 0.89 (Holland et al., 1994, cited in Dozier, Sampson, & Reardon, 2013). Overall, support exists for both the reliability and validity of the SDS. (Dozier, Sampson, & Reardon, 2013).

3.4.3.3 Consistency and congruence

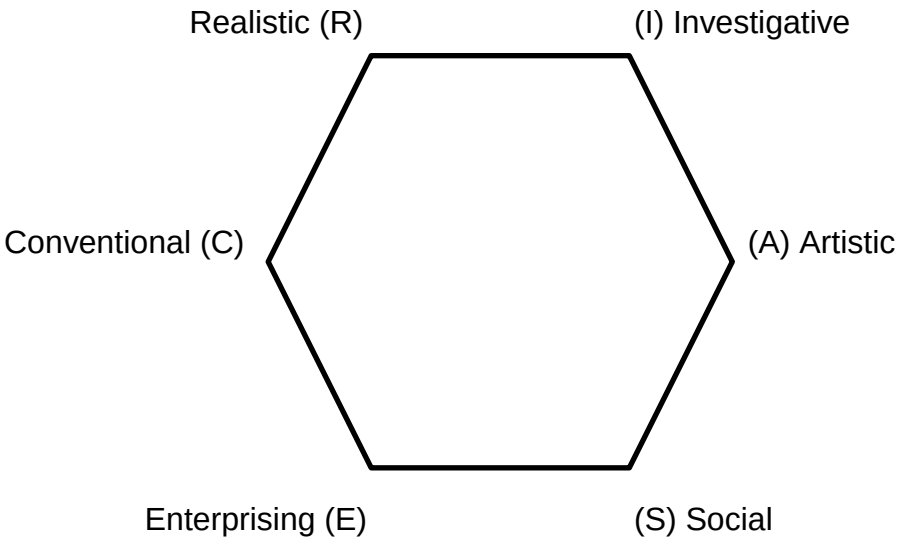

Figure 1. Holland's Hexagonal Model of Interest. From Manual for the Self-Directed Search Questionnaire (SDS), Gevers et al., (1995).

Figure 1 is a spatial representation of the concepts of consistency and congruence. Consistency is defined as the degree to which an occupational profile is internally consistent. According to Gevers et al., (1995, p. 11) "The consistency of a profile decreases in proportion to the distance between the two fields on the hexagon with the highest scores. "A high degree of consistency is an indication that an individual's interest, skills and work values relate well to one another" (Gevers et al., 1995).

As seen in Figure 1, the following are adjoining types, non-adjoining types, and opposite types:

- Adjoining types — RI, RC, IR, IA, AI, AS, SA, SE, EC, ES, CE, and CR — have the greatest consistency, as the distances between them are the shortest.
- Non-adjoining types are separated by a third type (RA, RE, IS, IS, AE, AR, SC, SI, ER, EA, CI, CS), and have less in common, because of the longer distance between them.
- Opposite types — RS, IE, AC, SR, EI, and CA — have virtually nothing in common, as they are on opposite sides, and the distances between them are very large.

In the context of the SDS, the congruence indicates the degree of comparability between a personality trait and a vocational environment (Gevers et al., 1995). According to Holland (1994), there are various degrees of congruence. For instance, the highest degree of congruence is when a personality type, for example, *Enterprising*, practises his/her profession in the same environment type (also *Enterprising*); however, if a personality type (for example, *Investigative*) works in an opposite environment (for instance, *Enterprising*), there is no congruence.

3.4.3.4 Differentiation

Differentiation is the degree to which the three highest scores of an individual's interest profile and an occupation's profile of environmental type are spread apart, for instance how much the scores differ from each other. If all the scores for each of the six types are very close, the profile is seen as a poorly differentiated profile.

3.5 STATISTICAL ANALYSIS

During research, statistical analysis consists of different steps. A description is given of the population representing the data that were collected. In the present study, the data were simplified and organised into various categories by means of descriptive statistics (Graziano & Raulin, 2000).

There are various ways of using descriptive statistics. In the current study, it was used to provide the reader with summary statistics (van der Merwe, 2005). The purpose of providing summary statistics is so that the data can be described with one or two numbers, which makes comparisons easier, and provides a basis for later analysis (Graziano & Raulin, 2000).

In order to explore the relationship between the OPQ, the SDS, and the 15FQ+, further statistical analysis was needed. The research thus took on a correlational form. "Correlational research allows the researcher to determine simultaneously the degree and direction of a relationship with a single statistic" (van der Merwe, 2005).

Correlation is a function of covariation (the degree to which a variable differs directly from or indirectly from another variable), and measures the extent of the relationship among variables, and the relationship's strength is determined by a correlation statistic, for example, Pearson correlation r (how close the correlation coefficient is to +1 or -1). The aim of correlational research is to ascertain whether there is a relationship between two variables, and to determine if the direction is positive or negative.

There are different types of correlational analysis, and it was decided, for the purpose of this study, to conduct a canonical correlation analysis. To make sense of cross-covariance matrices; canonical correlation analysis is used. Canonical correlation analysis is used to make sense of cross-covariance matrices (Sherry & Henson, 2005). If there are correlations are detected among the variables, canonical correlation analysis is used to find the linear combinations that have the utmost number of correlations with each other (Degani, Shafto, & Olson, 2006). The SAS (Statistical Analysis System) statistical program was used for the canonical correlation.

Secondary data were used and converted to the correct format, in order to be able to describe the sample. Firstly, the data were checked for any errors. Field (2005) explained an *outlier* as an observation that differs from the rest of the data. These outliers have the ability to affect the mean score of the data, and will result in biased data.

Canonical correlation was used to identify correlations between all the variables with each other, in order to determine the interrelationships between the dimensions of the OPQ and the SDS, and between the 15FQ+ and the SDS.

3.5.1 Descriptive statistics

Descriptive statistics is the combination of all the statistical methods used to describe the sample, and enhances understanding of the data (Maree, 2010). In the current study, the descriptive statistics used to describe the data included measures of variability, skewness, and kurtosis. Furthermore, descriptive statistics explains how well an item corresponds to the content of a scale (Taylor, 2009). Item means and standard deviations convey important information. The mean indicates the participants' general selection tendency for an item, while the standard deviation points towards the average deviation of responses from the mean of the item (Taylor, 2009).

According to Pallant (2007), descriptive statistics likewise provides information on how scores are distributed on continuous variables, which is known as *skewness* and *kurtosis*. The symmetric distribution of the population is provided by the skewness variable. The peakedness of the distribution is provided by kurtosis. The values of skewness and kurtosis would be zero in a perfectly normal distribution. Skewed distributions are either positively (high scores) or negatively skewed (low scores). Kurtotic distributions describe the way in which scores are widely dispersed or gathered together. For skewness and kurtosis to be considered an approximate normal distribution, the values should be between –1.50 to +1.50 (Muthén & Kaplan, 1985).

3.5.1.1 Measures of variability

Measures of variability focus on how far the scores in a distribution are spread apart, which is in contrast with central tendency, which is concerned with how the scores in a distribution are grouped together. For the purposes of the present study, the standard deviation was the only measure of variability used. Standard deviation

indicates how much variation from the average exists. It offers information concerning the distance between the results and the mean (Kriel, 2001). When the data points are close to the mean, it is indicative of a low standard deviation.

3.5.2 Inferential statistics

Inferential statistics is used to obtain inferences about the general population from which the sample was taken (Maree, 2007).

The objective of construct validation is to ascertain whether test scores provide a reliable measure of a particular construct (Murphy & Davidshofer, 2001). Construct validation can therefore be described as a process through which evidence of inferring a measures meaning is obtained. According to McBurney (1994), construct validity takes on the form of relevant empirical data that support the inference, where a response consistently has a particular meaning. It must be kept in mind when using construct validity that it is for measures with multiple indicators. According to Cascio (1998), the process of construct validation begins with the formulation of hypotheses about the characteristics of those indicators with a high score on a particular measurement procedure, in contrast to those with low scores.

For the purpose of the present study, correlation coefficients were determined.

3.5.2.1 Correlation coefficient

Correlations are used to determine the linear relationship that exists between variables. Once the correlations have been identified, the strength, direction, and size should be determined. Correlations that are identified as statistically significant are the only correlations that are further discussed. Field (2005) stated that results are statistically significant if they can be generalised to the sample, and are significant. If the correlations are not statistically significant, further investigation is required, as these correlations could be due to chance.

Two levels of statistical significance were used in the present study:

- $p<0.05$ (one-tailed test); and
- $p<0.01$ (one-tailed test).

