Personality as a Predictor of Risk-Taking Behaviour

by

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Dissertation

submitted in fulfilment of the requirements for the degree

MASTER OF ARTS
(PSYCHOLOGY)

in the

FACULTY OF HUMANITIES

at the

UNIVERSITY OF JOHANNESBURG

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July 2012

ACKNOWLEDGEMENTS

I would like to whole-heartedly thank the following people for making this dissertation possible:

My family, for providing me with endless support during this process. Words are not adequate to express my sincerest gratitude.

My supervisor and mentor, Deon de Bruin, for all the knowledge he has imparted on me over the last couple of years.

My co-supervisor, Graham du Plessis, for his willingness to become a part of this project, and for being so prepared to help, even at a moment's notice.

My colleague, Nicola Taylor for assistance with the formatting.

Annien Wium, for her unwavering support, friendship and assistance.

Jennifer Charlton, for reading and correcting my work.

SUMMARY

The present study was conducted to investigate the relationship between personality and risk-taking behaviour in the South African context. Personality was measured with the Basic Traits Inventory (BTI), an assessment specifically developed to measure the broad dimensions of the five factor model of personality (John & Srivastava, 1999) in South Africa. The five dimensions on the BTI have the same names as the well-known five factor model, namely: Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. The primary objective of this study was to investigate the underlying personality structure across ten different forms of risk-related behaviour. The risk behaviours included smoking, alcohol consumption, illegal drug use, sexual promiscuity, thrill-seeking activities, gambling, physical violence, romantic infidelity and other behaviours that may have led to a respondent being arrested. Given South Africa's unique population, a further objective of this study was to examine the degree to which the results from the study would be in line with those reported in so-called Western, Educated, Industrialised, Rich and Democratic (WEIRD) societies.

The sample consisted of 683 respondents, all second-year students from a bilingual (Afrikaans and English) university in Johannesburg. There were 142 men and 538 women in the sample. Three of the respondents' gender was unknown. There were 425 White respondents, 120 Black respondents, 83 Indian respondents, 46 Coloured respondents and nine respondents who did not specify any population group. Respondents' mean age was 20.99 years with a standard deviation of 5.10 years. The sample was not representative of the South African population, with men being underrepresented and White respondents overrepresented in comparison to other population groups. A multivariate technique, Descriptive Discriminant Analysis, was used to analyse personality differences across groups. The groups were formed based on the frequency with which individuals engaged in the

different risk-behaviours. Post-hoc analyses allowed for a closer examination of group differences.

The results revealed that a single, statistically significant discriminant function emerged for all ten of the risk variables with the exception of one, for which two possible discriminant functions were identified. This showed that different combinations of the five personality factors were, to some extent, able to account for group separation on each of the risk variables. Considering the results as a whole, some interesting findings were revealed. It became evident that no single personality structure exists across the different risk-variables of this study. It was clear that some personality factors were more important, whereas others were less important, depending on the type of risk-behaviour being considered. Despite these seeming differences, important patterns of personality emerged across the risk-variables. Conscientiousness, and in particular, Extraversion were identified as the most salient predictors of the risk-behaviours in this study, although important contributions were also made by the remaining personality factors. Conscientiousness was further found to be the most important predictor of health-risk behaviours such as smoking, alcohol consumption, and drug use. In general, Openness to Experience, Agreeableness, and Neuroticism appeared to be more selectively associated with specific risk-behaviours when compared to Extraversion and Conscientiousness.

Overall, the findings reported in this study were largely in line with those reported in so-called WEIRD countries. The results of this study further supported the generalisability of prior research regarding the relationship between personality and risk-taking. It also demonstrated the utility of the five factor model as a promising predictor of risky behaviour. For future research it is recommended that the facet-scale level of the BTI be used to further investigate the personality-risk relationship.

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CHAPTER 1: INTRODUCTION

1.1 Problem Statement

It is evident from simple observation that individuals vary in the degree to which they are willing to engage in risk-taking behaviour. Whereas some individuals appear to be risk averse and try to avoid situations they perceive to be risky, other people deliberately choose to engage in behaviours with less certain outcomes. But why would some individuals purposefully decide on a course of action that could possibly end in disaster? Why shun safety and security to engage in behaviours where the risks for perilous outcomes are exponentially higher? For people averse to risk this is difficult to understand.

One could argue that people take risks because it frequently results in positive outcomes. Stated differently, taking risks might be worthwhile due to the potential for substantial reward. For example, taking a financial risk to start a new business venture may result in great financial wealth. Indeed the pay-off can be staggering when considering some extreme cases of entrepreneurial success, such as, for example, Anton Rupert's success with Rembrand, or Steve Jobs' success with Apple.

Risk-taking can also have many other positive outcomes, such as the gaining of political power, social esteem, romantic partner(s), or physical exhilaration (Trimpop, 1994). By contrast, risky decisions may go wrong and result in the loss of financial security, impaired health, and the overall reduction in long term well-being or even death, depending on the particular type of risky behaviour (Trimpop, 1994).

Despite the benefits that may result from risk-taking, the benefits alone do not explain why some individuals appear to be attracted to risk-related behaviours whereas others consistently try to avoid them. What are the driving forces of risk-taking behaviour? If an individual

consistently engages in high risk behaviours, it would suggest that internal dispositional factors are responsible for the behaviour (Zuckerman, 2004). Thus, if risk-taking behaviour manifests relatively consistently over time, it could likely be attributable to the stable influence of personality. If personality does indeed underlie risk-taking, one could, to some extent, expect pattern-like behaviour with regards to the frequency and degree of intensity with which such behaviour manifests. This might reflect a relatively stable, internal influence on behaviour, characteristic of personality (Nicholson, Fenton-O'Creevy, Soane, & Willman, 2005). Thus, one would expect some people to be inclined toward risk-taking in the same way that some people are inclined toward extraversion and vice versa. Such a conceptualisation of risk-taking seems to match everyday observation.

If an individual's personality can indeed account for his/her propensity to engage in risk-taking behaviour, why does it matter? Is there a benefit to knowing what aspects of personality are most predictive of particular forms of risk-taking behaviour? It is indeed important because risk often comes at a price (Bernstein, 1996). It matters because decisions involving risk frequently end in personal disaster and have financial implications at various levels of society (Nicholson et al., 2005).

For example, every year countless people die in traffic accidents due to unnecessary forms of risk-taking such as speeding, drinking and driving, or just by being reckless on the road. According to the World Health Organisation (WHO), traffic accidents are a leading cause of death worldwide (WHO, 2008). In South Africa alone, around 13 000 people die annually from traffic accidents with an estimated cost of almost R14 billion to the South African economy (Road Traffic Management Corporation, 2008).

Similarly, many unnecessary deaths result from individuals not abiding by the health and safety protocols of industrial occupations (Haupt & Smalwood, 2005). In an attempt to

quantify the costs of industrial deaths, Haupt and Smalwood found that 26 per 100 000 workers die in fatal accidents per year, 1186 million days of work are lost to general accidents, and there is an additional indirect cost of around R3 billion in the construction industry alone.

Equally disturbing are statistics around health-risk behaviours. For example, Sitas et al. (2004) found that 8% of all adult deaths in South Africa were caused by smoking , and on a global scale, one out of ten deaths can be attributed directly or indirectly to smoking (WHO, 2008).

The role of alcohol abuse in society is particularly destructive. For example, Schneider, Norman, Parry, Plüddemann, and Bradshaw (2007) showed that 7.1% of deaths in South Africa are alcohol related, resulting in around 1.1 million life-years lost annually. Moreover, alcohol has been linked to multiple types of criminal behaviour including homicide, sexual violence, domestic violence, assault, child abuse, and drinking and driving (Schneider et al., 2007).

Further, in South Africa, unsafe sexual practices are a massive problem with regards to the prevention and management of HIV and AIDS. According to Statistics South Africa, the number of AIDS-related deaths reported for 2011 was 257 910 which represents 43.6% of the total number of deaths for the year (Statistics South Africa, 2011). A further 316 900 new infections were reported for adults 15 years and older, and there were 63 600 new infections among children (Statistics South Africa, 2011). A further consequence of people dying from AIDS-related illnesses is the 2.1 million AIDS orphans that were left behind in 2011 alone (SSA, 2011).

Even though not all of the above-mentioned deaths can be ascribed to risk-taking behaviour, there can be no doubt that risk-related actions contributed either directly or indirectly to a

vast proportion of these unnecessary deaths. As such, it is critical to understand the internal drivers of risk-taking behaviour, since situational efforts to constrain and discourage risk-related behaviours are limited in their effect. Consider for example, the health and safety procedures in industrial settings; traffic rules related to speeding or drinking and driving; the health warnings on packets of cigarettes; and campaigns to discourage and warn against sexually transmitted diseases such as HIV and AIDS. A greater understanding of the internal dispositional determinants of risk-taking, such as personality, has the potential to significantly improve our ability to identify, predict and manage risk-taking behaviour.

For example, a better understanding of those factors that determine a person's propensity to engage in risk-taking could contribute significantly to organisational risk management programs (Bernstein, 1996; Nicholson et al., 2005). It could enhance prevention and intervention programs regarding health management since six of the top ten causes of death are directly or indirectly related to behaviours that pose serious health risks (WHO, 2008). Moreover, it could be useful from a crime preventive and correctional perspective, based on the established relationship that has been found to exist between risk-taking behaviours and delinquency, antisocial behaviour and crime in general (Swogger, Walsh, Lejuez, & Kosson, 2010).

Considering the aforementioned examples of risky behaviour, as well as the many not mentioned here, it should be clear that there is a great need to understand risk-taking behaviour. There is potential to save thousands of lives and to ease the burden on the economy. Moreover, this knowledge can help to improve the social fibre of the population in terms of helping to create a safer social climate, and a society free of disease and substance dependency. In turn, this helps to create families where parents are present and healthy, and can support families in the broadest sense of the word.

It is therefore critical to further increase our understanding of risk-taking behaviour by investigating the particular role that personality plays in this construct. Given that people take risks in so many different facets of life, it would be extremely useful to have a nuanced comprehension regarding the personality structure underlying risky behaviour.

There is another important reason to investigate risk-taking behaviour within the South African context specifically. Risk-taking behaviour and its psychological correlates (e.g., personality), like most other psychological phenomena, have been investigated primarily elsewhere in the world (Henrich, Heine, & Norenzayan, 2010). This is problematic given that most of what is known about psychology today – not only risk-taking and its psychological correlates – is generalised from a very specific knowledge base in societies known as Western, Educated, Industrialised, Rich and Democratic (WEIRD; Henrich et al., 2010).

Henrich et al. (2010) demonstrate that the implicit assumption within psychology - that there is very little variation across human populations – is flawed, by making two important points in particular. First, they show that WEIRD populations, from which most generalisations about human behaviour are made, are some of the least representative populations. Second, they demonstrate this by showing differential results in some of the most fundamental aspects of psychology including "visual perception, fairness, cooperation, spatial reasoning, categorisation and inferential induction, moral reasoning, reasoning styles, self-concepts and related motivations, and the heritability of IQ" (Henrich et al., 2010; p. 1). Given these findings, it is reasonable to question whether what we know about the psychology underlying risk-taking can be applied to the African context and South Africa in particular.

Although South-Africa by no means represents a WEIRD society, it is not completely non-WEIRD either. It can also not be considered a truly representative country of Africa either. A few points are highlighted to demonstrate some of the unique characteristics of the South

African population. First, despite the majority of South Africans being indigenous Africans, who can further be differentiated in terms of culture and language, the population also contains substantial White, Indian, and so-called Coloured (mixed race) groups which can also be divided further in terms of culture and language. Even though the White population represents a minority group in the total population, the dominant influence they have had on South African life for the past 300 years has introduced a great deal of Western influence on the indigenous cultures of the country (Giliomee & Mbenga, 2007). Similarly, African culture has had an influence on the other cultures in the country, although arguably to a lesser extent.

Second, South Africa also has a well-established industrial economy based on Western capitalist principles and has had a liberal democracy for the past 17 years. However, its liberal constitutional democracy can be considered a new occurrence given its relatively recent introduction, which means that the concept is not yet well entrenched in South African society.

A further problem is that during apartheid, the advantaged White group received a good Western style education whereas other groups, specifically Black South Africans, received little or inferior quality education. In sum, it should be clear that the South African population represents a unique and diverse conglomeration of individuals, neither representative of WEIRD societies nor typical African societies. At best, it could be said to contain strong elements of each. However, the heterogeneity of the population provides a richness of human diversity which makes South Africa a very important place for research, given the problem of a primarily WEIRD psychological knowledge base.

In summary, the destructive potential of different types of risk behaviour on many levels of society demonstrates a need to be able to understand, explain and predict such behaviour.

Having the ability to effectively manage risk behaviour has the potential to improve society at the level of the individual, organisation and economy. Investigating the psychology underlying risk-taking behaviour is crucial in South Africa given its uniqueness in comparison to typical WEIRD societies. It is therefore imperative to determine whether current knowledge on this topic can be generalised to the South African population.

1.2 Aim and Objectives

The objective of the present study is to investigate the relationship between personality and risk-taking behaviour. The main objective of the study is to investigate the relationship between personality, as measured by the Five Factor Model (Costa & McCrae, 1992), and a range of risk-related behaviours. The purpose of this is to identify those aspects of personality that can facilitate our understanding of the complex processes underlying risky behaviour. A further purpose is to determine whether personality is uniquely related to each type of risk behaviour or if a particular pattern of personality traits underlie most types of risk behaviour. To ensure that the psychological constructs measured make sense within the South African context, a comprehensive measure of personality, developed and validated specifically for this context, will be used in the present study. The findings obtained in this study will also be compared to previous findings reported in so-called WEIRD societies.

1.3 Overview of the Chapters

Chapter 1 presents the problem and purpose of the present study. The rationale for conducting the present study is presented, followed by the aim and objectives of the study.

In Chapter 2, the development of the Five Factor Model (FFM) is discussed. The history of the model is presented, followed by a review of the literature concerning the

conceptualisation of each of the five factors. The Basic Traits Inventory (BTI), a South African developed personality assessment based on the FFM is introduced.

Chapter 3 explains the construct of risk-taking behaviour. Research on what is currently known about this construct is reviewed. This is followed by a discussion of sensation seeking, a trait thought to underlie much risk-related behaviour. Lastly, the personality research related to each of the risk variables investigated in the present study is presented individually.

In Chapter 4, the steps followed in the execution of the study are presented. Descriptive information of the sample is presented along with the psychometric properties of the BTI. The statistical technique, Descriptive Discriminant Analysis (DDA) is explained and the survey used to gather risk data is reproduced.

Chapter 5 presents the results from the DDA for each of the ten risk-behaviours investigated in the study. The chapter concludes with an at-a-glance summary table, to put the results into perspective.

In Chapter 6, the results reported in Chapter 5 are discussed. The results obtained in the present study are compared to previous findings and the utility of personality as a predictor of risk-behaviour is considered. The limitations of the study are discussed, and recommendations for further research are made

CHAPTER 2: THE FIVE FACTOR MODEL OF PERSONALITY

In order to measure personality, this study makes use of a questionnaire that was designed to explicitly measure the FFM of personality (Costa & McCrae, 1992). The aim of this chapter is to present the development of this model through a discussion of its history. Each of the five factors will be discussed, and the scales of the Basic Traits Inventory (BTI) will be introduced. Some criticisms of the model will be addressed in the last section of the chapter.

2.1 The Development of the FFM of Personality

From a historical perspective, the three major schools of psychology that have dominated theories of personality are psychoanalytic, behaviourist and humanistic (McCrae & Costa, 2002). Psychoanalytic theories (largely grounded in Freudian thinking) focus on the unconscious motivations of the individual, which are deduced from secondary sources of information including dreams, fantasies and accidental slips of the tongue (Norcross & Prochaska, 2009). The behaviourist school emphasises observable behaviour and those factors determining behaviour such as the situation, an individual's history and expectations of reinforcement (Meyer, Moore, & Viljoen, 2002). In contrast, the humanistic approach to personality identifies the limitations and inherent biases present in these methodologies, and stress our capacity to love, think, and develop as human beings (McCrae & Costa, 2002).

Although these theories are able to demonstrate how people are similar and different, their focus on individual differences tends to be secondary to other facets of the theory. Moreover, the individual differences relevant to each theory are very limited in focus. Psychoanalysis for example, may stress neuroses and impulse control in describing different degrees of maladjustment whereas the humanists may be interested in people's levels of motivation (McCrae & Costa, 2002). Indeed, in Maddi's (1996) well known and comprehensive review

of all major personality theories, he refers to the individual differences contained in each theory as peripheral characteristics. These are discussed separately to the core characteristics believed to be central to the theory. Thus, these personality theories each focussed on specific traits to the exclusion of others and no one theory was able to provide a comprehensive account of individual differences. An approach was therefore needed that could provide an integrated and comprehensive picture of the individual differences present in human personality.

This is the focus of the trait psychological approach to personality in which individual traits are identified and then used to systematically build a more comprehensive theory of personality. Traits are considered as the lowest, most basic level at which personality can be studied. For example, McAdams (1995) argued that there are three different levels at which personality can be studied. The trait level is the most basic, which he referred to as "the psychology of the stranger" (McAdams, 1992, p. 353), since it provides only a dispositional description of the individual. The second level refers to the personal concerns of the individual such as motivational or developmental aspects relevant at a particular time of life. The third level pertains to the individual's identity within a larger life story (McAdams, 1995). Given that a trait level measure of personality will be used in this study, only the first level of McAdams' (1995) hierarchy is discussed further in this chapter.

McCrae and Costa (2002) define traits as "dimensions of individual differences in tendencies to show consistent patterns of thoughts, feelings and actions" (p. 25). According to Derlega, Winstead and Jones (2005), traits have the following characteristics:

- They are dimensions on which people can score high, low or medium when measured on a continuum.

- They are not determinants of behaviour but rather tendencies to behave in a particular way depending on a given context.
- They are recognised because they create consistent patterns of behaviour.
- They manifest pervasively in an individual's thoughts, feelings and actions.

These criteria represent the fundamental indicators in terms of what traits look like and how they can be recognised. The definition and description also implies that people can be ranked on a particular dimension, for example, shyness or anxiety, by the degree to which they manifest the trait.

When reviewing the literature, it quickly becomes evident that trait psychology has a rather troublesome history. Four decades ago, Goldberg (1971) noted a phenomenal growth in the number of personality traits postulated and the concomitant number of scales that were developed to measure them. This problem was compounded by the fact that many of these scales had different names, but measured the same constructs, whilst semantically identical scale names often measured different constructs (John & Srivastava, 1999). The sheer number of traits and scales studied, and the overlap between them made it extremely difficult for the field to advance in a constructive and meaningful manner. What trait psychology needed was a structure that would facilitate the study of vast numbers of traits in a simplified but meaningful way. It needed a taxonomy similar to that found in the natural sciences.

According to John, Angleitner and Ostendorf (1988), the purpose of a taxonomy in personality psychology is to provide a "systematic framework for distinguishing, ordering and naming individual differences in people's behaviour and experience" (p.172). Such a framework would enable the creation of personality domains that could be studied meaningfully rather than attempting to study each of the human attributes individually. Furthermore, a taxonomy of traits and attributes would help to systematically advance our

knowledge since it would facilitate the ready and effective communication of research findings among personality researchers. This would be achieved by providing empirical research with a common language. However, personality taxonomies remained a contentious issue because "the world did not present itself in neat little packages" (Gould, 1981, p. 158). Today, after many years of research, it appears that the FFM of personality or, the so-called 'Big Five' personality factors has managed to create some level of consensus concerning such a taxonomy among researchers in the field. The development of the FFM can be traced back to the lexical approach of personality description (Taylor, 2004). John et al. (1988) observe that the basic assumption underlying this approach is that "those individual differences that are most salient and socially relevant in people's lives will eventually become encoded into their language; the more important such a difference, the more likely it is to become expressed as a single word" (p. 174).

This idea was first expressed by Klages (1926) and was subsequently elaborated by Allport and Odbert (1936), Cattell (1943), Norman (1963), and Goldberg (1982). The assumption was that one needed to look no further than the dictionary to find a comprehensive list of attributes with which to describe people in any given language. From a taxonomic perspective, this would imply that a personality taxonomy could be derived from a complete list of natural language terms rather than having to create one anew (John, 1990).

In line with the lexical approach, Allport and Odbert (1936) set about extracting all the behavioural terms that could be used to distinguish between people from an English dictionary (*Webster's New International Dictionary, 1925*). This vast effort meant working systematically through the 550 000 words contained in the dictionary and extracting any terms that can be used to "distinguish the behaviour of one human being from that of another" (Allport & Odbert, 1936, p. 24). The result of this process was a list comprising nearly 18 000 terms.

Daunting as the task appeared to be, Allport and Odbert (1936) sought to simplify their work by creating a structure that would reduce the list into meaningful and manageable semantic clusters. They divided the total list of descriptive terms into four major categories. The first category was defined as "generalized and personalized determining tendencies – consistent and stable modes of an individual's adjustment to his environment" (p. 38). From their list, 4 504 personality traits were included in this category. Examples included words like *aggressive, altruistic and sociable.*

Words descriptive of temporary mood states or activities were included in category two. These words appeared to describe states of a short-term, fleeting nature (Taylor, 2004). A total of 5 226 words were allocated to this category. Examples included terms like *abashed, rejoice, frantic and confused* (Allport & Oddbert, 1936, p. 38).

The third category was defined as "weighted terms conveying social and characterial judgments of personal conduct, or designated influence on others" (Allport & Oddbert, 1936, p. 38). This category comprised 5 226 terms such as *insignificant* and *dazzling,* that were thought to reflect social evaluations rather than internal dispositions. Terms of this type were not considered to be descriptive of an actual personality trait but rather the consequences thereof (Pervin & John, 1997).

Category four contained all words that could not be allocated to any of the prior groups and were labelled "metaphorical and doubtful" (Allport & Oddbert, 1936, p. 38). Descriptors of physical qualities such as *lean* and *redhead*, or terms describing talents like *adept* and *gifted*, and all other words that caused ambiguity were placed in this category. A total of 3 682 terms were included in this miscellaneous category.

A recurring problem in this process was that many of the terms could easily be allocated to more than one category. In order to eliminate this problem, the total list was edited by three

independent judges. However, Allport and Odbert (1936) found that each reviewer still had a preferred category to which they allocated more terms than did the others.

Raymond Cattell's (1943) work was built on the important foundations laid by Allport and Odbert. In an attempt to develop a multi-dimensional model of personality structure, Cattell first reduced their list into a more manageable size by focussing only on their first category, which contained the most stable personality trait terms. To this list he added 100 terms descriptive of temporary states which he also thought to be appropriate descriptors of personality. To further reduce the list, all terms that were similar were grouped together into clusters of synonyms. As a next step, Cattell included an antonym for each word in all the clusters. This had the effect of making each cluster more meaningful because they could now be defined based on the bi-polar characteristics of each cluster. For 25 of these clusters, no opposites could be found and remained unpaired. A criticism of this process is that the pairings were done somewhat subjectively by Cattell, making a qualitative evaluation of the pairings difficult to evaluate (John et al., 1988). The total effect of this reduction and pairing made it possible to classify 4 500 terms which resided in 160 clusters. To reduce the size of the clusters, roughly 13 terms from each cluster were extracted and a key term was chosen to summarise them. By this time Cattell had managed to halve the lists originally created by Allport and Odbert.

In order to examine the comprehensiveness of his list of personality descriptors, Cattell (1943) conducted a review of the relevant literature at the time, which included work on typologies, factor analytic studies, temperament and intelligence. He found that his list was quite comprehensive with the exception of some aspects related to emotionality, and some traits pertaining to psychotic and neurotic disorders (John, 1988). Cattell then supplemented his 160 clusters with terms of this type, but furthermore added 21 new clusters, with well-established aspects from the psychological literature which he believed to be important. The

21 new clusters comprised of one for general intelligence, nine for special abilities and 11 for areas of interest (John et al., 1988).

Despite having dramatically reduced the original work of Allport and Odbert (1936), Cattell's set of clusters was still too large. He next took his first empirical reduction step by conducting a cluster analysis (Cattell, 1943). Data were gathered for 100 adults that were rated on all 171 clusters. Correlations were calculated between 171 variables for the 100 individuals in the study. This was a monumental task at the time, but it nevertheless resulted in a matrix comprising 14 535 correlations covering 14 square feet. The criterion for cluster creation was when two variables were correlated at around 0.45. Two variables were considered identical if they were correlated at 0.84 or higher. The results from this process yielded a final set of 67 clusters (Cattell, 1943).

However, Cattell was determined to further reduce his set of clusters (Cattell, 1945). In the next round he examined psychological literature with the aim of identifying trait clusters from other research. In this process he eliminated clusters that were not confirmed by prior research. Furthermore, where two or three of his own clusters were found to overlap with clusters obtained in other research, he would merge them into one large, inclusive cluster. This process again dramatically reduced the clusters to a final set of 35 variables.

With a much reduced and more manageable variable set, Cattell (1945) attempted to identify the major dimensions of personality. The intercorrelation matrix that was used as an input for factor analysis was based on the mean intercorrelations between the 35 variables from 13 groups. In each of these groups, 16 adult male participants were rank ordered by two judges on all the variables. From the factor analytic results, Cattell extracted and interpreted 12 factors. These 12 factors, and an additional four factors, which were said to be a function of

the questionnaire domain, were later used in the development of the 16PF (Cattell, Eber, & Tatsuoka, 1970).

According to Cattell (1945), there is also a high degree of correspondence across various methods like other ratings, self-report and objective test data. However, research by Becker (1960) and Nowakowska (1973) has brought these claims into question. Furthermore, research by Digman and Takemoto-Chock (1981) used Cattell's own correlation matrices but they could not confirm the same number of factors, or factors with similar compositions. They finally concluded that "Cattell's original model, based on the unfortunate clerical errors...cannot have been correct" (Pervin, 1994, p. 104).

Cattell's pioneering work stimulated interest in the structure of trait ratings among researchers worldwide for many decades (John et al., 1988). For example, Fiske (1949) used 22 of Cattell's 35 variables in a study with 128 clinical psychology trainees for which data from multiple raters were factor analysed. Results across different raters were found to be very similar, and pointed to five factors in each case (Fiske, 1949).

Similarly, Tupes and Cristal (1961), who also used variables from Cattell's (1945) work, conducted a study that comprised of eight samples with diverse participants including airmen, undergraduate students and experienced clinicians, each with multiple rating scores. They consistently found "five relatively strong and recurrent factors and nothing more of any consequence" (1961, p. 14). They named these factors and provided descriptive terms in each case as follows:

(I) Surgency (talkative, assertive, energetic)

(II) Agreeableness (good-natured, cooperative, trustful)

(III) Dependability (conscientious, responsible, orderly)

(IV) Emotional Stability (calm, not neurotic, not easily upset)

(V) Culture (intellectual/cultured, polished, independent-minded)

These five factor structures were similar to the first five factors in Cattell's solution (1945). Other studies that used Cattell's variables to a greater or lesser extent, also reported five factor structures similar to Tupes and Cristal (1961). See for example, Norman (1963), Borgatta (1964), and Digman and Takemoto-Chock (1981).

Norman's (1967) work essentially replicated and expanded the work of Allport and Odbert (1936). He also set out to compile a list of personality descriptors which he wanted to be exhaustive, precise and well-structured in order to be useful in personality theory, science, and assessment (John et al., 1988). Norman also started with a dictionary search in order to identify any attribute or behavioural terms descriptive of personality which did not make it into Allport and Odbert's original list. Overall, only another 171 terms were added to the list, rendering a total of 18 125 terms. He then set about eliminating unsuitable terms according to four exclusion criteria. The first exclusion category contained evaluative terms and quantifiers; the second category was for terms considered to be vague, ambiguous and metaphorical. The third exclusion category contained terms thought to be difficult, obscure and unfamiliar, and category four comprised of anatomically descriptive terms and those descriptive of current physical and mental conditions and dispositions.

The remaining terms were divided into three domains namely: stable biophysical traits; temporary states and activities; and social roles, relationships, and effects. Each domain was again subdivided into prime terms, moderately difficult terms, and odd and colloquial terms (Norman, 1967).

Overall, the process that Norman followed required that descriptor terms be grouped into well-defined categories after explicit exclusion criteria were applied, all based on the consensus of four judges. This resulted in a total of 2 800 terms for which Norman gathered data on 50 male and 50 female undergraduate students. The students had to rate themselves, a well-liked peer, a neutral peer, a disliked peer, as well as the social desirability of each trait term. Analysis of the data resulted in the exclusion of another 1 200 terms which were found to be unfamiliar or unclear in meaning.

A total of 1 566 terms remained, which were used in Norman's (1967) hierarchical classification system. He started by dividing the 1566 terms into 10 classes, each class representing one pole from the five factor dimensions. From this sorting process it was discovered that there were not an equal numbers of terms for the different dimensions. For example, only 64 terms could be allocated to factor IV (Neuroticism pole) whereas 274 terms were descriptive of factor II (Disagreeableness pole). Similar findings have since been reported in other research by Peabody and Goldberg (1987), who also found factor II (Agreeableness) to be the largest and factors IV (Neuroticism) and V (Openness to Experience, Culture or Intellect) to be the smallest.

Norman (1967) further divided the terms contained in the 10 categories into 75 narrow semantic clusters. For example, categories for antagonism, criticism and aggression were created for the Disagreeableness pole on the Agreeableness dimension. At the lowest level of Norman's three-tier hierarchical classification system he created synonym clusters. The 75 new categories were examined for semantic similarity and the synonyms were clustered accordingly. This process rendered a total of 571 synonym cluster sets.

In an attempt to investigate Norman's (1967) classification system, Goldberg (1982) compiled a list comprising 1 710 trait terms, after removing about 1 000 terms (nouns and

adjectives) from Norman's list of stable traits that were considered to be unacceptable. He created 75 category scales from this list, and gathered self-rating data from 187 college students for these terms. The results from factor analyses found that a robust five factor structure emerged irrespective of the extraction method and rotation.

Goldberg (1982) noticed some irregularities in the way Norman's mid-level semantic categories were compiled. He rectified the problem in his own work by implementing an evaluation-explicit method developed by Peabody (1970), which resulted in 47 semantic clusters. These clusters were treated as scales and rated by the same sample of college students, which again resulted in changes to his taxonomy. In fact, Goldberg had multiple rounds in his taxonomic research, resulting in his work being regarded as some of the most comprehensive and meticulous contributions to the field of trait psychology. Overall, his taxonomy resulted in 893 adjectives and 42 categories. Important, however, was the recurrent finding of a robust five factor structure across the many rounds of his taxonomic research, which he eventually referred to as the Big Five factors of personality (Goldberg, 1990). When considering all the aforementioned research conducted according to the lexical approach of personality description, Goldberg succinctly summarised the conclusions that can be drawn from this body of work in the following statement:

> Consequently, it now seems reasonable to conclude that analysis of any reasonably large sample of English trait adjectives in either self or peer descriptions will elicit a variant of the Big-Five factor structure, and therefore that virtually all such terms can be represented within this model. (p. 1223)

2.2 Five Factor Questionnaires: The NEO Personality Inventory–Revised (PI-R) and BTI

An integrative framework for the FFM eventually came in the form of the NEO-Personality Inventory (PI; Costa & McCrae, 1992). Both Paul Costa and Robert McCrae's primary research interest was the study of aging, and the NEO PI was originally developed to study age related personality effects (McCrae & Costa, 2002). Their work now represents the second tradition that gave rise to the FFM, which was based on the analysis of questionnaires. This line of research started with Eysenck's and Eysenck's (1964) work on Extraversion and Neuroticism which was later dubbed the "Big Two" by Goldberg and paved the way for the "Big Five" factors of personality (McCrae & John, 1992).

Costa and McCrae (1992) included Extraversion and Neuroticism in their first questionnaire although they also included Openness to Experience after a factor analysis of Cattell's 16 primary factors revealed three higher order factors. However, in the early eighties, they came to realise that these factors resembled three of the Big Five factors of personality that emerged from the lexical approach. They also realised that their three factor trait model did not represent a comprehensive measure of personality when compared to the FFM that had emerged from the lexical tradition. They subsequently developed Agreeableness and Conscientiousness scales and were able to show that the five factors measured by their questionnaire converged with adjective-based measures of the Big Five (John, 1990). The revised version which included Agreeableness and Conscientiousness in their questionnaire is known as the NEO PI-R (Costa & McCrae, 1992).

Costa and McCrae's (1992) process of development can be described as "a rational or deductive approach to test construction, coupled with extensive analyses of the internal structure of the item pool" (Briggs, 1992, p. 274). They mainly used factor analyses

(principal components analysis) to evaluate the tool and to guide their progress. According to Briggs, most factor analysts focus on internal criteria such as scree tests and simple structure in their research. By contrast, Costa and McCrae were guided by external criteria such as convergent and discriminant validity coefficients in their interpretation of data (Briggs, 1992).

The NEO PI-R consists of 181 items that measure the five broad dimension of the FFM. For each of the five factors, lower level facet scales were developed. These measure more specific aspects of the broader domain (McCrae & Costa, 2003). Accordingly, each broad dimension is measured by 48 items that divide into six facet scales comprising eight items each (Costa & McCrae, 1992). Two versions are available, Form S and Form R, the former being the self-report version and the latter allowing for rating by someone else. Both forms are identical, except that on Form R, the 'I's' were changed to 'he' or 'she' (Briggs, 1992). The NEO PI-R facet scales are presented in the next section where each of the five factors is discussed separately.

In South Africa, Taylor and De Bruin (2006) developed a questionnaire that is an explicit operationalization of the FFM in the South African context. This questionnaire, the BTI, contains 193 items with a 5-point Likert-type response format. Bearing South Africa's unique demographic context in mind during the development of the questionnaire, items were specifically evaluated for appropriate content. Another major consideration was to maximise the simplicity and clarity of language use on the BTI. This was done to facilitate readability and to maximise understanding because the questionnaire is in English, which is a second language for most South Africans (Taylor, 2004). Thus, like the NEO PI-R, the BTI was developed to comprehensively measure the Big Five personality dimensions of Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness. In the next

section, the facet scales for both the NEO PI-R and the BTI will be presented so that the similarities and differences between the two questionnaires become apparent.

2.2.1 Neuroticism (N)

There appears to be consensus regarding this dimension among researchers (Mayer & Sutton 1996; McCrae & John, 1992). The construct of Neuroticism is firmly rooted in psychopathology, and the preoccupation of psychologists with pathology has led to the development of countless scales that measure Neuroticism (McCrae & Costa, 1987). A central component of Neuroticism appears to be negative emotionality, which is characterised by experiences of anxiety, anger, depression and embarrassment (Tellegen, 1985). Some researchers also consider low self-control or impulsive behaviours such as overeating, smoking and drinking as facets of Neuroticism (McCrae, Costa, & Busch, 1986). The additional component of irrational beliefs, such as inappropriate self-blame have also been advanced as important aspects of Neuroticism (Teasdale & Rachman, 1983).

Watson and Clark (1984) evaluated scales thought to be different in nature including Neuroticism, Ego Strength, General Maladjustment, Repression-Sensitisation and Social Desirability, and demonstrated that they could all be integrated into the broader construct of Negative Affectivity. They considered Negative Affectivity to be a pervasive mood disposition. Thus, the manifestation thereof is not depended on external stressors but should be quite consistent across time. They further stress that Negative Affect does not necessarily refer to how effectively individuals are able to manage themselves, but rather how they feel about themselves and their world. According to Watson and Clark (1984), individuals high on Negative Affect are "particularly sensitive to the minor failures, frustrations and irritations of daily life...and have a tendency to dwell upon and magnify mistakes, frustrations, disappointments and threats" (p. 466).

For Costa and McCrae (1992), the following six traits are considered important indicators of Neuroticism and were included as facet scales on the NEO PI-R: *Anxiety, Angry Hostility, Depression, Self-Consciousness, Impulsiveness,* and *Vulnerability*. Taylor and De Bruin (2006) considered the following four facets to be salient indicators of Neuroticism on the BTI:

- *Anxiety* refers to an individual's tendency to be nervous, apprehensive and tense in general.
- *Depression* is reflected by the tendency to experience guilt, sadness, and hopelessness, and to feel discouraged and dejected.
- *Self-consciousness* is reflected by the degree to which a person is sensitive to criticism, and has frequent feelings of shame and embarrassment.
- *Affective instability* refers to the tendency to become upset easily, and experience feelings of anger, bitterness and be emotionally volatile.

According to Watson and Clark (1997), Negative Affect and the tendency to experience positive emotions are not opposite poles of one factor. Instead, they are considered to be independent affective dimensions. This means that they are mutually exclusive feeling states and can therefore manifest at the same time. This notion is elaborated further in the discussion of Extraversion.

2.2.2 Extraversion (E)

In contrast to Neuroticism, there appears to be less agreement regarding the core of the Extraversion dimension (McCrae & John, 1992). According to Costa and McCrae (1992), extraverts typically enjoy being with other people in groups and gatherings, and tend to be "assertive, active and talkative…they like excitement and stimulation and tend to be

cheerful...upbeat, energetic and optimistic" (p. 15). Eysenck and Eysenck (1975) had a similar conception of Extraversion, but their definition went further to include aspects of impulsivity and appeared to characterise extraverts as somewhat less socialised than Costa and McCrae characterised them (Watson & Clark, 1997). Other researchers also consider extraverts to be more ambitious and achievement-oriented and included these aspects in their own models (Hogan & Hogan, 2007; Tellegen, 1985).

The Extraversion and Agreeableness factors of the FFM encapsulate the major dimensions of interpersonal theory or the so-called "interpersonal circumplex" (McCrae & John, 1992 p. 195; Watson & Clark, 1997; Wiggens, 1979). Accordingly, the major dimensions of interpersonal theory are Dominance and Affiliation, however there appears to be less consensus on where to locate Extraversion on this axis. Some researchers argue that Extraversion is best characterised by Dominance (Goldberg, 1990; Wiggins, 1996) whereas others believe that Extraversion is best represented by both Dominance and Affiliation in roughly equal proportions (McCrae & Costa, 1989). Similar constructs have emerged in other research regarding Extraversion and are considered to be salient aspects of the construct (Tellegen et al., 1988). For example, Dominance can be identified by the Surgency component of Extraversion in Hogan & Hogan's (2007) model and is also reflected by the Agentic Positive Emotionality dimension in Tellegen's work (1982). Affiliation is similar to the Sociability disposition in Hogan's model and the Communal Positive Emotionality dimension in Tellegen's (1982) work.

After conducting a thorough review of the literature, Watson and Clark (1997) sought to integrate the different views and models of Extraversion. They presented a three-level model that included all the major components of existing models at the time. Accordingly, six component traits comprise the higher order dimension of Extraversion namely: *Venturesomeness* which refers to the seeking of excitement, adventure, variety and

stimulating activities in general; and *Affiliation* which refers to the characteristic sociability component in virtually all models, typically characterised by warm and friendly interactions with others. *Positive affectivity* refers to the experience of frequent and intense positive feelings characterised by being cheerful and optimistic. *Energy* refers to having high levels of energy resulting in a fast paced, busy, full and interesting life. *Ascendance* is reflected by being exhibitionistic, and displaying a tendency for being forceful, decisive and dominant. *Ambition* refers to valuing challenges, mastering tasks and achieving success, and a willingness to work hard and persevere in order to do so.

At the next level, the six facets are divided into sub-traits. For example, Ascendance is divided into Exhibitionism and Dominance, and Energy into Liveliness and Activity. Venturesomeness and Ambition are considered peripheral features of the model, because they have not been included in most of the earlier models, and because they have been found to load on higher order dimensions in other research (Costa & McCrae, 1998). They also do not appear to be correlated with each other, nor are they correlated with some of the other central components in the model (Costa & McCrae, 1992; Zuckerman, Kuhlman, & Camac, 1988, cited by Watson & Clark, 1997).

Similar to Tellegen's (1985) view, Watson and Clark (1984), also felt strongly that the core of Extraversion resided in positive emotionality. They considered positive emotionality to be the "glue" the binds the various facets of the construct together and presented empirical research in support of their view (Watson & Clark, 1997, p. 777). Positive emotionality should not be confused with the opposite of Negative Affect as discussed in Neuroticism above. For instance, enthusiastic, cheerful and optimistic people are not necessarily low on anxiety or depression. That would be dependent on the person's level of Neuroticism (McCrae & John, 1992). Positive and Negative Affect are therefore not opposites, but play central roles in both Extraversion and Neuroticism respectively.

Individuals low on Extraversion tend to be quiet, reserved, shy, silent and withdrawn (John, 1990; McCrae & John, 1992). Important however, is that low Extraversion refers more to an absence of Extraversion rather than the opposite thereof (Costa & McCrae, 1992). Thus, introverts might be reserved and have a preference for being alone, but this does not mean that they are unfriendly or suffer from social anxiety. It is also important to note that low Extraversion should not be equated with the Jungian concept of Introversion which includes a component of introspection or reflection (Myers, McCaulley, Quenck, & Hammer, 1998). This characteristic is part of Openness to Experience (Costa & McCrae, 1992; McCrae & John, 1992).

On the NEO PI-R, Costa and McCrae's (1992) view of Extraversion is similarly broad to that of Watson and Clark. Their model also includes six facet scales, but they divided Affiliation into Warmth and Gregariousnesss and moved Ambition to Conscientiousness. Extraversion is therefore measured by the following facet scales: Venturesomeness, Warmth, Gregariousness, and Positive Affectivity, Energy, Ascendance and Ambition.

On the BTI, Taylor & De Bruin (2006) considered the following five facet scales as important components in their conceptualisation of Extraversion:

- *Gregariousness* is reflected by an individual's need for frequent social interaction and having a preference for people as opposed to being alone.
- *Positive affectivity* refers to how frequently an individual experiences emotions such as joy, happiness, love, and is enthusiastic, optimistic and cheerful.
- *Ascendance* is reflected by the degree to which a person enjoys entertaining and leading or dominating large groups of people.
- *Excitement-seeking* measures a person's need for adrenaline-pumping experiences and stimulation from noisy places, bright colours or other such intense sensations.

- *Liveliness* is reflected by the extent to which a person is bubbly, lively and energetic.

2.2.3 Openness to Experience (O)

Openness to Experience is the most contentious dimension of the Big Five factors of personality (McCrae & John, 1992). This is because researchers from the lexical and questionnaire traditions differ in their interpretation of this dimension. In essence, researchers working from questionnaires postulate a much broader construct than those working with adjective trait lists (McCrae & Costa, 1997). This makes it difficult to reach a consensus concerning the fundamental nature of the construct. This in turn led to many names for factor V, each reflecting a slightly different conceptualisation of the construct.

Tupes and Cristal (1961) preferred the term Culture. This reflected some of the components they identified in their research with a connotation of being intellectually cultured, which was likely responsible for the chosen term. However, McCrae and Costa (1997) argued that their use of the term Culture is more reflective of an individual's breeding and liberal education than of broad personality description. The extent to which these factors are indeed related to Openness to Experience has also been investigated, and in both cases, only modest correlations were reported for the role of education and family influences (McCrae & Costa, 1988).

Another popular term used for this factor is Intellect or some variation thereof (Costa & McCrae, 1997). Intellect is suggestive of cognitive ability and many of the words used as descriptors of this factor in the lexical tradition point to intelligence, such as knowledgeable, intelligent and analytical (Angleitner & Ostendorf, 1989; Goldberg, 1990). Despite the fact that only Openness to Experience, from the five factor dimensions, is modestly related to actual measures of intelligence, Costa and McCrae (1997) objected to the use of the term. First, they criticised the lexical approach for too narrow a selection of terms for inclusion into

factor analytic studies, because there is no counterpart for broader concepts related to Openness such as "novelty-seeking, or need for variety" on adjective trait lists (p. 832). Second, they argue that Intellect as a label is too narrow because other more diverse facets of the construct, such as being more easily hypnotisable (Tellegen & Atkinson, 1974 cited by Costa & McCrae, 1997) is in no way reflected, or could feasibly be associated with the term. Third, Intellect refers to the ability to quickly grasp new ideas. However, individuals high on this dimension also enjoy new information and experiences for their own sake and actively pursue novelty. Fourth, they consider the term Intellect to be problematic for feedback purposes. It would be difficult to label the opposite of Intellect, or low scorers on the construct, whereas referring to closed individuals as the opposite of Openness, should pose no problem. Fifth, they argue it would obstruct research, since it would be confusing to investigate the effect of intelligence on Intellect, if Intellect is considered to be reflective of intelligence.

From the questionnaire tradition, McCrae and Costa (1997) postulated the broader, more encompassing term of Openness to Experience. The term was first coined in one of their earlier studies, in which they factor analysed Cattell's (1945) 16PF data, and named one of the three identified factors as such. The other two factors were Neuroticism and Extraversion, and are discussed elsewhere. The idea to name this factor Openness to Experience was not completely random. For example, McCrae and Costa (2002) cite the influence of Rogers (1961) who proposed that openness to inner experience was important for good mental health. This came after his discovery that many of his patients were out of touch with their own feelings. McCrae and Costa (2002) also point to a measure of openness to fantasy and aesthetic experience which was developed by Coan (1974) as well as Tellegen and Atkinson's (1974) work on "the capacity to become deeply involved in experiences" (p. 35),

which they referred to as an openness to absorbing experience. (cf. McCrae, 1987; McCrae & Costa, 2002).

On the NEO PI-R, six facet scales were included as part of the Openness to Experience factor namely: Fantasy, Aesthetics, Feelings, Actions, Ideas, and Values. Taylor and De Bruin (2006) considered the following five facets to be important indicators of Openness to Experience on the BTI:

- *Aesthetics* is reflected through an appreciation of art, music, poetry and beauty, without necessarily having artistic talent.
- *Actions* refer to an individual's willingness to try new and different activities.
- *Values* are reflected by the degree to which a person is willing to re-examine social, political and religious values as opposed to blindly accepting authority and honouring tradition.
- *Ideas* refers to being intellectually curious, willing to entertain new or unconventional ideas, and relishing philosophy and brain-teasers.
- *Imagination* refers to having a vivid imagination, enjoying fantasies, and being a creative thinker.

2.2.4 Agreeableness (A)

Over decades of research in psychology, many constructs have been identified that can be considered part of the larger construct of Agreeableness (Graziano & Eisenberg, 1997). From the lexical tradition, an Agreeableness type of construct appeared in the early work of Allport and Odbert (1936). Their category three terms contained evaluative descriptors like amiable and agreeable. This trend has continued throughout the lexical history as described previously.

In a thorough review of the literature, Graziano and Eisenberg (1997) referred to the lexical traditions' discovery of Agreeableness as a cognitive perspective on the construct, because the encoding of natural language terms is reflective of people's knowledge of agreeable tendencies from interdependent aspects such as language, social perception and personality. However, they view this research as descriptive, and not explanatory in nature.

Temperament has been postulated as a reason for the individual differences in Agreeableness. For example, Caspi, Bem and Elder (1989) demonstrated the stability of ill-tempered dispositions over time, and other research has shown that an individual's basic level of emotionality and aggression determines to what extent it is possible to sooth or placate them after being stressed or emotionally aroused (Buss & Plomin, 1984).

Neuropsychological models have also been put forward to explain individual differences in Agreeableness (Fox & Davidson, 1984; Kinsbourne & Bemporad, 1984) as well as research concerning hostility related emotions (Costa, McCrae, & Dembroski, 1989). Differences between the approach and avoidance motives of individuals have also been implicated in Agreeableness (Jensen-Campbell, Graziano, & Hair, 1996).

According to McCrae and Costa (1987) the best way to understand Agreeableness is by examining the disagreeable pole of the dimension. As such, they describe disagreeable individuals as follows: "cognitively they are mistrustful and sceptical, affectively they are callous and unsympathetic; and behaviourally they are uncooperative, stubborn and rude" (p. 88). From a more optimistic perspective, Digman (1990) considered Agreeableness to be representative of the humane features of humanity, characterised by altruism, caring, nurturance and emotional support. Thus, the agreeable person will be sympathetic, willing to help and will expect similar behaviour from others (Costa & McCrae, 1992). Overall, a central component of this dimension appears to be an individual's ability to bond effectively

with others. However, when disagreeableness or antagonism is taken to the extreme, it may resemble sociopathy (Eysenck & Eysenck, 1975). Despite referring to two neurotic tendencies, Horney's (1945) view could perhaps be applied as an apt description of the Agreeableness construct as either moving toward people or moving against people.

The six facets included on the NEO PI-R comprising the Agreeableness dimension are: Trust, Straightforwardness, Altruism, Compliance, Modesty, and Tender-Mindedness (Costa & McCrae, 1992). Five facets were considered to be reflective of Agreeableness on the BTI (Taylor & De Bruin, 2006) namely:

- *Straightforwardness*, which refers a tendency to be frank and sincere, as opposed to deceitful and manipulative.
- *Compliance* is the degree to which a person defers to other people, inhibits aggression and is able to "forgive and forget".
- *Modesty* is reflected by the degree to which a person is humble and self-effacing.
- *Tendermindedness* which refers to individuals characterised by high levels of sympathy and concern for others.
- *Prosocial tendencies* refer to an individual's propensity to be kind, generous, helpful and considerate.

2.2.5 Conscientiousness (C)

Conscientiousness can refer to being diligent and thorough or to being governed by one's conscience, although these two concepts appear to be correlated (McCrae & Costa, 1992). The construct has been labelled differently by many researchers, depending on the given set of traits being studied, for example, the Will to Achieve (Digman & Takemoto-Chock 1981), Constraint (Tellegen, 1982), Prudence (Hogan & Hogan, 2007), and Self-Control (Conn &

Rieke, 1994). From the empirical literature it seems that Conscientiousness has two broad underlying components, the first being an inhibitory or constraint dimension (Hogan & Hogan, 2007) and the second representing forward striving or a will to achieve (Digman & Takemoto-Chock, 1981). Costa and McCrae (1998) refer to the proactive and inhibitive groupings of Conscientiousness. Other than that, there appears to be no consensus on the optimal set of traits underlying the domain of Conscientiousness (Costa & McCrae, 1998; Roberts, Chernyshenko, Stark, & Goldberg, 2005). Thus, a wide variety of definitions has been proposed for the construct. This is because some researchers conceptualise the construct primarily in terms of achievement whereas others consider constraint or responsibility to be more important, and subsequently include different facet scales for Conscientiousness in their research (Roberts et al., 2005). The problem is compounded by the fact that some of the facets of Conscientiousness have been shown to be differentially related to performance criteria (LePine, Colquitt, & Erez, 2000; Moon, 2001).

Research from the lexical tradition investigating the lower order traits of Conscientiousness has identified the following traits: orderliness, industriousness, responsibility and decisiveness (Saucier & Ostendorf, 1999); meticulousness, superficiality, reliability and recklessness (Perugini & Gallucci, 1997); as well as orderliness, responsibility, industriousness and impulse control (Peabody & de Raad, 2002). Many of these traits are named differently, but measure the same construct, for example orderliness and meticulousness (Roberts et al., 2005). The most recent study following a lexical approach conducted by Roberts, Bogg, Walton, Chernyshenko and Stark (2004) found support for almost all the above-mentioned traits but also identified two new traits that have not been reported previously. They reported seven facets, namely, orderliness, industriousness, reliability, decisiveness, impulse control and two new facets named conventionality and formalness (Roberts et al., 2004).

Costa and McCrae (1992) included Competence, Order, Dutifulness, Achievement, Striving, Self-Discipline, and Deliberation as important indicators for the Conscientiousness dimension on the NEO PI-R. Research conducted by Hough and Ones (2001) resulted in a taxonomy comprising six lower order traits including achievement, dependability, impulse control, order, moralistic and persistence.

Seeking to identify the underlying structure of Conscientiousness from a questionnaire perspective, Roberts et al. (2005) conducted a factor analysis on facet scales related to Conscientiousness. They extracted all facet scales conceptually related to conscientiousness from seven well-known and comprehensive personality questionnaires which were developed from different theoretical conceptualisations, and are all psychometrically sound. They included facet scales from the NEO PI-R, 16PF, California Psychological Inventory (CPI), Multidimensional Personality Questionnaire (MPQ), Jackson Personality Inventory (JPI-R), Hogan Personality Inventory (HPI) and the AB5C scales (Roberts et al., 2005). In the absence of a unifying theory concerning the lower order structure of Conscientiousness, exploratory factor analysis was considered to be more appropriate than confirmatory factor analysis for the purpose of their study. Multiple techniques were used to determine the optimal number of factors to extract. A six-factor solution was considered superior to other solutions and the authors concluded that it "provided the most empirically and conceptually satisfactory structure for the lower-order domain of Conscientiousness" (Roberts et al., 2005, p. 119). The six factors were identified as industriousness, order, self-control, traditionalism, responsibility and virtue. Five of the six NEO PI-R traits loaded on the industriousness and order facets only, and clearly demonstrates where the NEO's focus lies. Self-control is also a familiar constraint-related construct, present in many conceptualisations of conscientiousness. The remaining facets are less familiar. According to Roberts et al. (2005), individuals high on traditionalism stick to the rules and norms of society, adhere to expectations, prefer the status

quo and will typically not challenge authority. High scorers on the responsibility scale like to be of service to others, are cooperative and dependable, whereas individuals scoring high on the virtue scale will be characterised by good or exemplary moral conduct.

On the BTI (Taylor & De Bruin, 2006) the following five constructs were considered important indicators of Conscientiousness:

- *Order* refers to the tendency to keep everything neat and tidy and in its proper place, and to be methodical.
- *Self-discipline* is reflected by the ability to start tasks and carry them through to completion and to motivate oneself to complete unpleasant tasks.
- *Dutifulness* is reflected by the tendency to stick to principles, fulfil moral obligations and be reliable and dependable.
- *Effort* refers to the setting of ambitious goals and working hard to meet them, by being diligent and purposeful.
- *Prudence* refers to an individual's tendency to think things through carefully, to check the facts and have good sense in general.

The discussion thus far has shown that the FFM of personality description is the culmination of about 75 years of evolving research. The model is firmly rooted in the lexical approach during which numerous researchers advanced the field through monumental efforts at different times in its history. Despite its late arrival, the questionnaire tradition played a pivotal role to support the FFM from a different perspective. Overall, it seems that the combined efforts from the lexical and questionnaire traditions have managed to bring about a previously unknown level of consensus among researchers concerning the basic structure of human personality. It does not, however, mean that research regarding personality structure

has ceased or that there are no criticisms of the model. Some of these issues are discussed in the next section.

2.3 Criticism of the FFM

A criticism of the FFM is its inability to provide a comprehensive account of personality (Block, 1995; McAdams, 1992; Pervin, 1994). There are other criticisms of the model, for example, that the model is atheoretical. However, only the limitations of the FFM related to its comprehensiveness as a measure of personality are considered relevant to this study and are discussed in this section. For example, McAdams (1992) argues that the FFM has six important limitations that are briefly discussed next.

McAdams (1992) considers traits to be a secondary, and subsequently less pertinent, aspect of personality. This view is akin to Maddi's (1996) theory which sees traits as comprising the periphery rather than the core dimensions of personality organisation. The essence of this criticism is that personality theories are more than the mere specification of traits.

McAdams (1992) also criticises the loss of information that occurs when one moves from the narrow and specific to the broad, more general level of abstraction. This is a result of the hierarchical nature of the model. At the most general level there are five factors within which more specific traits are located, which are then broken into their constituent parts. Since narrowly defined traits are useful for the prediction of specific behaviours (Buss, 1989) the argument is that as one moves from the specific to the general level - of only five factors - much predictive power is sacrificed.

McAdams further feels that the FFM lacks explanatory power. He considers the FFM as a descriptive rather than a causal taxonomy. Revelle (1987) originally made this distinction to differentiate between taxonomies that tend to describe recurrent behavioural patterns that are

observable and those that are biologically anchored. An example of the latter would include Eysenck's (1990) physiological explanation of extraverted behaviour or Zuckerman's (2004) concept of sensation seeking. The biological basis of both these constructs has been researched comprehensively (Eysenck, 1990; Zuckerman, 1994). This would imply that the ontological status of the FFM remains in question (Briggs, 1989; McAdams, 1992).

A further criticism of the FFM is its disregard for context. In particular, McAdams (1992) criticises McCrae and Costa's (1984) view of personality as trans-contextual. McCrae and Costa (1984) argued that despite the changing nature of life, traits are essentially unchanging. Only the way they are expressed may change over time. However, McAdams (1992) feels that this is a short sighted view. He believes that a person's situational, cultural and historical contexts are crucial elements necessary for a comprehensive understanding, and detailed description of personality. Similar concerns have been raised by other researchers who recognise the importance of environmental factors, even if the degree of influence is not yet clear (Buss, 1995; Pervin, 1994).

McAdams (1992) also questions where a person can be located in the FFM. He criticises the idea that the person is no more than a set of "generic trait scores" (p. 346). He advocates the integrative and organised nature of personality. In other words, the focus should be on the whole person. This stands in contrast to a primary focus on traits, where the person is only a means and not the end.

McAdams (1992) argues that the FFM is essentially a "psychology of the stranger" (p. 349). First, he argues that methodologically, the system of rating simple behaviours is essentially an "oversimplifying" and "economising" game with one ground rule: to get a "general, superficial and virtually non-conditional picture of your personality" (p. 350). Second, he argues that five factor psychology is based on an observer perspective. This is because either

an individual's behaviour is rated by someone else, or in the case of self- ratings, it is done by considering one's own behaviours relative to those of others. He cites Hogan (1987) who believes that the model makes a powerful contribution to personality research from an observer perspective. McAdams agrees, but argues that the FFM has little to offer from the "standpoint of the actor" (McAdams, p. 351).

Most of the criticisms put forward by McAdams and others against the FFM are compelling. However it is important to remember that the FFM was not developed to account for the complete human personality, but rather that it should account for the structural relations among personality traits (Goldberg, 1991). In this regard, the FFM seems to succeed. It is therefore important to understand the role and function of the FFM in the overall context of personality research. John, Naumann and Soto (2008) summarised the utility of the FFM as follows:

It provides an account of personality that is primarily descriptive rather than explanatory; emphasises regularities in behaviour rather than inferred dynamic and developmental processes, and focuses on variables rather than individuals or types of individuals. (p. 140)

Thus, despite the fact that the FFM is not the final answer in personality research, it represents a sufficiently comprehensive account of personality which makes it ideal for studies in which the individual is not the focus of study. This makes five factor questionnaires such as the BTI extremely useful for research where traits and their empirical relations to other forms of behaviour, such as risk-taking behaviour, can be investigated.

2.4 Conclusion

This chapter reviewed the development of the FFM of personality description. The body of research presented shows that this model represents a sufficiently comprehensive measure of

personality and makes a questionnaire such as the BTI ideally suited as the personality measure of choice for the purpose of the present study. The next chapter introduces the concept of risk-taking, and examines its relation to personality.

CHAPTER 3: RISK-TAKING AND PERSONALITY

Human beings continuously have to make decisions that involve different levels of risk-taking (Figner & Weber, 2011). This may include a wide array of choices, for example, deciding to invest in equities or fixed rate bonds, or taking up a new hobby like paragliding or model boating. Deciding to use condoms during sex or what to have for dinner are all decisions that expose an individual to different degrees of risk. Everyday observation reveals that individuals differ in the extent to which they are willing to engage in risky behaviours. The chapter reviews the literature concerning the relationship between the personality dimensions of the FFM and risky behaviour. Although both individual difference factors and situational determinants of risk behaviour will be discussed in this chapter, the primary focus will be on personality factors associated with risky behaviour.

According to Figner and Weber (2011), the propensity to engage in risk-taking behaviour has to be understood in terms of many influences. However, despite the multitude of influences, it appears that all possible determinants of risk behaviour can be viewed either as a characteristic of the person or a characteristic of the situation, or a combination of both (Weber, 2010). Restated in a different way, our attempts to understand risk-taking behaviour revolve around a central question: who takes risks when? In this context, the "who" refers to the individual difference factors related to risk-taking. For example, we would investigate whether age, gender, genetic, cultural and personality differences are related to different degrees of risky behaviour (Figner & Weber, 2011). The "when" refers to the situational determinants of risky behaviour, for example, the specific domain in which the decision has to be made, whether the situation is affect laden or not, or how a situation is framed (Figner, Mackinlay, Wilkening, & Weber, 2009; Figner & Weber, 2011). Viewing behaviour in this way has the effect of explaining the large variation in risk-related decision making. This

variation is due to the notoriously low correlations reported between different risk measures and between similar risk measures studied in different contexts (Nicholson et al., 2005).

The focus in the present study is on a particular case of the "who" in combination with the "when". Thus, on the one hand, the focus is on the individual difference factors related to risk-taking behaviour, with a particular focus on personality (the "who"). On the other hand, these personality traits are investigated in relation to specific risk-taking variables across a range of risky domains (the "when"). In contrast to previous research that typically investigates a unitary personality trait – or a few at most – and its relationship to a specific risk variable, this study employed a more integrated approach. A large personality taxonomy in the form of the FFM is used to examine the relationship of personality to the range of diverse risky variables from different risk domains. According to Bromiley and Curley (1992) such an approach represents the most comprehensive manner in which individual differences related to risk-taking can be studied since a number of individual characteristics are analysed simultaneously in different situations or conditions.

In order to put this study into a larger perspective, some relevant individual difference factors ("who's") and situation specific factors ("when's") thought to be salient to provide sufficient context will be discussed in the following sections. This is important because some of the research findings stand in contrast to previous scientific convention. Other findings point to different branches of psychological research that may turn out to be relevant for a fully nuanced understanding of risk-taking behaviour. Certain sections are important purely as a result of the extensive body of literature that contributed to the current understanding of risk behaviour. Some sections are briefly discussed while others are elaborated on more extensively, depending on the unique requirements of each section.

3.1 Domain Specificity ("when?")

An important research finding that has emerged in the past few years, is that risk-taking tends to be domain-specific and not as generalisable as previously thought (Hanoch, Johnson, & Wilke, 2006). This line of research makes it clear that risk-taking cannot be reduced to a unitary personality trait (Figner & Weber, 2011). For example, it cannot be deduced that the individual who takes up a risky hobby such as paragliding will also make risky investments in equity markets. Research does not support the conclusion that taking risks in one aspect of life necessarily generalises to all others contexts as well (Hanoch et al., 2006). Thus, a person's propensity to engage in risk-taking cannot be inferred completely from the behaviour displayed in another risk-related situation. As such, it would be inappropriate to label the person who paraglides as a risk-taker in general, because it would imply trait like behaviour suggesting that this person takes risks in many – or all other – domains of life. However, should the individual make risky choices in more domains of life, for example, the paraglider also enjoys gambling, high-risk investments and risky sexual practices, a label of risk-taker would be more appropriate. In such cases, individual difference factors such as personality can be reasonably expected to play a causal role, since the situations differ but the behavioural choices in each case reflect a common element, namely risk-taking.

Nevertheless, the finding that risk-taking tends to be domain specific has implications for research in this field. It necessitates broader research designs because determining an individual's risk appetite in one context can no longer simply be generalised to other contexts. Research conducted by Weber, Blais and Betz (2002) has gone a long way to support this view. They did research with an instrument called the Domain Specific Risk-taking (DOSPERT) scale that measures risk-taking in the following six domains: gambling, investing, ethical choices, health/safety, social interaction, and recreation (Weber et al., 2002). With this instrument the authors could clearly demonstrate that individuals differ in

the amount of risk they are willing to take in different domains. Similar results have subsequently been reported in other research investigating domain specificity (Hanoch et al., 2006). According to Figner and Weber (2011), research conducted with the DOSPERT scales has demonstrated that "in many cases, individual differences in risk-taking are less driven by differences in the appetite for risk itself (the risk attitude) but by individual differences in the perception of risks and returns" (p. 212).

The statement above stresses that the perception or appraisal of risk appears to be of primary importance for our understanding of risk-taking behaviour. The implication is that neither individual differences nor situational determinants by themselves can provide a comprehensive understanding of risky behaviour. It suggests that these factors affect risk-related decisions via their influence on the perceptions or appraisal of the risky situation. This view can be considered the golden thread that runs through the literature which will become evident in the following sections.

3.2 Gender Differences ("who?")

It appears to be accepted fact that gender differences exist with regard to risk-taking behaviour (Byrnes, Miller, & Schafer, 1999; Figner & Weber, 2011; Jianakoplos & Bernasek, 1998). The meta-analytic study by Byrnes et al. (1999) serves as a case in point of an influential study that contributed to this view among researchers. Byrnes et al. (1999) analysed the results from 150 studies which converged on the idea that men tend to take more risks than women on almost all risky endeavours.

More recent research seems to suggest that gender differences in risk-taking may disappear when differences in perception of the potential benefits and costs of risk-taking are controlled (Hanoch et al., 2006; Weber, 2010; Weber, Blais, et al., 2002; Weber & Johnson, 2008). For example, women were found to be less risk-taking in financial, recreational and ethical

domains, but more risk-taking in social contexts. Once the differences in perception were accounted for, it emerged that men and women do not differ in their attitude toward risk at all (Figner & Weber, 2011). However, in real terms, men still take more risks in specific domains compared to women, but this is since men perceive these risk-activities as less threatening, and not because they have a different appetite for risk behaviour in general.

The research on gender differences clearly demonstrates the important role that perceptions play as a determining factor of whether or not an individual will engage in risky behaviour, irrespective of attitude to risk in general. This finding therefore also shows that individual differences influence risk related decision-making via the process of appraisal.

3.3 Affective and Deliberative Risk-taking ("when?")

One of the most interesting recent developments in risk-taking research is that affective processes appear to be important psychological determinants of risk-taking behaviour in certain contexts (Weber & Johnson, 2009). In particular, it appears that risk-related choice depends on whether the risky decision itself is based on a "cold, deliberative" process or a "hot, affective process" (Figner & Weber, 2011, p. 214). According to Figner and Weber (2011), there are many ways in which affective processes can influence risk-related decisions. For example, affective processes or emotions can direct an individual's attention to very specific aspects of the choice options (Weber, Siebenmorgen, & Weber, 2005), or in the prospect theory of Kahneman and Tversky (1979; 1992), affective processes have the effect of transforming perceived probabilities into subjective values. At a very direct and involved level, affective processes have the effect of contributing to an individual's resistance to a desired but risky outcome, or alternatively, may cause a person to succumb to temptation (Figner et al., 2010).

Figner and Weber (2011) further distinguished between two types of affect, namely integral and incidental affect. Integral affect refers to situations in which the affect emerges from the particular decision itself, for example the excitement involved in a particular gambling move. On the other hand, incidental affect refers to affect or emotions that stem from a different source altogether, but which influence the decision at hand. An example might be the sadness involved in the loss of a close friend or family member which may in turn influence the way investment decisions are made (Figner & Weber, 2011).

This research makes the point that affect plays a pivotal role as a determinant of risk-taking behaviour. It highlights the idea that affect or emotion has a causal effect on the way information or situations are perceived ceteris paribus, and subsequently on the decisions that follow this interpretation process. These findings are in line with those obtained during the past two decades of research in other branches of psychology – and other disciplines – which period has appropriately been named the affective revolution (Haidt & Kesebir, 2010). The primary, salient role of affect and emotion has been shown to be a crucial element of human cognition in many disciplines, including neuroscience (Damasio, 1994; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001); neuroeconomics (Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003); social psychology (Haidt, 2001), developmental psychology (Haidt & Kesebir, 2010; Hamlin, Wynn, & Bloom, 2007) and the multi-disciplinary field of research on morality (Haidt, 2007). To demonstrate the importance of this knowledge on our understanding of risk-taking behaviour, a research example of its influence on a "who" × " when" interaction follows next.

3.4 Age Differences and Affective Processes ("who" × "when")

Similar to the conventional view with regard to gender differences, few would argue against the statement that adolescents are more inclined toward risk-taking behaviour in general,

based on simple observation alone. Research evidence also supports this view and shows that adolescent individuals do indeed take more risks in many domains such as with substance abuse, sexual activity, and driving behaviour (Figner et al., 2009). In fact, it is common knowledge that insurance companies charge a premium on car insurance and rental, for individuals younger than 25 years. Thus, they explicitly account for this tendency in business. However, in a card game specifically designed to elicit both "hot" and "cold" affective processes in two different versions of the game, researchers were able to demonstrate that adolescents only showed increased risk-taking when affective processes were involved and that there were no differences in their risk-taking tendencies under "cold" or deliberative risk-taking conditions when compared to any other age groups (Figner et al., 2009). Thus, it turns out that adolescents are in general no more risk-taking than other age groups, but in conditions or situations where affective processes are activated, they do show increased risk-taking tendencies.

According to Figner and Weber (2011), these findings are in line with neurodevelopmental research which shows that neural networks related to different psychological processes mature at different stages of the development process (Ernst & Fudge, 2009; Somerville, Jones, & Casey, 2010; Steinberg, 2010). Thus, those neural systems responsible for reward sensitivity that determine the degree to which an individual is tempted in a risky situation develop early during the maturation process. By contrast, the neural system that enables resistance to such temptations develops only at a later stage, during adolescence or early adulthood (Figner & Weber, 2011).

The research regarding age differences and affective processes discussed above is especially important in the context of the present study, since the sample of respondents from which data for this study were obtained falls into the late adolescent, early adulthood age category. Thus, it is important to consider the "hot" or "cold" affective properties of the risky variables

used in this study so as to gauge the relative influence that affective states may have had on the data collected for the present sample. For example, if a risk variable is considered "hot", one could reasonably expect that the sample group containing primarily adolescents and young adults would have reported higher frequencies of risky behaviour compared to what one would have expected from a typical adult sample group.

With regards to the golden thread discussed earlier in the chapter, this research also shows that different risk-related situations or conditions may prime different psychological processes – hot or cold affect – that again strongly influence the perceptions or appraisals of risk, which in turn, influence subsequent behaviour. Thus, the "hot" or "cold" affective processes seem to function as a mechanism that impact on risk behaviour via the influence that it has on an individual's perception or appraisal of the risky situation or condition.

Since the primary focus of the present study is on individual difference factors (the "who") associated with risky behaviour, and personality in particular, the following section describes an important and well-researched personality trait shown to be strongly related to most forms of risk-taking behaviour (Zuckerman, 2004). Relevant aspects of the literature on sensation seeking are discussed next.

3.5 Sensation Seeking

The study of individual differences related to risk-taking was pioneered by Marvin Zuckerman (Zuckerman, 2004). He advocates a genetic perspective of risk-taking behaviour by postulating the personality trait of sensation seeking. He defined sensation seeking as "the seeking of varied, novel, complex and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience" (Zuckerman, 1994, p. 27). Research from twin studies, breeding experiments, and investigations about the biological correlates of sensation seeking has yielded support for the

view that sensation seeking is, at least partially, a genetically determined construct (Zuckerman, 1994). The determinants of sensation seeking fall beyond the scope of this study, however current explanations for the trait include genetic, psychophysiological, biological, and social factors that have cognitive influences via our behaviours, attitudes and preferences (Zuckerman, 1983, 1984, 1990, 1994, 1996, 2004; Zuckerman, Buchsbaum, & Murphy, 1980).

An individual's rating on the trait of sensation seeking is determined by means of the Sensation Seeking Scale (SSS). Zuckerman, Kolin, Price, and Zoob (1964) originally developed the Sensation Seeking Scale, which has been revised several times since then. Form V, the most widely used version in research studies, consists of 40 items that measure four components, namely Thrill and Adventure Seeking (TAS), Experience Seeking (ES), Disinhibition (Dis) and Boredom Susceptibility (BS). An overall sensation seeking score is obtained by combining the four components.

3.6 Sensation Seeking and Risk-taking

The research on sensation seeking has expanded exponentially since the development of the first sensation seeking scale (Zuckerman et al., 1964). This has led to the discovery that sensation seeking is related to almost all types of risk behaviour, which in turn has been confirmed by a substantial body of research evidence (Zuckerman, 1994). As such, it is important to understand the mechanism through which sensation seeking affects risk-taking behaviour.

Individuals with high levels of sensation seeking tend to seek out activities that promise stimulation. High sensation seekers are therefore motivated to increase the stimulation they experience (Roberti, 2004). It is for this reason that sensation seeking is a correlate of risk-taking behaviour. Individuals engage in risk behaviours due to the arousal that often

accompanies such activities. However, it is important to stress that risk-taking itself is never the primary motive of any behaviour. Risk is the potential outcome or consequence that may follow the pursuit of arousal (Roberti, 2004; Zuckerman, 1994, 2004). In short, individuals do not seek risk for its own sake.

When one considers all the different types of risk behaviours that sensation seekers engage in, it becomes evident that there are constructive and destructive outlets that individuals can use to channel the energy or drive created by the trait. An example of a positive outlet might be through the practice of high risk sports (Malkin & Rabinowitz, 1998) or choosing a risky vocation (Zaleski, 1984) as opposed to negative outlets such as substance abuse (Cohen & Fromme, 2002), sexual risk-taking (Williams et al., 1992) and gambling (McDaniel & Zuckerman, 2003). Important however, is that sensation seeking is the common element running through the different types of risk behaviour, which demonstrates the importance of this individual difference variable for our understanding of risk-taking behaviour. Sensation seeking appears to be a salient individual difference factor in almost all risk domains.

3.7 Sensation Seeking and the FFM

The pioneering work of Zuckerman (1994, 2004) and the massive body of research which followed greatly contributed to our knowledge and understanding of this personality trait and its relation to risk-taking behaviour. Since the aim of the present study is to investigate the extent to which the FFM of personality is related to risk-taking, it is important to understand how sensation seeking is related to the dimensions of the FFM.

Research investigating the relationship between sensation seeking (SSS-V), and the FFM (McCrae, 1987) found that sensation seeking (total SSS score) is correlated primarily with Openness to Experience ($r = 0.45$, $p < .01$). At the subscale level of the SSS, Experience Seeking had the strongest correlation with Openness to Experience. Agreeableness correlated

with the total SSS score and with the Disinhibition and Boredom Susceptibility subscales in particular (McCrae, 1987). Zuckerman, Kuhlman, Joireman, Teta, and Kraft (1993) reported very similar results a few years later. Openness to Experience was again correlated with the Experience Seeking subscale of the SSS ($r = .43$, $p < 0.01$). Boredom Susceptibility ($r = -.48$, $p < 0.01$) and Disinhibition ($r = -.40$, $p < 0.01$) was again found to have a strong relation to Agreeableness.

Of the five factor dimensions, Extraversion has also been found to be associated with sensation seeking. This is not surprising since Eysenck (1975, 1985, 1990) characterised extraverts as individuals with a need for stimulation. Empirically, it has been shown that Extraversion relates to sensation seeking on the Eysenck three factor model of personality (Zuckerman, Eysenck, & Eysenck, 1978), as well as the FFM of personality description (Aluja, Garcia, & Garcia, 2002; Tok, 2011). The above-mentioned research therefore suggests that sensation seeking is primarily related to the Openness to Experience, Extraversion and Agreeableness dimensions of the FFM.

3.8 Sensation Seeking and the FFM: Nomological Network

The empirical relations between risk-taking and personality – as measured by sensation seeking – have mostly followed a psychobiological approach (Hoyle, Fejfar & Miller 2000). This means that there is biological support for its existence. The advantage of traits rooted in biology is that this provides more than mere descriptions of behaviour but manages to explain many of the causal mechanisms involved in risk-taking behaviour (Eysenck & Eysenck, 1975; Zuckerman, 1994).

With the aim of extending the nomological network of personality traits related to risk-taking behaviour, a taxonomic framework represented by the FFM will be used to identify additional relationships between personality and risk-taking behaviour. One of the traits in this model is

Extraversion, which is thought to be characterised by a need for stimulation (Eysenck & Eysenck, 1975, 1985, 1990). Further, on the BTI, the Extraversion dimension contains the facet of Excitement Seeking, which is conceptually very similar to sensation seeking (Taylor, 2004). Combined, these facts create a conceptual link between Extraversion and sensation seeking, especially Extraversion as defined and operationalised on the BTI with the facet of Excitement Seeking.