To determine the strength of the relationship between variables, Cohen's criteria for correlation effect sizes were used (Cohen, 1988):

- $r=0.01$: small (weak relationship);
- $r=0.30$: medium (moderate relationship); and
- $r=0.50$: large (strong relationship).

According to Blinkhorn and Johnson (1990), correlation coefficients that are within the moderate relationship category (0.30) and higher can be considered practically significant, and should be taken seriously.

3.5.3 Canonical correlation

One of the methods of statistical analysis used for this study was canonical correlation. This type of correlation is a multivariate statistical model that enables the study of linear relationships amongst two sets of variables.

> "Canonical correlation analysis is a multivariate statistical model that facilitates the study of interrelationships among sets of multiple dependent variables and multiple independent variables. Whereas multiple regression predicts a single dependent variable from a set of multiple independent variables, canonical correlation simultaneously predicts multiple dependent variables from multiple independent variables" (Hair et al., 1998; Hardoon et al., 2003).

The canonical correlations were done as follows:

- the six dimension of the SDS and 30 dimensions of the OPQ; and
- the six dimensions of the SDS and the 16 dimensions of the 15FQ+.

It is important to note that there are pitfalls in canonical correlation. One of the biggest limitations is interpretability. The procedure of canonical correlation is used because it maximises correlation, but it does not maximise the interpretation of the variates (Tabachnick & Fidell, 2001).

When deciding on which functions to interpret, the "practical significance of the canonical functions, represented by the size of the canonical" (Hair et al., 1998, p. 200) correlation, should be considered (Hair et al., 1998). According to Hair et al. (1998), there are no commonly accepted guidelines for determining a suitable size for canonical correlations. Instead it is usually determined by the contribution of the findings to be able to better understand the research inquiry being studied (Hair et al., 1998).

Canonical correlation is a good method for analysing the irrelationship between different psychological tests. The reason why this type of analysis was used in the present study is because canonical correlation analysis enables one to see the factors that relate to each other, and provides insight into which dimensions are common between the two tests. Additionally, we were able to determine the amount of shared variance between the OPQ and the SDS, and between the 15FQ+ and the SDS.

Canonical correlation analysis is a method for exploring the relationships between two multivariate sets of variables, all measured for the same individual. A multivariate technique is multiple regression analysis, which can predict the value of a solitary dependant variable, whereas canonical correlation assists the study of relationships between sets of manifold dependent variables and manifold independent variables simultaneously (Hair, Anderson, Tatham, & Black, 1998). Since the present study was aimed at exploring the interrelationship between several independent and dependent variables, canonical correlation was an appropriate method.

3.6 RESEARCH ETHICS

3.6.1 Ethical issues regarding the problem statement

When formulating the problem, the researchers must ensure that they do not marginalise or disempower the study participants. In order to avoid this ethical dilemma, the researcher can conduct a pre-test to establish a relationship of trust with the participants, so that any marginalisation can be discovered before the study starts (Creswell, 2009). In the present study, none of the participants were marginalised or disempowered, as secondary data were used, and all candidates completed the questionnaire between 2005 and 2012, and the results of this historical data were used and analysed.

3.6.2 Ethical issues in data collecting

Important things to consider when collecting data:

- Participants must not be put at risk.
- Legislation needs to be taken into consideration.
- The researcher must take care when assessing individuals who are underage or mentally handicapped, as well as pregnant women.
- A consent form with specific elements must be developed.

The present study was conducted at an institution of higher education, in the Department of Human Resource Management, and permission was given to use the existing data for the purposes of this study. All participants' details were kept private, and the information collected was accurate and without bias.

3.6.3 Ethical issues in data analysis and interpretation

When interpreting data, one must consider the protection of the anonymity of the participants; data should be kept safely, and discarded after a period of time, so that the information remains confidential (Bell & Bryman, 2007). When the data are interpreted, the researcher must ensure that such interpretation is accurate, and, in

the case of quantitative research, the researcher may have to have a debriefing session with the participants (Creswell, 2009). In the present study, the data were kept in a locked-up storage facility, and the identities of all participants were kept private. When the data were analysed, it was done in an honest, objective, and fair manner.

3.7 CONCLUSION

Chapter 3 highlighted the research design as it related to the research approach. The method of inquiry and broad research design, as well as the sample and data-collection method, were discussed. Each instrument that was used in the study was discussed, as well as the instrument's reliability and validity. The statistical analysis method was explained as it pertained to both the inferential and descriptive statistics. The ethics, and quality of the study were also discussed. In Chapter 4, the findings of the data analysis will be discussed.

CHAPTER 4: RESULTS

4.1 INTRODUCTION

This chapter presents the statistical findings obtained from the canonical correlation between the SDS, the OPQ, and the 15FQ+. The psychometric tests were administered to a sample (*N=632*) of Human Resources honours students and their candidates. SAS was used to analyse the data. This chapter will highlight the results obtained from the sample. First, the data were analysed in terms of descriptive statistics, which is discussed, where after the results and findings of the statistically significant correlations are presented.

4.2 DESCRIPTIVE STATISTICS

Descriptive statistics is the combination of all the statistical methods used to describe the sample, and enhances understanding of the data (Maree, 2010). The descriptive statistics that were looked at in this study are the biographical data, gender, race/ethnicity, age, level of schooling/highest education or qualification, and occupation. These are presented in the figures below:

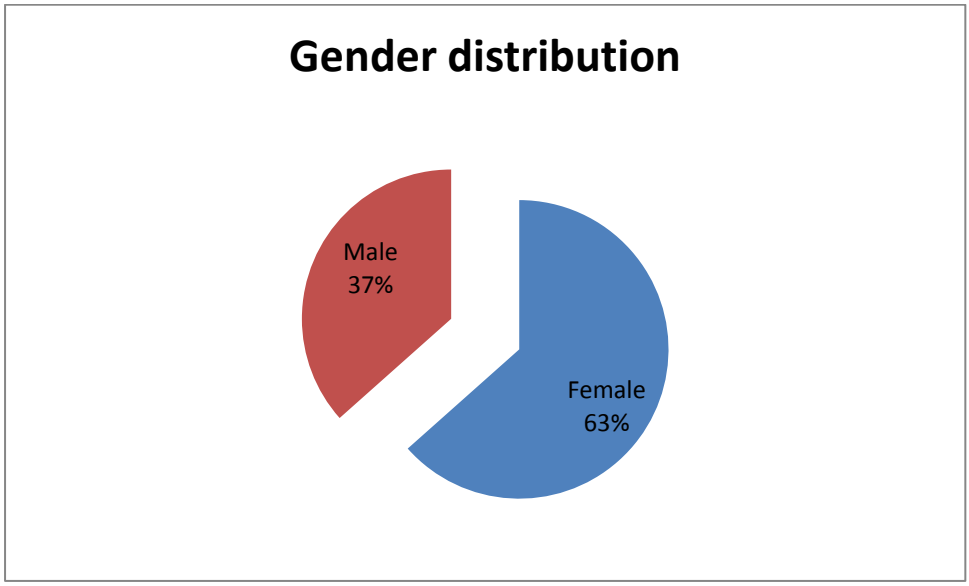

Figure 2. **Gender distribution of sample (N=632).**

Figure 2 illustrates the gender distribution of the sample. The sample consisted of 629 individuals, comprising of 37% men (*n=230*) and 63% women (*n=399*). Three of the individuals in the sample did not indicate their gender.

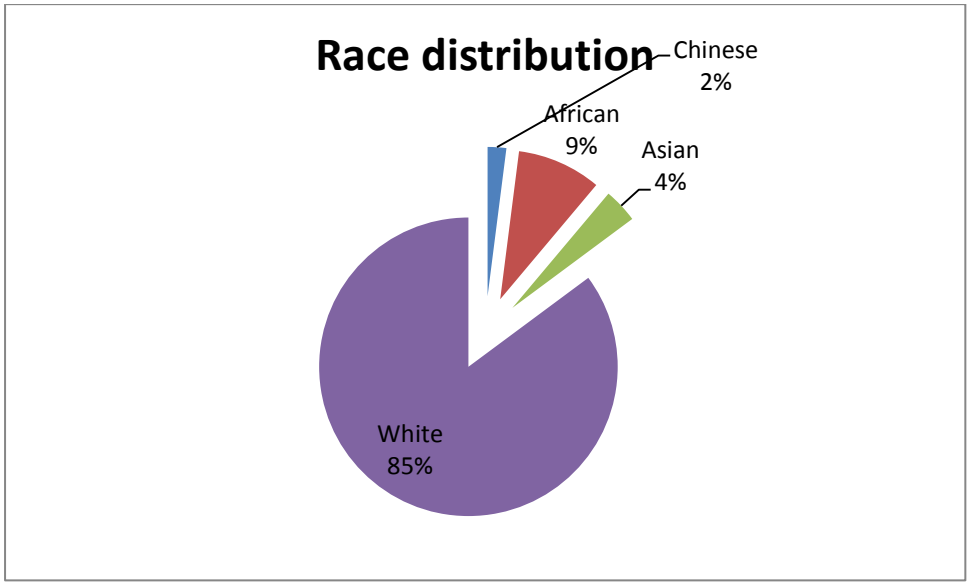

Figure 3. **Race distribution of sample (N=632)**

Figure 3 indicates the distribution of the sample in terms of race. The majority of the individuals in the sample where white, 85 % (*n=505*), and 9% were African (*n=54*).