From a nomological perspective therefore, the five factor dimensions of Openness to Experience, Agreeableness and Extraversion are linked to sensation seeking, either empirically (Openness and Agreeableness), or theoretically (Extraversion). As such, an a priori expectation that these five factor dimensions will be related to the risk variables investigated in this study is reasonable. In fact, the association that Openness, Agreeableness, and Extraversion have with sensation or stimulation seeking behaviour, could feasibly be the causal, but underlying element responsible for the way that risky behaviour manifests in these personality dimensions.

3.9 The Influence of Sensation Seeking on Risk Perception

Given that sensation seeking is related to most types of risk behaviour, it would be important to investigate whether sensation seeking has an effect on the perception and appraisal of risky situations. This would imply that the mechanism through which sensation seeking is related to risk-taking is more complicated than merely being a drive toward novel and intense sensations. Sensation seeking may result in a cognitive bias, whereby it affects the perception of risk in sensation seekers, so that situations involving substantial risk are perceived to be less threatening for sensation seekers than for the rest of the population.

Research seems to show that there is indeed a difference between how sensation seekers and non-sensation seekers view the world (Franken, Gibson, & Rowland, 1992; Horvath &

Zuckerman, 1993; Roberti, 2004; Zuckerman, 1994, 2004). For example, Franken et al. (1992) found that sensation seekers view many objects and situations as less threatening than do low or non-sensation seekers. Accordingly they do not view them as risky and are much more likely to engage with them since such objects or situations are not considered harmful or dangerous.

Similar results were reported by Horvath and Zuckerman (1993), who conducted a study with 447 undergraduate students that rated activities thought to reflect crime risk, minor violation risk, financial risk and sports risk. Ratings by sensation seekers showed that they considered these activities to be less risky than did low sensation seekers and they were more likely to engage in these activities than were low sensation seekers. They also found that risk appraisal is a function of experience, which means that the more one engages in a specific activity, the lower the risk perception (Horvath & Zuckerman, 1993).

This research points to the fact that sensation seekers do not perceive the possibility of negative consequences resulting from risk-related behaviour in the same way that non-sensation seekers do (Roberti, 2004). Zuckerman (2004) concludes that "risk appraisal is a significant factor in the prediction of risky behaviour" and that "high sensation seekers tend to estimate risks as lower even in activities they have not experienced" (p. 65).

In this section the role of sensation seeking in risk-taking behaviour was considered. It became evident that sensation seeking underlies risk-taking in many domains, and that it is related to the five factor dimensions of Openness to Experience, Agreeableness, and Extraversion. It was also argued that sensation seeking might well be a causal factor underlying the theoretical (Extraversion) and empirical (Openness and Agreeableness) relationships with the FFM. With regard to the golden thread, it was shown that differences in sensation seeking influence the way risk-related situations are perceived by low and high

scorers on the trait. This further supports the recurrent finding that individual and situational determinants of risk have to be understood in terms of their influence on the individual's perception or appraisal of the risk-related decision. The next section reviews literature where the FFM as a whole was used to examine its relationship to risk-taking behaviour.

3.10 FFM and Risk-Taking Behaviour

Nicholson et al. (2005) conducted a study in which they investigated the relationship between the complete FFM and risk-taking behaviour in six domains. The NEO PI-R was used as a measure of personality, and recreation, health, career, finance, safety and social risk-taking were measured by means of the Risk-Taking Index, developed by the authors. Their results revealed that each of the five personality dimensions were related to almost all the risk variables and in particular to overall risk, which is a composite risk-taking score (Nicholson et al., 2005). Based on these results the authors argued that the FFM can represent a dynamic model of risk behaviour. Nicholson et al. (2005) describe this dynamic model as follows:

> High Extraversion (especially sensation-seeking) and openness supply the motivational force for risk-taking; low Neuroticism and Agreeableness supply the insulation against guilt or anxiety about negative consequences, and low conscientiousness makes it easier to cross the cognitive barriers of need for control, deliberation and conformity. (p. 170)

This study is interesting in that it implies that a comprehensive measure of personality could be used to predict the likelihood of an individual engaging in risk-taking behaviour provided that the individual's score on each of the dimensions are in line with the model as set out above.

In one of the most comprehensive studies to date, Soane, Dewberry and Narendran (2010) used structural equation modelling (SEM) to investigate both the direct and indirect associations between the FFM and risk-taking behaviour across the DOSPERT domains (Blais & Weber, 2006; Weber et al., 2002). The DOSPERT domains include ethical, recreational, investment, gambling, health and safety, and social risk-taking. They measured the five factor dimensions with the NEO PI-R (Costa & McCrae, 1992). Three hypotheses were tested. First, that personality is indirectly related to risk-taking via a consideration of the perceived benefits and costs associated with a specific behaviour. Second, a direct link between personality and risk-taking was postulated, in that personality is a direct predictor of risk-taking in each risk domain. The last hypothesis was that personality would be directly and indirectly associated with risk-taking, which would further be influenced by the specific context, or risk domain. Given the large number of relationships tested and reported by Soane et al. (2010), the best fitting SEM models with the standardised path coefficients are presented in Figures 3.1 to 3.5 in order to facilitate interpretation of the results. The figures are reproduced with permission of the authors. Error terms and covariance coefficients between the five factor dimensions were removed by the original authors to improve clarity in the figures (Soane et al., 2010).

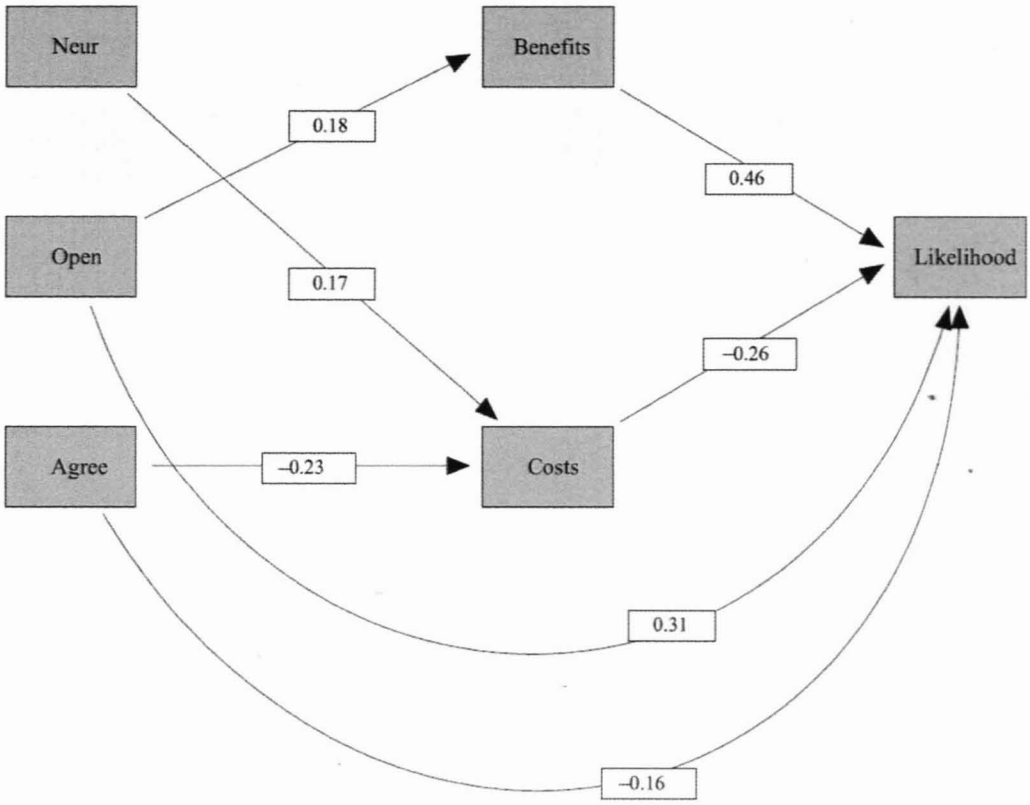

Figure 3.1. Path coefficients for social risk-taking
Note: Neur=Neuroticism; Open=Openness to Experience; Agree=Agreeableness

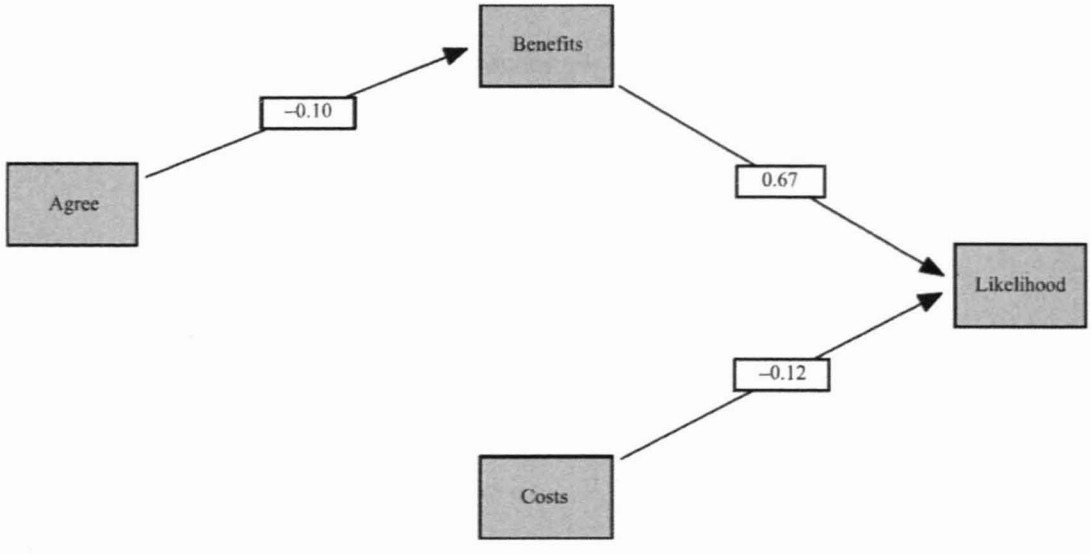

Figure 3.2. Path coefficients for investment risk-taking
Note: Agree=Agreeableness

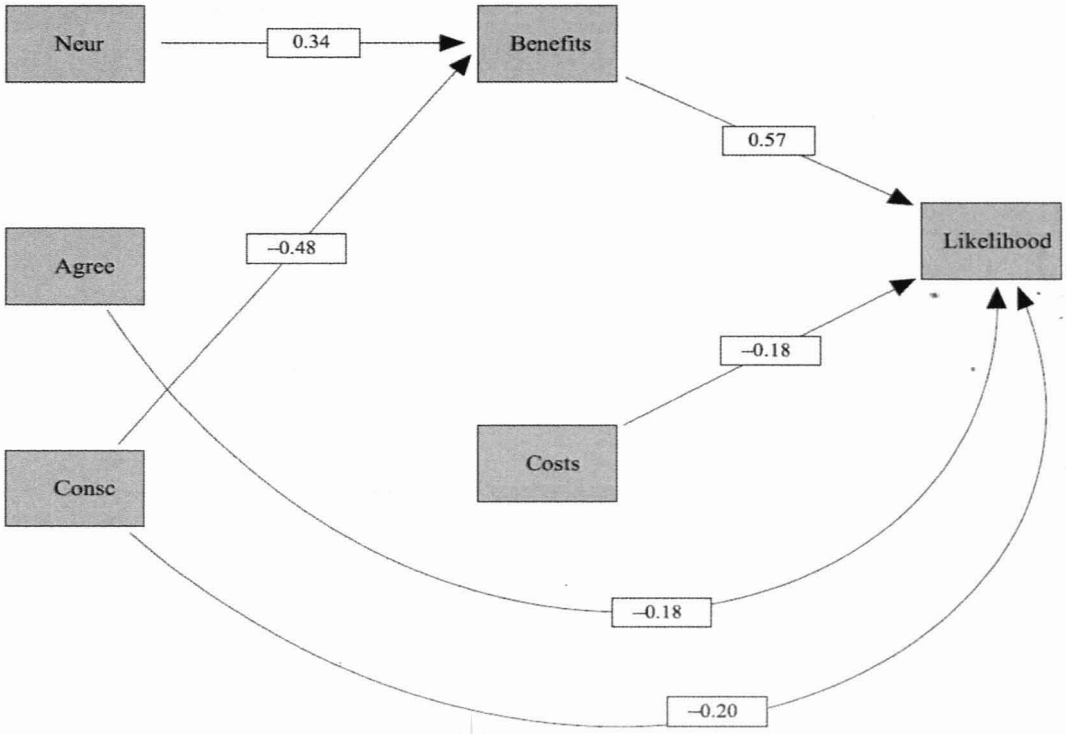

Figure 3.3. Path coefficients for ethical risk-taking
Note: Neur=Neuroticism; Agree=Agreeableness; Consc=Conscientiousness

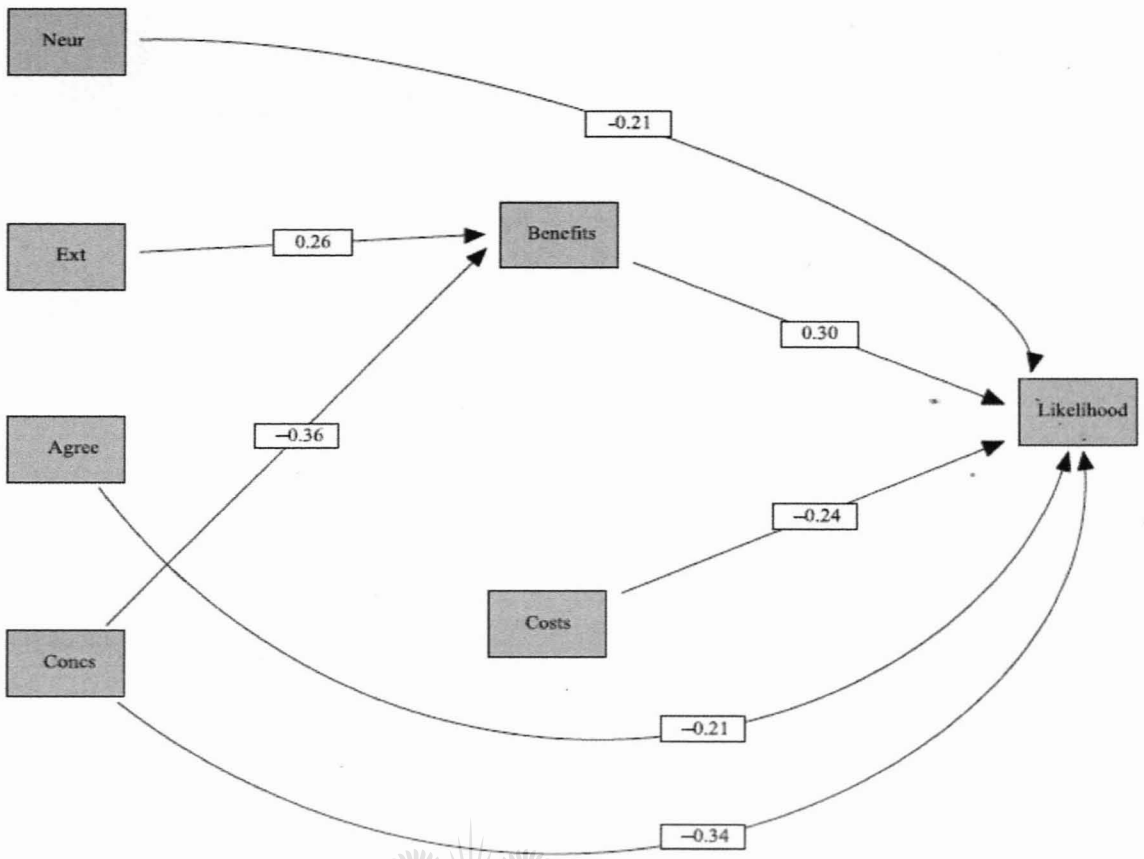

Figure 3.4. Path coefficients for gambling.
Neur=Neuroticism; Ext=Extraversion; Agree=Agreeableness; Consc=Conscientiousness.

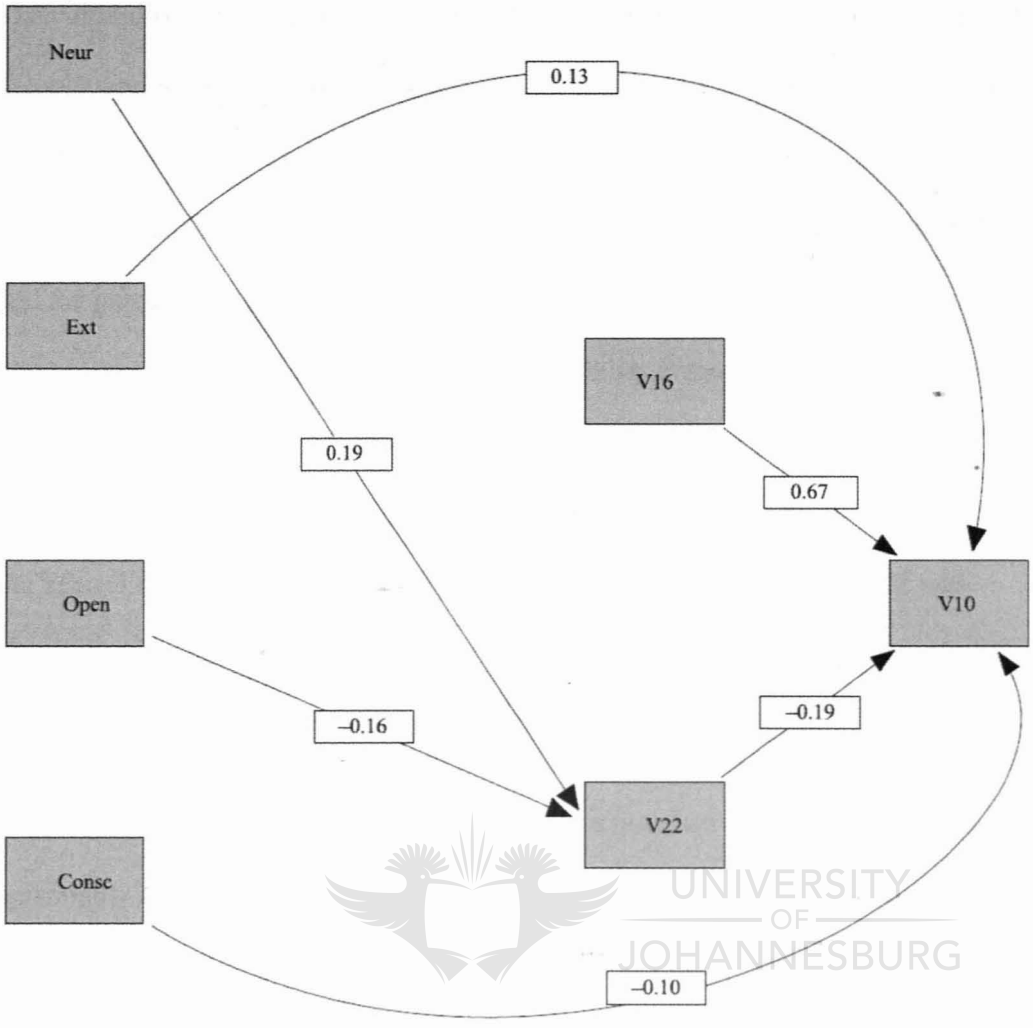

Figure 3.5. Path coefficients for recreational risk-taking.
Neur=Neuroticism; Ext=Extraversion; Open= Openness; Consc=Conscientiousness

The results reported in these figures show that in almost all of the risk domains, personality appears to be associated both directly and indirectly with risk-taking. It is however important to note that some personality dimensions have only a direct relation on the risk behaviour whereas others have only an indirect association via the perceived costs and benefits. Yet other dimensions seem to play both a direct and indirect role on risk behaviour in a particular domain.

The variability with regards to the particular dimensions related to risk behaviour in a specific domain, and whether or not the relation is direct or indirect also supports the influence of situational determinants of risk-taking behaviour. It seems, therefore, that the contextual factors – or different risk domains – in turn have an effect on personality, the perceived costs and the perceived benefits of risk behaviours (Soane et al., 2010). Thus, given a particular domain, such as ethical risk-taking, some personality dimensions are more relevant than others and the focus may be more on the perceived benefits than on the perceived costs, or vice versa. Furthermore, a particular personality dimension – such as Conscientiousness in the Ethical domain – could be directly predictive of the risk variable itself, and simultaneously play a role in the way the risk-related situation is perceived via its influence on the perceived costs and/or benefits.

The influence of the situation is evidenced by the fact that the specific combination of personality factors, perceived costs and benefits are different in each of the risk domains. These combinations are, in fact, unique to each risk domain. It is clear that the FFM of personality is indeed predictive of risk-taking behaviour in all the domains investigated in their study. Overall, the findings reported by Soane et al. (2010) are in line with previous research discussed in this chapter, which highlighted the importance of the situation, or risk domain, as well as the way in which individual difference factors influence the perception of risk-related situations.

3.11 Five Factor Personality and Individual Risk-taking Variables

In line with the primary purpose of this study, the previous section reviewed research where the association between personality and risk-taking was investigated using the FFM in different risk domains. To cast the net somewhat wider, the next section will discuss research

conducted over the past 10 – 15 years, in which the relationship between personality and each of the risk variables investigated in this study is examined more closely.

The primary focus of this review is to identify and discuss studies where the relationship between the FFM and the particular risk variables of this study was previously investigated. Where such studies could not be found, but studies were located in which personality measures other than five factor measures were used , this research will be discussed and related back to the FFM to make it meaningful in the context of the present study.

3.11.1 Personality and alcohol consumption.

Many studies have investigated the relation between personality and alcohol consumption (Elkins, King, McGue, & Iacono, 2006; Flory, Lynam, Milich, Leukefeld, & Clayton, 2004; Terracciano & Costa, 2004; Trull & Sher, 1994; Walton & Roberts, 2004). From a five factor perspective, the personality dimension that consistently emerges as having the strongest association with health risk behaviours such as alcohol use and abuse is Conscientiousness or Conscientiousness-related traits (Hong & Paunonen, 2009).

There is also substantial evidence that extraverted behaviour appears to be related to higher levels of alcohol consumption (Flory et al., 2002; Hampson, Goldberg, Vogt, & Dubanoski, 2006; Luhtanen & Crocker, 2005). This is not surprising when considering the existing research on the relation between Extraversion and stimulation seeking, discussed earlier in this chapter (Eysenck & Eysenck, 1985; Zuckerman, 2004). Agreeableness has similarly been implicated with higher levels of alcohol consumption even though the reason for this

In a study using the Big Five factors of personality, Hong and Paunonen (2009) examined the relationship between these personality dimensions and alcohol consumption. Their results were in line with previous research. They reported significant results for low

Conscientiousness and Agreeableness and higher levels of Extraversion related to increased alcohol consumption (Hong & Paunonen, 2009).

Based on the consistent findings reported above, one could reasonably expect that alcohol consumption will be predicted by lower scores on Conscientiousness and Agreeableness but higher scores on Extraversion in the present study.

3.11.2 Personality and illegal substance use.

The literature on personality traits associated with drug use and abuse has implicated a number of different traits although there is some consistency in the findings. In a meta-analysis of longitudinal studies, Gorman and Derzon (2002) investigated traits associated with marijuana use and abuse. They identified categories of traits related to negative affect (e.g., anxiety and depression), unconventionality (e.g., non-religiousness and tolerating deviance) and emotionality (behaviour actually related to Extraversion or Disinhibition). According to Terracciano, Lockenhoff, Crum, Bienvenu and Costa (2008), these categories would map onto the Neuroticism, Extraversion and Openness to Experience dimensions of the FFM.

It is interesting that Gorman and Derzon did not find any evidence for Conscientiousness as being relevant to marijuana use given the results reported by Bogg and Roberts (2004). In their meta-analytic study, Bogg and Roberts specifically examined the relationship between Conscientiousness and a number of health-risk behaviours. Across all categories of drug use, they consistently found lower scores on Conscientiousness and Conscientiousness-related traits.

Studies investigating the relationship between personality and specific drugs such as cocaine and heroin have found mostly similar results. For example, both cocaine and heroin users

have been found to score high on Neuroticism and Neuroticism–related traits but also high on Psychoticism, which is characterised by low Agreeableness and Conscientiousness in five factor terms (Kornor & Nordvik, 2007). Extraversion has also been found to be associated with heroin use although this relationship was not robust (Kornor & Nordvik, 2007).

Terraciano et al. (2008) conducted a study in which they compared the personality profiles of marijuana, cocaine and heroin users and non-users using the FFM. They found that high Neuroticism and low Conscientiousness were consistently associated with heroin and cocaine use. The profile for marijuana users also included low Conscientiousness, but moderate Neuroticism and high Openness to Experience.

At the lower facet level, the association between Neuroticism and heroin and cocaine use was extended to all six lower facets. For Conscientiousness, all the facet scales with the exception of Order was associated to heroin, cocaine and marijuana use. At the facet level, Excitement Seeking on the Extraversion dimension was consistently found to be associated with all three types of drug use (Terraciano et al., 2008).

The research reported above has found empirical relations between all the five factor dimensions and drug use when considered together. The most consistent and stable results seem to implicate high Neuroticism and low Conscientiousness as predictive of drug use overall, with the profile for marijuana use being slightly different. Based on these findings, one could expect these dimensions to emerge as important predictors of illegal substance use in the present study.

3.11.3 Personality and smoking.

Many studies have examined the relationship between smoking and personality (Terracciano & Costa, 2004). Starting four decades ago, Smith (1970) conducted a review of the literature

in which he reported that smokers tended to be more impulsive and extraverted, less agreeable and to have worse mental health when compared to non-smokers.

Eysenck and Eysenck (1985) believed that smokers would be more extraverted because they would seek stimulation and also argued that more neurotic individuals would smoke to reduce their tension levels. This turned out to be quite an accurate prediction. Despite the mixed results from many studies, when individual differences between smokers and non-smokers were investigated, smokers were consistently found to be more extraverted and neurotic than non-smokers (Breslau, Kilbey, & Andreski, 1994; Kassel, Stroud, & Paronis, 2003).

In addition to Extraversion and Neuroticism, more associations between personality and smoking have emerged from the research literature. For example, some studies have reported higher scores for smokers on the Psychoticism scale of the Eysencks' (1975) P-E-N structure (Arai, Hosokawa, Fukao, Izumi, & Hisamichi, 1997), whereas others reported lower levels of Agreeableness for smokers when compared to non-smokers (Smith, 1967; Vollrath, Knoch, & Cassano, 1999).

Terracciano and Costa (2004) cite studies which have also reported low Conscientiousness to be predictive of health risk behaviours in general and smoking in particular (e.g., Booth-Kewley & Vickers 1994; Vollrath & Torgersen, 2002). In one exceptional study, Kubicka, Matejcek, Dytrych, and Roth (2001) conducted a 24 year follow-up and found that only lower levels of Conscientiousness in childhood were predictive of smoking in adulthood.

The most conclusive evidence regarding the relationship between personality and smoking came from a meta-analysis conducted by Munafo, Zetteler, and Clark (2007). Their analysis included cross sectional studies from 1972 to 2001. They found that smokers tended to score higher on both the Neuroticism and Extraversion scales of the Eysencks' (1975) three factor

personality structure when compared to non-smokers. Using the FFM, Terracciano et al. (2008) found that low Conscientiousness and high Neuroticism were most predictive of smoking. Although Extraversion as a whole did not predict smoking in their study, the Extraversion facet scale of Excitement seeking was indeed found to predict smoking (Terracciano et al., 2008).

In summary, Neuroticism, Conscientiousness and Extraversion appear to be particularly salient dimensions of the FFM related to smoking. Based on prior research, one could reasonably expect Neuroticism, Extraversion, Conscientiousness and Agreeableness to emerge as important predictors of smoking in the present study, although the inconsistent empirical support for Agreeableness casts some doubt on this relationship.

3.11.4 Personality and gambling.

The personality dimensions relevant to gambling and in particular pathological gambling have been studied by using an array of personality inventories (Bagby et al., 2007). For example, by using the three factor model of Eysenck and Eysenck (1975), the impulsivity and intensity seeking aspects of personality were reported to be strongly associated with pathological gambling (Nower, Derevensky, & Gupta, 2004). Along with the Eysenck and Eysenck's inventory, Steel and Blaszcynski (1996) included other personality measures in a study where they identified the constructs of sensation seeking, criminal liveliness, impulsiveness and criminal distress to be important personality variables related to gambling. They found that these constructs were able to account for 62% of the shared variance with gambling behaviour overall (Steel & Blaszcynski, 1996).

Slutske, Caspi, Moffit and Poulton (2005) conducted a study with the Multi-dimensional Personality Questionnaire (Patrick, Curtin, & Tellegen, 2002), and reported lower levels of emotional constraint and higher levels of negative emotionality to be related to gambling.

Some studies were not able to find support for personality being an important variable related to gambling. For example, Langewisch and Frisch (1998) investigated whether personality as measured by the alternative FFM (Zuckerman, Kuhlman, Thornquist, & Kiers, 1991) was able to predict the severity of pathological gambling symptoms. Despite the neuroticism-anxiety and impulsive-sensation seeking measures of the inventory, they found no evidence that the model could predict different levels of gambling behaviour. Similarly, Gerdner and Svensson (2003) did not find any association between impulsivity and gambling in their research using the biopsychosocial seven factor model of personality (Cloninger, Svrakic, & Przybeck, 1993).

Bagby et al. (2007) used the FFM of personality as measured by the NEO PI-R (Costa & McCrae, 1992) to examine the personality differences between pathological and non-pathological gamblers. They reported that the personality of pathological gamblers is characterised by higher levels of impulsivity and emotionality and higher levels of excitement seeking for both pathological and non-pathological gamblers. Overall, higher levels of gambling were related to higher scores on the Neuroticism dimension, and lower scores on Conscientiousness (Bagby et al., 2007).

3.11.5 Personality and aggression (Starting a fight and defending oneself in a fight)

Two of the risk-taking variables included in this study deals with a history of getting involved in physical fights or having to defend oneself in such fights. It is assumed that higher levels of overt individual aggression or trait anger might elicit situations where such behavioural expression may result in physical violence. For this reason, research investigating the relation between anger/aggression and personality is reviewed in this section.

Studies examining the relationship between aggressive behavioural tendencies and personality consistently point to the five factor dimensions of Agreeableness (or rather the

opposite, Antagonism) and Neuroticism (Bettencourt, Talley, Benjamin, & Valentine, 2006). For example, a study by Sharpe and Desai (2001) found the Neuroticism and Agreeableness dimensions of the FFM to be highly predictive of elevated scores on Buss and Perry's (1992) Aggression Questionnaire. Whereas Agreeableness was strongly correlated to all the facet scales which include Anger, Physical Aggression, Verbal Aggression and Hostility, Neuroticism was only associated with the Anger and Hostility scales (Sharpe & Desai, 2001). Similar results were reported by Martin, Watson and Wan (2000) who also used the Buss and Perry Aggression Questionnaire as well as the State-Trait Anger Scale (Spielberger, Jacobs, Russell, & Crane, 1983). In particular they reported a stronger link between anger and Neuroticism while Agreeableness had the strongest association with behavioural aggression (Martin, Watson, & Wan, 2000). Indeed, Bettencourt et al. (2006) argued that Neuroticism and Agreeableness represent two somewhat separate constructs related to aggression. Neuroticism seems to capture the anger facet of aggression and appears to be mostly reactive in nature as a result of provocation. Agreeableness has been linked to aggression without provocation as well. Agreeableness is therefore associated with aggression under both provocation and neutral conditions (Bettencourt et al., 2006). Examples of the latter include studies whereby it was shown that lower levels of Agreeableness are associated with more destructive means of conflict resolution such as physical aggression and threatening behaviours (Jensen-Campbell, Gleason, Adams, & Malcolm, 2003; Jensen-Campbell & Graziano, 2001).

The theoretical directions pointed out in the above research are strongly supported by a meta-analysis conducted by Bettencourt et al. (2006) in which they examined the relationship between personality and aggressive behaviour. Their study included all personality variables related to aggression such Neuroticism, Agreeableness, Trait Aggressiveness, Trait irritability, Trait Anger, Emotional Susceptibility, Narcissism, Dissipation-Rumination, and

Impulsivity. The meta-analytic findings were consistent with the research which found two different patterns of aggressive behaviour. Offering an integrated interpretation with the five factor dimensions as focal point, Bettencourt et al. (2006) stated that their meta-analytic findings provided

> Compelling evidence that Neuroticism may be more likely to be positively associated with aggressive behaviour only in response to provocation and that Antagonism may be more likely to be positively associated with a proneness to engage in aggressive behaviour across a variety of situations. (p. 770)

Based on the research discussed above, it seems clear that of the FFM, Neuroticism and Agreeableness (or Antagonism) appear to be the primary dimensions related to aggressive behaviour. Accordingly, one would expect the aggression-related risk variables of this study to be predicted by higher levels of Neuroticism and lower levels of Agreeableness (high Antagonism).

3.11.6 Personality and sexual risk-taking

Earlier in the chapter it was shown that sensation seeking is predictive of sexual risk-taking (Hoyle et al., 2000). However, the same study also implicated impulsivity and the Extraversion and Agreeableness dimensions of the FFM as important predictors of risky sexual behaviour (Hoyle et al., 2000).

Miller et al. (2004) conducted a comprehensive study in which they investigated the relationship between personality as measured by the FFM and six risky sexual behaviours. They found that Neuroticism alone was not significantly predictive of the risky sexual variables in the study. Extraversion was related to three variables including a positive relationship between the number of sexual partners before age 20; substance use (alcohol or

drug) before or during sex; and that men (and not women) tended to start sexual activity at a young age. Openness to Experience was related to having sex without a condom, having children at an early age and starting sexual activity at a young age. Four sexual risk variables were implicated for low Agreeableness or Antagonism including a higher number of sexual partners, substance use before or during sex, sex with people other than the primary partner, and an early sexual debut. A somewhat counterintuitive finding was that Conscientiousness was inversely related to the use of alcohol or drugs before or during sex, but none of the other risk variables were related to Conscientiousness. Given the nature of Conscientiousness, Miller et al. (2004) expected that a construct associated with being planful, deliberative and self-disciplined would be much more related to risky sex (inversely) than their results indicated.

Miller et al. (2004) next conducted analyses at the facet level to see if any facets emerged as prominent indicators of risky sexual conduct. They reported only those facets that predicted more than one of the six outcomes. Overall, five facet scales were found to be important. From the Extraversion dimension Gregariousness was related to having many sexual partners and substance use before or during sex. In line with Hoyle et al.'s (2000) findings, Excitement Seeking was also related to alcohol and marijuana use before or during sex but Miller et al. also found that excitement seeking predicted sexual activity at a young age. With regards to Openness to Experience, low scores on Fantasy were related to both sexual activity and having borne a child at a young age (Miller et al., 2004). For this curious finding, the authors theorised that such women may be too preoccupied with the demands of raising children to engage in fantasising at all.

The remaining two facets both came from the Agreeableness dimension. Both the Trust and Straightforwardness scales were related to sex outside of the primary relationship (Miller et al., 2004). In addition, low Straightforwardness scores were related to substance use before or

during sexual encounters and low scorers on the Trust scale also reported having more sexual partners than high scorers on this facet scale (Miller et al., 2004).

Based on the research discussed above, one would therefore expect the five factor dimensions of Extraversion, Openness to Experience, Agreeableness and to some extent Conscientiousness to be predictive of the risky sexual behaviours investigated in this study. Neuroticism is not expected to be a significant predictor of this variable.

3.11.7 Personality and infidelity

Hendrick and Hendrick (1987) investigated the relationship between permissiveness and the trait of sensation seeking. They found that permissiveness was positively correlated with the SSS subscales of Boredom Susceptibility, Disinhibition, Experience Seeking (Hendrick & Hendrick, 1987). In five factor terms, Disinhibition would be associated with Openness to Experience, and Experience Seeking would be related to Extraversion. Therefore, based on the known theoretical relationships between sensation seeking and the FFM, this research seems to suggest that Openness to Experience and Extraversion would be important in trying to understand infidelity in romantic relationships (referred to in short as cheating).

Studies investigating a direct relationship between the FFM and cheating found low levels of Agreeableness and Conscientiousness related to infidelity, relationship dissatisfaction as well as the likelihood of cheating within the first four years of marriage (Schackelford, Besser, & Goetz, 2008; Schmitt, 2004).

Orzeck and Lung (2005) conducted a study in which they compared the scores of cheaters and non-cheaters on each of the five factor dimensions. They reported significantly higher scores for cheaters on the Extraversion and Openness to Experience scales when compared to non-cheaters (Orzeck & Lung, 2005). Cheaters also scored significantly higher on the

Conscientiousness scale and lower on the Agreeableness dimension in line with the findings reported by Miller et al. (2004).

The above research implicates four of the five dimensions of the FFM as possible contributors to infidelity in romantic relationships. The evidence is somewhat ambiguous for Conscientiousness for which both low and high levels of the trait were predictive of infidelity. For the remaining dimensions, the empirical findings suggest that Extraversion, Neuroticism, Openness to Experience and Agreeableness are likely to emerge as important predictors of infidelity in the present study.

3.11.8 Personality and thrill-seeking

Earlier in this chapter, the role of sensation seeking as a predictor of risk-taking behaviour was discussed. Research was also presented that showed that sensation seeking is related to Openness to Experience, Extraversion and Agreeableness (see section on sensation seeking and the FFM above). Since Thrill and Adventure seeking is one of the subscales of the SSS, it is likely that these five factor dimensions might be predictive of thrill-seeking behaviour from a theoretical perspective.

In a study conducted by Tok (2011) to investigate the relation between high risk sports participation and personality, he argues that Zuckerman's sensation seeking construct does not adequately explain the motivation for thrill-seeking behaviour. Zuckerman (1992) primarily considers physical sensation to be the driving force of sensation seeking, but Tok suggests that a cognitive component may be required to fully understand high risk (thrill-seeking) sports participation. He argues that Openness to Experience may represent this cognitive element.

Based on the finding that Conscientious loaded on the same factor as impulsiveness and sensation seeking, Tok (2011) also hypothesised that thrill-seekers would score lower on this five factor dimension. He further expected that thrill-seekers would better manage the anxiety associated with thrill-seeking activities when compared to others and should therefore obtain lower scores on the Neuroticism dimension of the FFM. Based on the Eysencks' (1985) research, Extraversion was also expected to be an important predictor of high risk sports. Overall, results revealed that high risk sports participants did indeed score significantly higher on Openness to Experience and Extraversion but lower on Neuroticism and Conscientiousness (Tok, 2011).

3.12 Conclusion

This chapter presented research on risk-taking behaviour. In the first section of the chapter some important individual and situational determinants of risk-taking behaviour were discussed. This was done to provide a richer, more nuanced understanding of the focal construct. The focus then shifted to the individual difference factors related to risky behaviour. The personality trait of sensation seeking and its relation to the FFM was discussed, followed by an examination of the FFM in various risk domains. Lastly, evidence was reviewed for the relation between personality – and the FFM in particular – and each of the risk variables investigated in the present study with the exception of the "times arrested" variable. No five factor studies examining such a relationship could be found. The procedure that was followed in the execution of this study along with the statistical techniques employed in the analysis of the data, are discussed in the next chapter.

CHAPTER 4: METHOD

In this chapter, the steps followed in the execution of this study are recounted. Information regarding the respondents in the study is provided, and the instruments used to measure the relevant variables are presented and discussed. The method of data collection is recalled, and the postulates are given. Lastly, the statistical techniques employed in the study are discussed.

The aim of this study is to investigate whether personality is predictive of risk-taking behaviour. To this end, 10 behaviours, all thought be indicative of risk-taking, were identified for investigation. A particular objective of the study was to investigate whether personality as measured according to the FFM is predictive of a broad range of risky behaviours.

4.1 Participants

The sample consisted of 683 respondents, all second-year students from a bilingual (Afrikaans and English) university in Johannesburg. There were 142 men and 538 women in the sample. Three of the respondents' gender was unknown. There were 425 White respondents, 120 Black respondents, 83 Indian respondents, 46 Coloured respondents and nine respondents who did not specify any population group. Respondents' mean age was 20.99 years with a standard deviation of 5.10 years. The sample was not representative of the South African population, with men being underrepresented and White respondents overrepresented in comparison to other population groups.

4.2 Instruments

4.2.1 The Basic Traits Inventory

For the purposes of personality measurement, the present study made use of the BTI, introduced in Chapter Two (Taylor & De Bruin, 2006). This assessment was developed to be

a measure of the FFM or the so-called Big Five factors of personality in the South African context. These five factors are: Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience. Comprehensive definitions for each of the factor and facet scales are provided in Chapter Two.

Extraversion is measured by means of five facet scales namely:

- Ascendance
- Liveliness
- Positive affectivity
- Gregariousness
- Excitement seeking

Agreeableness is measured by means of five facet scales namely:

- Straightforwardness
- Compliance
- Prosocial tendencies
- Modesty
- Tendermindedness

Conscientiousness is measured by means of five facet scales namely:

- Effort
- Order
- Dutifulness
- Prudence
- Self-Discipline

Neuroticism is measured by means of four facet scales namely:

- Affective Instability
- Depression
- Self-Consciousness
- Anxiety

Openness to Experience is measured by means of five facet scales namely:

- Aesthetics
- Ideas
- Actions
- Values
- Imagination

These scales are measured by means of 193 items. The items are written in the form of statements to which participants can respond on a 5-point Likert-type scale. The response options included Strongly Disagree, Disagree, Sometimes, Agree and Strongly Agree. All items are keyed positively, thus there are no items that have to be reverse scored. In addition, none of the items contains words like "not", "never" or "no" (Taylor & de Bruin, 2006). In order to avoid confusion and to ensure ease of translatability, items were kept as short and concise as possible. As a last step, Rasch analysis and item factor analysis provided the basis for item selection into the final version of the scale (de Bruin & Rudnick, 2007).

4.2.2 Reliability evidence for the BTI

Cronbach alpha internal consistency reliability coefficients for each of the five factor dimensions as well as their facet scales are reported in Table 4.1. The reliability coefficients for the five factor scales are very good. Overall, the facet scales have acceptable reliability coefficients with the exception of Modesty ($\alpha = 0.56$) and Openness to Values ($\alpha = 0.44$).

Table 4.1

Cronbach Alpha Coefficients for Facets of the Basic Traits Inventory

Scale (number of items in parenthesis)	Total	Black	White
Ascendance (7)	.74	.72	.83
Liveliness (8)	.68	.63	.77
Positive affectivity (6)	.64	.65	.83
Gregariousness (7)	.79	.74	.87
Excitement-seeking (8)	.78	.68	.87
Affective instability (8)	.85	.80	.88
Depression (9)	.83	.78	.90
Self-consciousness (9)	.80	.75	.89
Anxiety (8)	.84	.81	.88
Effort (8)	.80	.73	.89
Order (10)	.83	.78	.90
Dutifulness (9)	.77	.76	.83
Prudence (6)	.71	.67	.78
Self-discipline (8)	.79	.74	.84
Aesthetics (7)	.82	.78	.88
Ideas (6)	.69	.65	.76
Actions (7)	.68	.64	.77
Values (6)	.44	.38	.58
Imagination (6)	.77	.73	.87
Straightforwardness (7)	.73	.71	.66
Compliance (8)	.70	.69	.71
Prosocial tendencies (8)	.76	.73	.80
Modesty (7)	.56	.51	.67
Tendermindedness (7)	.77	.74	.82

Note. Coefficients where $\alpha < .60$ are indicated in boldface.

4.2.3 Validity evidence for the BTI

Exploratory factor analysis revealed a pattern of loadings that is consistent with five factor theory. All the facet scales loaded on their posited factors, and none had secondary loadings on any other factor with the exception of Straightforwardness (r = 0.31) loading on Conscientiousness. The rotated pattern matrix is presented in Table 4.2.

Table 4.2

Factor Pattern Matrix of the Basic Traits Inventory for the Total Group

	Factors				
Facets	E	N	C	O	A
Ascendance	.54	-.05	.16	.04	-.09
Liveliness	.77	.06	.10	-.11	.00
Positive affectivity	.50	-.11	.05	-.04	.18
Gregariousness	.65	-.05	-.08	.05	.04
Excitement-seeking	.55	.15	-.28	.12	-.09
Affective Instability	.10	.72	-.01	.06	-.13
Depression	-.06	.85	.00	.05	.05
Self-Consciousness	-.01	.81	.02	-.02	.10
Anxiety	.00	.83	.09	-.07	.05
Effort	.10	.04	.73	-.03	-.05
Order	-.02	.06	.81	-.09	-.01
Dutifulness	.06	.00	.66	.03	.13
Prudence	-.09	.06	.83	.12	-.10
Self-Discipline	.02	-.04	.77	.01	-.03
Aesthetics	-.01	.02	-.10	.62	.08
Ideas	.00	-.08	.03	.75	-.03
Actions	.21	.00	.07	.45	.05
Values	-.04	.09	-.04	.47	.04
Imagination	.03	-.04	.15	.57	.03
Straightforwardness	.00	-.10	.31	-.09	.46
Compliance	.10	.03	-.11	-.10	.82
Prosocial Tendencies	.01	-.02	.04	.08	.60
Modesty	-.12	.09	-.02	.12	.53
Tendermindedness	-.03	.02	.00	.16	.65

Note. Facets with factor loadings above .30 are indicated in boldface.

4.3 Risk-taking questionnaire

In this study, risk-taking behaviour was measured by means of a 10-item questionnaire, enquiring about the frequency with which an individual engaged in a broad range of risky behaviours in given time frames. The 10 questions included in the risk-taking survey were:

1. On average, how many cigarettes do you currently smoke per day?
2. Approximately how many heterosexual sexual partners have you had in your life?
3. Approximately how many times a year do you use an illegal substance?
4. On average how many alcoholic drinks do you consume per week?
5. Approximately how many times have you tried thrill activities such as bungee-jumping, parachuting, or parasailing?
6. How many times have you been arrested by the police?
7. Approximately how many times in your life have you cheated (any physical contact) on a romantic partner?
8. Approximately how many times have you started a physical fight?
9. Approximately how many times have you defended yourself in a physical fight?
10. On average how many times a year do you go gambling in a casino?

4.4 Procedure

Prior to the study, it was communicated to all respondents that participation in the study was voluntary and that data would be treated confidentially. The surveys were handed out during classes in 2007. Students were informed about the nature of the study, and given several days to complete the survey. To mediate the effects of possible social desirability, all surveys were completed anonymously.

4.5 Postulates

Four postulates were proposed and tested in the present study. Mean-group differences were examined in this study.

4.5.1 Postulate 1

Personality as measured by the five factor dimensions will be able to differentiate among the categories of risk-taking behaviour (The risk-taking variables were categorised based on the sample characteristics. No categories with fewer than 35 respondents were created).

4.5.2 Postulate 2

Not all five personality dimensions will be significant contributors to the discriminant function when discriminating between the categories for each risk-taking variable. Thus, certain dimensions will be more important for some risk variables and less important for others.

4.5.3 Postulate 3

Based on reviewed literature, it is postulated that the most important personality variables with regard to group separation will be Extraversion, Openness to Experience and Conscientiousness.

4.5.4 Postulate 4

Based on the finding that almost all types of risk-taking behaviour are related to sensation seeking, it is postulated that the Extraversion dimension will be related to all the risk

behaviours investigated in this study, due to the facet scale of Excitement seeking on this dimension.

4.6 Statistical analysis

4.6.1 Descriptive discriminant analysis

Discriminant analysis is a multivariate technique for analysing group differences. Discriminant analysis comprises of two different techniques namely predictive discriminant analysis (PDA) and descriptive discriminant analysis (DDA; Sherry, 2006). The choice of which to use will be largely dependent on the research question of a given study.

An important distinction between the two approaches is that DDA is part of the General Linear Model (GLM), whereas PDA is considered only to be related to the GLM due to its hybrid nature (Thompson, 1998). According to Henson (2000), all statistical procedures in the GLM have the following characteristics in common:

- They are correlational in nature
- They maximize the shared variance between variables or variable sets
- They yield r^2-type effect sizes
- They apply weights to observed variables to create synthetic or latent variables that becomes the focus of the analysis

In line with the purpose of this study, DDA is used to identify those variables most relevant to group separation (Sherry, 2006). In principle, DDA is very similar to multiple regression analysis, in that it creates a linear combination of continuous variables. The standardised discriminant function coefficients calculated in DDA are analogous to the beta weights in multiple regression in that they indicate the relative importance of each variable to the criterion (Sherry, 2006).

According to Betz (1987) it is important to realise that group differences are emphasised in DDA and similarities are de-emphasised. Accordingly, variables on which groups differ will be weighted more heavily. This is an important consideration from a research design perspective. Given the purposes of the present study, this makes DDA the most appropriate statistical technique for this research question.

A second reason for the use of DDA in this study is the multivariate nature of the research design. Research questions such the one posed by this study can be addressed by conducting multiple univariate tests, or one multivariate test. According to Sherry (2006)

> Multivariate techniques best honor the reality of social science research because they assume that human behaviour has multiple causes and multiple effects and that these causes and effects exist simultaneously, not mutually exclusive form each other. (p. 664)

A major criticism against the use of univariate tests is that they increase the likelihood of making a Type I error. A Type I error is when a significant result, or difference between groups is found, when in fact, no such effect exists in the population. According to Thompson (1991, 1994), the use of multivariate techniques reduces the chances of making Type I errors, because multiple decision variables are solved in one test. The use of univariate tests in a given data set should therefore be kept to a minimum to reduce the probability of Type I errors (Kellow, 2000; Thompson, 1994). Another problem with using analysis of variance (ANOVA) for example, is that multiple comparisons are made independently without considering the possibility of shared variance between the variables. To account for this problem, this study employs a multivariate statistic technique in the form of DDA, rather than conducting multiple univariate tests like ANOVA.

Like most statistical methods, DDA has a number of assumptions that have to be met before the analysis can be conducted (Klecka, 1980; Tabachnick & Fidell, 1996). The seven assumptions of DDA are:

- You should have at least two or more mutually exclusive groups
- A minimum of two subjects per group is required
- The sample size of the smallest group must exceed the number of continuous variables
- Continuous variables have to be measured at the interval level
- A continuous variable cannot be a linear combination of other continuous variables (e.g., a composite scale comprising a number of facet scales)
- Multivariate normality must be demonstrated for each group on each of the continuous variables
- The groups should have approximately equal covariance matrices

4.6.2 Post-hoc tests

In essence, post-hoc tests are pairwise comparisons, in which different combinations of a treatment group are compared simultaneously (Field, 2005). Post-hoc procedures are conceptually similar to t-tests, however, pairwise comparisons control for Type I error by keeping the level of significance constant at .05 for each test (Field, 2005). Thus, the probability of making a Type I error is not affected even though many separate tests are run on the same sample. Given that there is a trade-off between Type I and Type II error, the chances of rejecting an effect that really exists is increased when using post-hoc procedures that tightly control Type I error such as Tukey's HSD (Field, 2005). Preferring a conservative procedure, Tukey's HSD was the method of choice in this study.

4.7 Conclusion

This chapter described the steps involved in the execution of this study. Information about the demographic composition of the sample was presented. The instruments used were discussed along with the steps followed in the administration process. The statistical method used to analyse the data was discussed to demonstrate why this technique was considered most appropriate for the present study. The following chapter will present the results of the analyses.

CHAPTER 5: RESULTS

In this chapter, the results of the discriminant function analyses for each of the risk-taking variables are reported. First, for each risk-taking behaviour, descriptive statistics are presented together with the graphic examination of trends on each personality trait across the categories of the grouping variable. Next, results of the discriminant function analysis are presented, followed by the results from a follow-up one-way ANOVA with Tukey's HSD post-hoc testing where relevant.

5.1 Smoking

Table 5.1 reports the means and standard deviations of the big five personality variables for each category of smoking frequency. Visual inspection of the means across the categories shows a pattern where higher frequencies of smoking appear to be related to higher Extraversion, Neuroticism and to some extent Openness to Experience. The pattern for Conscientiousness is characterised by a decrease, followed by an increase, and ending off on a decline again. However, the overall pattern appears to be that Conscientiousness decreases as the frequency of smoking increases.

Table 5.1

Descriptive Statistics for Smoking

Smoking frequency	Category	Personality variable	Mean	Standard deviation
0 (n = 502)	1	Extraversion	119.82	18.11
		Neuroticism	93.42	24.08
		Conscientiousness	149.63	21.49
		Openness to Experience	119.30	17.16
		Agreeableness	132.56	17.50
1-4 (n = 37)	2	Extraversion	121.65	17.7
		Neuroticism	99.57	20.94
		Conscientiousness	144.76	20.37
		Openness to Experience	122.65	14.87
		Agreeableness	136.86	14.14
5-8 (n = 44)	3	Extraversion	123.20	19.80
		Neuroticism	98.13	24.63
		Conscientiousness	139.43	19.24
		Openness to Experience	123.07	16.98
		Agreeableness	130.20	17.15
10-15 (n =67)	4	Extraversion	124.87	17.60
		Neuroticism	96.83	24.25
		Conscientiousness	145.38	23.63
		Openness to Experience	122.04	14.84
		Agreeableness	129.19	13.78
16+ (n = 35)	5	Extraversion	124.54	23.29
		Neuroticism	96.23	23.48
		Conscientiousness	143.17	19.47
		Openness to Experience	122.77	16.28
		Agreeableness	137.40	16.39

Figures 5.1 to 5.5 provide a visual illustration of the relationship between the frequency of smoking and each of the Big Five factors of personality. From the figures it is evident that Extraversion displays a discernible trend that appears to be the most stable across all the categories of smoking frequency. Neuroticism and Openness to Experience appear to follow an upward trend although the patterns are not stable. Conscientiousness seems to follow a downward trend overall but the pattern is not stable either. No discernable trend was observable for Agreeableness.

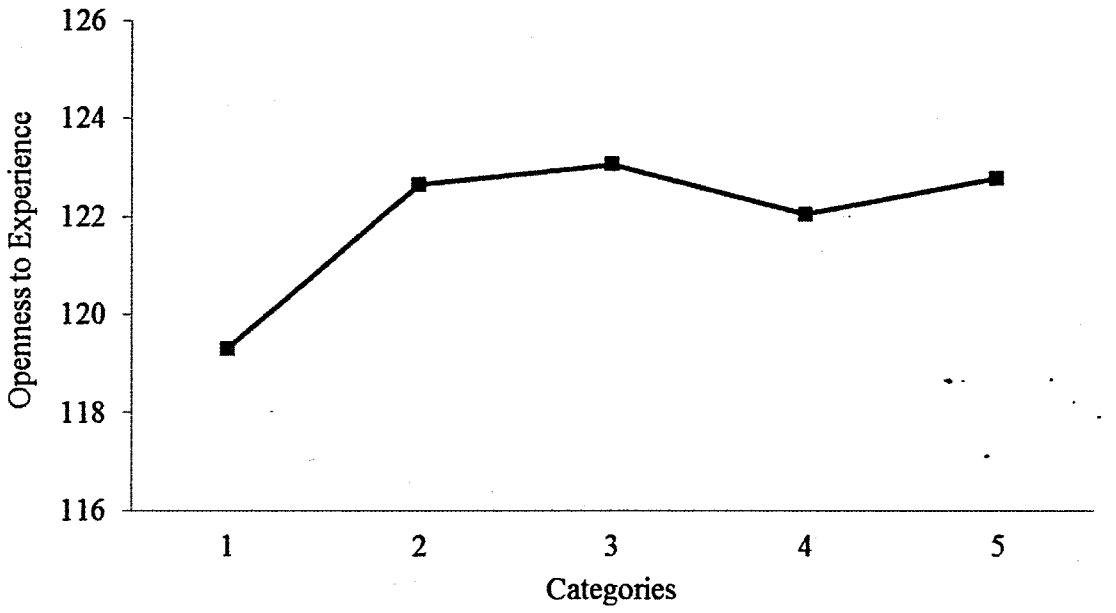

Figure 5.1. Mean scores on Openness to Experience for each of five categories of smoking

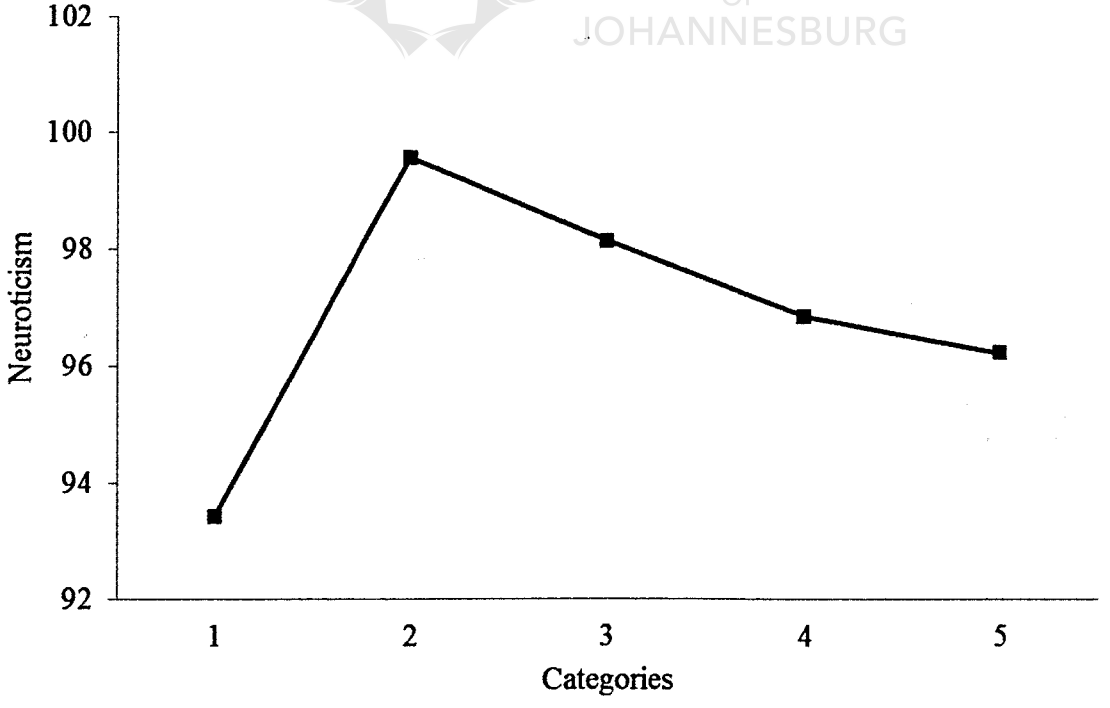

Figure 5.2. Mean scores on Neuroticism for each of the five categories of smoking

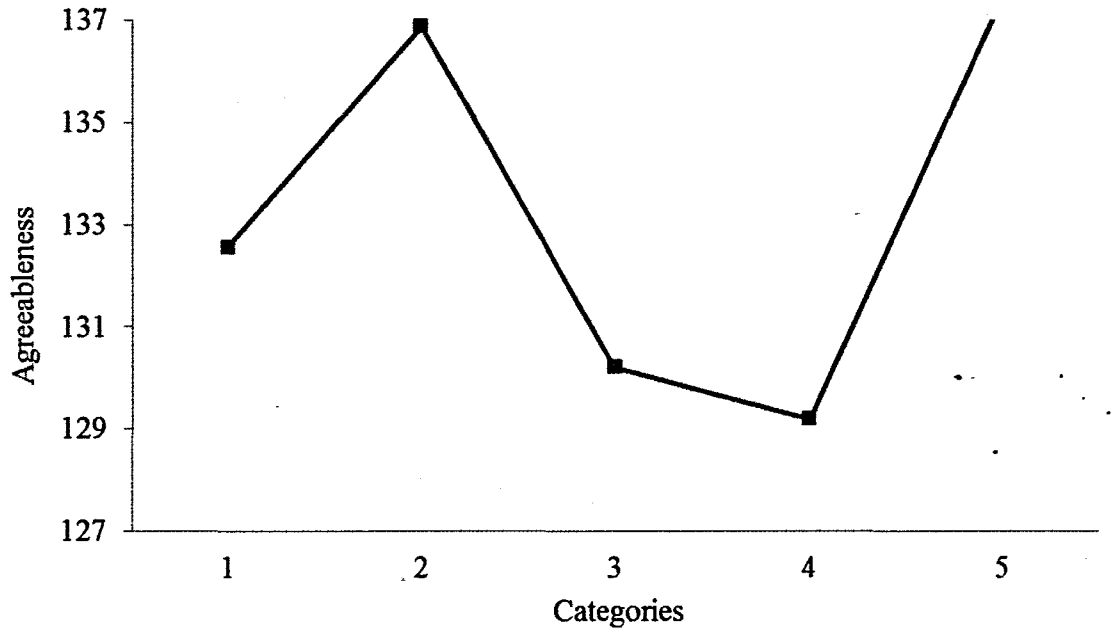

Figure 5.3. Mean scores on Agreeableness for each of the five categories of smoking

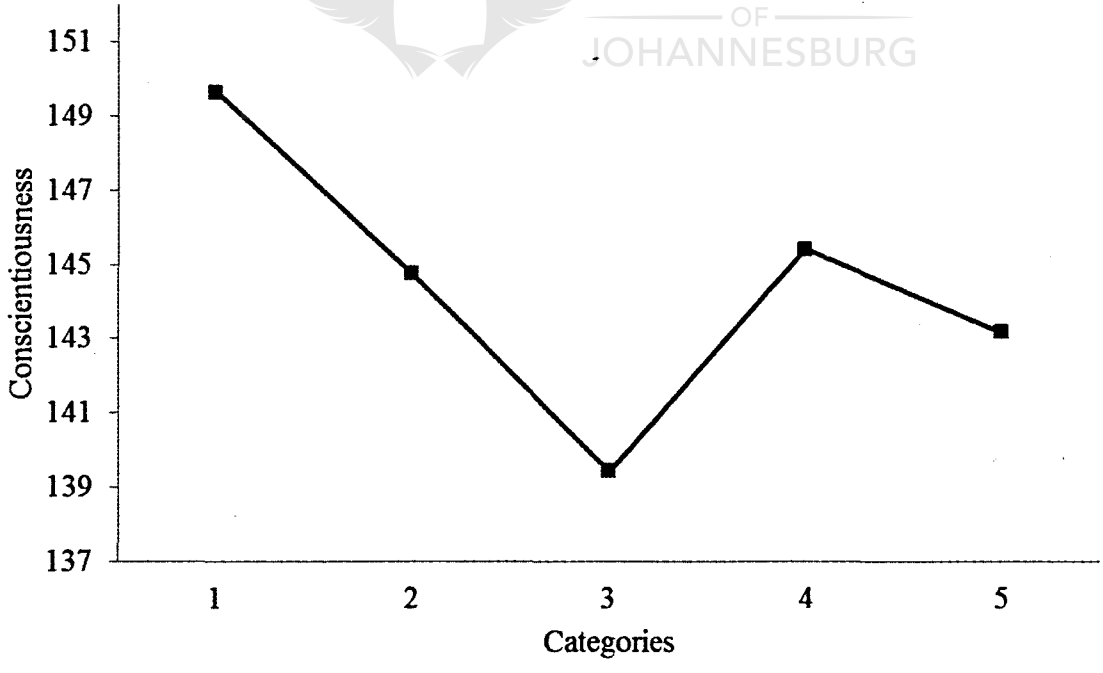

Figure 5.4. Mean scores on Conscientiousness for each of the five categories of smoking

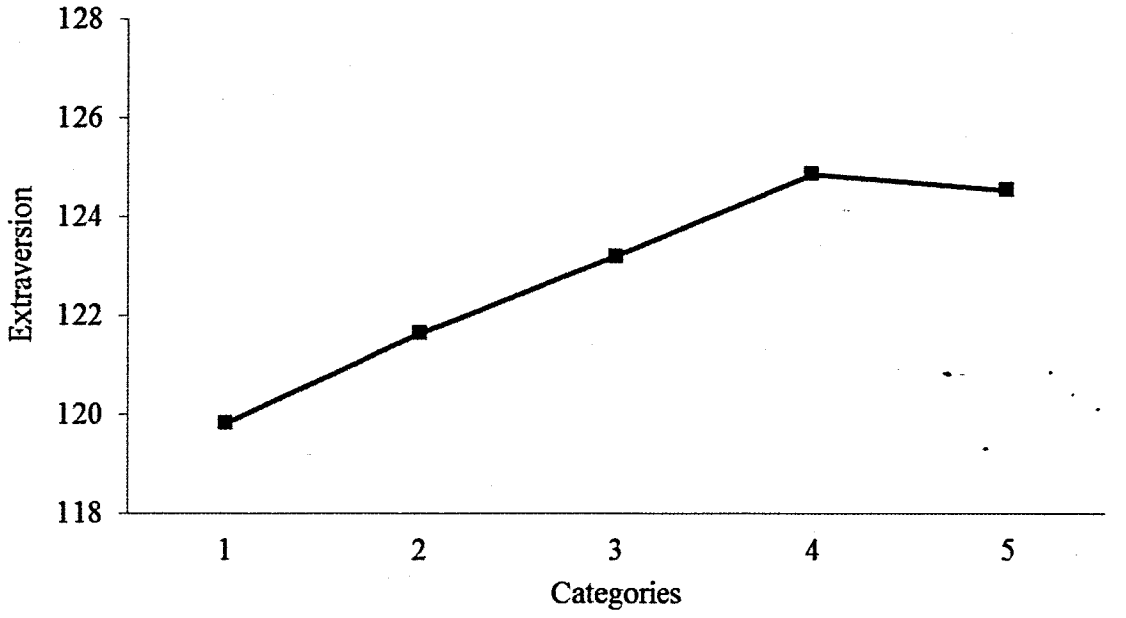

Figure 5.5. Mean scores on Extraversion for each of the five categories of smoking

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify those personality factors (or combinations of them) that were best able to distinguish between the different categories of smokers. Discriminant function analysis proceeds on the assumption that the covariance matrices of the different groups are equal. Box's M test reveals that the data met the assumption [Box's $M = 79.528$, $F(60, 62930.369) = 1.268$; $p = 0.079$].

The discriminant function analysis produced four discriminant functions. Taken together, the four functions significantly discriminated between the five groups of smokers [χ^2 (20) = 48.309, $p < 0.001$; Wilk's $\Lambda = 0.931$]. However, upon removal of the first function, the remaining functions failed to significantly discriminate between the groups [χ^2 (12) 14.289, $p = 0.283$; Wilk's $\Lambda = 0.979$]. Hence, the results show that only the first function significantly contributed toward the separation of the five groups of smokers.

The canonical correlation between the smoking groups and the composite of the five personality traits represented by function one was 0.221, which shows that the multivariate

combination of the five traits shared approximately 5% of its variance with the different levels of smoking behaviour.

The discriminant structure matrix reflects the correlations between each of the personality traits with the first discriminant function. Table 5.2 revealed that the function has a strong negative correlation with Conscientiousness, and moderate correlations with Extraversion, Openness to Experience, and Neuroticism. The correlation between the function and Agreeableness was close to zero. These results showed that of the Big Five factors of personality, Conscientiousness is best able to discriminate between the categories of smoking.

Table 5.2

Discriminant Structure Matrix for Smoking

	Function 1	
Personality variable	r_s	r_s^2
Conscientiousness	-0.60	36.00%
Openness to Experience	0.38	14.44%
Agreeableness	-0.05	00.25%
Extraversion	0.41	16.81%
Neuroticism	0.33	10.89%

Table 5.3 reports the mean scores for each of the five groups on the first discriminant function (expressed as z-scores). This indicates the magnitude to which the linear combination of personality variables, as represented in function one, differed across the various smoking groups. This relationship is visually presented in Figure 5.6.

Table 5.3

Group Centroids for Smoking

Group	Cigarette smoking	Function 1
1	0	-0.13
2	1-4	0.26
3	5-9	0.53
4	10-15	0.33
5	16+	0.33

Thus, individuals who do not smoke tend be lower on Extraversion, Openness to Experience and Neuroticism and higher on Conscientiousness. Table 5.3 shows that the combination of lower Conscientiousness and higher Extraversion, Openness to Experience and Neuroticism was most strongly related to individuals who smoke five to nine cigarettes per day. The general observable pattern seems to suggest that individuals who smoke more, are likely to be less Conscientious, more Extraverted and somewhat more open to experience and neurotic when compared to non-smokers.

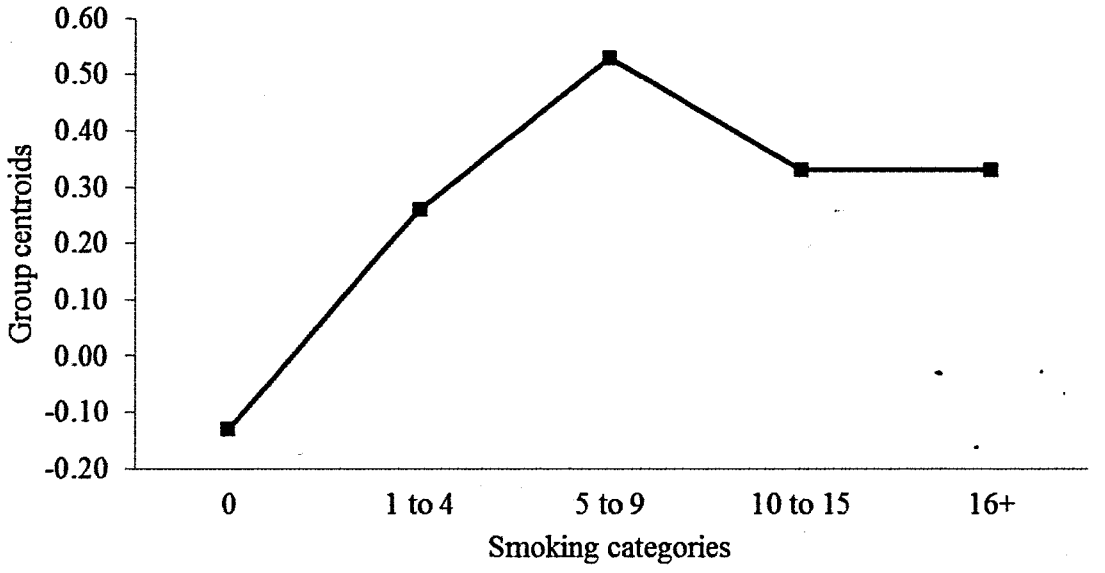

Figure 5.6. Line graph of the group centroids for smoking

The results of follow-up one way ANOVAs indicate that on a univariate level only Conscientiousness discriminated between the groups ($p = 0.09$). Tukey's post-hoc HSD test showed that the difference between the Conscientiousness scores of the non-smokers (group 1) and the moderate smokers (group 3) was significant ($p = 0.021$), but none of the remaining differences were statistically significant.

5.2 Number of Sexual Partners

Table 5.4 reports the means and standard deviations of the Big Five personality variables for each category of the grouping variable (amount of heterosexual partners in the past year). Visual inspection of the means across the categories shows a pattern where having more sexual partners is characterised by an increase in the levels of Extraversion and Openness to Experience and a decrease in the levels of Conscientiousness and Agreeableness.

Table 5.4

Descriptive Statistics for Heterosexual Partners

No of sexual partners	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	118.74	17.54
		Neuroticism	95.60	24.87
		Conscientiousness	150.10	20.84
		Openness to Experience	117.35	16.25
		Agreeableness	133.31	16.87
1-3	2	Extraversion	120.45	19.02
		Neuroticism	94.53	23.37
		Conscientiousness	148.06	21.87
		Openness to Experience	120.82	16.75
		Agreeableness	133.31	16.56
4-9	3	Extraversion	124.15	18.76
		Neuroticism	91.69	22.37
		Conscientiousness	145.80	22.29
		Openness to Experience	121.20	17.18
		Agreeableness	130.07	18.00
10+	4	Extraversion	125.98	18.27
		Neuroticism	95.74	25.73
		Conscientiousness	141.92	20.89
		Openness to Experience	128.55	15.76
		Agreeableness	130.89	17.13

Figures 5.7 to 5.11 provide a visual illustration of the relationship between the number of sexual partners and each of the personality traits. A discernible pattern was observable for Extraversion, Openness to Experience, Conscientiousness and Agreeableness as the number of sexual partners increased on each of the traits. Inspection of Figure 5.8 revealed no discernable pattern for Neuroticism across the categories of the grouping variable.