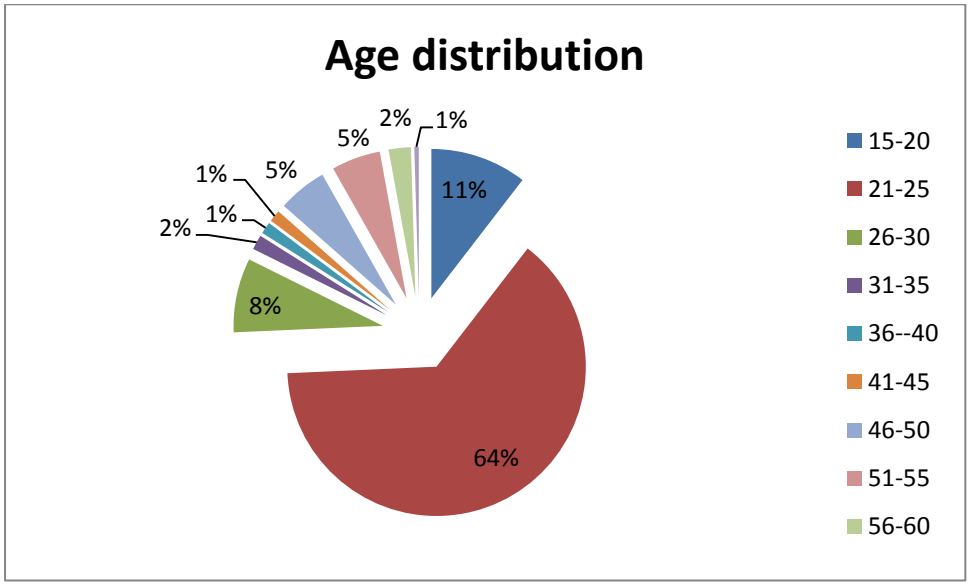

Figure 4. **Age distribution of sample (N=632).**

Figure 4 illustrates the age distribution of the sample. The majority of the sample was between the ages of 21 to 25 years old, at 64%. The smallest representation was in the age brackets 36 – 40, 41 – 45, and 46 – 50 years old, which each accounted for 1% of the sample. Only 622 individuals gave their age.

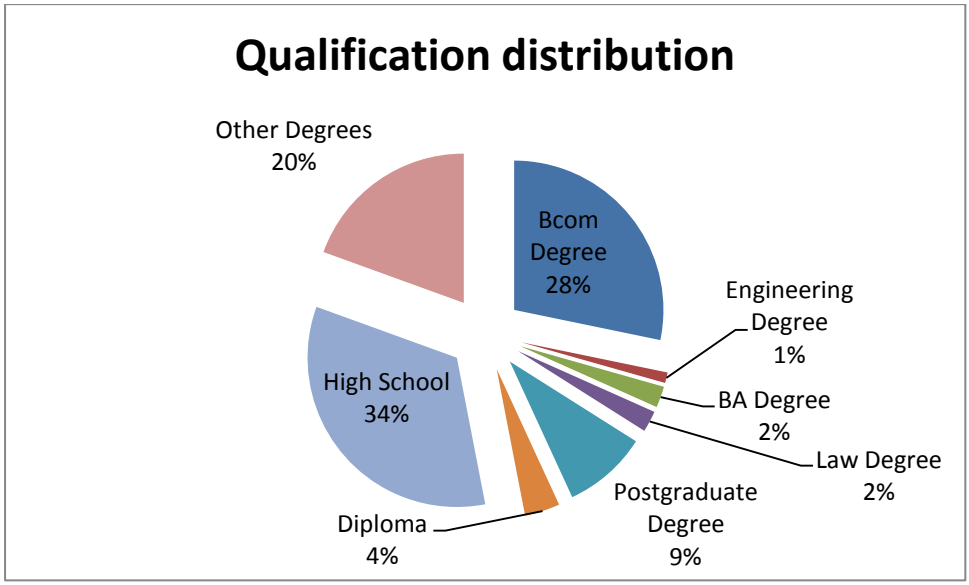

Figure 5. **Qualification distribution of sample (N=632).**

Figure 5 indicates that 34% (n=88) of the individuals had completed high school, and the fewest candidates had an engineering degree (1%). Only 262 of the 632 individuals in the sample provided their qualifications.

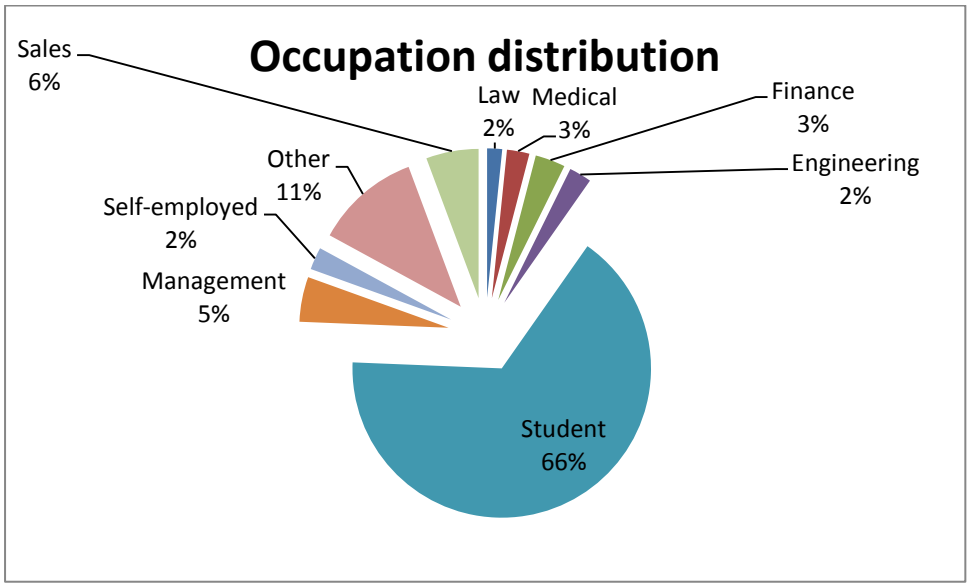

Figure 6. **Occupation distribution of sample *(N=632)*.**

Figure 6 illustrates the occupation distribution of the sample. There were quite a variety of occupations, therefore the occupations where clustered into the predominate fields found in the sample. The vast majority of the sample were students — 66% (n=81). Only 122 of the individuals indicated their occupations.

Table 10 displays the means, standard deviations, skewness, and kurtosis of the age of the individuals in the sample, as well as for the SDS, the 15FQ+, and the SDS. Those items with extreme scores are indicated in bold, and are highlighted.