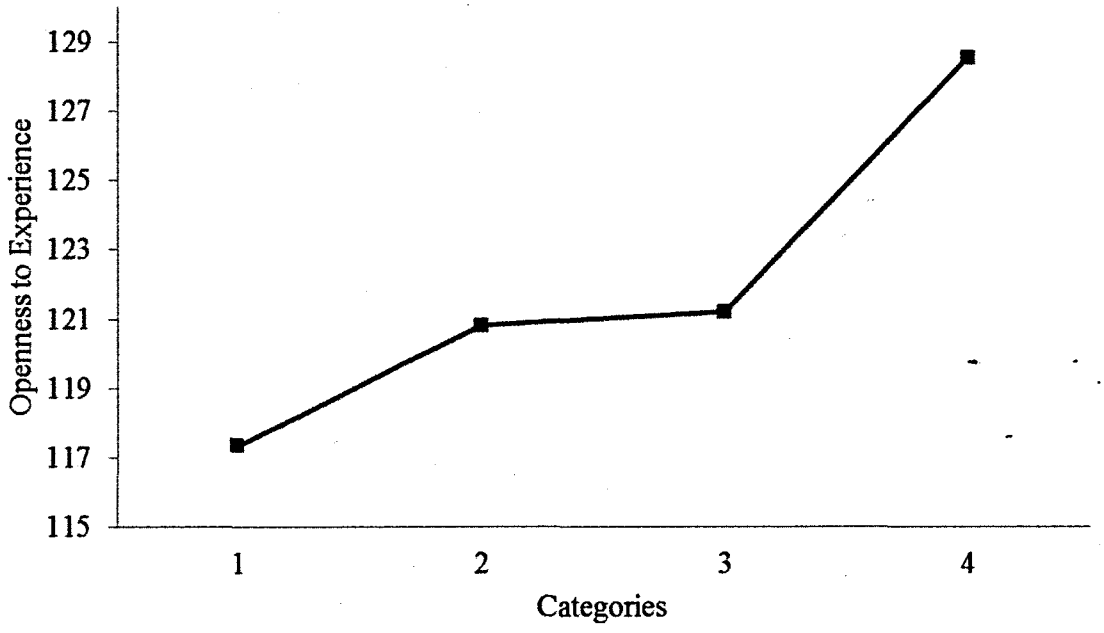

Figure 5.7 Mean scores on Openness to Experience for each of the categories based on the number of previous sexual partners

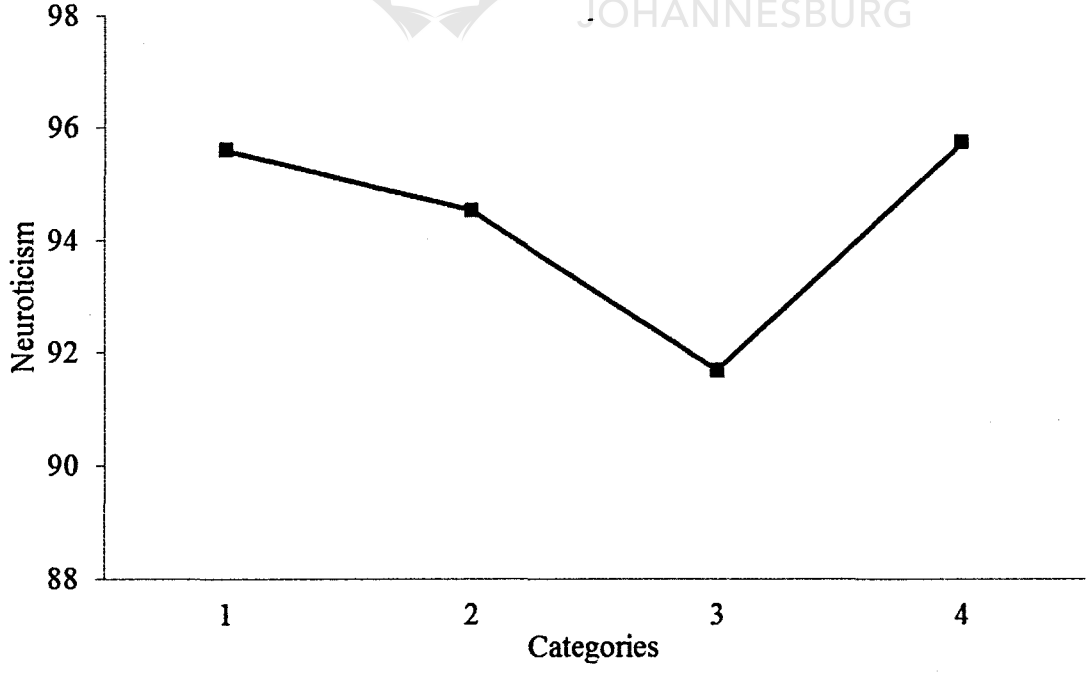

Figure 5.8 Mean scores on Neuroticism for each of the categories based on the number of previous sexual partners

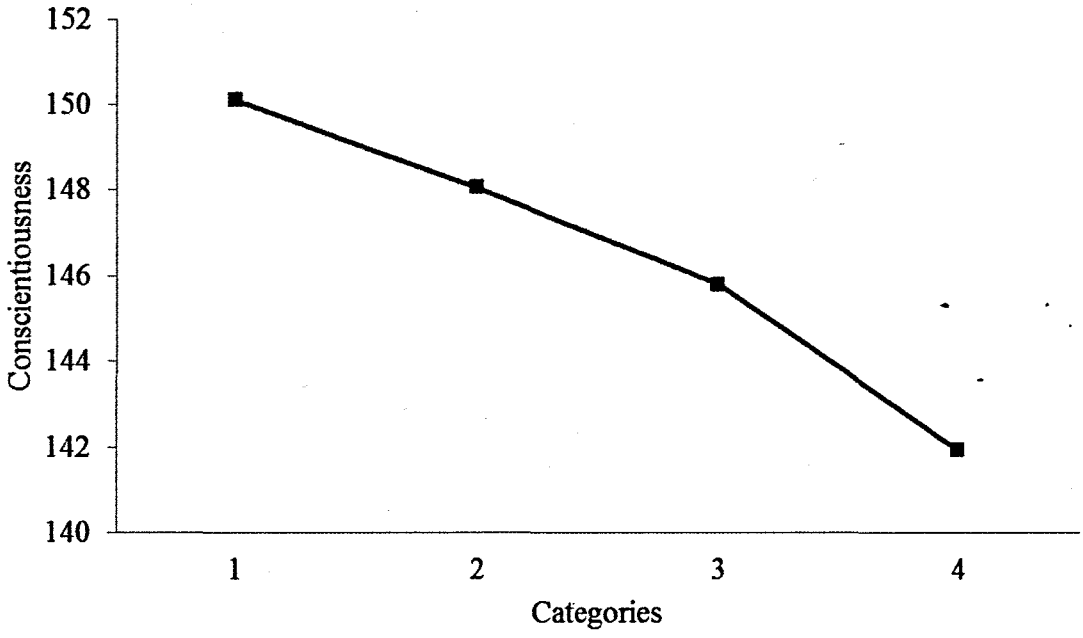

Figure 5.9 Mean scores on Conscientiousness for each of the categories based on the number of previous sexual partners

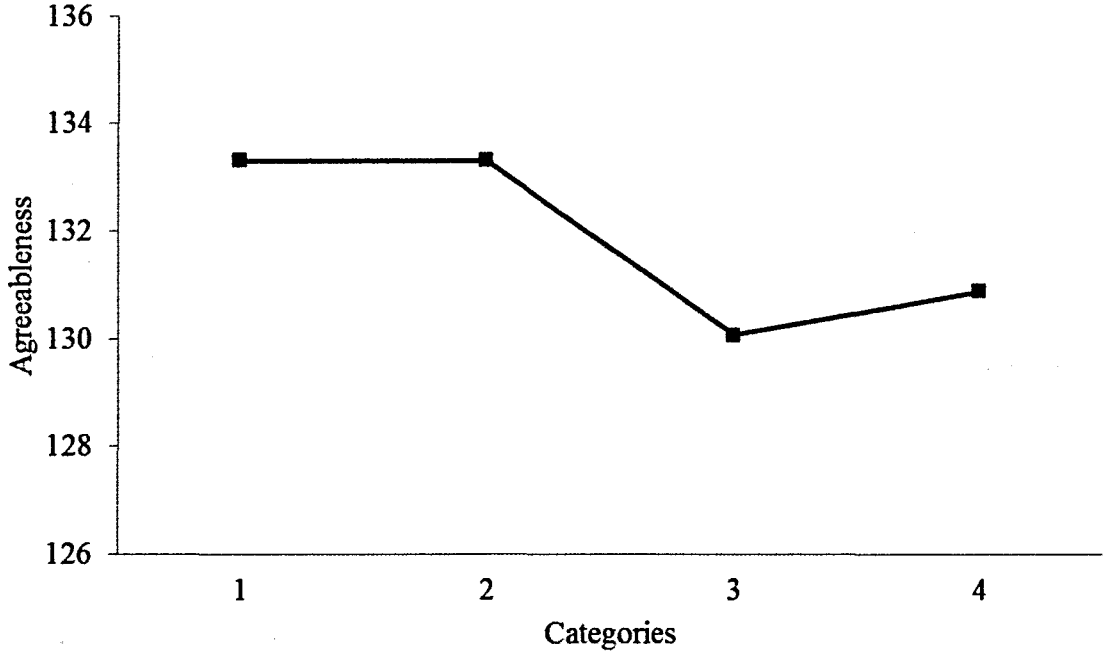

Figure 5.10 Mean scores on Agreeableness for each of the categories based on the number of previous sexual partners

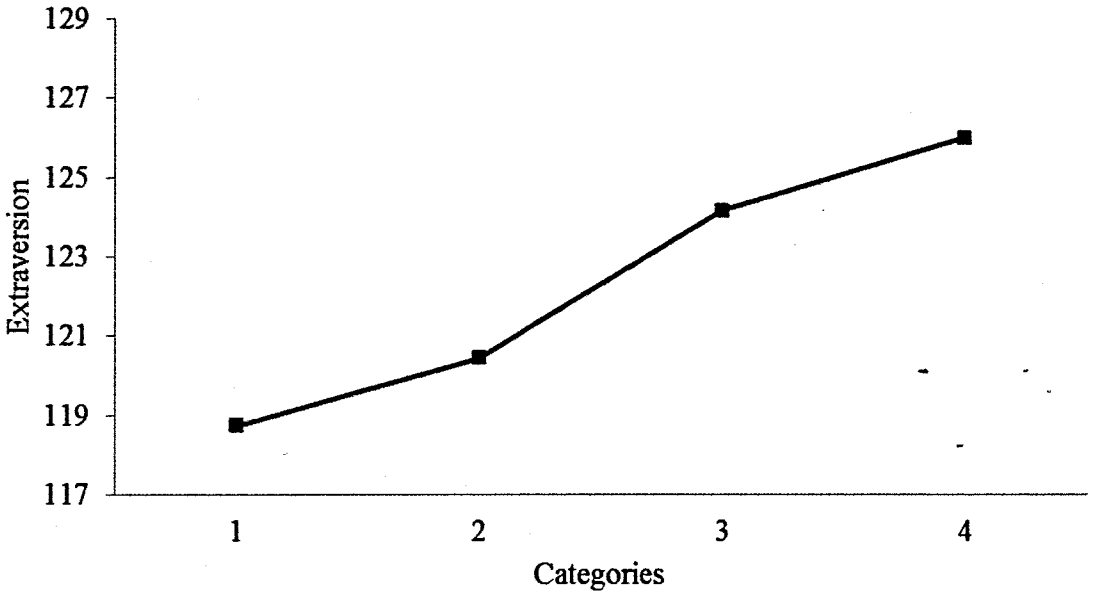

Figure 5.11 Mean scores on Extraversion for each of the categories based on the number of previous sexual partners

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify those personality factors (or combinations of them) that were best able to distinguish between the different categories of the grouping variable (number of heterosexual partners). Box's M test revealed that the data met the assumption of equal covariance matrices across the different groups [Box's $M = 47.651$, $F(45,145213.409) = 1.037$; $p = 0.403$].

The results of a discriminant function analysis produced three functions. Taken together the three functions significantly discriminated between the four grouping variables [χ^2 (15) 56.719, $p < 0.001$; Wilk's $\Lambda = 0.920$]. However, upon removal of the first function the remaining functions failed to significantly discriminate between the groups [χ^2 (8) 6.740, p = .565; Wilk's $\Lambda = 0.990$]. The results show that only the first function significantly contributed toward the separation of the four grouping variables.

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.266, which shows that the multivariate combination of the personality variables shared approximately 7% of its variance with the grouping variables comprising different numbers of heterosexual partners.

Table 5.5 shows that the function had a strong positive correlation with Openness to Experience and a moderate positive correlation with Extraversion. A moderate negative correlation was found for Conscientiousness and a small negative correlation was found for Agreeableness. The correlation with Neuroticism was close to zero. These results show that of the Big Five factors of personality, Openness to Experience and Extraversion were best able to discriminate between the categories comprising of a different number of heterosexual partners in each.

Table 5.5.

Discriminant Structure Matrix for the Number of Sexual Partners

	Function 1	
Personality variable	r_s	r_s^2
Openness to Experience	.63	39.06%
Extraversion	.46	20.70%
Conscientiousness	-.39	15.29%
Agreeableness	-.21	04.54%
Neuroticism	-.09	00.76%

Table 5.6 shows the magnitude to which the linear combination of personality variables, as represented in function one, differed across the grouping variables. Thus, individuals with no or few heterosexual partners (group 1) tended to be lower on Openness to Experience and Extraversion, higher on Conscientiousness and slightly higher on Agreeableness.

Table 5.6.

Group Centroids for the Number of Sexual Partners

Heterosexual partners	Function 1
0	-.26
1-3	-.00
4-9	.25
10+	.72

Figure 5.12 shows that the general pattern observable therefore seemed to suggest that individuals who had more heterosexual partners – as reflected in the 10+ category – were likely to be more Open to Experience, more Extraverted, less Conscientious and somewhat less Agreeable than individuals who had fewer heterosexual partners.

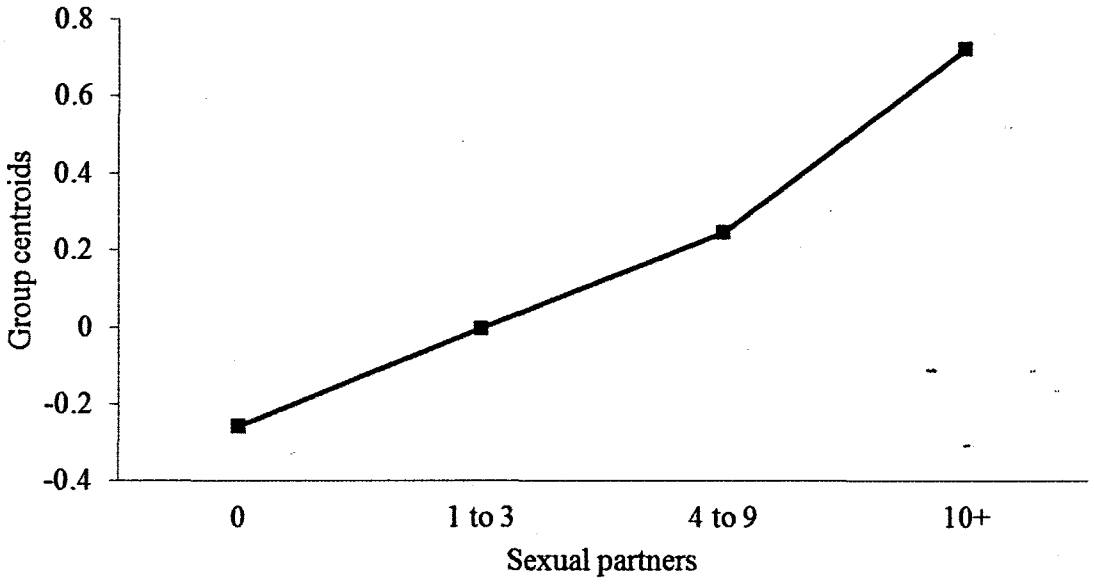

Figure 5.12. Line graph of group centroids for sexual partner categories

The results of follow-up one way ANOVAs indicate that on a univariate level, Extraversion ($p = 0.011$), Conscientiousness ($p = 0.047$) and Openness to Experience ($p = 0.000$) discriminated between the grouping variables. However, Tukey's post-hoc HSD test showed that only Openness to Experience and Extraversion significantly discriminated between the group variables. For Openness to Experience, significant differences ($p < 0.01$) were only found between the group with no heterosexual partners and the 10+ group. Significant differences for Extraversion were found between the group with no heterosexual partners and both the medium ($p = 0.042$) and high groups ($p = 0.047$). None of the remaining differences were significant.

5.3 Illegal Substance Use

Table 5.7 reports the means and standard deviations of the Big Five personality variables for each category of illegal substance use. Visual inspection of the means across the categories shows a pattern where higher levels of substance use is characterised by an increase in Openness to Experience and Extraversion and a decrease in Conscientiousness and

Neuroticism, although the pattern for Neuroticism is not clear. The mean Agreeableness and Neuroticism scores are much more ambiguous and no particular trend is immediately observable.

Table 5.7.

Descriptive Statistics for Illegal Substance Use

Substance use	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	119.65	17.88
		Neuroticism	94.38	23.84
		Conscientiousness	150.49	21.53
		Openness to Experience	118.78	16.84
		Agreeableness	132.70	17.47
1-4	2	Extraversion	122.13	18.91
		Neuroticism	95.40	24.08
		Conscientiousness	141.35	19.97
		Openness to Experience	122.19	14.92
		Agreeableness	131.58	14.69
5-15	3	Extraversion	125.54	20.83
		Neuroticism	98.27	24.40
		Conscientiousness	137.76	19.43
		Openness to Experience	126.29	15.61
		Agreeableness	134.17	17.75
16+	4	Extraversion	131.00	20.24
		Neuroticism	90.29	25.29
		Conscientiousness	137.71	18.82
		Openness to Experience	129.24	17.40
		Agreeableness	130.76	13.85

Figures 5.13 to 5.17 provide a visual illustration of the relationships between the level of substance use and each of the five personality traits. A discernable trend in the pattern is observable as the level of illegal substance use increases on most of the traits. Inspection of the figures shows that the pattern for Neuroticism was less stable and that no clear trend seemed to emerge for Agreeableness.

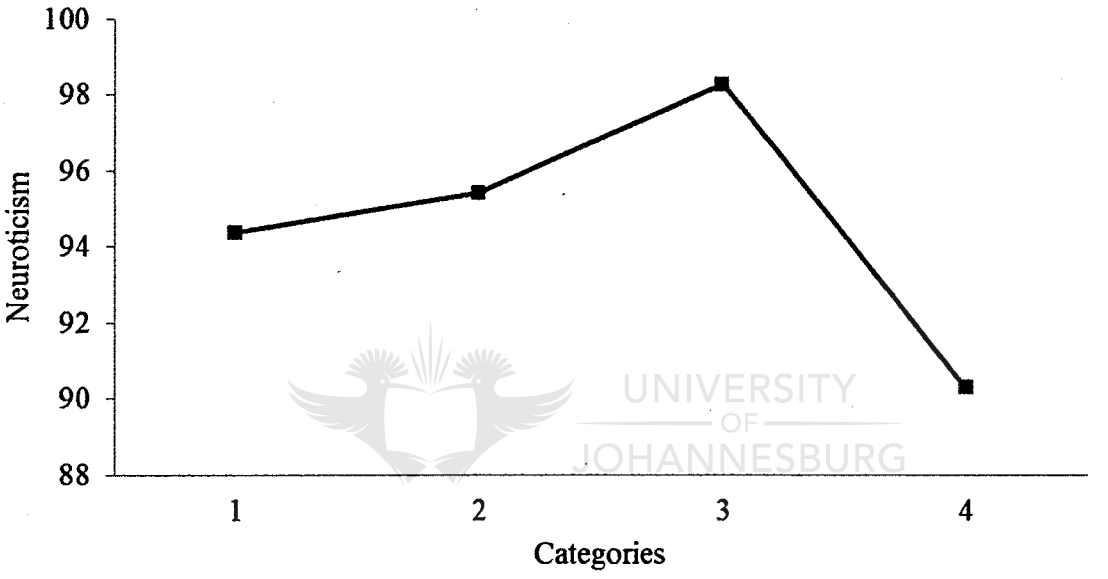

Figure 5.13. Mean scores on Neuroticism for each of the categories based on the frequency of of illegal substance use

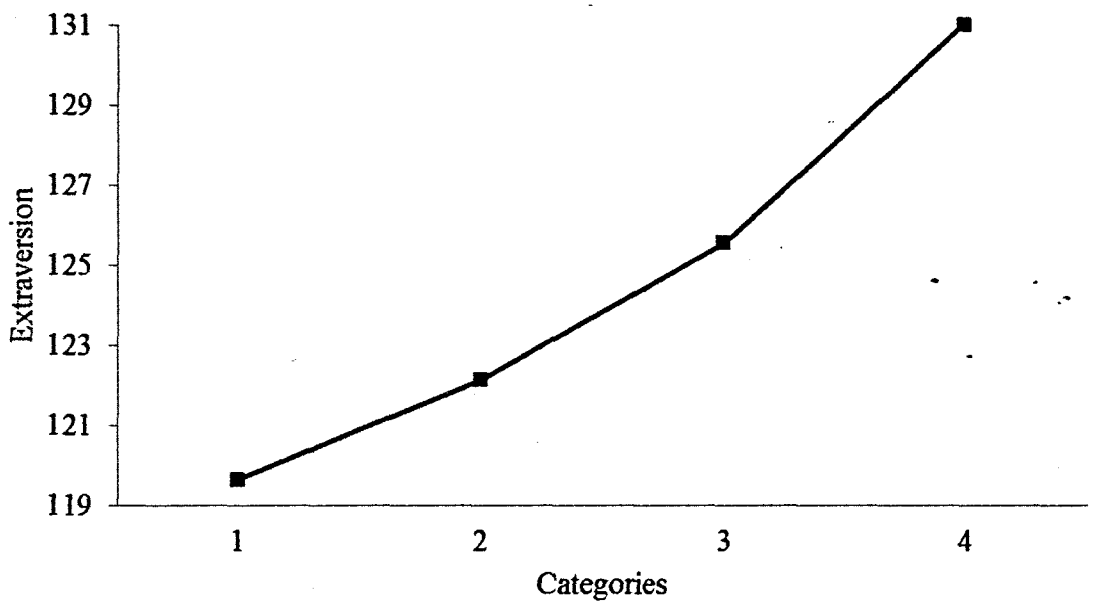

Figure 5.14. Mean scores on Extraversion for each of the categories based on the frequency of illegal sustance use

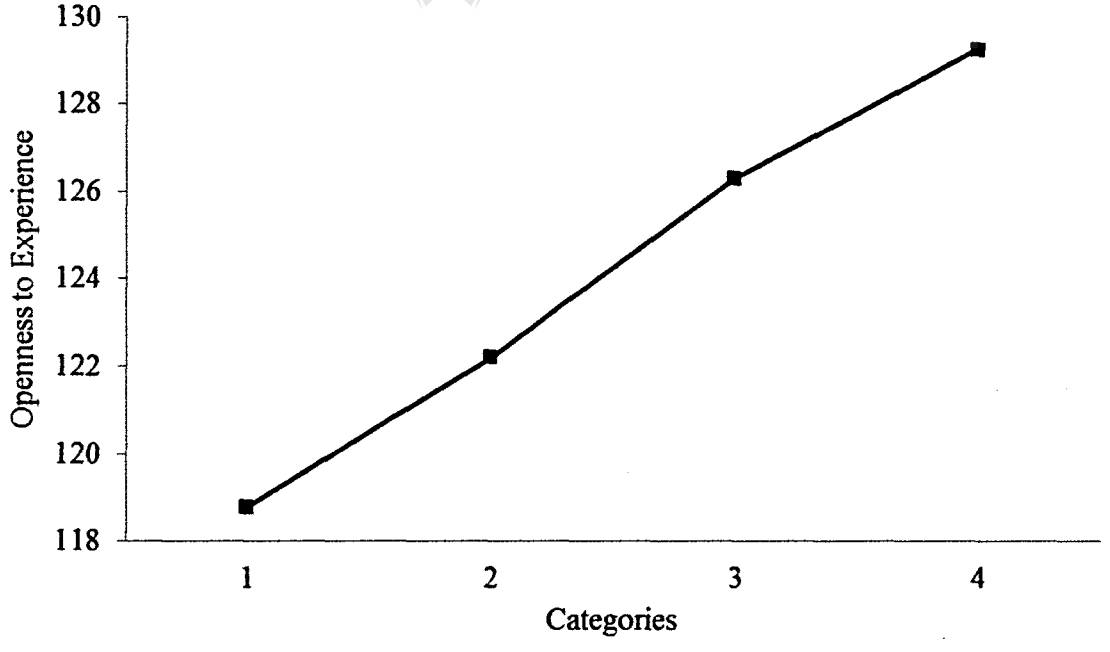

Figure 5.15. Mean scores on Openness to Experience for each of the categories based on the frequency of illegal substance use

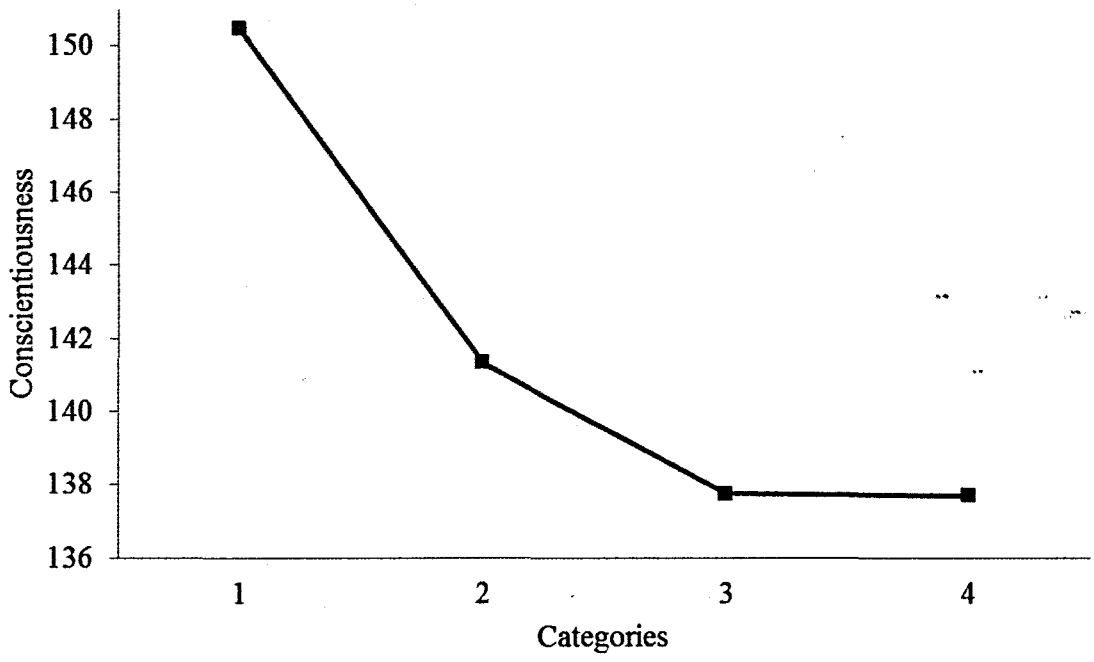

Figure 5.16. Mean scores on Conscientiousness for each of the categories based on the frequency of illegal substance use

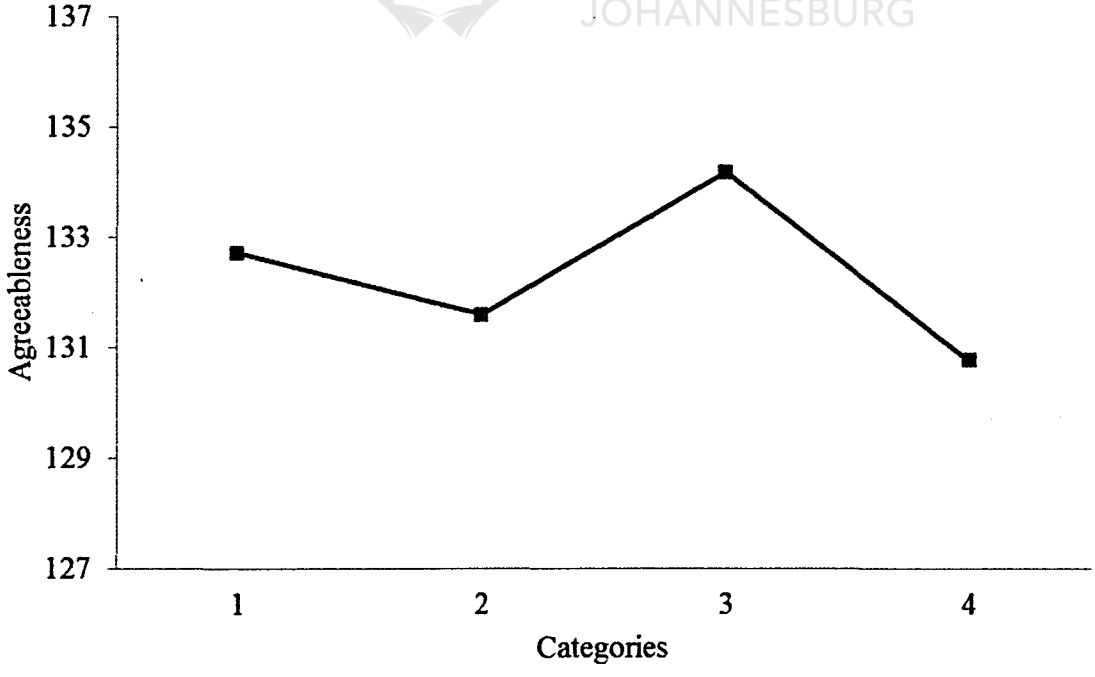

Figure 5.17. Mean scores on Agreeableness for each of the categories based on the frequency of illegal substance use

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify those combinations of personality traits that were best able to distinguish between the different levels of illegal substance use. Box's *M* test revealed that the data met the assumption of equal covariance matrices across the different groups [Box's $M = 48.895$, F (45, 46304.491) $= 1.042$; $p = 0.395$].

The results of a discriminant function analysis produced three functions. Taken together the three functions significantly discriminated between the four grouping variables [χ^2 (15) 83.819, $p < 0.001$; Wilk's $\Lambda = 0.884$]. However, upon removal of the first function the remaining functions failed to significantly discriminate between the groups [χ^2 (8) 5.459, p =.708; Wilk's Λ =.992]. The results showed that only the first function significantly contributed toward the separation of the four grouping variables.

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.330, which shows that the multivariate combination of the personality variables shared approximately 11% of its variance with various levels of illegal substance use.

The discriminant structure matrix reflects the correlations between each of the personality variables with the first discriminant function. Table 5.8 shows that the function has a strong negative correlation with Conscientiousness and moderate correlations with Extraversion and Openness to Experience. The correlations for Neuroticism and Agreeableness were close to zero. These results indicate that of the Big Five factors of personality, Conscientiousness is best able to discriminate between various levels of illegal substance use.

Table 5.8

Discriminant Structure Matrix for Substance Use

	Function 1	
Personality variable	r_s	r_s^2
Neuroticism	.01	00.01%
Agreeableness	-.04	00.15%
Conscientiousness	-.62	38.81%
Extraversion	.41	17.06%
Openness to Experience	.49	24.21%

Table 5.9 shows the magnitude to which the linear combination of personality variables, as represented by function one, differed across the different grouping variables. These results indicate that individuals who do not make use of illegal substances tend to be higher on Conscientiousness, and lower on Extraversion and Openness to Experience.

Table 5.9.

Group Centroids for Substance Use

Substance use	Function 1
0	-.18
1-4	.38
5-15	.74
16+	.97

Overall, the results reflected in Figure 5.18 indicate that individuals characterised by a higher levels of illegal substance use – 16+ per year – are likely to be less Conscientiousness, more Extraverted and quite Open to Experience when compared to less frequent or non-users of illegal substances.

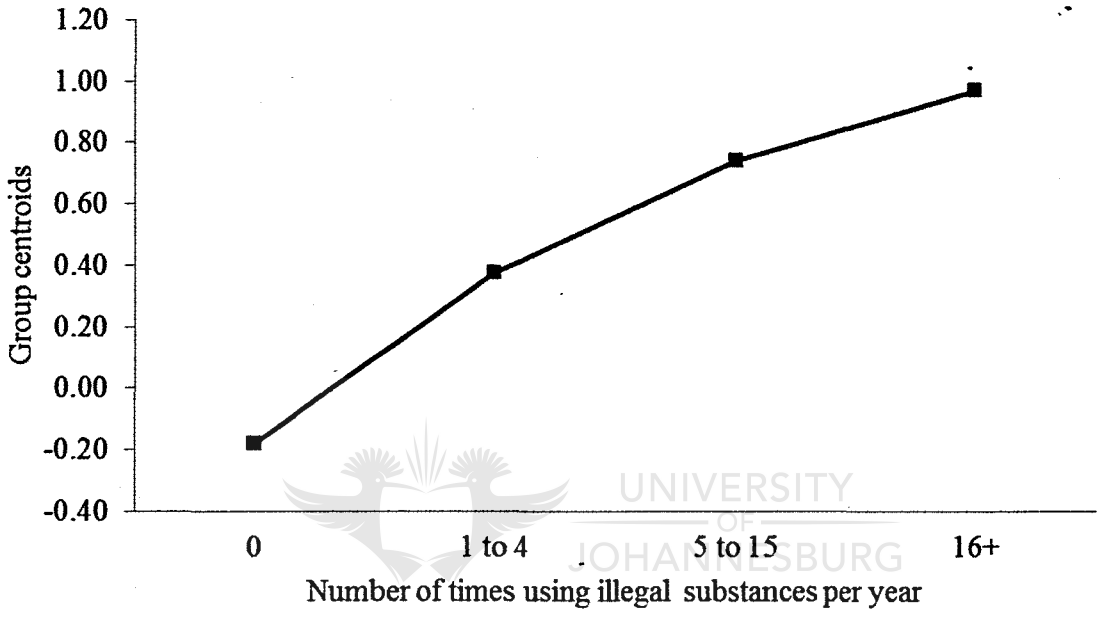

Figure 5.18. Line graph of the group centroids for illegal substance use

The results of follow-up one way ANOVA indicate that on a univariate level, Extraversion, ($p = 0.001$), Conscientiousness ($p = 0.000$) and Openness to Experience ($p = 0.000$) discriminated between the grouping variables. Tukey's post-hoc HSD test showed that for Extraversion, significant differences were only found between the non-substance users and the high users, as charaterised by the 16+ category ($p = 0.003$). For Conscientiousness, signifcant differences were found across all four categories of the grouping variable. For Openness to Experience, significant differences were found only between non-substance users and the moderate ($p = 0.027$) to high categories ($p = 0.002$).

5.4 Alcohol Consumption

Table 5.10 reports the means and standard deviations of the Big Five personality variables for each category of alcohol use. Visual inspection of the means across the categories shows a pattern where higher levels of alcohol use is characterised by an increase in Extraversion and Openness to Experience and a decrease in Agreeableness and Conscientiousness. No clear trend is observable for Neuroticism.

Table 5.10.

Descriptive Statistics for Alcohol Use

Alcohol use	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	117.83	18.92
		Neuroticism	93.32	25.30
		Conscientiousness	150.95	22.84
		Openness to Experience	118.15	17.40
		Agreeableness	134.36	17.99
1-3	2	Extraversion	119.69	17.16
		Neuroticism	95.52	22.88
		Conscientiousness	149.62	20.33
		Openness to Experience	121.23	16.04
		Agreeableness	132.14	16.21
4-9	3	Extraversion	124.91	17.33
		Neuroticism	94.22	22.63
		Conscientiousness	145.38	21.03
		Openness to Experience	120.70	16.75
		Agreeableness	131.56	17.26
10+	4	Extraversion	127.85	20.55
		Neuroticism	95.76	25.50
		Conscientiousness	137.03	18.45
		Openness to Experience	122.32	17.00
		Agreeableness	129.74	15.32

Figures 5.19 to 5.23 provide a visual illustration of the relationship between the number of alcoholic drinks consumed per week and the five personality traits. Discernible trends in the patterns are observable as the consumption of alcohol increased for each of the traits. The trends for Neuroticism and Openness to Experience were somewhat less stable in their direction. However, the overall trend appeared to be upward for these traits.