Table 10

Descriptive Statistics for Sample

Variable	N	Mean	Std. deviation	Skewness	Kurtosis
Age					
Age	622	27.164	10.948	**1.872**	**2.311**
SDS					
Realistic	632	16.329	10.289	0.758	-0.251
Investigative	632	20.312	8.847	0.433	-0.362
Artistic	632	20.027	10.325	0.243	-0.768
Social	632	28.423	8.315	-0.027	-0.531
Enterprising	632	26.068	8.370	-0.189	-0.152
Conventional	632	22.299	8.347	0.261	-0.470
15FQ+					
Cool reserved	632	18.337	4.655	-1.043	0.546
Intelligence	632	18.275	5.036	-0.989	0.497
Affected by feelings	632	14.130	5.199	-0.260	-0.654
Accommodating	632	14.100	5.578	-0.349	-0.686
Sober serious	632	15.204	5.749	-0.406	-0.717
Expedient	632	17.038	5.987	-0.811	-0.258
Retiring	632	12.642	6.336	-0.134	-0.997
Hard-headed	632	15.809	5.417	-0.599	-0.324
Trusting	632	10.320	5.098	0.170	-0.438
Concrete	632	11.188	4.991	0.129	-0.514
Direct	632	17.351	5.300	-0.958	0.260
Confident	632	15.366	5.673	-0.353	-0.790
Conventional	632	9.171	5.326	0.376	-0.454
Group-orientated	632	10.198	5.798	0.326	-0.715
Informal	632	20.279	3.189	-1.346	2.686
Composed	632	12.997	6.251	0.007	-1.004
OPQ					
Persuasive	632	4.225	1.656	0.667	0.550
Controlling	632	4.111	2.075	0.362	-0.435
Outspoken	632	4.799	1.992	0.036	-0.234
Independent-minded	632	6.293	1.737	-0.058	0.046
Outgoing	632	6.158	1.951	-0.126	-0.526
Affiliative	632	5.816	1.861	0.240	0.042

Socially confident	632	5.024	1.927	0.298	-0.068
Modest	632	5.896	1.622	-0.180	0.332
Democratic	632	3.956	1.985	0.394	-0.519
Caring	632	4.551	2.406	0.435	-0.833
Data rational	632	4.212	1.987	0.144	-0.561
Evaluative	632	4.079	2.136	0.498	-0.441
Behavioural	632	5.168	2.174	0.475	-0.601
Conventional	632	6.622	1.769	-0.451	0.281
Conceptual	632	5.008	1.859	0.089	-0.146
Innovative	632	4.283	2.071	0.497	-0.063
Variety-seeking	632	4.530	2.019	0.327	-0.330
Adaptable	632	5.527	1.791	-0.085	0.167
Forward-thinking	632	4.366	2.057	0.379	-0.167
Detail-conscious	632	5.233	1.932	-0.002	-0.234
Conscientious	632	4.812	2.134	0.226	-0.365
Rule-following	632	5.421	1.585	-0.307	0.196
Relaxed	632	5.394	1.947	-0.217	0.081
Worrying	632	6.342	1.800	-0.199	-0.096
Tough-minded	632	4.684	1.837	0.238	0.011
Optimistic	632	4.324	2.375	0.505	-0.689
Trusting	632	5.492	1.813	0.117	-0.076
Emotionally controlled	632	6.013	1.945	-0.185	-0.197
Vigorous	632	3.932	2.180	0.568	-0.204
Competitive	632	5.391	1.833	-0.088	-0.273
Achieving	632	4.516	1.928	0.146	-0.259
Decisive	632	5.293	1.660	0.346	0.044
Social desirability	632	6.734	1.737	-0.555	-0.135

As can be seen from the table above, the data are normally distributed, except in the cases of *Age* and *Informal* for the 15FQ+, which are highly skewed and kurtotic.

4.3 RESULTS FOR CANONICAL CORRELATION BETWEEN THE SDS AND THE 15FQ+, AND BETWEEN THE SDS AND THE OPQ

Canonical correlations were computed to analyse the concurrent relationship between the manifold independent and dependent variables that shaped part of this research enquiry. With regard to the level of significance for canonical correlations, a minimum level of 0.05 is acceptable for interpretation.

4.3.1 Canonical correlation of the 15FQ+ and the SDS

Table 11

Canonical Correlation of the 15FQ+ and SDS

Independent variable	**Variant 1**	**Variant 2**	**Variant 3**	**Variant 4**	**Variant 5**	**Variant 6**
Cool reserved/ Empathetic	**0.675**	0.295	**-0.436**	-0.009	**0.400**	0.124
Low intelligence/ High intelligence	-0.069	**0.407**	**0.333**	**0.679**	0.130	-0.165
Affected by feelings/ Emotionally stable	-0.074	**0.323**	0.018	0.271	0.011	0.005
Accommodating/ Dominant	0.029	**0.665**	**0.352**	0.083	**-0.301**	0.157
Sober serious/ Enthusiastic	**0.377**	**0.498**	0.103	**-0.384**	0.087	-0.274
Expedient/ Conscientious	-0.108	0.221	**-0.398**	**0.542**	-0.260	**0.413**
Retiring/ Socially bold	**0.373**	**0.621**	**0.320**	-0.046	0.012	0.036
Hard-headed/ Tender-minded	**0.833**	**-0.337**	-0.011	0.290	-0.274	-0.010
Trusting/Suspicious	-0.248	-0.045	0.018	-0.018	-0.241	0.024
Concrete/Abstract	**0.452**	-0.130	**0.650**	0.016	**0.395**	0.200
Direct/Restrained	0.055	-0.079	-0.185	0.265	-0.059	0.015
Confident/Self-doubting	0.160	-0.209	**-0.313**	0.081	0.121	**-0.319**
Conventional/ Radical	0.181	-0.062	**0.546**	-0.193	**0.324**	-0.153
Group-orientated/ Self-sufficient	-0.297	**-0.549**	-0.001	**0.414**	0.074	0.090
Informal/Self-disciplined	-0.046	0.116	**-0.357**	0.108	-0.002	**0.309**
Composed/Tense-driven	-0.089	-0.065	0.136	-0.150	-0.201	0.243
Dependent variable	**Variant 1**	**Variant 2**	**Variant 3**	**Variant 4**	**Variant 5**	**Variant 6**
Realistic	**-0.520**	0.114	0.266	0.060	**0.590**	**0.543**

Investigative	-0.232	0.061	**0.310**	**0.712**	**0.517**	-0.269
Artistic	**0.718**	-0.282	**0.516**	0.180	0.005	**0.327**
Social	**0.813**	**0.397**	-0.224	0.140	**0.324**	0.081
Enterprising	0.218	**0.855**	**0.403**	0.036	-0.173	0.168
Conventional	-0.012	**0.358**	-0.261	**0.655**	**-0.403**	**0.460**
Canonical correlation	0.701	0.577	0.493	0.385	0.251	0.158
F-value	11.860	8.420	6.210	4.120	2.370	1.420
Adjusted canonical correlation	0.688	0.558	0.476	0.365	0.219	0.118
Squared canonical correlation	0.491	0.333	0.243	0.148	0.063	0.025
Eigenvalue	0.967	0.498	0.322	0.174	0.068	0.026
Num DF	96	75	56	39	24	11
Den DF	3462.8	2930.8	2382.7	1816	1228	615
Pr > F	<.0001	<.0001	<.0001	<.0001	0.0002	0.1576

The canonical correlation coefficients for the first five variants (0.701, 0.577, 0.493, 0.385, and 0.251) were statistically significant ($p<0.01$). Cohen's effect size of the correlations can be considered large for Variants 1, 2, and 3, and medium for Variants 4 and 5. The results indicate significant inter-correlations and shared variance between the 15FQ and the SDS.

Most of the shared variance ($R^2 = 0.491$) between the instruments can be associated with Variant 1. Variant 1 can be considered theoretically interpretable with the positive loadings on the 15FQ+ variables *Tender-minded* (0.833), *Empathetic* (0.675), *Abstract* (0.452), *Socially bold* (0.373), and *Enthusiastic* (0.377), with positive loadings on the SDS variables *Social* (0.813) and *Artistic* (0.718). The SDS variable *Realistic* (-0.520) had a negative loading. According to Holland's hexagon theory (Barrick et al., 2003), strong correlations between adjacent variables should

be expected, and opposites should be less well or negatively related. The variable loadings demonstrate that people with strong social and artistic career preferences may also demonstrate tender-minded, empathetic, abstract, socially bold, and enthusiastic personality traits. The inverse may be true for people with realistic career preferences.

Variant 2 accounted for the second-most shared variance (R^2 = 0.333) between the instruments. With regard to theory, Variant 2 can be explained by the positive loadings on the 15FQ+ variables *High intelligence* (0.407), *Emotionally stable* (0.323), *Dominant* (0.665), *Enthusiastic* (0.498), and *Socially bold* (0.621), and showed positive loadings on the SDS variables *Social* (0.397), *Enterprising* (0.855), and *Conventional* (0.358). The 15FQ+ variables that had negative loadings were *Hard-headed* (-0.337) and *Group-orientated* (-0.549), and there were no significant negative loadings for the SDS variables.

Variant 3 accounted for the third-most shared variance (R^2 = 0.243) between the instruments. Variant 3 can be considered theoretically interpretable with the positive loadings on the 15FQ+ variables *High-intelligence* (0.333), *Dominant* (0.352), *Socially bold* (0.320), *Abstract* (0.650), and *Radical* (0.546), and the positive loadings on the SDS were *Investigative* (0.310) *Artistic* (0.516), and *Enterprising* (0.403). The variable loadings demonstrate that people with strong enterprising career preferences may also demonstrate dominant and socially bold personality traits. The negative loadings on the 15FQ+ plus were *Cool reserved* (-0.436), *Expedient* (-0 398), *Confident* (-0.313), and *Informal* (-0.357), with no negative loadings on the SDS. The results indicate that the *Artistic* type in respect with career preferences may also be inclined to show a high level of abstract thinking (imaginative, impractical), and demonstrate a high level of radicalism (experimental, openness, unconventional).

When relating Variant 4 of the 15FQ+ to Variant 4 of the SDS, there were several correlations. Variant 4 accounted for the shared variance of R^2 = 0.148 between the instruments. The positive loadings on the 15FQ+ variables were *High intelligence* (0.679), *Conscientious* (0.542), *Self-sufficient* (0.414), and the positive loadings for the SDS were on *Investigative* (0.712) and *Conventional* (0.655). The variable

loadings demonstrate that people with strong investigative and conventional career preferences may also demonstrate high intelligence, and conscientious and self-sufficient personality traits. There were no negative loadings on the SDS; however, there was one on the 15FQ+: *Sober serious* (-0.384). This means that the *Investigative* and *Conventional* career types may be inclined to demonstrate a *Sober serious* personality trait.

Variant 5(R^2 = 0.063) and 6 (R^2 = 0.025) demonstrated a low shared variance between the instruments.

4.3.2 Canonical correlation of the OPQ and the SDS

Table 12

Canonical Correlation of the OPQ and the SDS

Independent variable	**Variant 1**	**Variant 2**	**Variant 3**	**Variant 4**	**Variant 5**	**Variant 6**
Persuasive	0.225	**0.644**	-0.276	**0.333**	-0.106	0.057
Controlling	0.058	**0.522**	-0.096	**0.355**	-0.110	-0.021
Outspoken	0.036	**0.350**	-0.140	**0.377**	0.087	-0.110
Independent-minded	0.104	-0.012	-0.140	0.207	0.242	0.048
Outgoing	**-0.300**	**0.648**	0.009	0.316	0.022	0.021
Affiliative	**-0.398**	**0.329**	0.084	0.160	**-0.340**	0.093
Socially confident	-0.138	0.290	0.077	0.225	-0.109	0.019
Modest	0.123	-0.296	-0.031	-0.112	0.016	0.038
Democratic	-0.208	0.040	0.022	**0.303**	-0.120	-0.035
Caring	**-0.394**	-0.052	0.125	**0.344**	**-0.508**	0.069
Data rational	**0.795**	-0.104	**0.336**	0.255	0.027	0.083

Evaluative	0.149	-0.043	-0.201	**0.461**	-0.194	0.019
Behavioural	**-0.410**	-0.091	0.103	**0.452**	-0.247	0.021
Conventional	0.025	-0.150	0.200	-0.238	0.061	-0.079
Conceptual	0.117	-0.085	0.041	**0.627**	0.210	0.046
Innovative	-0.075	-0.005	**-0.564**	**0.440**	-0.049	0.224
Variety-seeking	-0.039	0.090	-0.250	0.239	-0.099	-0.197
Adaptable	-0.156	-0.030	-0.205	0.259	0.230	0.051
Forward-thinking	0.141	0.157	0.195	0.190	-0.230	0.098
Detail-conscious	-0.082	0.097	**0.394**	-0.022	0.056	**0.421**
Conscientious	-0.207	0.094	0.298	0.210	-0.003	0.048
Rule-following	-0.049	-0.076	0.317	-0.052	-0.170	0.216
Relaxed	0.065	0.098	-0.179	0.028	-0.203	0.056
Worrying	-0.171	**-0.327**	0.227	-0.205	0.128	-0.113
Tough-minded	0.241	0.047	**-0.329**	0.157	-0.266	0.203
Optimistic	-0.053	0.186	-0.201	0.182	-0.146	0.083
Trusting	-0.246	0.110	0.028	0.116	-0.054	0.246
Emotionally controlled	**0.315**	**-0.308**	-0.154	**-0.359**	-0.137	0.137
Vigorous	-0.060	0.102	0.033	0.103	-0.021	0.446
Competitive	**0.320**	0.279	-0.055	0.020	0.105	-0.251
Achieving	-0.013	0.430	-0.017	0.227	-0.002	0.034
Decisive	0.080	0.308	-0.096	-0.057	-0.047	0.128
Social desirability	-0.096	0.131	0.161	0.145	0.118	0.066
Dependent	**Variant**	**Variant**	**Variant**	**Variant**	**Variant**	**Variant**

variable	1	2	3	4	5	6
Realistic	**0.494**	-0.062	**-0.409**	0.218	**-0.638**	**0.362**
Investigative	**0.607**	-0.150	-0.014	**0.746**	-0.027	-0.228
Artistic	**-0.420**	-0.100	**-0.328**	**0.506**	**0.463**	**0.485**
Social	**-0.557**	0.298	**0.436**	**0.596**	-0.116	0.205
Enterprising	0.089	**0.921**	-0.036	0.226	0.110	0.282
Conventional	**0.414**	0.165	**0.605**	0.010	0.227	**0.620**
Canonical correlation	0.628	0.580	0.482	0.405	0.248	0.211
F-value	4.980	3.950	2.840	2.000	1.150	0.990
Adjusted canonical correlation	0.592	0.551	0.440	0.361	-	-
Squared canonical correlation	0.394	0.337	0.232	0.164	0.062	0.044
Eigenvalue	0.650	0.507	0.302	0.196	0.066	0.047
Num DF	3516.700	2946.400	2368.800	1784.500	1194.000	598.000
Den DF	3516.7	2946.4	2368.8	1784.5	1194.0	598.0
Pr > F	<.0001	<.0001	<.0001	<.0001	0.206	0.478

The canonical correlation coefficients for the first four variants (0.628, 0.580, 0.482, and 0.405) were statistically significant ($p<0.01$). Cohen's effect size of the correlations can be considered strong for Variants 1, 2, 3, and 4. The results signify significant inter-correlations and shared variance between the OPQ and the SDS.

Most of the shared variance ($R^2 = 0.394$) between the instruments can be associated with Variant 1. Variant 1 can be considered theoretically interpretable with the positive loadings on the OPQ variables *Data rational* (0.795), *Emotionally controlled*

(0.315), and *Competitive* (0.320), with positive loadings on the SDS variables *Realistic* (0.494), *Investigative* (0.607), and *Conventional* (0.414). The SDS variables *Artistic* (-0.420) and *Social* (-0.557) had negative loadings, as did the OPQ variables *Outgoing* (-0.300), *Affiliative* (-0.398), and *Caring* (-0.394). According to Holland's hexagon theory (Barrick et al., 2003), strong correlations between adjacent variables should be expected, and opposites should be less well or negatively related. The variable loadings demonstrate that people with strong preferences for *Realistic*, *Investigative*, and *Conventional* career preferences may also demonstrate *Data rational*, Emotionally *controlled,* and *Competitive* personality traits. The inverse may be true for people with *Artistic* and *Social* career preferences.

Variant 2 accounted for the second-most shared variance (R^2 = 0.337) between the instruments. With regard to theory, Variant 2 can be explained by the positive loadings on the OPQ variables *Persuasive* (0.644), *Controlling* (0.522), *Outspoken* (0.350), *Outgoing* (0.648), and *Affiliative* (0.329), with a positive loading on the SDS variable *Enterprising* (0.921). The OPQ variables that had negative loadings were *Worrying* (-0.327) and *Emotionally controlled* (-0.308), and there were no significant negative loadings for the SDS variables. This can be explained by Holland's hexagon theory (Barrick, Mount, & Gupta, 2003). A person with a strong *E*nterprising career preference may also demonstrate *Persuasive*, *Controlling*, *Outspoken*, *Outgoing*, and *Affiliative* personality traits.

Variant 3 accounted for the third-most shared variance (R^2 = 0.232) between the instruments. With regard to theory, Variant 3 can be explained by the positive loadings on the OPQ variables *Data rational* (0.336) and *Detail-conscious* (0.394), with positive loading on the SDS variables *Social* (0.436) and *Conventional* (0.605). From theory, one could deduce that individuals who prefer a *Conventional* work environment are likely to have *Detail conscious* and *Data rational* personality traits. *Social* and *Conventional* are non-adjoining types, as they are separated by a third type, and they have less in common because of the longer distance between them (Gevers et al., 1995). None of the OPQ variables has any relation to the *Social* type from the SDS. Negative loadings for the OPQ were *Innovative* (-0.564) and *Tough-minded* (-0.329), and on the SDS the negative loadings were *Realistic* (-0.409) and *Artistic* (-0.328). Individuals who show a preference for *Artistic* work environments

are likely to have an *Innovative* personality trait, and those with a preference for *Realistic* work environments are likely to demonstrate a *Tough-minded* personality trait.