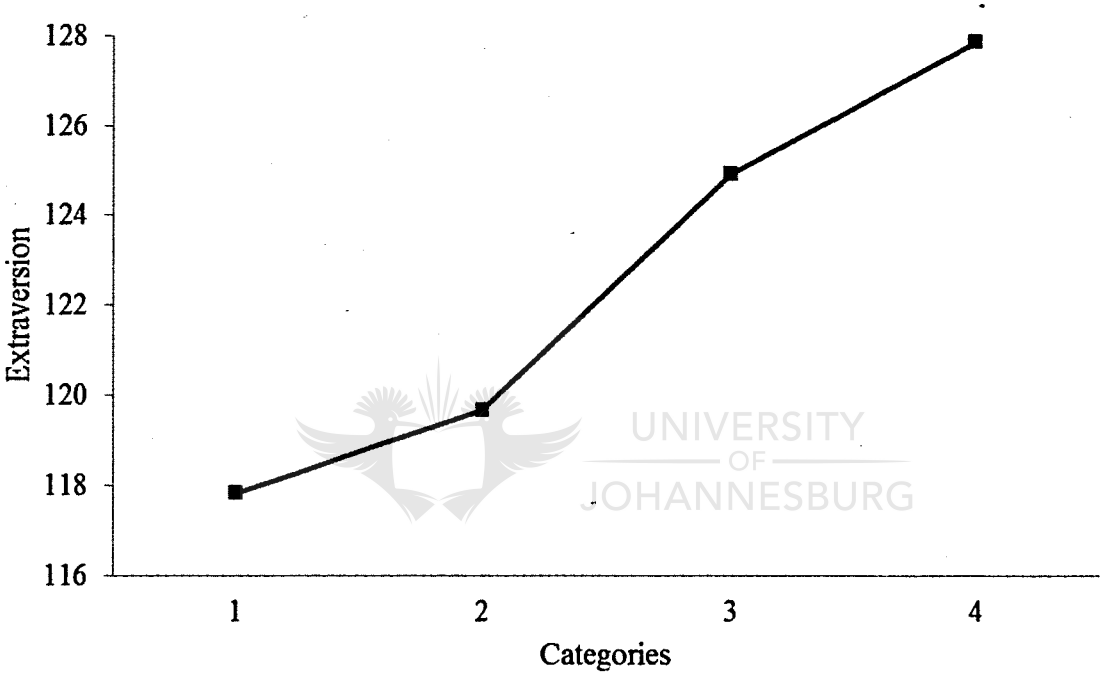

Figure 5.19 Mean scores on Extraversion for each category of alcohol use

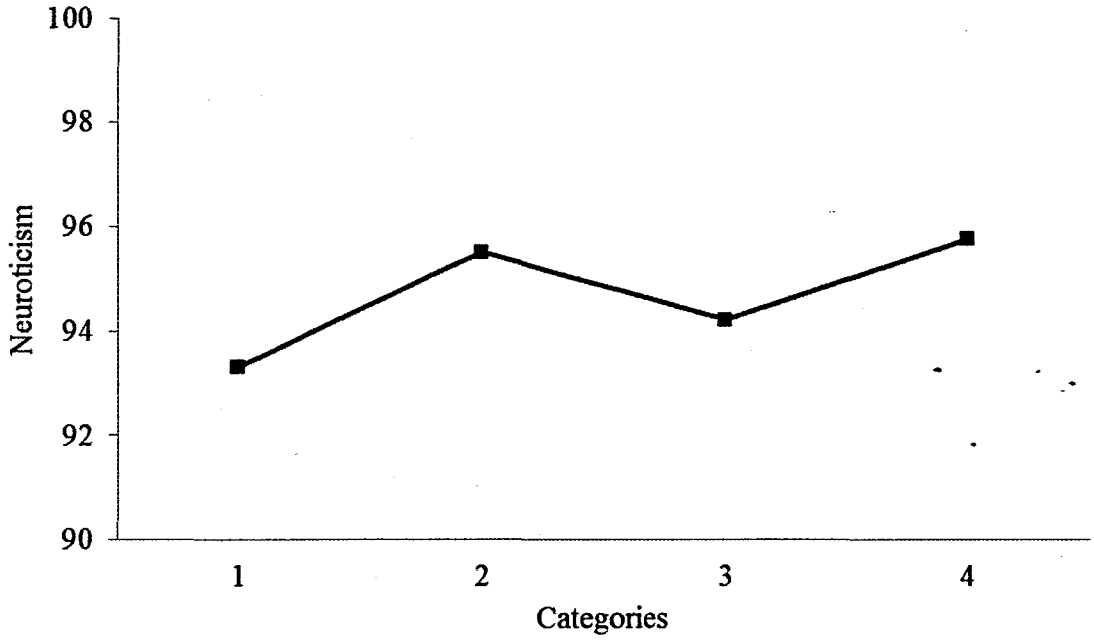

Figure 5.20 Mean scores on Neuroticism for each category of alcohol use

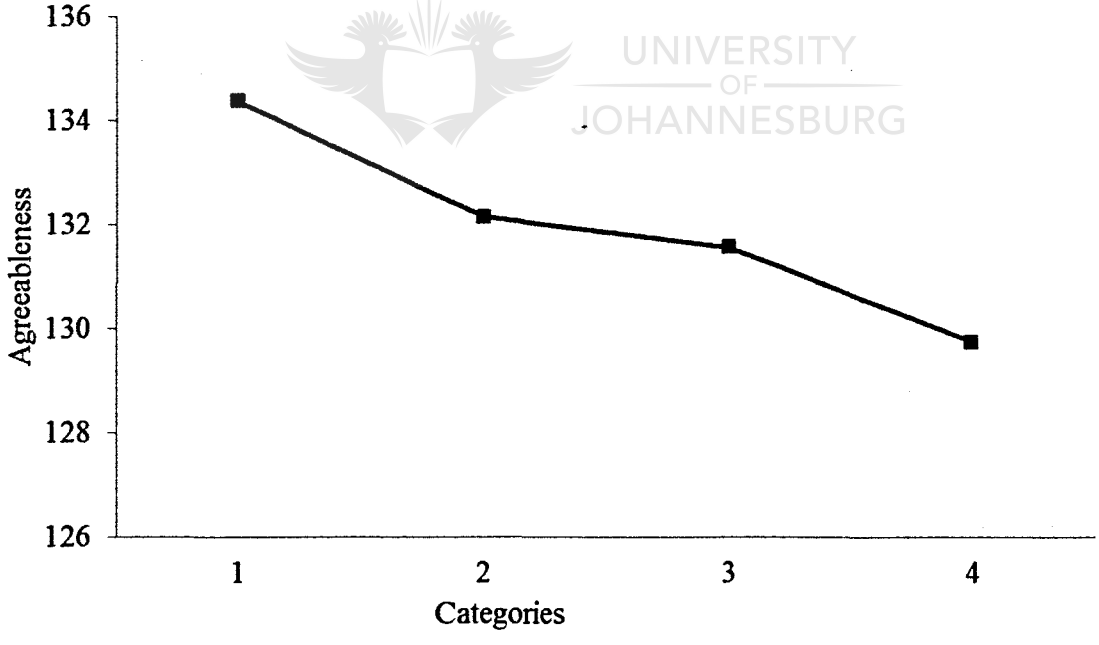

Figure 5.21 Mean scores on Agreeableness for each category of alcohol use

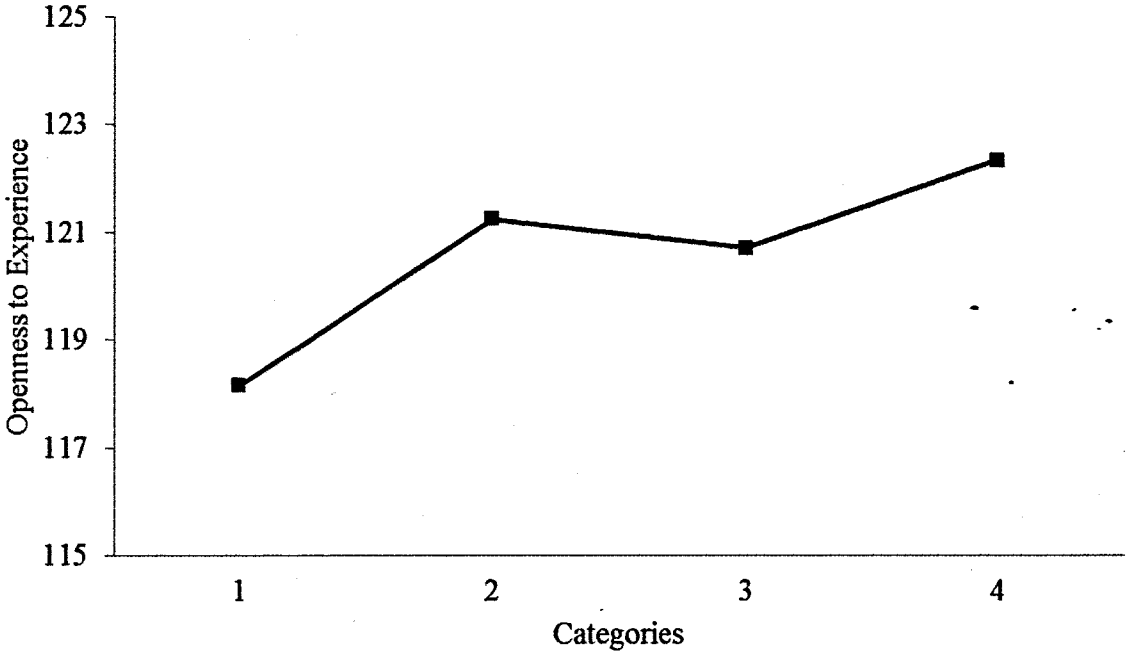

Figure 5.22 Mean scores on Openness to Experience for each category of alcohol use

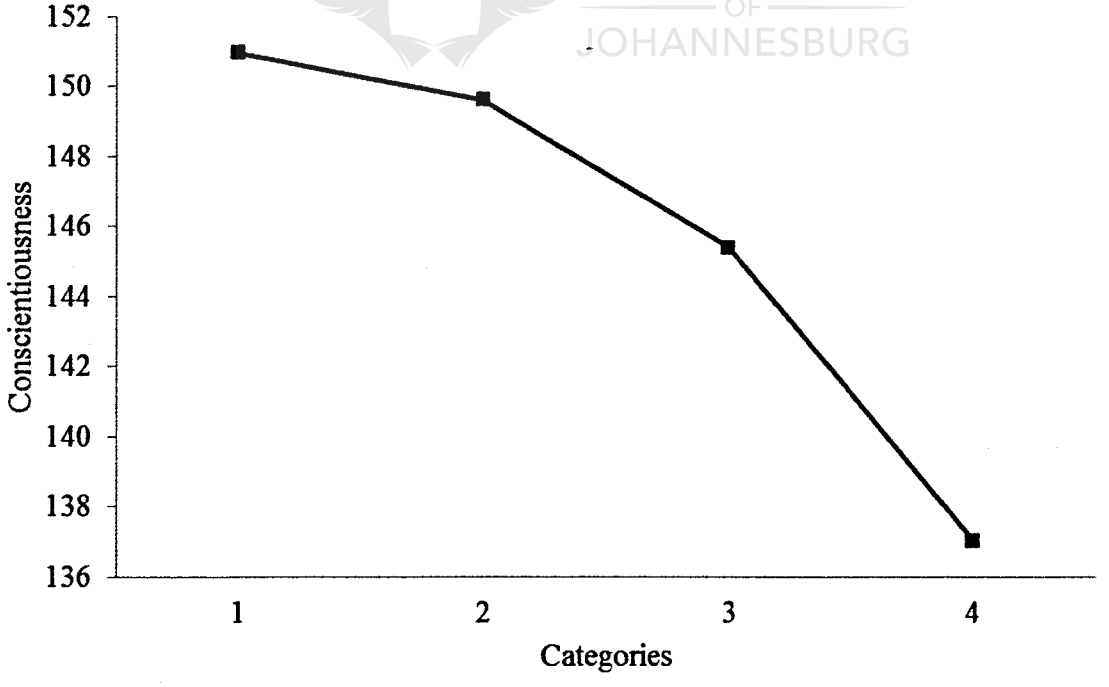

Figure 5.23 Mean scores on Conscientiousness for each category of alcohol use

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify those personality traits best able to distinguish between the different levels of alcohol consumption per week. Box's *M* test revealed that the data met the assumption of equal covariance matrices across the different groups. [Box's $M = 46.336$, F (45, 286195.695) = 1.012; $p = 0.450$].

The results of a discriminant function analysis produced three functions. Taken together, the three functions significantly discriminated between the four grouping variables [χ^2 (15) 81.952, $p < 0.001$; Wilk's $\Lambda = 0.886$]. Upon removal of the first function, the remaining functions failed to significantly discriminate between the groups [χ^2 (8) 9.509, p =0.301; Wilk's $\Lambda = 0.986$]. The results showed that only the first function significantly contributed toward the separation of the four grouping variables.

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.318, which shows that the multivariate combination of the personality variables shared approximately 10% of its variance with various levels of alcohol use per week.

The discriminant structure matrix reflects the correlations between each of the personality variables with the first discriminant function. Table 5.11 shows that the function has a strong negative correlation with Conscientiousness and strong positive correlation with Extraversion. A small positive correlation was found for Openness to Experience and a small negative correlation with Agreeableness. These results indicate that of the Big Five factors of personality, Conscientiousness and Extraversion are best able to discriminate between various levels of alcohol use.

Table 5.11

Discriminant Structure Matrix for Alcohol Use

	Function 1	
Personality variable	r_s	r_s^2
Openness to Experience	.21	04.37%
Neuroticism	.07	00.49%
Agreeableness	-.25	06.00%
Conscientiousness	-.58	33.87%
Extraversion	.56	31.02%

Table 5.12 indicates the magnitude to which the linear combination of personality variables, as represented in function one, differ across the categories of alcohol consumption. The results showed that individuals who do not consume alcohol tend to score higher on Conscientiousness and Agreeableness and lower on Extraversion and Openness to Experience.

Table 5.12

Group Centroids for Alcohol Use

Alcohol use	Function 1
0	-.31
1-3	-.07
4-9	.29
10+	.76

Figure 5.24 presents a visual illustration of this linear combination across each of the groups. In general, the results indicate that individuals who consume more alcohol per week – as indicated by the 10+ category – are likely to be more Extraverted and less Conscientious when compared to the lower consumption groups.

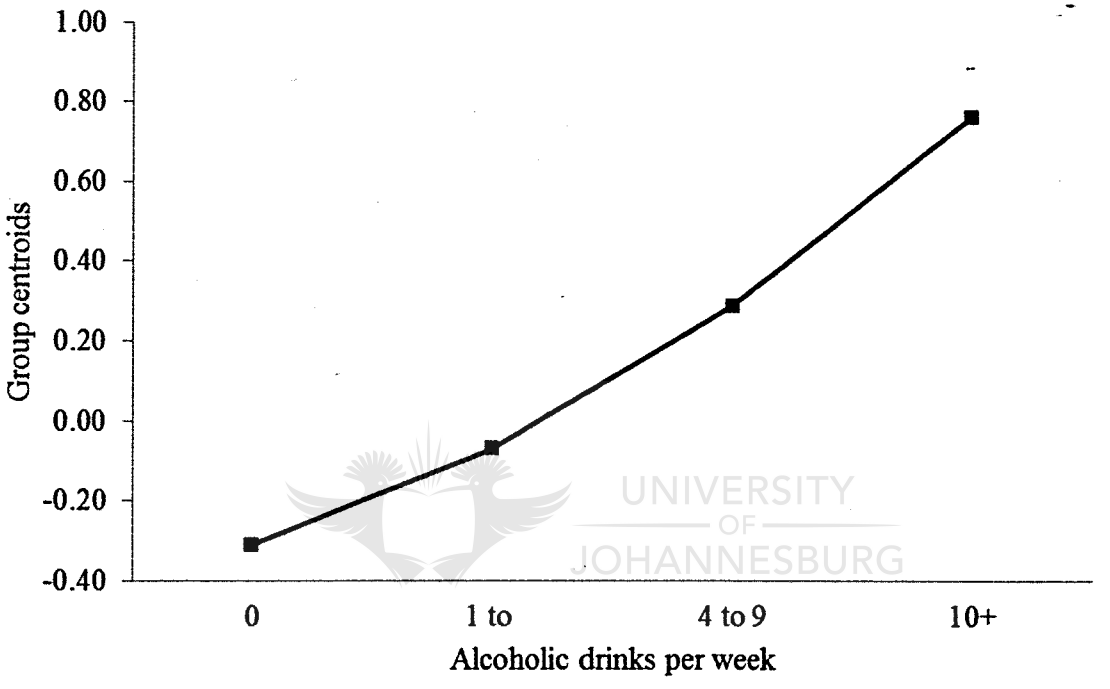

Figure 5.24. Line graph of the group centroids for alcohol use

The results of follow-up one way ANOVAs indicate that on a univariate level, Extraversion ($p = 0.000$) and Conscientiousness ($p = 0.000$) discriminated between the grouping variables. Tukey's post-hoc HSD test showed that for Extraversion, significant differences were found between all the groups except between the non-user (0) and mild (1-3) categories as well as between the moderate (4-9) and high (10+) categories. None of the other group differences was significant. For Conscientiousness, significant differences were found between the high users of alcohol – as indicated by the 10+ category – and every other category. The remaining differences were not significant.

5.5 Thrill activities

Table 5.13 reports the means and standard deviations of the Big Five personality variables for each category of thrill seeking. Visual inspection of the means across the categories shows a pattern where higher levels of thrill seeking do not appear to follow any discernible pattern for any of the traits except on Extraversion. The patterns for Conscientiousness, Agreeableness, and Openness to Experience and Neuroticism are all somewhat erratic across the various levels of thrill-seeking behaviour.

Table 5.13

Descriptive Statistics for Thrill Activities

Thrill activities	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	116.38	17.06
		Neuroticism	97.04	23.32
		Conscientiousness	147.86	21.16
		Openness to Experience	118.54	17.12
		Agreeableness	132.20	16.92
1-2	2	Extraversion	124.17	18.46
		Neuroticism	91.51	23.40
		Conscientiousness	147.87	22.02
		Openness to Experience	122.29	15.17
		Agreeableness	135.42	15.50
3-5	3	Extraversion	130.02	17.52
		Neuroticism	89.88	25.67
		Conscientiousness	149.20	22.54
		Openness to Experience	123.39	15.79
		Agreeableness	129.28	18.23
6+	4	Extraversion	129.46	21.02
		Neuroticism	94.27	26.30
		Conscientiousness	146.46	21.88
		Openness to Experience	119.11	21.04
		Agreeableness	130.68	19.75

Visual inspection of the Figures 5.25 to 5.29 reveals that none of the traits displayed a stable pattern in any one direction, except for Extraversion which appeared to follow a relatively stable pattern in an upward direction. The patterns for Agreeableness and Neuroticism seemed to be characterised by slight downward movements overall.

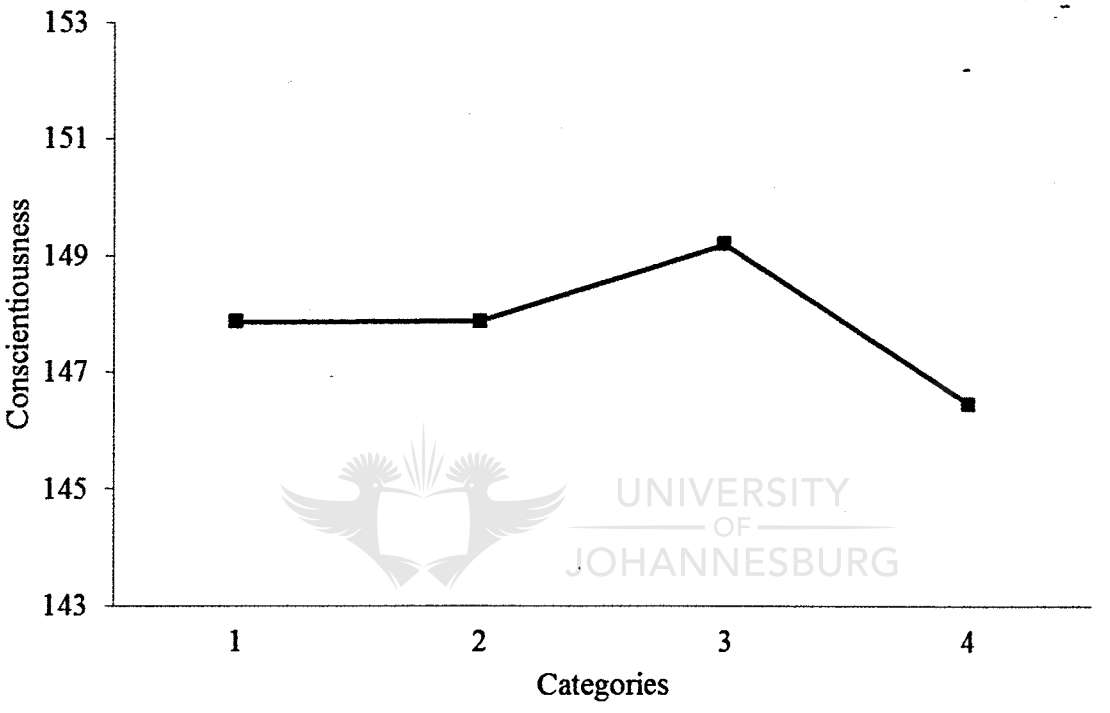

Figure 5.25. Mean scores on Conscientiousness for each of the categories, based on the number of thrill-seeking activities an individual has participated in previously.

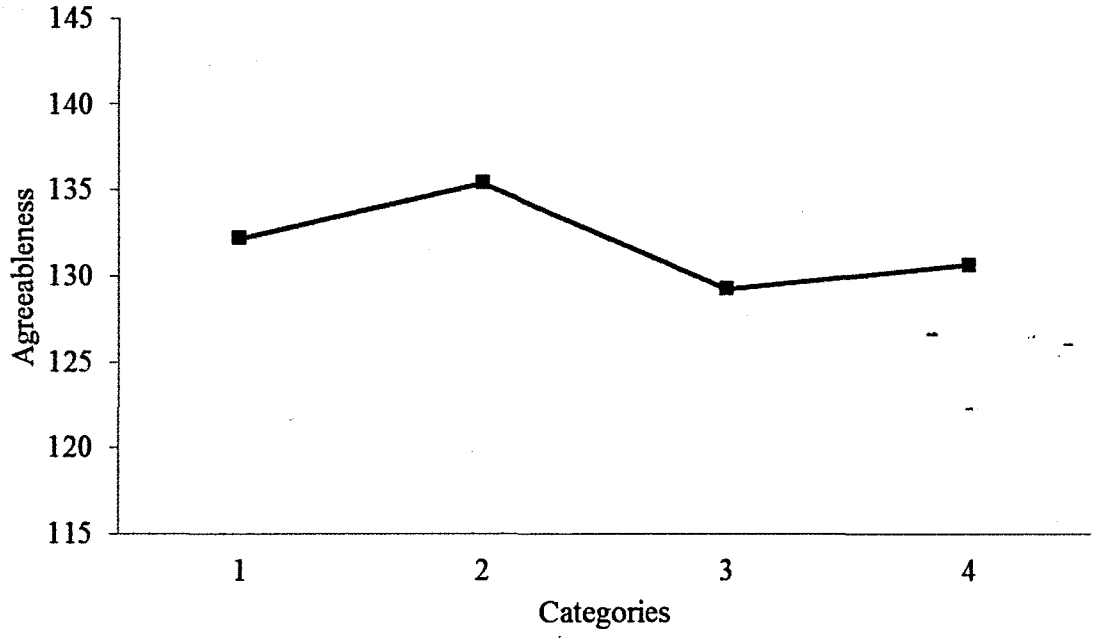

Figure 5.26. Mean scores on Agreeableness for each of the categories, based on the number of thrill-seeking activities an individual has participated in previously

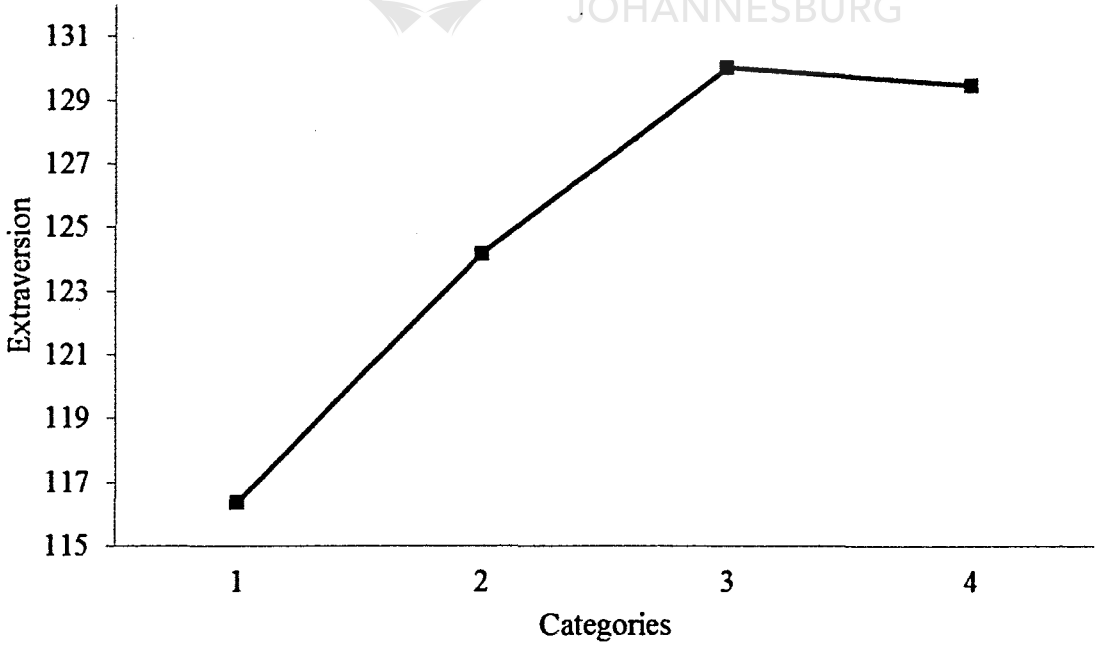

Figure 5.27. Mean scores on Extraversion for each of the categories, based on the number of thrill-seeking activities an individual has participated in previously.

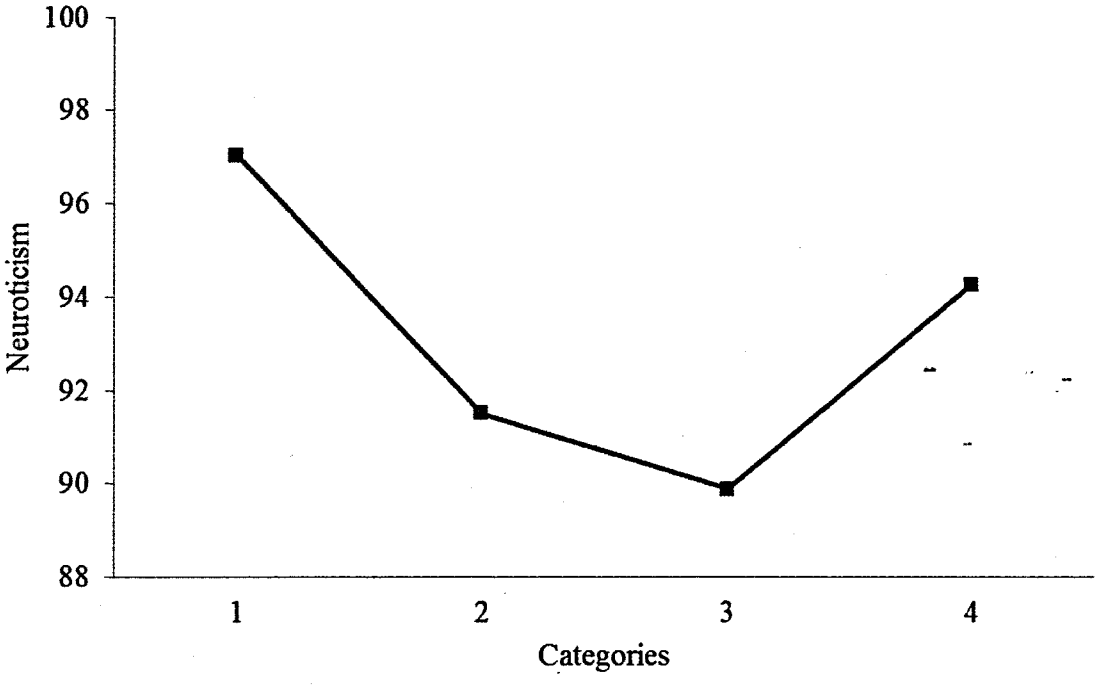

Figure 5.28. Mean scores on Neuroticism for each of the categories, based on the number of thrill-seeking activities an individual has participated in previously.

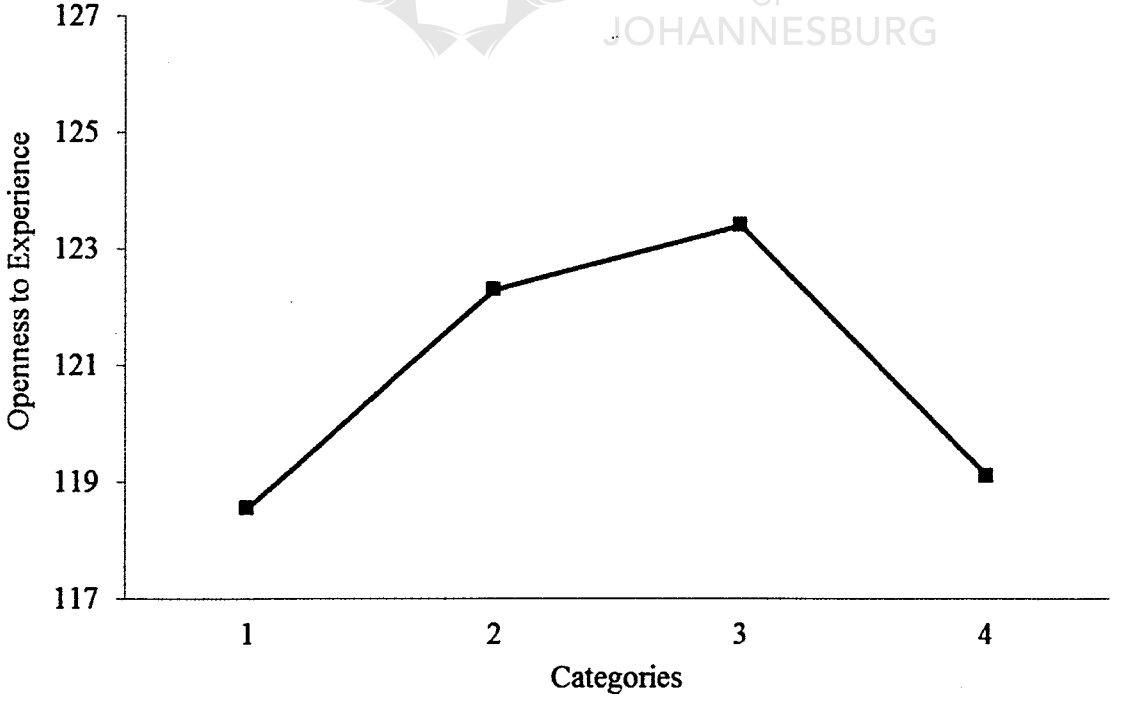

Figure 5.29. Mean scores on Openness to Experience for each of the categories, based on the number of thrill-seeking activities an individual has participated in previously.

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify those personality traits that were best able to distinguish between the different levels of thrill-seeking activities. Box's M test revealed that the data met the assumption of equal covariance matrices across the different groups [Box's $M = 60.362$, F (45, 65728.067) = 1.304; $p = 0.083$].

The results of a discriminant function analysis produced three functions. Taken together the three functions significantly discriminated between the four grouping variables [$\chi^2(15) = 88.182$, $p < 0.001$; Wilk's $\Lambda = 0.878$]. However, upon removal of the first function the remaining functions failed to significantly discriminate between the groups [$\chi^2(8) = 15.305$, $p = 0.053$; Wilk's $\Lambda = 0.9780$]. Hence, the results show that only the first function significantly contributed toward the separation of the four grouping variables.

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.319, which shows that the multivariate combination of the personality variables shared approximately 10% of its variance with various levels thrill seeking behaviour.

Table 5.14 showed that the function had a strong positive correlation with Extraversion, and a moderate negative correlation with Neuroticism. A small positive correlation was found for Openness to Experience, however the correlations for Agreeableness and Conscientiousness were close to zero. These results indicate that of the Big Five factors of personality, Extraversion is best able to discriminate between the various levels of thrill-seeking behaviour.

Table 5.14.

Discriminant Structure Matrix for Thrill Activities

	Function 1	
Personality variable	r_s	r_s^2
Extraversion	.90	80.64%
Agreeableness	-.09	00.88%
Openness to Experience	.29	08.58%
Neuroticism	-.33	10.56%
Conscientiousness	.03	00.09%

Table 5.15 indicates the magnitude to which the linear combination of personality variables, as represented in function one, differed across the grouping variables. Inspection of the table showed that individuals who do not engage in thrill-seeking activities tend to score lower on Extraversion and Openness to Experience, and somewhat higher on Neuroticism.

Table 5.15.

Group Centroids for Thrill Activities

Thrill activities	Function 1
0	-.26
1-2	.13
3-5	.64
6+	.53

This is graphically presented in Figure 5.30. Overall, the results showed that individuals who are inclined towards thrill-seeking behaviour are more likely to be Extraverted and somewhat more open to experience but slightly less neurotic when compared to non-thrill seekers.

Figure 5.30. Line graph of the group centroids for thrill seeking

The results of follow-up one way ANOVAs indicate that on a univariate level, Extraversion ($p = 0.000$), Neuroticism ($p = 0.017$), Openness to Experience ($p = 0.021$) and Agreeableness ($p = 0.030$) discriminated between the grouping variables. However, Tukey's post-hoc HSD test showed that only Extraversion and Agreeableness significantly discriminated between the grouping variables. For Extraversion, significant differences ($p = 0.000$) were found between the non-thrill seekers and all the other categories. None of the other categories for Extraversion were significant. For Agreeableness significant diferences were found only between the slight (1-2) and moderate (3-5) categories ($p = 0.027$). The remaining differences were not significant.

5.6 Number of Times Arrested

Table 5.16 reports the means and standard deviations of the Big Five personality variables for each category of the grouping variable. Visual inspection of the means across the categories shows a pattern where a history of being arrested appears to be characterised by higher levels of Extraversion, and lower levels of Neuroticism, Conscientiousness, Openness to Experience and Agreeableness.

Table 5.16.

Descriptive Statistics for Number of Times Arrested

Times Arrested	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	120.56	18.30
		Neuroticism	94.85	23.75
		Conscientiousness	148.37	21.59
		Openness to Experience	120.20	16.41
		Agreeableness	132.80	16.97
1-4	2	Extraversion	126.15	20.88
		Neuroticism	89.23	26.98
		Conscientiousness	141.26	20.22
		Openness to Experience	119.64	22.48
		Agreeableness	128.54	16.96

Visual inspection of the Figures 5.31 to 5.35 shows that clear trends are observable for each of the five traits except for Openness to Experience. A history of being arrested appears to be positively related to Extraversion and negatively related to Agreeableness, Conscientiousness, and Neuroticism.

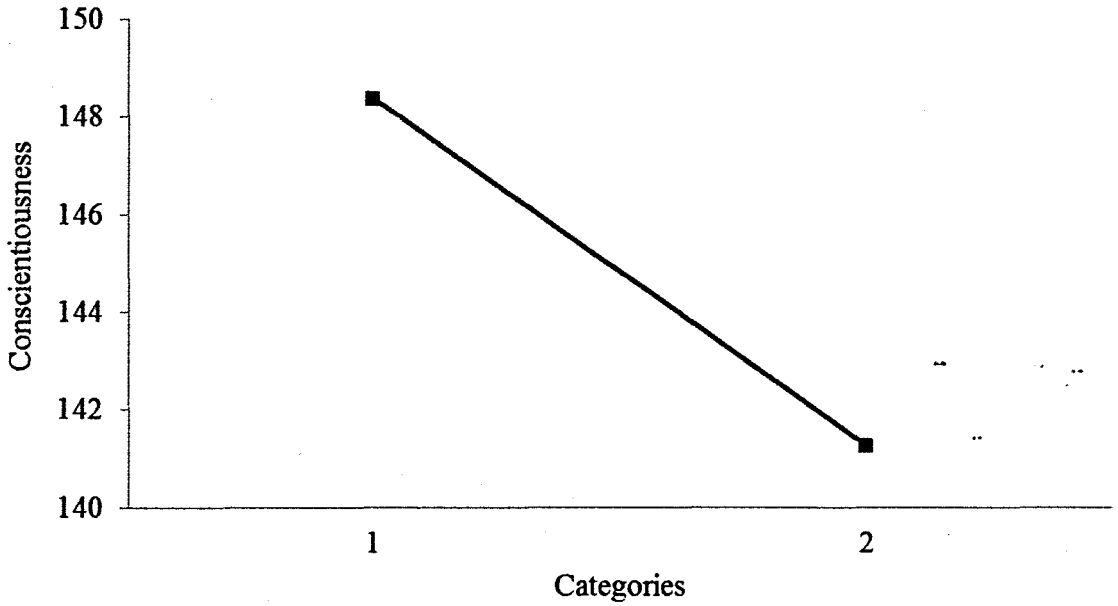

Figure 5.31. Mean scores on Conscientiousness for each of the categories based on the number of times arrested

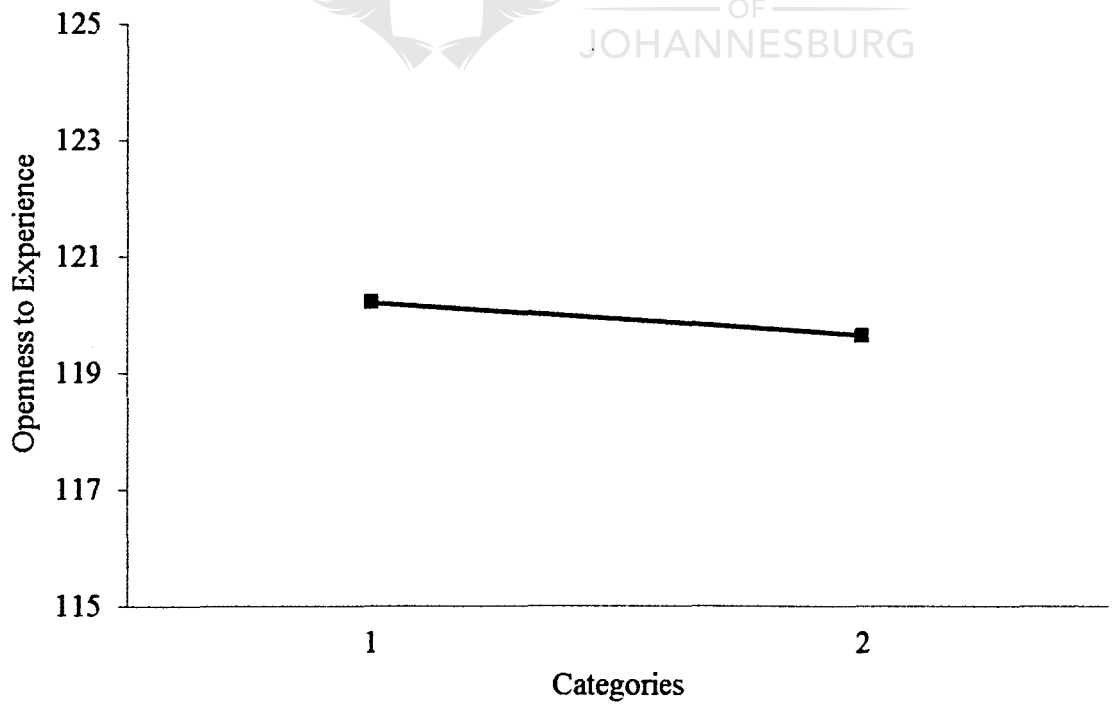

Figure 5.32. Mean scores on Openness to Experience for each of the categories based on the number of times arrested

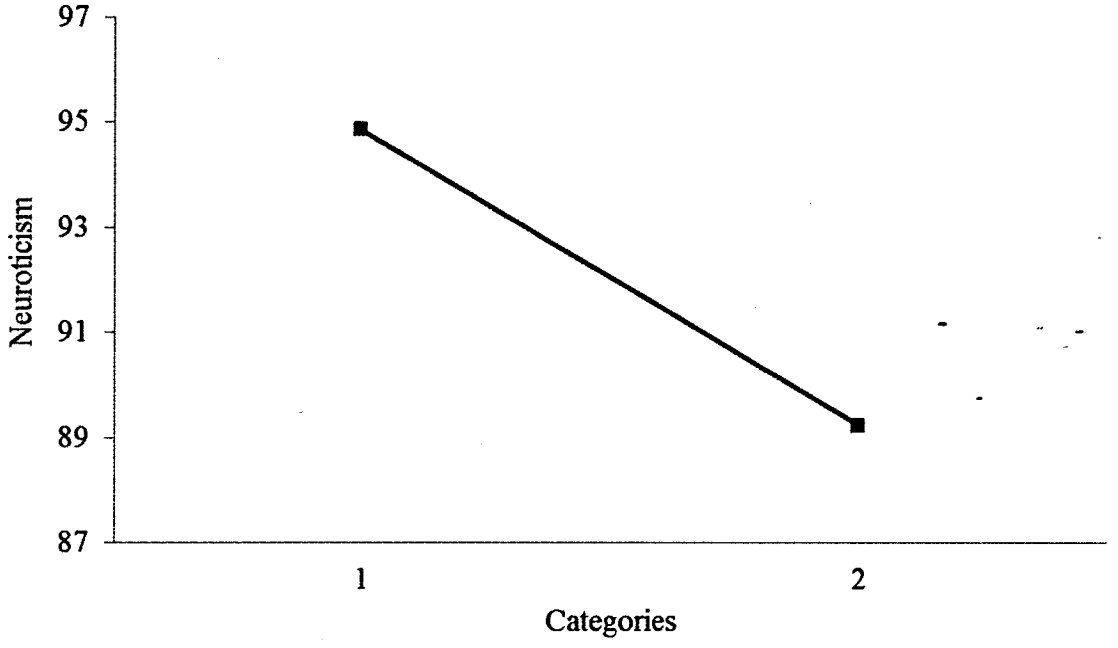

Figure 5.33. Mean scores on Neuroticism for each of the categories based on the number of times arrested

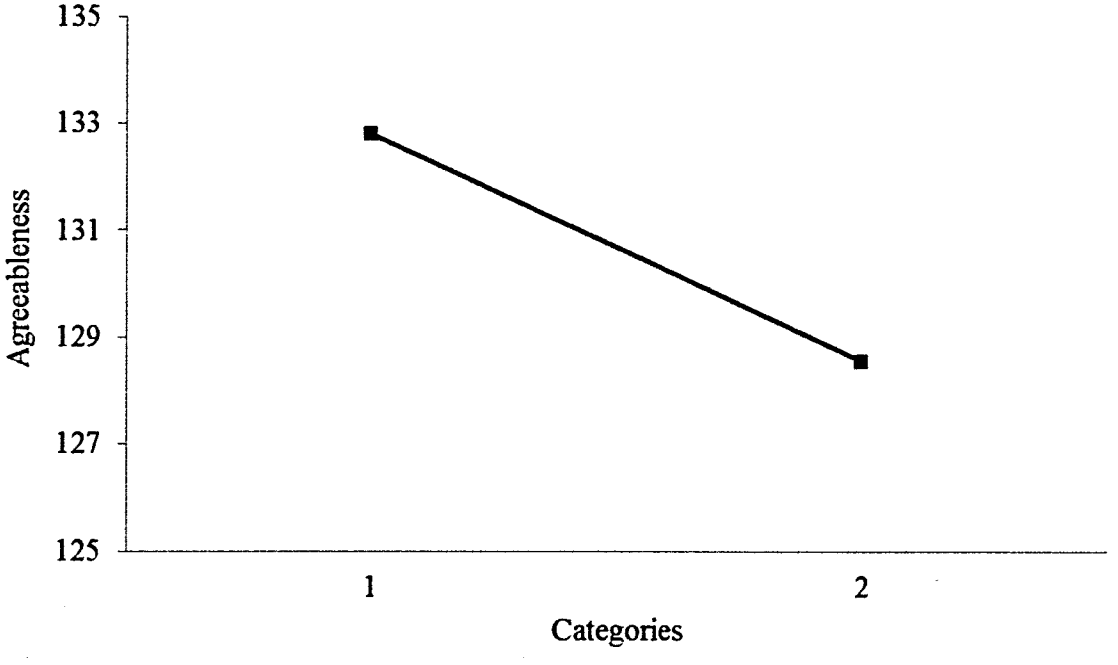

Figure 5.34. Mean scores on Agreeableness for each of the categories based on the number of prior arrests

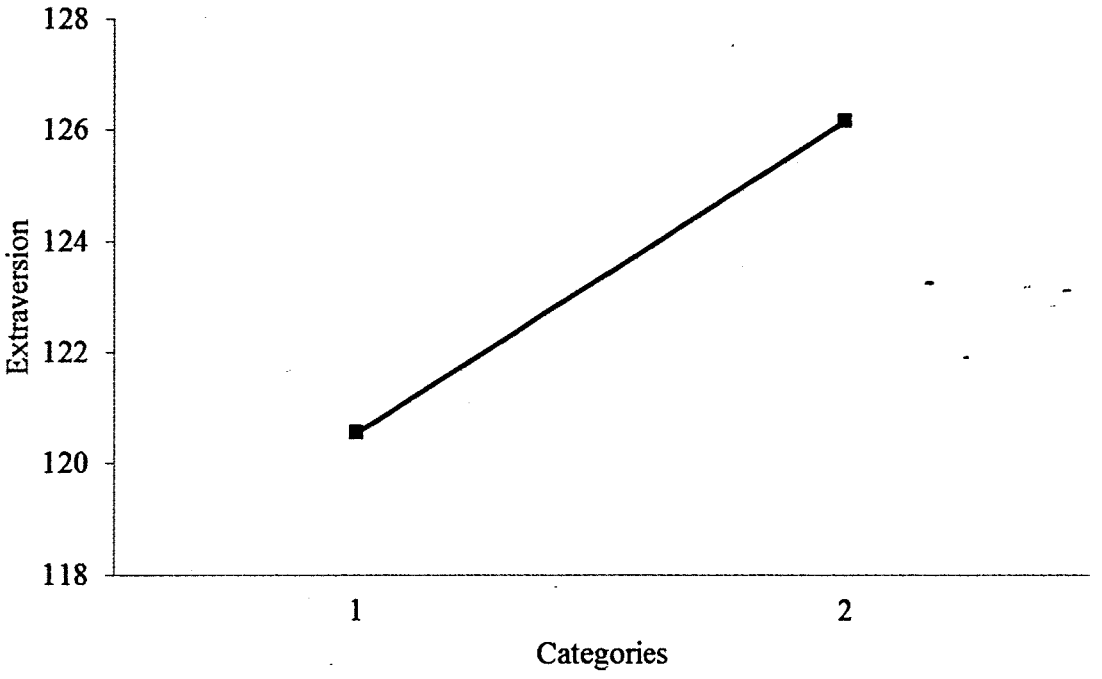

Figure 5.35. Mean scores on Extraversion for each of the categories based on the number of times arrested

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify the personality traits that were best able to distinguish between the grouping variables. Discriminant function analysis proceeds on the assumption that the covariance matrices of the different groups are equal. Box's *M* test revealed that the data met the assumption [Box's $M = 23.539$, $F(15, 16507.106) = 1.494$; $p = 0.098$].