Variant 4 accounted for the third-most shared variance (R^2 = 0.164) between the instruments. Positive loadings for the OPQ were *Outspoken* (0.377), *Democratic* (0.303), *Caring* (0.344), *Evaluative* (0.461), *Behavioural* (0.452), *Conceptual* (0.627), and *Innovative* (0.447). The positive loadings for the SDS were *Investigative* (0.746), *Artistic* (0.506), and *Social* (0.596), and there were no negative loadings. This can be explained by the research done by Barrick, et al., (2003) which found that there was a moderately stron relationship between *Extraversion* (the FFM equivalent of *Outspoken* from the OPQ) and *Social*, a smaller relationship between *Agreeableness* (FFM equivalent of *Democratic* and *Caring* from the OPQ) and, a moderately strong correlation / relationship between *Openness to Experience* (FFM equivalent of *Behavioural*, *Conceptual*, and *Innovative* from the OPQ) and *Artistic* and Investigative. A person with a strong *Investigative* career preference may demonstrate *Evaluative*, *Conceptual,* and *Innovative* personality traits. According to Holland's hexagonal theory (Barrick et al., 2003), *Investigative* and *Artistic* are adjoining types, as are *Artistic* and *Social*; they have the greatest consistency, as the distances between them are the shortest. There was one negative loading on the OPQ: *Emotionally controlled* (-0.359).

Variant 5 (R^2 = 0.0.062) and Variant 6 (R^2 = 0.044) demonstrated a low shared variance between the instruments.

4.4 CONCLUSION

Correlation sizes ranged between very small (<0.01), small (r=0.01), medium (*r*=0.30), and large (*r*=0.50) (Cohen, 1988). Thus, the correlation coefficients obtained from the results of the correlation between the 15FQ+ and SDS and, the correlation between the OPQ and SDS are medium to large. According to Cascio and Aguinis (2011), correlation coefficients with a medium effect size should be considered practically significant.

CHAPTER 5: INTERPRETATION, CONCLUSION, AND RECOMMENDATIONS

5.1 INTRODUCTION

Chapter 4 highlighted the findings from the canonical correlations analyses. The purpose of this chapter is to integrate the findings from the correlations with the findings of the literature, in order to explore the interrelationship between the SDS, the 15FQ+ and the OPQ. After the findings have been discussed, the value of the study will be highlighted, and recommendations for further studies will be presented. This chapter will present the final conclusions of the study.

5.2 DISCUSSION

In the canonical correlations, two correlations were done: the multiple variants of the SDS were compared to the multiple variants of the 15FQ, and the multiple variants of the SDS were compared to the multiple variants of the OPQ. After the correlational analyses were conducted, relationships where found between the independent and dependant variables, and the research question of how the OPQ and the 15FQ+ interrelate with the SDS types (RIASEC) was answered.

5.2.1 Canonical correlation of the 15FQ+ and SDS

The canonical correlation analyses resulted in five significant variants explaining interrelations between the 15FQ+ and the SDS measures. There were significant positive loadings on the first variant, namely *Empathetic*, *Enthusiastic*, *Socially bold*, *Tender-minded*, and *Abstract*, and the positive loadings on the SDS were *Artistic* and *Social*. There were no statistically significant negative loadings on the 15FQ+, but there was one on the SDS: *Realistic* (-0.520). According to Moutafi et al. (2005), *Empathetic*, *Enthusiastic*, and *Socially bold* are the 15FQ+ dimensions that correspond to the *Extraversion* dimension of the Big Five. *Tender-minded* and *Abstract* are the dimensions of the 15FQ+ that correspond to the *Openness*

dimension of the Big Five. According to Larson et al. (2002), *Artistic* relates moderately to *Openness* (*Tender-minded* and *Abstract* from the 15FQ+), and *Social* relates to *Extraversion* (*Empathetic*, *Enthusiastic*, and *Socially bold* from the 15FQ+).

These findings largely confirm the findings of previous studies, for example those of Barrick, Mount, and Judge (2001), Barrick, Mount and Gupta (2003), Campbell and Borgen (1999), Tokar and Swanson (1995), Mount, Barrick, Scullen and Rounds (2005), Prediger(1982), Holland (1997), and Ackerman and Heggestad (1997), even though a different personality assessment tool was used. Furthermore, these correlations were to be expected, as an individual who is empathetic is also generally warm, enjoys participating, and is interested in people. This is also true for those who are the *Social* type (Barrick et al., 2003). *Realistic* showed a negative correlation with *Empathetic*, *Enthusiastic*, *Socially bold*, *Tender-minded* and, *Abstract*, because this type would have a preference for working with objects and have an aversion to social and creative activities, hence the positive loading on *Artistic*, which is opposite to *Realistic* (Barrick, Mount, & Judge, 2001; Barrick, Mount, & Gupta, 2003; Holland, 1973, 1997).

From the canonical analysis of the 15FQ+ and the SDS, the second-most significant variant indicated that the 15FQ+ had positive loadings on the variables *High intelligence*, *Emotionally stable*, *Dominant*, *Enthusiastic*, *Socially bold*, and *Group-orientated*. The positive loadings on the SDS were *Social*, *Enterprising*, and *Conventional*. Table 3, in Chapter 2, illustrates the dimensions of the 15FQ+ that are related to the dimensions of the Big Five. Holland (1997, cited in Kachik, 2003) described the *Enterprising* type as an individual who has a preference for being assertive, ambitious, domineering, self-confident, and ambitious, and who enjoys taking the lead.

The same can be said for an individual with the *Dominant* personality trait; these individuals have a preference for taking charge of a situation, and are competitive. These relationships explain the loadings found on the second variant. According to the study done by Barrick et al. (2003), *Enterprising* individuals show a preference for partaking in activities that entail leading and convincing others to achieve organisational goals; however, they tend to evade methodical and symbolic

activities. Furthermore, it has been found that *Enterprising* individuals quite often lack scientific ability (Gottfredson, Jones, & Holland, 1993), and are possibly do not score high on the *Investigative* and *Conventional* types. Individuals who are *Socially bold* tend to be talkative and socially confident; they are likely to be happy with talking in front of a large crowd, which explains the relationship with an *Enterprising* type person (Barrick et al., 2003). *Enthusiastic* individuals tend to be lively, happy-go-lucky people, and enjoy being surrounded by people (Barrick et al., 2003). All of these domains are related, which was confirmed by the canonical correlation's results. Certain of the vocational interest types are somewhat connected to personality traits, predominantly the *Enterprising* and *Artistic* types (Barrick et al., 2003). This, therefore, points towards meaningful relationships, as prescribed by theory, and indicates that these vocational interests and preferences appear to significantly converge with personality.

The other vocational types overlap only slightly with personality types, and, in terms of the *Realistic* interest type, there was a strong negative loading (r = -0.52) on Variant 1 (from the SDS and the 15FQ+ canonical correlation), and a strong positive loading on Variant 5 (r = 0.59), which contradicted the findings of Barrick et al. (2003). The relationships found between the variables in the canonical correlation where moderate to strong (lowest was r= 0.385, and highest was 0.701). Furthermore, in a meta-analysis done by Barrick et al. (2003), it was found that, when there was congruity between personality and interests, greater correlations where found. An example of this is the correlation between the two vocational types *Enterprising* and *Social*, which are the two largest social components, which were correlated with *Extraversion*, and the *Social* type was also related to *Agreeableness* (Barrick et al., 2003).

In order to acquire an improved understanding of the interrelationship between *Extraversion* and *Enterprising* with regard to comparing the relationship between the 15FQ+ and the SDS types, the second-order factors of the 15FQ+ have to be examined.

Empathetic, *Enthusiastic*, *Self-sufficient*, *Socially bold*, and *Group-orientated* in the 15FQ+ are the corresponding factors to *Extraversion* from the FFM, and these individuals will possibly score lower on *Investigative* and *Conventional*. From the correlation done, all four of the aforementioned first-order factors had medium to strong loadings (lowest was r = 0.320 and highest was r = 0.675). In this regard, Ackerman and Heggestad (1997) found a moderate to strong correlation between *Extraversion* and *Enterprising*. This was to be expected, as individuals who have a propensity to be adventurous, active, and bold are likely to enjoy hobbies or careers that necessitate them to use persuasive abilities and direct others (Barrick et al., 2003). According to Costa and McCrae (1992) and Goldberg (1992, cited in Barrick et al., 2003), extraverts should have a preference for *Social* and *Enterprising* jobs, as extroverts generally behave in a social, energetic, adventurous, assertive, and bold manner. A motivating factor for extroverts is to be able to influence others or obtain economic or organisational goals and rewards (Barrick et al., 2003). Others studies done by Barrick and Gupta (1997) and De Fruyt and Mervielde (1999) found that the *Social* type was also associated with *Extraversion*. The results from the study by Barrick et al. revealed a moderately strong positive interrelationship between *Enterprising* and *Extraversion*.