The results of a discriminant function analysis produced one function only. The function significantly discriminated between the two grouping variables [$\chi^2(5) = 12.525$, $p < 0.05$; Wilk's $\Lambda = 0.982$]. The results show that only one function could be determined that contributed to separation of the groups.

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.135, which shows that the multivariate combination of the personality variables shared approximately 2% of its variance with the two categories of the grouping variable.

Table 5.17 showed that the function had a strong positive correlation with Conscientiousness and a strong negative correlation with Extraversion. Moderate positive correlations were found for Agreeableness and Neuroticism. Openness to Experience had a correlation of close to zero. These results indicate that of the Big Five factors of personality, Conscientiousness and Extraversion were best able to discriminate between the categories of the grouping variable.

Table 5.17.

Discriminant Structure Matrix for Number of Times Arrested

	Function 1	
Personality variable	r_s	r_s^2
Conscientiousness	.56	31.70%
Extraversion	-.52	26.73%
Agreeableness	.43	18.23%
Neuroticism	.40	16.00%
Openness to Experience	.06	00.32%

Table 5.18 shows the magnitude to which the linear combination of personality variables, as represented in the function, differed across the grouping variables (number of times arrested). Inspection of the table shows that individuals that have never been arrested are more likely to

score lower on Extraversion and higher on Conscientiousness, Agreeableness and Neuroticism.

Table 5.18.

Group Centroids for Number of Times Arrested

Times arrested	Function 1
0	.03
1-4	-.55

This can be confirmed by visually inspecting Figure 5.36. Overall, the results show that individuals who have previously been arrested – as indicated by the 1 to 4 category – are more likely to be Extraverted, but less Conscientious, Agreeable and Neurotic.

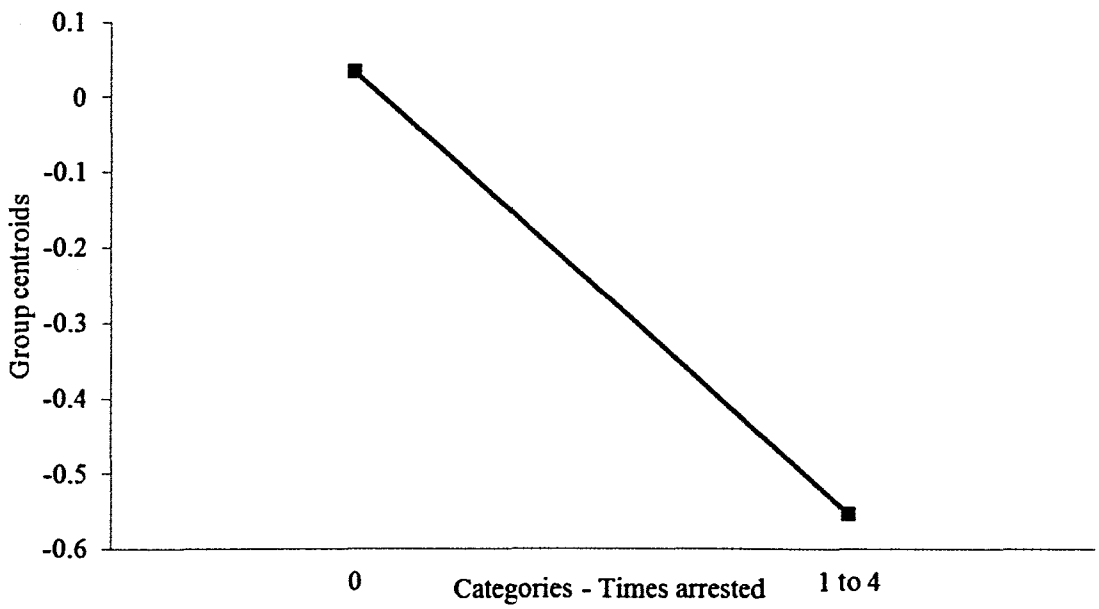

Figure 5.36. Line graph of group centroids for number of times arrested

The results of follow-up one way ANOVAs indicate that on a univariate level, Extraversion ($p = 0.072$) and Conscientiousness ($p = 0.045$) discriminated between the grouping variables. Tukey's post-hoc HSD test could not be computed due to an insufficient number of grouping variables.

5.7 Romantic Infidelity (cheating)

Table 5.19 reports the means and standard deviations of the Big Five personality variables for each category of cheating on a romantic partner. Visual inspection of the means across the categories shows a pattern where a history of cheating appears to be characterised by higher levels of Extraversion, and lower levels of Neuroticism, Conscientiousness and Agreeableness. No immediate pattern is observable from the means of Openness to Experience.

Table 5.19.

Descriptive Statistics for Romantic Infidelity

Times cheated	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	119.23	18.75
		Neuroticism	95.95	24.18
		Conscientiousness	150.48	21.44
		Openness to Experience	119.33	17.40
		Agreeableness	133.93	16.98
1-3	2	Extraversion	120.88	17.42
		Neuroticism	92.97	23.57
		Conscientiousness	146.17	21.56
		Openness to Experience	121.46	15.13
		Agreeableness	132.03	16.51
4+	3	Extraversion	129.16	19.01
		Neuroticism	93.21	24.14
		Conscientiousness	141.99	20.65
		Openness to Experience	119.59	19.30
		Agreeableness	127.57	17.96

Figures 5.37 to 5.41 provide a visual illustration of the relationship between the categories of cheating with each of the Big Five Factors of personality. Visual inspection of the figures showed that clear trends are observable for four of the five traits. Conscientiousness, Neuroticism and Agreeableness seem to decrease as the frequency of cheating increases. Extraversion appears to increase as the degree of cheating increases. No discernable pattern was observed for Openness to Experience.

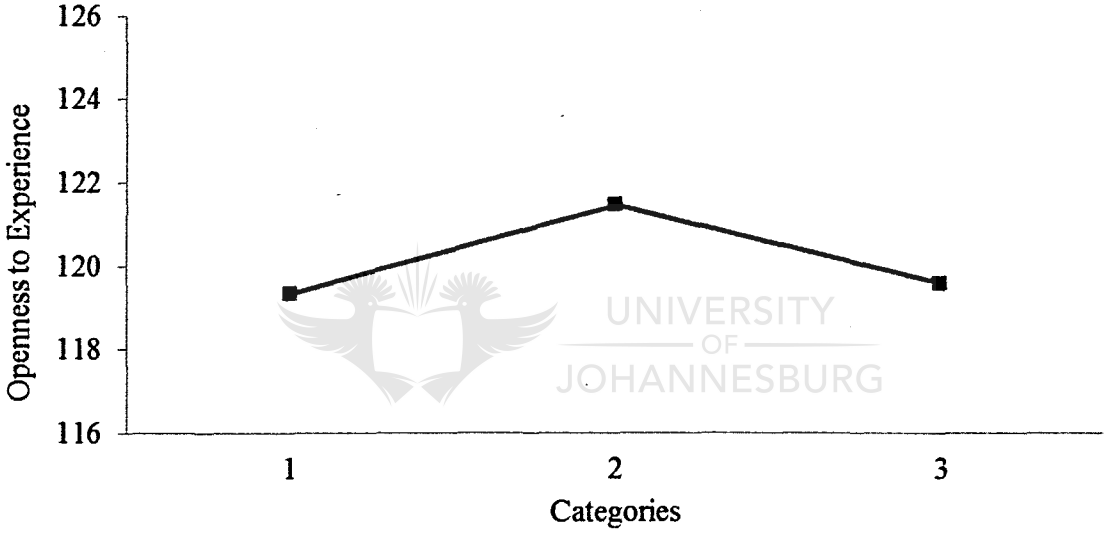

Figure 5.37. Mean scores on Openness to Experience for each of the categories based on the number of times cheated on a romantic partner

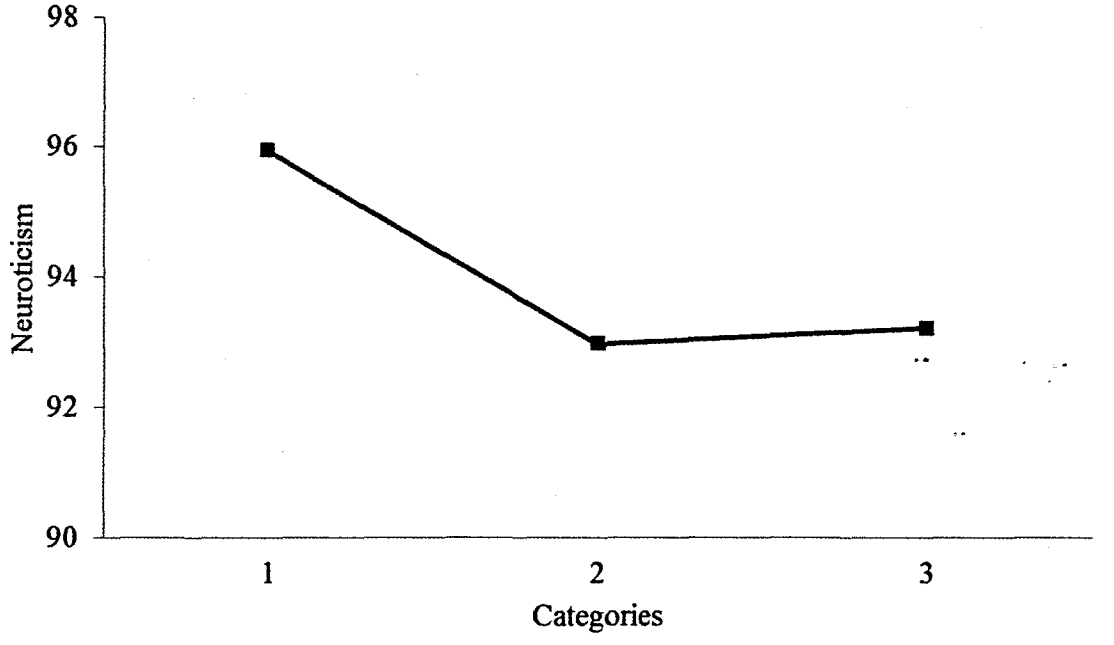

Figure 5.38. Mean scores on Neuroticism for each of the categories based on the number of times cheated on a romantic partner

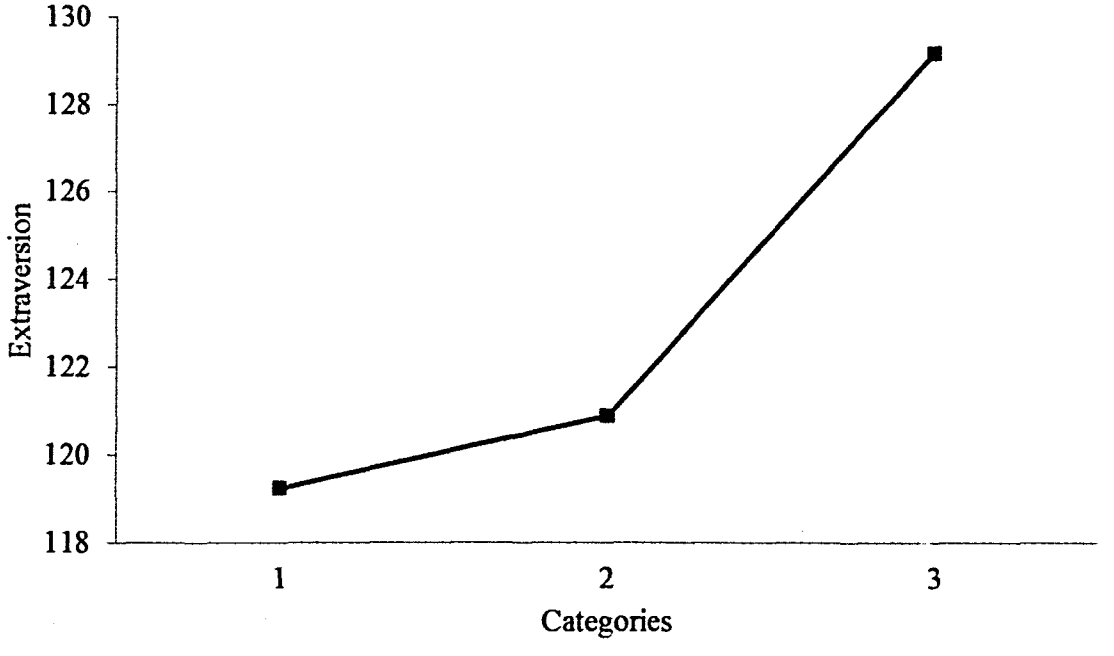

Figure 5.39. Mean scores on Extraversion for each of the categories based on the number of times cheated on a romantic partner

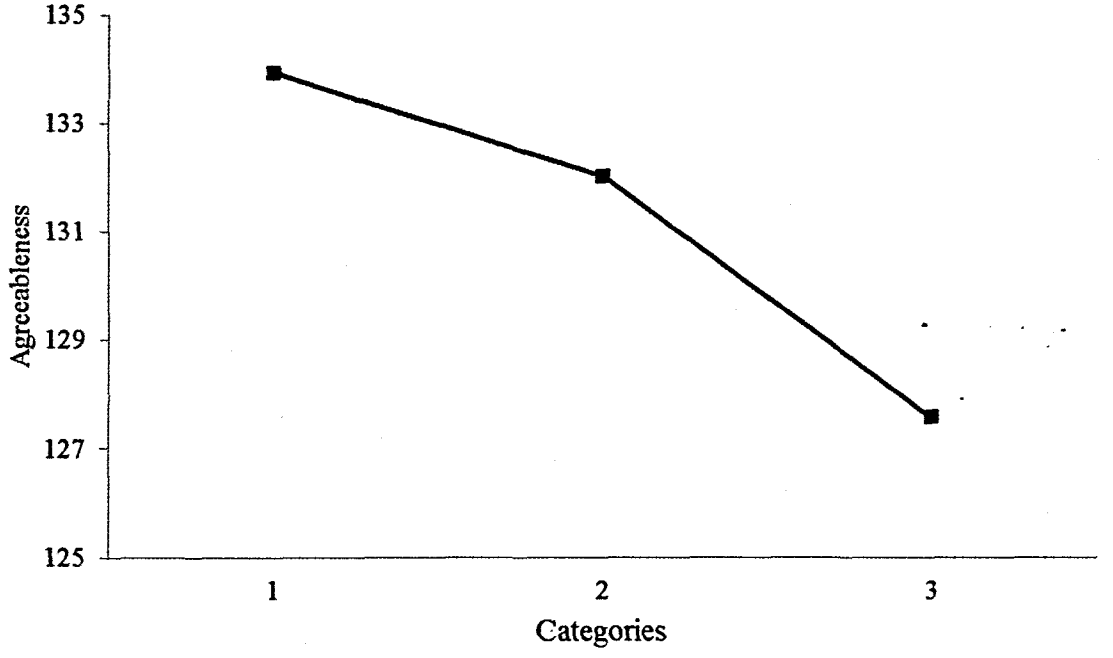

Figure 5.40. Mean scores on Agreeableness for each of the categories based on the number of times cheated on a romantic partner

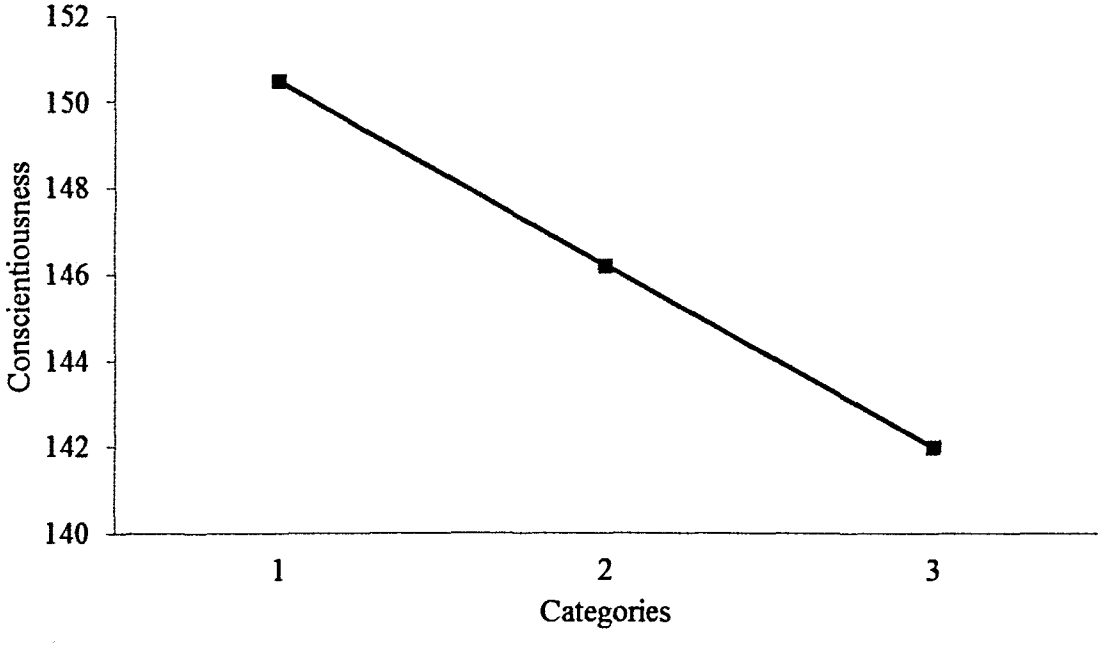

Figure 5.41. Mean scores on Conscientiousness for each of the categories based on the number of times cheated on a romantic partner

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify personality traits that can best distinguish between the different levels of cheating behaviour. Box's M test reveals that the data met the assumption of equal covariance matrices in the different groups [Box's $M = 45.658$, F (30, 138278.690) = 1.495; $p = 0.040$].

The results of a discriminant function analysis produced two functions. Taken together the two functions significantly discriminated between the three grouping variables [χ^2 (10) 53.583, $p < 0.001$; Wilk's $\Lambda = 0.924$]. Upon removal of the first function the remaining function failed to significantly discriminate between the groups [χ^2 (4) 8.258, $p = 0.083$; Wilk's $\Lambda = 0.988$]. Hence, the results show that only the first function significantly contributed toward the separation of the cheating categories.

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.25, which shows that the multivariate combination of the personality variables shared approximately 6% of its variance with the three categories of romantic cheating behaviour.

Table 5.20 shows that the function has a strong negative correlation with Extraversion and moderate positive correlations with Conscientiousness and Agreeableness. The correlations with Openness to Experience and Neuroticism were not significant. These results indicate that of the Big Five factors of personality, Extraversion is best able to discriminate between the categories of the grouping variable, followed closely by Conscientiousness and Agreeableness.

Table 5.20.

Discriminant Structure Matrix for Romantic Infidelity

	Function 1	
Personality variable	r_s	r_s^2
Extraversion	-.59	35.28%
Conscientiousness	.48	23.23%
Agreeableness	.43	18.49%
Openness to Experience	-.06	00.37%
Neuroticism	.16	02.62%

Table 5.21 indicates the magnitude to which the linear combination of personality variables, as represented in the function, differ across the grouping variables (number of times cheated on a romantic partner). Inspection of the table shows that individuals that have never cheated on a romantic partner are more likely to score lower on Extraversion and higher on Conscientiousness and Agreeableness.

Table 5.21.

Group Centroids for Romantic Infidelity

Cheated	Function 1
0	.19
1-3	-.06
4+	-.67

Visual inspection of Figure 5.42 confirms this view. Overall, the results suggest that individuals characterised by higher levels of cheating behaviour are more likely to be Extraverted, less Conscientious and less Agreeable when compared to individuals that cheat less or not at all.

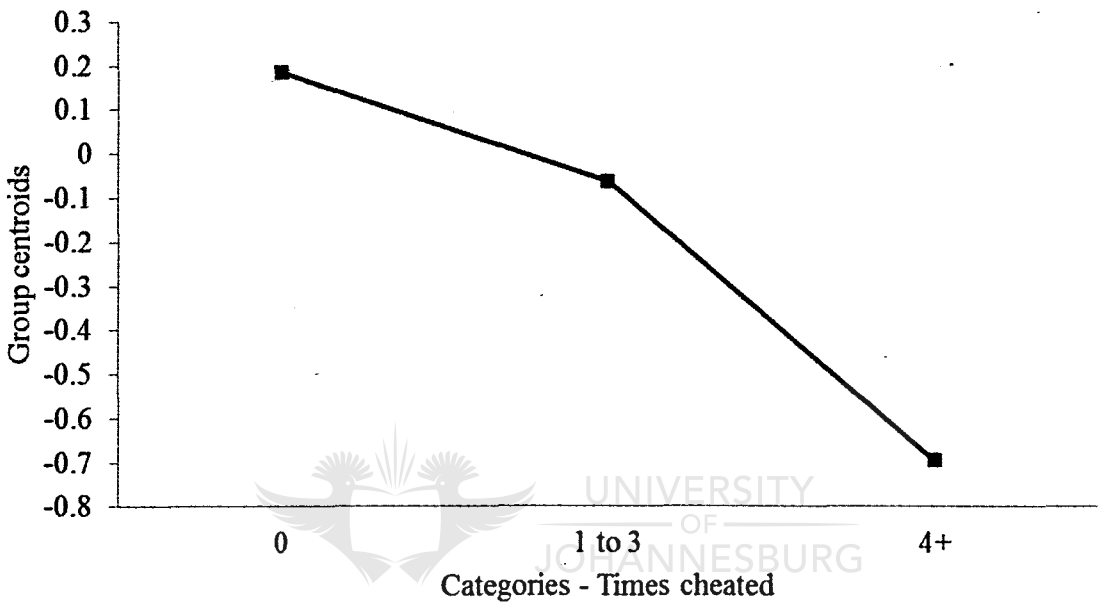

Figure 5.42. Line graph of the group centroids for romantic cheating.

The results of follow-up one way ANOVAs indicate that on a univariate level, Extraversion ($p = 0.000$), Conscientiousness ($p = 0.003$) and Agreeableness ($p = 0.013$) discriminated between the grouping variables. However, Tukey's post-hoc HSD test showed that for Extraversion, significant differences were found between all groups except between the non (0) and moderate cheaters (1-3) ($p < 0.01$). Only between the moderate (1-3) and high (4+) categories were the differences not significant for Conscientiousness. Significant differences were found only between non (0) and frequent cheaters (4+) for Agreeableness ($p = 0.012$).

5.8 Number of Times Started a Fight

Table 5.22 reports the means and standard deviations of the Big Five personality variables for each category of starting a fight. Visual inspection of the means across the categories shows a pattern where a history of starting a fight appears to be characterised by higher levels of Extraversion, and lower levels of Neuroticism, Conscientiousness and Agreeableness. No immediate pattern is observable from the means of Openness to Experience.

Table 5.22.

Descriptive Statistics for Starting a Fight

Times started a fight	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	119.46	17.97
		Neuroticism	94.78	23.52
		Conscientiousness	149.08	20.92
		Openness to Experience	119.60	16.00
		Agreeableness	133.14	16.47
1-3	2	Extraversion	123.36	19.48
		Neuroticism	93.22	25.60
		Conscientiousness	145.42	22.75
		Openness to Experience	121.69	17.94
		Agreeableness	131.14	18.13
4+	3	Extraversion	126.87	18.04
		Neuroticism	97.61	21.54
		Conscientiousness	145.97	23.18
		Openness to Experience	120.18	20.51
		Agreeableness	131.87	17.86

Inspection of Figures 5.43 to 5.47 shows that a clear trend in the pattern is only observable for Extraversion. No immediately obvious trends were apparent for the remaining traits. The patterns for Agreeableness and Conscientiousness appear to decrease as the frequency of fighting increases. The patterns for Openness to Experience and Neuroticism were more ambiguous. However, the pattern for Neuroticism seems to indicate an overall increase as the frequency of fighting increases.

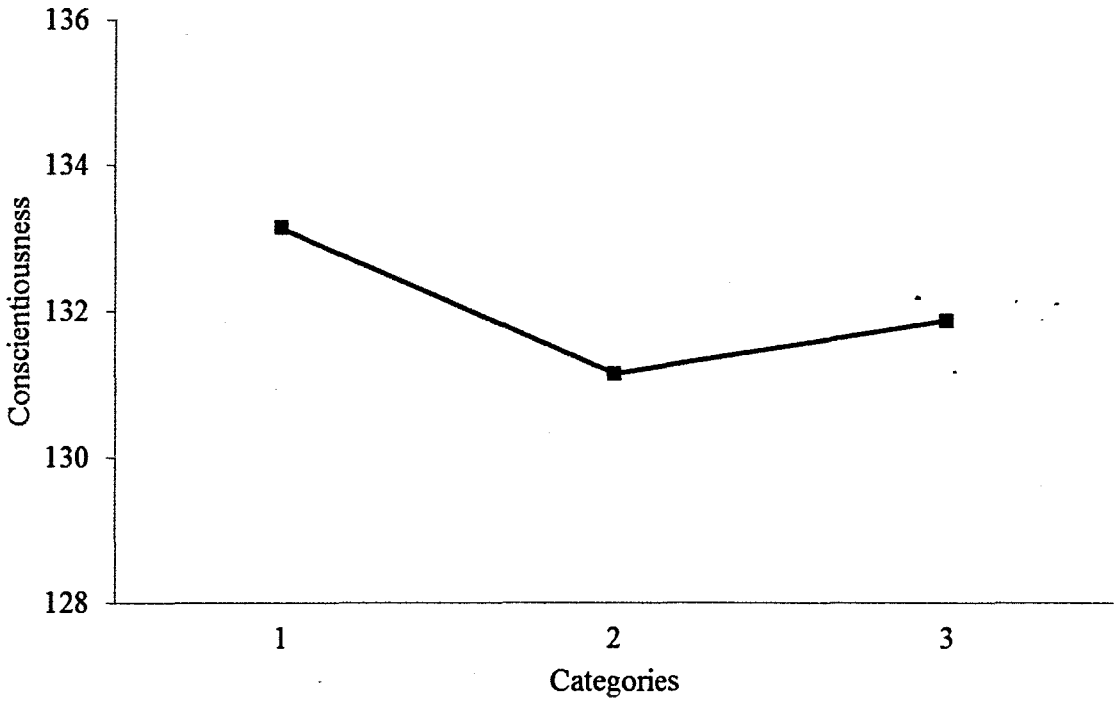

Figure 5.43. Mean scores on Conscientiousness for each of the categories based on the number of times having started a physical fight

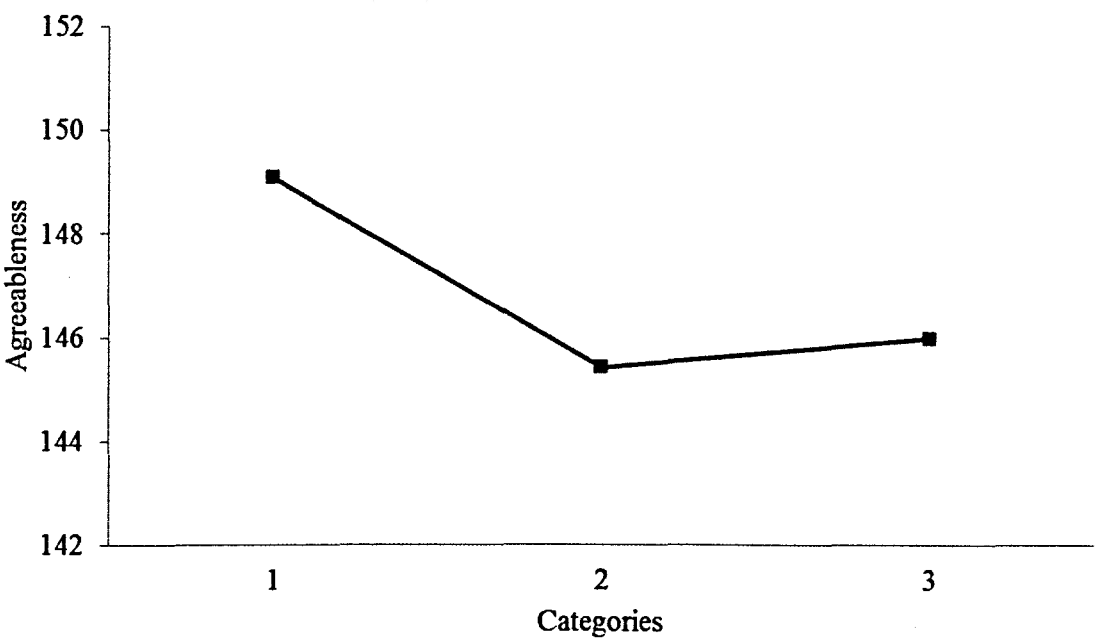

Figure 5.44. Mean scores on Agreeableness for each of the categories based on the number of times having started a physical fight

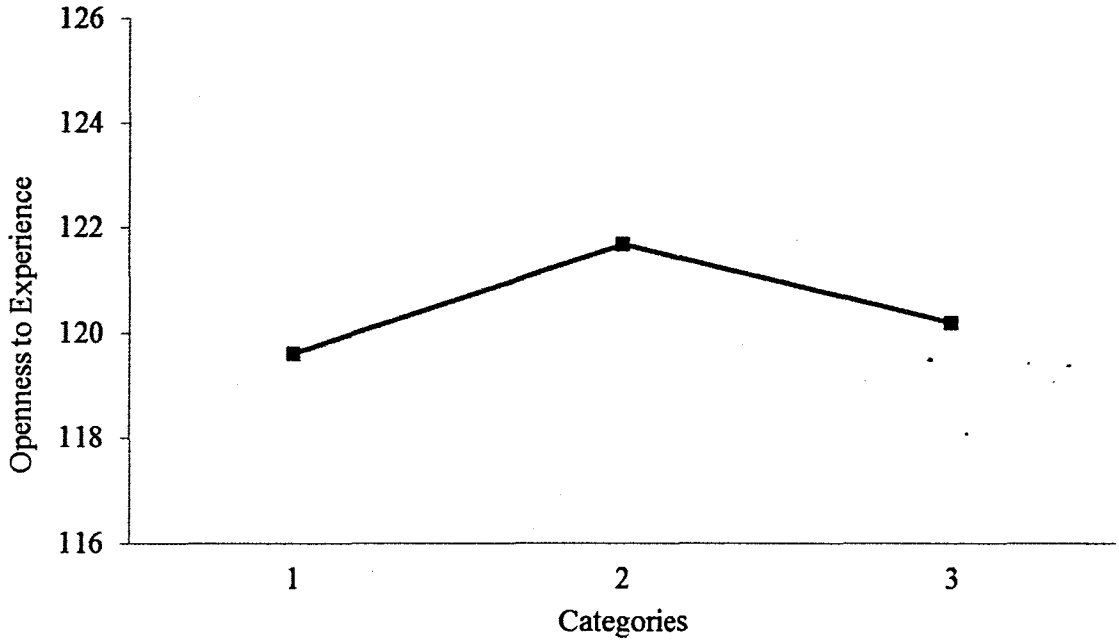

Figure 5.45. Mean score on Openness to Experience for each of the categories based on the number of times having started a physical fight

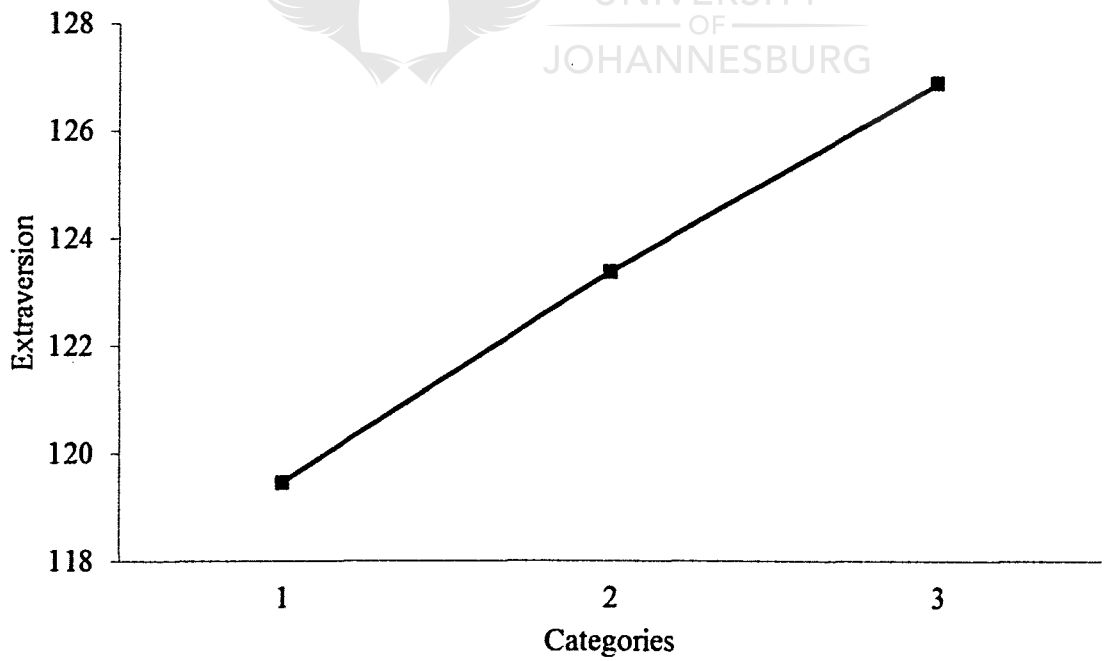

Figure 5.46. Mean scores on Extraversion for each of the categories based on the number of times having started a physical fight

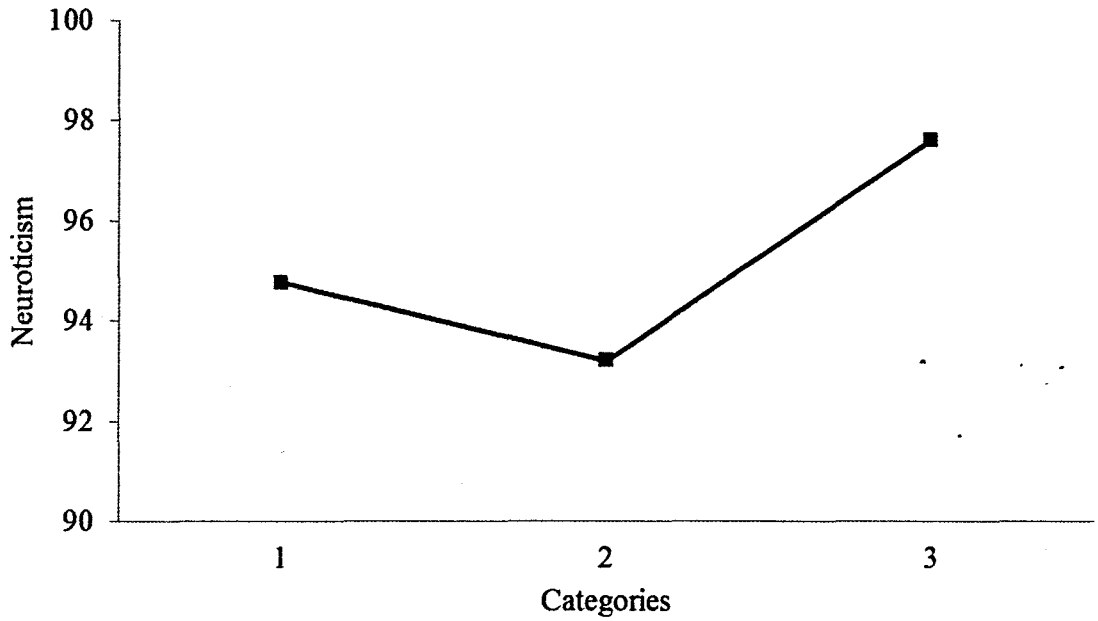

Figure 5.47. Mean scores on Neuroticism for each of the categories based on the number of times having started a physical fight

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify those personality traits (or combinations of them) that were best able to distinguish between the different categories of the grouping variable. Box's M test revealed that the data met the assumption of equal covariance matrices across the different groups [Box's $M = 37.932$, F (30, 35379.604) = 1.226; $p = 0.184$].