According to Larson et al. (2002), *Investigative* overlaps by 0.20 to 0.60 with *Openness*, *Enterprising* relates by 0.20 to 0.50 with *Extraversion*, and *Artistic* relates moderately (0.40 to 0.50) to *Openness*. Results from the present study showed an overlap of between 0.403 and 0.855, which supports the conclusion that there is a strong to very strong relationship between *Enterprising* and *Extraversion*. Individuals who score high on *Agreeableness* (corresponding 15FQ+ first-order factors: *High intelligence*, *Accommodating*, *Suspicious*, *Radical*), have the tendency to be sympathetic and show kindness to others. Furthermore, agreeable individuals customarily strive for collaboration rather than opposition (Costa & McCrae, 1992). This proposes that *Agreeableness* has a relationship with the *Social* type (Barrick et al., 2003). This, therefore, points towards meaningful relationships as described by theory, and to these vocational interests and preferences having a significantly overlap with personality. The present study's results, as well as the findings of Barrick et al. (2003), emphasise the role of congruence, as individuals who tend towards social and reward-seeking behaviour show a preference for a working

environment where there is a lot of social interaction, and are specifically attracted to these roles when these provide opportunities for a leadership position and material rewards.

Furthermore, there were positive loadings on the 15FQ+ variables *High-intelligence*, *Dominant*, *Socially bold*, *Abstract*, and *Radical* (Variant 3), and the positive loadings on the SDS were *Investigative*, *Artistic* and *Enterprising*. According to Larson et al. (2002), *Investigative* overlaps by 0.20 to 0.60 with *Openness*, and *Artistic* relates moderately (0.40 to 0.50) to *Openness*. According to the 15FQ+ manual, *Openness* is related to *Empathetic*, *Tender minded*, *Abstract,* and *Radical*. *Investigative*, *Artistic*, *Abstract*, and *Radical* had high loadings on the same variant in the present study, and one can therefore deduce that *Investigative* and *Artistic* interests are related to *Openness*, as pointed out by Larson et al. (2002). The corresponding 15FQ+ factor for *Openness* is *Tough-minded*, and the first-order factors are *Empathetic*, *Tender-minded*, *Abstract*, *Radical*, and *Conceptual*. There was a strong relationship between *Empathetic*, *Tender-minded*, *Abstract*, and *Radical, on the one hand,* and the *Artistic* type, on the other. The lowest loading was 0.452, and the highest was 0.833. From these loadings, it can be confirmed that there is a strong interrelationship between these variables and the *Artistic* type. The *Investigative* type had strong relationships with *Empathetic*, *Abstract*, and *Radical*. As such, one can deduce that individuals with an *Investigative* and *Artistic* career preference are likely to have personality traits such as *Abstract* and *Radical* (Barrick et al., 2003).

In so far as theory is concerned (for example, the studies by Barrick et al., 2003; Larson et al,, 2002; and Moutafi et al., 2005), the findings of past studies are consistent with the findings of the present study. However there are two exceptions: *Realistic* and *Conventional*, which were found to relate to the personality variables of the 15FQ+.

5.2.2 Canonical correlation and of the OPQ and the SDS

The canonical correlation analyses of the OPQ and the SDS variables resulted in four statistically significant and meaningful variants. The first and most meaningful variant revealed positive loadings on *Data rational* and *Emotionally controlled*. The canonical correlation analyses between the OPQ and SDS variables resulted in meaningful variant structures. According to Cohen's (1988) theory, the loadings for *Data rational* are strong for Controlled and moderate for *Competitive*. All three variables on the SDS showed strong loadings. According to Costa et al. (1984), Gottfredson et al. (1993), and Kiani (2010), individuals who are *Data rational* have a preference for working with numbers, base decisions on facts and figures, and are rational and objective. They are likely to behave in an emotionally controlled manner (Visser & du Toit, 2004). Individuals who are the *Investigative* type share similar interests, in that they are prone to being systematic, and enjoy investigative activities (Visser & du Toit, 2004).

As *Realistic* and *Investigative* are adjacent to one other, according to Holland's hexagonal model (Gevers et al., 1995), they are highly consistent with each other, and, as such, one would expect them to be related. Holland's theory also assumes that *Conventional* and *Realistic* types to be related, due to their position on the hexagon (Prediger, 1982; Costa et al., 1984; Gottfredson et al., 1993). These theories support the results of the current study.

In terms of the link between the dimensions of the OPQ and the Big Five (Bartram, 2013), there is no equivalent for *Data rational*, but *Emotionally controlled* is linked to *Extraversion* (negative loading), and *Competitive* is linked to *Agreeableness* (negative loading). However, it was found that the *Realistic* type was not related to any Big Five personality dimensions as some of the other types were (Barrick et al., 2003), which is notable, as the present study indicates a clear relationship between *Realistic* and a number of personality variables.

Variant 1 of the canonical correlation between OPQ and SDS also showed negative loadings for interest fields *Artistic* and *Social*. This was to be expected, as *Social* is on the opposite side to *Realistic* and *Investigative* on the Holland's hexagon (Gevers,

1995; Barrick et al., 2003). *Artistic* is adjacent to *Investigative*, but further away on the hexagon to *Realistic* and *Conventional*. The negative loadings for the OPQ were *Outgoing*, *Affiliative*, and *Caring*. According to Larson et al. (2002), *Artistic* relates to *Openness*, and *Social* relates to *Extraversion* (OPQ dimensions *Outgoing*, *Socially confident*, *Affiliative*). *Caring* links with the Big Five in the *Agreeableness* dimension. One can conclude from the theory of the Big Five and the SDS that the interrelations found in the present study were to be expected. It should be noted that Bartram (2013) illustrated the correspondence between 25 of the 32 OPQ scales to the Big Five dimensions.

The variables of the second-most important variant (Variant 2), which loaded positively, show that an individual with an *Enterprising* career preference is likely to display *Persuasive*, *Controlling*, *Outspoken*, *Outgoing*, and *Affiliative* personality traits, according to the OPQ. An individual with an *Enterprising* career preference is likely to have *Persuasive*, *Controlling*, *Outspoken*, *Outgoing*, and *Affiliative* personality traits. The *Enterprising* type furthermore displays a preference for leading and manipulating or persuading others (Gevers, 1995; Barrick et al., 2003). Holland (1997) characterised an individual with an *Enterprising* interest preference as sociable, optimistic enthusiastic, extroverted, excitement–seeking, and assertive.

Individuals with an *Outspoken* personality freely express their opinions, and are lively and animated, and those who have the *Affiliative* trait enjoy the company of others. Larson et al. (2002) found that *Enterprising* relates to *Extraversion*. There is correspondence between the Big Five's *Extraversion* dimension and the OPQ dimensions *Outgoing*, *Socially confident*, *Affiliative*, *Persuasive*, and *Controlling* (Bartram, 2013). These finding indicate that the loadings from the second variant between the OPQ and SDS are supported by theory and previously conducted research (Larson et al., 2002; Barrick et al., 2003; Bartram, 2013).

A strongly *Enterprising* person is unlikely to demonstrate *Worrying* and *Emotionally controlled* personality traits (link between Big Five dimensions and OPQ; negative loadings on *Emotionally stable* and *Extraversion*) (Bartrams, 2013). According to the OPQ, negative loadings on *Emotionally controlled* imply a person who openly expresses feelings, finds it difficult to conceal how he/she feels, and displays

emotion clearly. Extroverts may be less inclined to keep feelings and emotions to themselves.

Variants 3 and 4 demonstrated a low shared variance between the instruments. However, there were significant findings. There was a high negative loading on *Innovative*, which related to *Conventional*. This demonstrates a relation between *Conventional* and personality variables that Bartram (2013) did not recognise. The *Openness* dimension from the Big Five is represented by the positive loadings on *Variety-seeking*, *Innovative*, *Conceptual*, and *Behavioural* dimensions of the OPQ. The findings of the present study show a correlation between the *Investigative* type and *Conceptual*. Mount, Barrick, and Scullen (2005) reported a moderate to substantial relationship between *Openness* and *Investigative*, and between *Social* and *Artistic*. From the studies by Mount et al. (2005), Holland (1997), and Larson et al. (2003), the findings of the current study were to be expected. The results show a very strong relationship between *Investigative* and *Conceptual*, a strong relationship between *Behavioural* and *Social*, and a strong relationship between *Innovative* and *Artistic*.

5.2.4 Summary

Most of the previous research conducted on the correlation between interest and personality used the FFM/Big Five and the SDS to explain and analyse these relationships. Due to this fact, there is no previous research available that could be directly compared to the findings of the present study. As such, in an attempt to compare the findings of this study with previous studies, articles on the correlation between FFM and SDS were used.

It is evident from the findings of the present research study that there is a relationship between interest and personality. However, it would appear that the different test batteries used for assessing interest and personality play an important role with regard to the strength of the interrelationship between personality and interest. From the meta-analyses conducted in the present study, it is evident that

there are meaningful overlaps between certain interest types and certain domains of personality (Larson et al., 2002). Even though an overlap exists, there is persuasive evidence that most work interests are different from personality.

Barrick et al. (2003) did a study on the relationship between personality dimensions and the RIASEC interest types, and their findings were that there is a moderately strong relationship between the RIASEC types and *Extraversion.*

As seen in Sections 5.2.1 and 5.2.2, the correlations found in the present study are supported by the findings of Barrick et al. (2003), Larson et al. (2002), and older studies done by Costa et al. (1984), De Fruyt and Mervielde (1999), Gottfredson, Jones, and Holland (1993), Holland, Johnston, and Asama (1994), Tokar and Swanson (1995), and Tokar et al. (1995). Due to the fact that the present study was done on the OPQ, 15FQ+, and the SDS, a few more correlations were found between the variables of all three tests, but the findings are supported by the theory, and were to be expected. The findings in this study answer the research question — how the OPQ and 15FQ+ interrelate with the SDS types (RIASEC).

5.3 VALUE OF THE STUDY

This study has theoretical and practical value. The study could contribute to a better understanding of how the SDS, the 15FQ+, and the OPQ interrelate with each other. Understanding this interrelationship will assist practitioners in the field when they have to decide on the most suitable test batteries for assessment and selection purposes. Furthermore, this study can lead to a better understanding of the constructs of the OPQ, the SDS, and the 15FQ+, which will aid practitioners in interpreting scores better, and improve feedback to clients. Understanding the interrelationship between these tests is also useful for understanding personality and interests in the workplace. Interests and personality are linked to work performance. Research done by Barrick et al. (2003), through meta-analyses, found that the two FFM traits — *Emotional stability* and *Conscientiousness* — are reliably related to job

execution. Furthermore, a meta-analysis done by Judge and Hies (2002) found that personality characteristics are interrelated to performance-oriented motivational measures such as objective setting, self-efficacy, and expectancy beliefs (Barrick et al., 2003). For career guidance, the results from the present study can enhance the career guidance process, as there is a better understanding of how the dimensions relate to each other in these three specific tests, instead of just the broad scale of the FFM. In terms of theoretical knowledge, there are limited studies on other personality test measures and interest scales; this study gives insight into the interrelationship between the OPQ, the 15FQ+, and the SDS, which can expand the theoretical understanding of the correlation of these specific personality questionnaires and interest types. The findings of this study support the construct validity of the respective instruments.

5.4 LIMITATIONS AND RECOMMENDATIONS FOR FUTURE STUDIES

This study focused on the interrelationship between the OPQ, the 15FQ+, and the SDS. There are several other types of personality questionnaires and interest measures available, which could be explored. Thus, the present study is limited by the fact that it only considered these three psychometric instruments. The sample was drawn from a single institution in South Africa, even though the participants varied in age, gender, and race, and were students from seven different academic years. The distribution of the sample was skewed, and it would be advantageous to obtain a more equally distributed sample in terms of age, gender, race, and qualifications. Therefore, the current study is limited in terms of its generalisability to populations other than the current sample of university students and their candidates. Another limitation is that only first-order variables were analysed. In order to have a more in-depth look at the results, one could consider analysis of higher-order variables. It should be noted that this study was done on a sample of Human Resources postgraduate university students and their candidates (which differed in age, ethnicity, language, and qualifications), and therefore might not be applicable to the entire demographical group of the country.

This study looked specifically at the interrelationship between the OPQ, the SDS, and 15FQ+. It is important to recognise other models, such as Tellegen's Big Three, the NEO-PI-R, and Jung's four types (Kiani, 2010). Future research should continue to attempt to synthesise the body of research examining the overlap of personality and interests beyond the OPQ, the 15FQ+, and the SDS. In this way, personality theorists can use the empirical reviews to modify current conceptualisations of how the overlap is currently viewed. From a practical standpoint, through a better understanding of the interrelationship between interest and personality, the practitioner can better select test batteries for career guidance and selection purposes. Understanding the interrelationship between the OPQ, the 15FQ+, and the SDS gives us a good indication of the way in which personality and interests overlap, but also shows us that these two areas are not simply interchangeable. Further research can be done to see how exactly these interrelationships affect the process of career guidance and selection. Very little research has been done specifically on the combination of these three tests, and, as such, to gain more insight to their interrelationships, further research needs to be conducted on these specific instruments.

It is important to note the likelihood that specific facets of personality and interests will correlate even higher than found in the present study. More studies of this nature need to be conducted to explain the links between personality and interests. Studies like this that focused on specific facets of personality and interest are likely to detect imperative links that are more obscure in the more general Big Five and Big Six models.

The main conclusion from the present study is that there is a moderate to strong interrelationship between personality traits and vocational interest. Barrick et al. (2003) suggested two other areas of research that could be done in the future to expand our understanding of the relationship between interests and personality. Firstly it should be ascertained if there is a higher-order structure that describes the relationship between the RIASEC interests and FFM traits, and, secondly, to explore how regular personality traits and interest types are equally related to job outcomes

(Barrick et al., 2003). Both areas could be explored using the OPQ and the 15FQ+ as measures of personality, instead of the FFM.

5.5 CONCLUSION

The purpose of this study was to explore the interrelationship between the OPQ, the 15FQ+, and the SDS. The sample of 632 respondents can be seen as a good sample size. The outcomes showed that some of SDS types related to some of the personality traits of the 15FQ+ and OPQ; in some cases the relationship was moderate, but in other cases there were strong relationships between the variables. In the meta-analysis conducted by Barrick et al. (2003), they found that personality traits had moderate relationships with *Enterprising* and *Artistic* types in particular, which indicates that these occupational interests and preferences appear to significantly overlap with personality. The findings of the present study were different, indicating that the use of different personality assessments tools can alter the results.

The findings in the research conducted by Barrick et al. (2003) and Ackerman and Heggestad (1997), showed that the *Realistic* interest type shows a very small relationship with personality variables, as the *Realist* type is primarily associated with abilities. However, in the present study, it was found that there is a strong relationship between *Realistic* and *Conventional* types and personality traits. These findings indicate that there is construct validity to this study, and that the requirements of convergent and discriminant validity have been met.

The two models that are most often used for categorising single differences are the FFM personality dimensions and Holland's RIASEC model of vocational behaviour. Both models have the same mutual objective of endeavouring to forecast and describe individuals' work behaviours (Barrick et al., 2003). The difference between the two is that the RIASEC types focus on an individual's preferences and interests, and the FFM personality dimensions focus on the way in which the individual thinks

and feels, and their characteristic way of thinking. Nevertheless, an overlap would be expected. Through meta-analysis, Barrick et al, (2003) found a way to measure the magnitude of this relationship. The findings in the present study show that there are definitely interrelationships between personality and interests, and, more specifically, that there is an interrelationship between the OPQ, the 15FQ+, and the OPQ.

For practitioners, this means that some of the dimensions of personality and some of the interest types are related, and, therefore, the Holland interest codes will have different personality implications (Kiani, 2010). For example, an individual who is a clear *Enterprising* type may tend to be extraverted, and a person who is a clear *Artistic* type is likely to be more open to new experiences.

Personality dimensions and vocational interest are the two main non-cognitive measures of individual difference, which can be portrayed in the field of Psychology. They mutually play a vital part in discerning human behaviour, because they impact motivation and the choices an individual makes. Comprehending the foundations of shared and unique variances amid the attributes that encompass these two domains offers a more holistic understanding of basic human motivations. The exact nature of the structural relationship between interests and personality has escaped even though the interrelationship between interests and personality has in general been understood (Mount et al., 2005). For this reason, further exploration is needed, and focus needs to be given to other personality measures, such as the OPQ and the 15FQ+. From the present study, it can be concluded that there is an interrelationship between the OPQ, the 15FQ+, and the SDS. In some cases, there are strong relationships, while others are moderate, but further investigation into the magnitude of these relationships needs to be done, in order to better understand the interrelationship between the OPQ, the 15FQ+, and the SDS.

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