The results of a discriminant function analysis produced two functions. Taken together the two functions significantly discriminated between the three grouping variables [$\chi^2(10)$ 23.741, $p < 0.01$; Wilk's $\Lambda = 0.966$]. Upon removal of the first function, the remaining function failed to significantly discriminate between the groups [χ^2 (4) 3.348, $p = 0.501$; Wilk's $\Lambda = 0.995$]. Hence, the results show that only the first function significantly contributed toward the separation of the four grouping variables.

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.172, which shows that the multivariate combination of the personality variables shared approximately 3% of its variance with the grouping variables.

Table 5.23 showed that the function had a strong positive correlation with Extraversion, and a moderate negative correlation with Conscientiousness. A small negative correlation was found for Agreeableness. The correlations for Neuroticism and Openness to Experience were not significant. These results indicate that of the Big Five factors of personality, Extraversion, followed by Conscientiousness was best able to discriminate between categories of the grouping variable.

Table 5.23.

Discriminant Structure Matrix for Starting a Fight

	Function 1	
Personality variable	r_s	r_s^2
Extraversion	.69	47.06%
Conscientiousness	-.43	18.32%
Agreeableness	-.28	07.84%
Neuroticism	-.05	00.22%
Openness to Experience	.27	07.08%

Table 5.24 indicates the magnitude in which the linear combination of personality variables, as represented in function one, differed across the categories of the starting a fight variable. Inspections of the table shows that individuals who do not start fights scored lower on

Extraversion and Openness but lower on Conscientiousness and Agreeableness when compared to individuals who have started fights.

Table 5.24.

Group Centroids for Starting a Fight

Start fight	Function 1
0	-.12
1-3	.23
4+	.37

Overall, the results in Figure 5.48 show that individuals who are more likely to start fights, as demonstrated by groups two and three, were more likely to be Extraverted and open to experience, but less Conscientious and Agreeable overall.

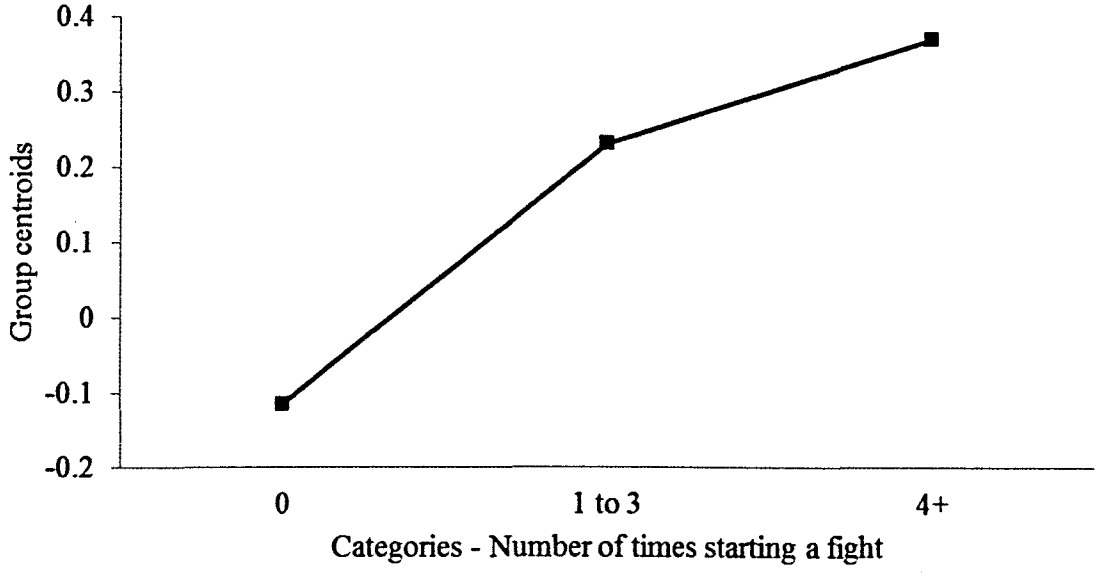

Figure 5.48. Line graph of group centroids for starting a fight

The results of follow-up one way ANOVAs indicate that on a univariate level, only Extraversion ($p = 0.009$) discriminated between the grouping variables. However, Tukey's post-hoc HSD test showed that there was no significant difference between any of the groups. A slightly less conservative reading of the significance value shows that there are indeed important differeces between the categories of the grouping variable which an individual's level of Extraversion might help to explain.

5.9 Defend-fight

Table 5.25 reports the means and standard deviations of the Big Five personality variables for each category of the grouping variable. Visual inspection of the means across the categories shows a pattern where it appears that Agreeableness, Conscientiousness and Neuroticism decrease and Extraversion increase as the frequency of the grouping variable increases (number of times having to defend oneself in a fight). No clear pattern was immediately observable for Openness to Experience.

Table 5.25.

Descriptive Statistics for Defend-fight

Defend self in fight	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	118.34	17.51
		Neuroticism	94.89	23.44
		Conscientiousness	149.21	21.61
		Openness to Experience	119.38	15.52
		Agreeableness	133.96	15.90
1-3	2	Extraversion	122.93	19.23
		Neuroticism	94.18	24.71
		Conscientiousness	148.93	20.90
		Openness to Experience	121.80	17.54
		Agreeableness	131.55	18.36
4+	3	Extraversion	124.77	18.73
		Neuroticism	94.16	23.98
		Conscientiousness	140.26	22.00
		Openness to Experience	118.45	19.01
		Agreeableness	130.03	16.61

From the patterns displayed in Figures 5.49 to 5.53, it is evident that the levels of Agreeableness, Conscientiousness and Neuroticism tend to decrease as the frequencies in the grouping variable increases. An opposite pattern emerges for Extraversion where it appears to increase along with the frequencies of the grouping variable.

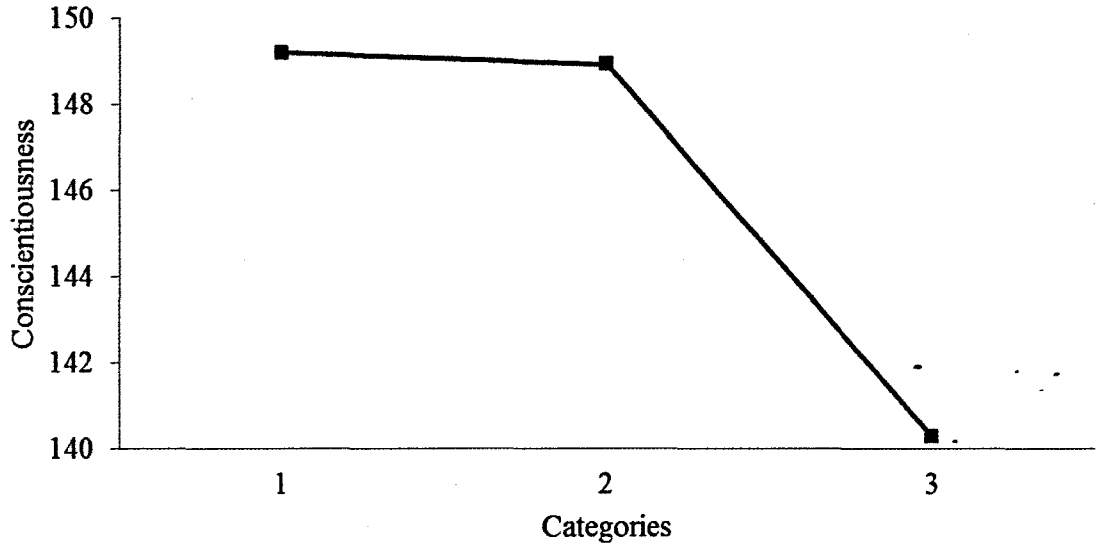

Figure 5.49. Mean scores on Conscientiousness for each of the categories based on the number of times having to defend oneself in a physical fight

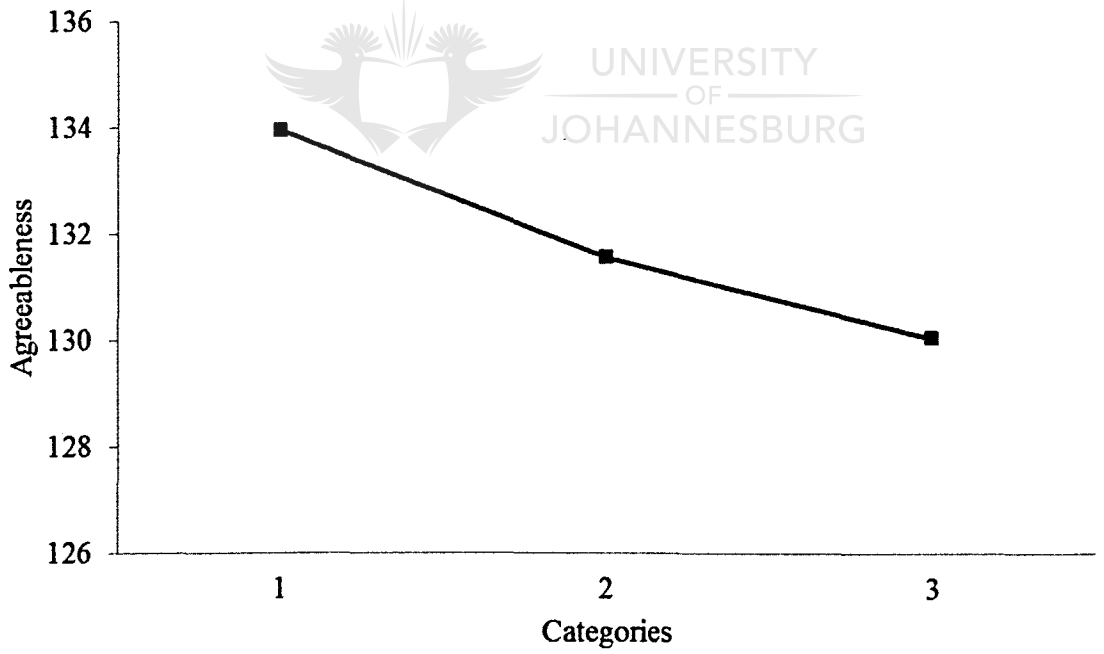

Figure 5.50. Mean scores on Agreeableness for each of the categories based on the number of times having to defend oneself in a physical fight

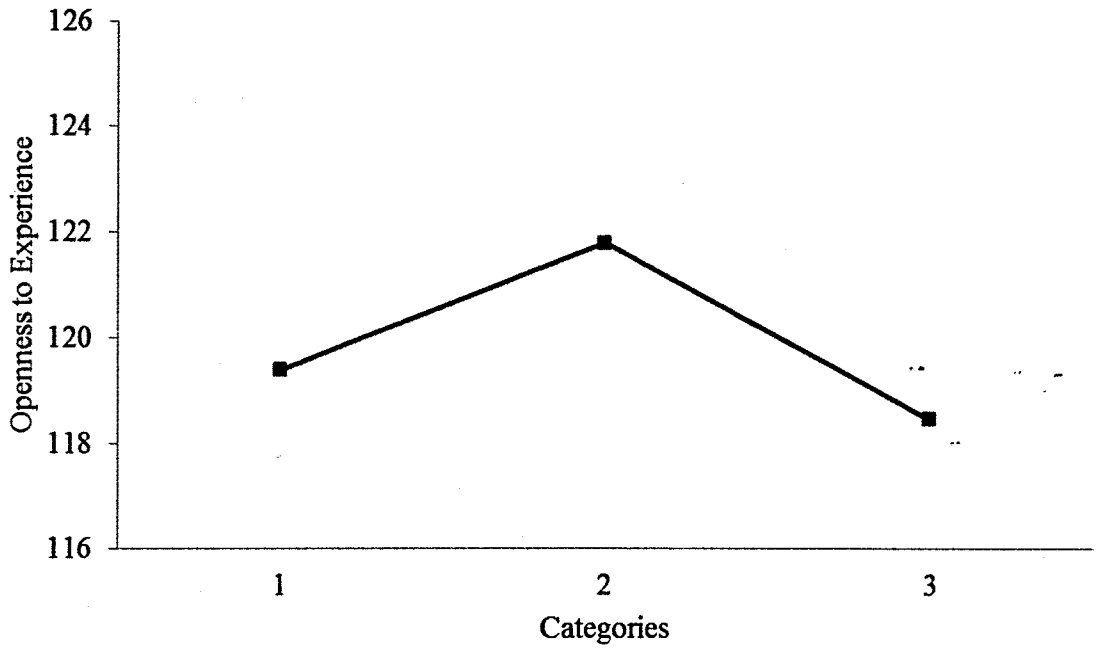

Figure 5.51. Mean scores on Openness to Experience for each of the categories based on the number of times having to defend oneself in a physical fight

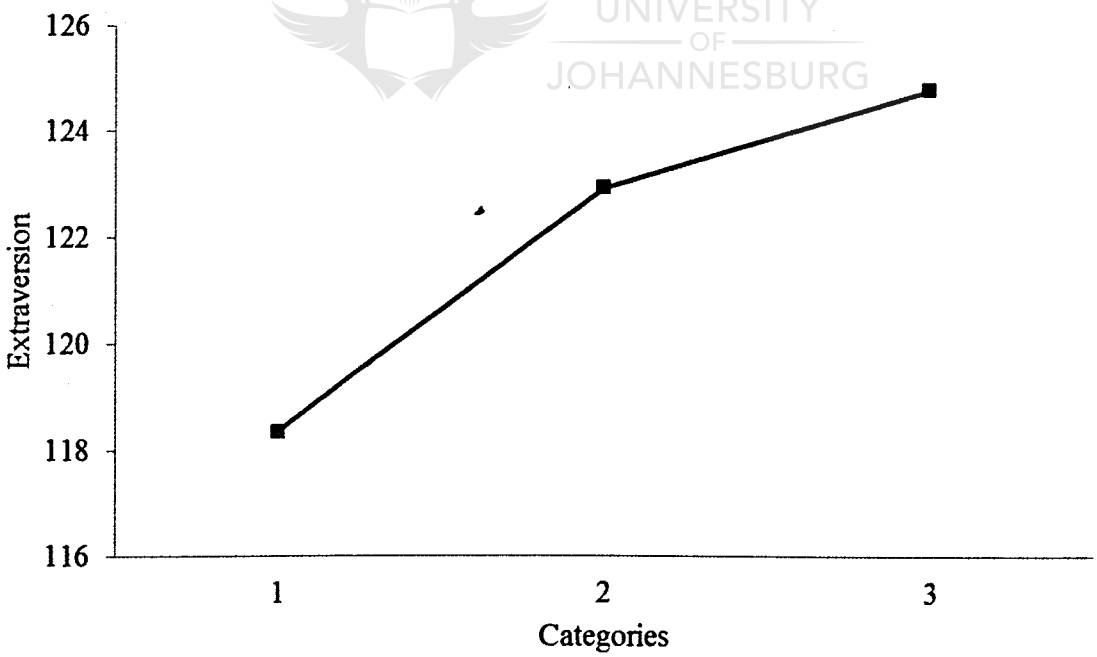

Figure 5.52. Mean scores on Extraversion for each of the categories based on the number of times having to defend oneself in a physical fight

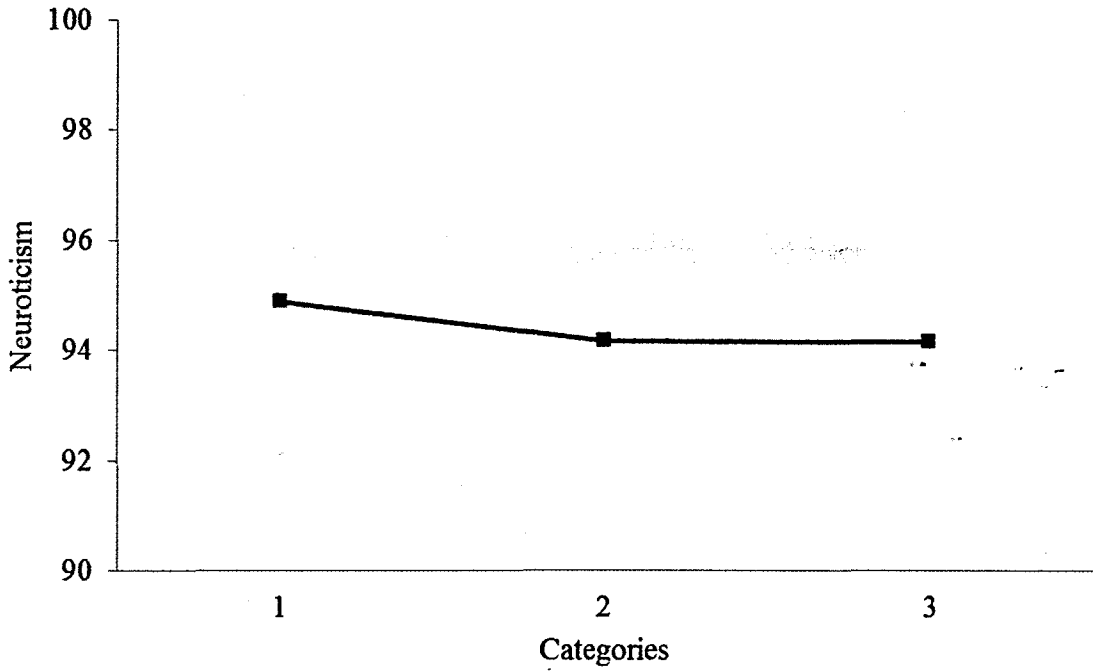

Figure 5.53. Mean scores on Neuroticism for each of the categories based on the number of times having to defend oneself in a physical fight

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify those personality traits (or combinations of them) that were best able to distinguish between the different levels of the grouping variable. Box's *M* test revealed that the data met the assumption of equal covariance matrices across the different groups [Box's $M = 46.629$, F (30, 232592.589) = 1.531; $p = 0.032$].

The results of a discriminant function analysis produced two functions. Taken together the two functions significantly discriminated between the three grouping variables [$\chi^2(10)$ 43.627, $p < 0.01$; Wilk's $\Lambda = 0.938$]. In this case, both the first and second function significantly contributed to the separation of the three grouping variables [χ^2 (4) 11.044, $p =$ 0.026; Wilk's $\Lambda = 0.984$].

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.216, which shows that the multivariate

combination of the personality variables shared approximately 5% of its variance with the grouping variables. The canonical correlation for function two was 0.127, which indicates that it shared approximately 2% of its variance with the grouping variables.

Table 5.26 showed that function one had a strong positive correlation with Extraversion, and moderate negative correlations with Conscientiousness and Agreeableness. The correlations for Neuroticism and Openness to Experience were close to zero. Function two had strong positive correlations with Conscientiousness and Openness to Experience. The correlations with Extraversion, Agreeableness and Neuroticism were not significant.

Table 5.26.

Discriminant Structure Matrix for Defend-fight

	Function 1		Function 2	
Personality variable	r_s	r_s^2	r_s	r_s^2
Extraversion	.62	38.19%	.28	7.73%
Agreeableness	-.39	15.05%	-.10	01.08%
Neuroticism	-.06	00.36%	-.05	00.26%
Conscientiousness	-.49	24.11%	.66	43.69%
Openness to Experience	.06	00.36%	.57	35.52%

Table 5.27 indicates the magnitude to which the linear combination of personality variables, as represented in function one and two, differ across the grouping variables (number of times it was required to defend self in a fight). These results are visually presented in Figure 5.54 and Figure 5.55.

Table 5.27.

Group Centroids for Defend-fight

Defend self in fight	Function 1	Function 2
0	-.20	-.06
1-3	.11	.15
4+	.44	-.22

The results for function one showed that individuals who do not have to defend themselves in fights are more likely to be introverted, Conscientious and Agreeable compared to individuals who have had to defend themselves – characterised by the 4+ category – who are more likely to be Extraverted, Conscientious and somewhat less Agreeable.

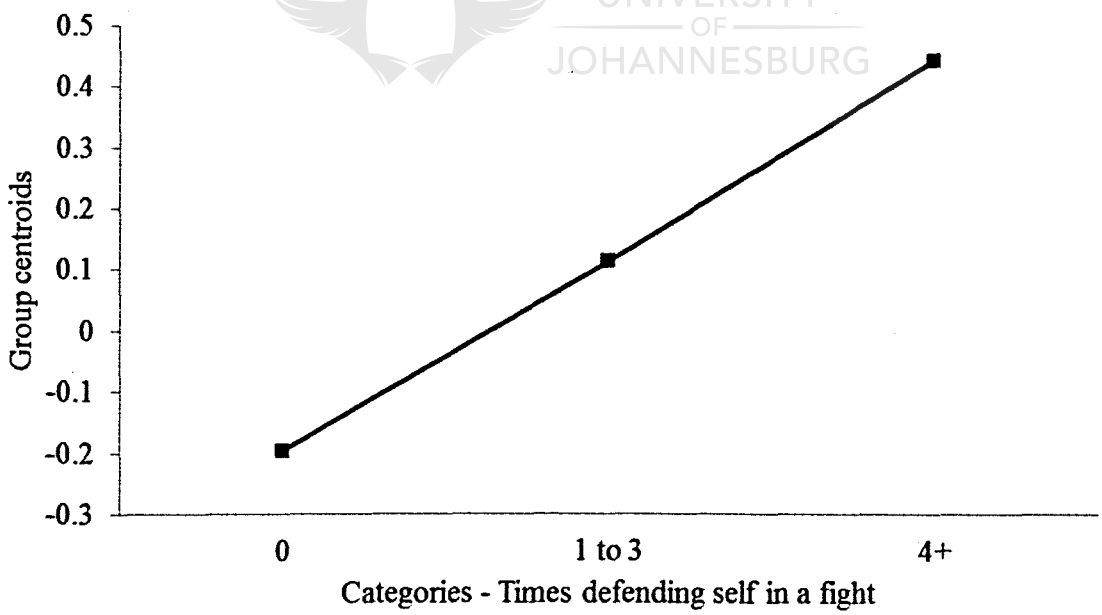

Figure 5.54. Line graph of the group centroids for defend-fight (Function one)

The results for Function 2 showed that individuals who need to defend themselves in a fight are more likely to be less Conscientious and less open to experience. However, it is important to consider that Function 2's correlation with the 4+ category is at best a weak one and therefore do not contribute much to our understanding with regards to group separation.

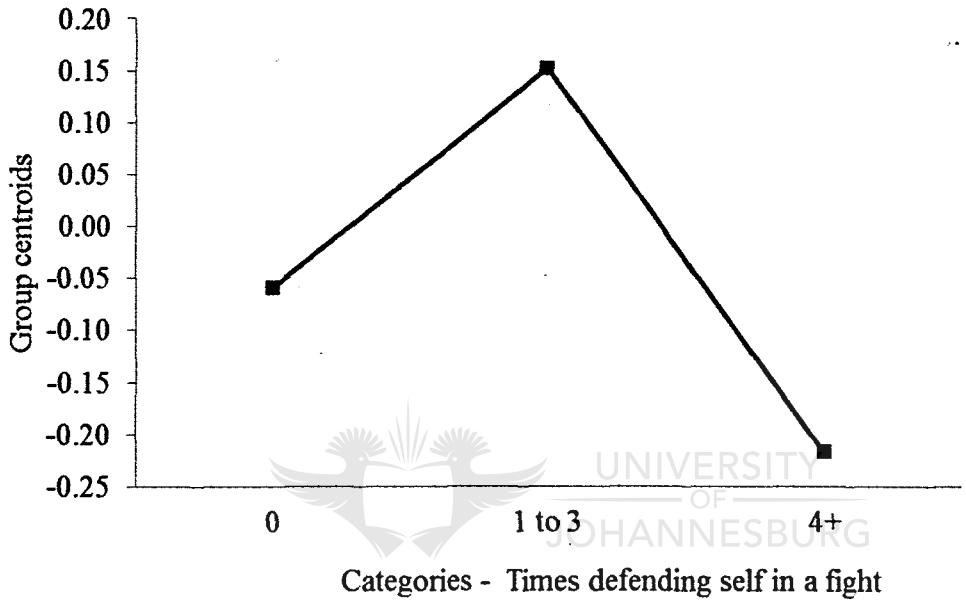

Figure 5.55. Line graph of the group centroids for defend-fight (Function two)

The results of follow-up one way ANOVAs indicate that on a univariate level, Extraversion ($p = 0.002$) and Conscientiousness ($p = 0.002$) discriminated between the grouping variables. Tukey's post-hoc HSD test showed that for Extraversion, the difference between the moderate (1-3) and the high (4+) groups was not significant ($p = 0.70$). The difference between the zero and moderate categories was not significant for Conscientiousness. None of the differences on any of the other personality traits was significant.

5.10 Gambling

Table 5.28 reports the means and standard deviations of the Big Five personality variables for each of the gambling categories. Visual inspection of the means across the categories shows a pattern where it appears that Neuroticism decreases and Extraversion increases across each of the categories of the grouping variable. No immediate pattern was observable from the mean scores for Conscientiousness, Openness to Experience and Agreeableness.

Table 5.28.

Descriptive Statistics for Gambling

Gambling frequency	Category	Personality variable	Mean	Standard deviation
0	1	Extraversion	118.54	18.33
		Neuroticism	95.32	24.23
		Conscientiousness	147.72	21.82
		Openness to Experience	119.64	17.00
		Agreeableness	132.18	17.24
1-3	2	Extraversion	122.19	17.76
		Neuroticism	94.33	23.08
		Conscientiousness	148.89	21.52
		Openness to Experience	121.08	17.03
		Agreeableness	133.60	17.23
4-9	3	Extraversion	124.72	16.85
		Neuroticism	93.55	26.05
		Conscientiousness	145.54	19.60
		Openness to Experience	118.98	14.94
		Agreeableness	131.57	14.44
10+	4	Extraversion	130.56	22.37
		Neuroticism	89.31	22.32
		Conscientiousness	149.50	22.96
		Openness to Experience	122.58	16.53
		Agreeableness	132.19	17.56

Inspection of Figures 5.56 to 5.60 shows that no clear trends were observable across the categories for Agreeableness, Conscientiousness and Openness to Experience. However, the pattern for Extraversion and Neuroticism appears to be relatively stable in one direction. Extraversion seems to increase and Neuroticism to decrease as the frequency of gambling rises.

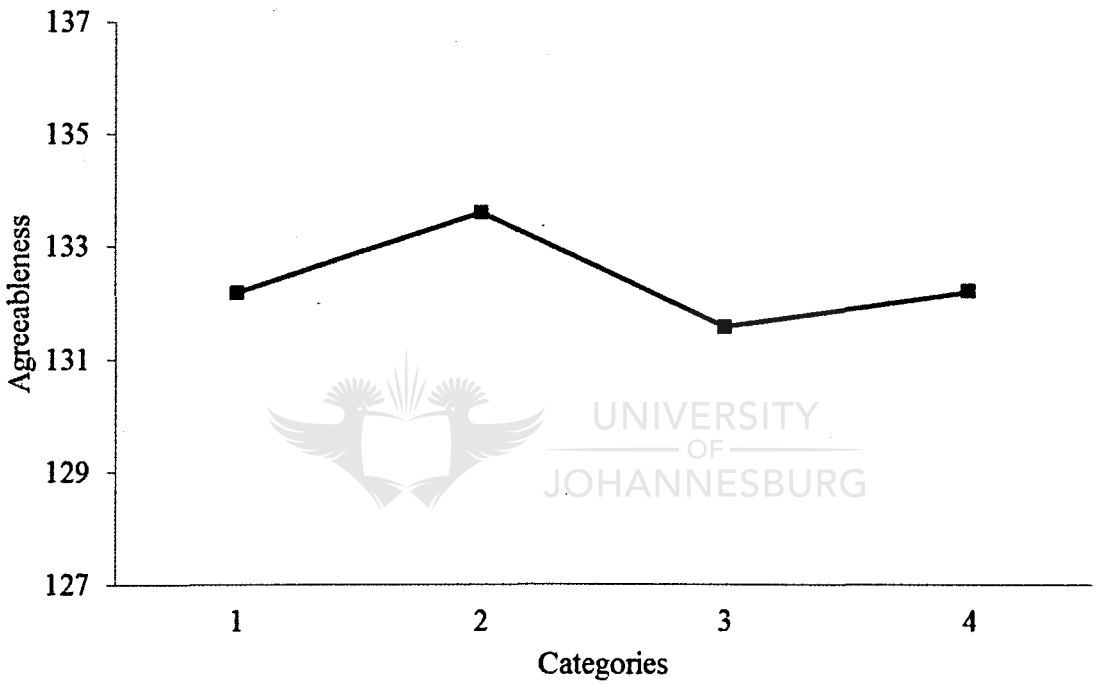

Figure 5.56. Mean scores on Agreeableness for each of the gambling categories

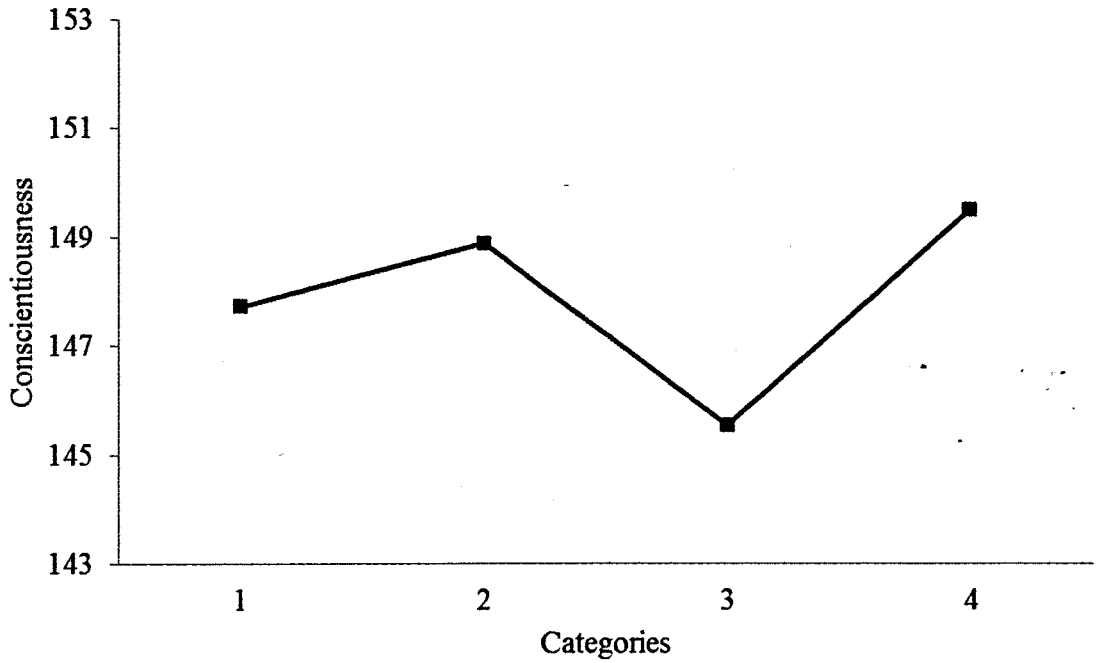

Figure 5.57. Mean scores on Conscientiousness for each of the gambling categories

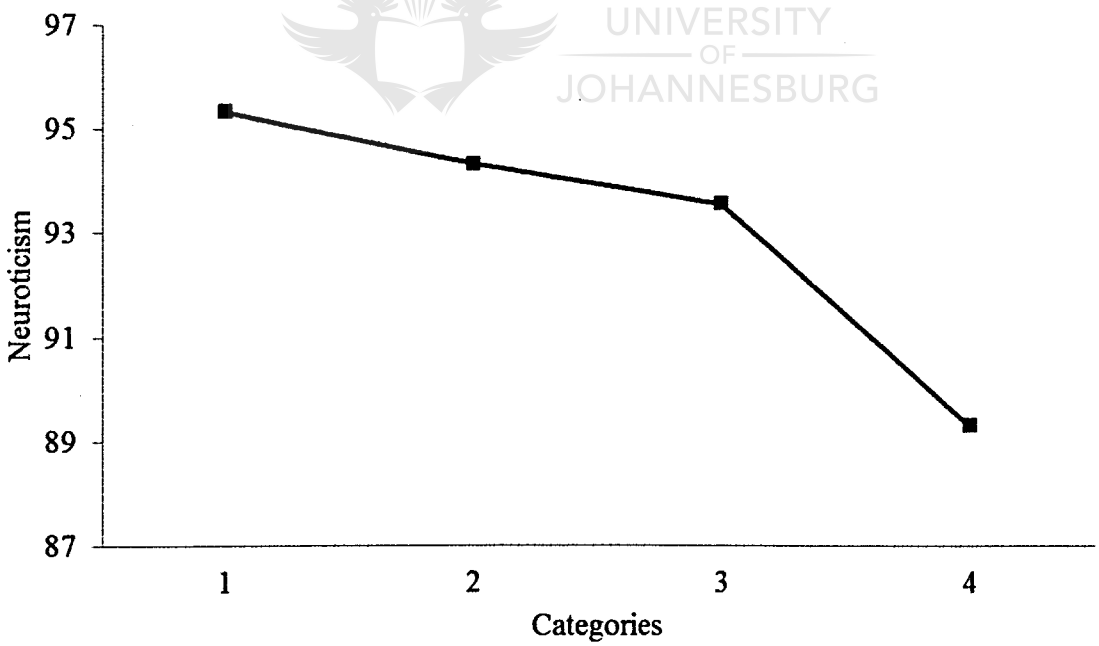

Figure 5.58. Mean scores on Neuroticism for each of the gambling categories

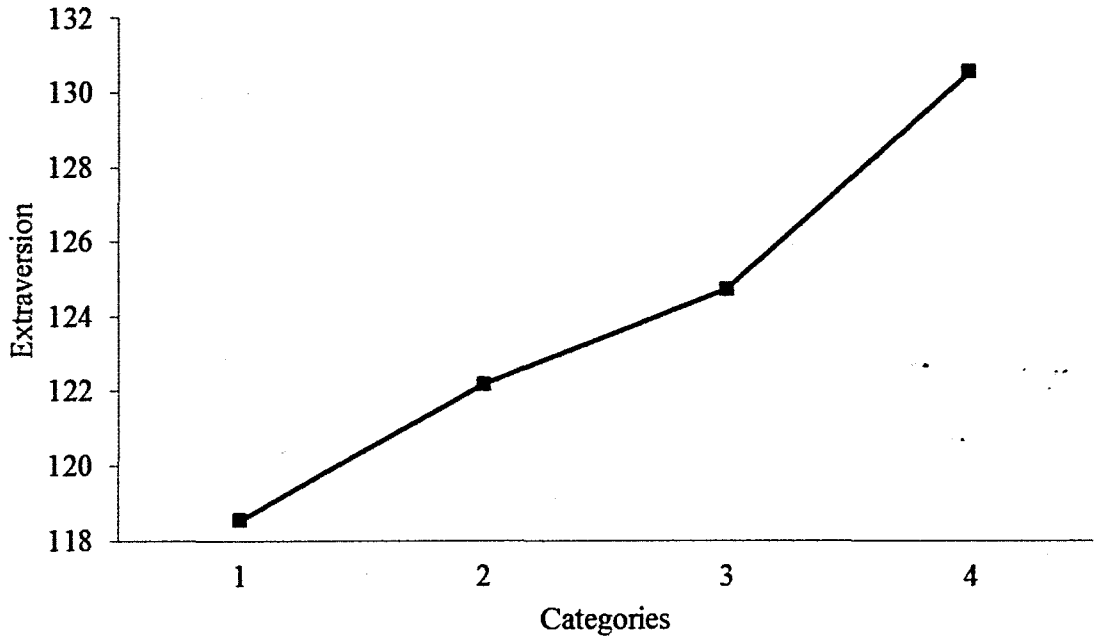

Figure 5.59. Mean scores on Extraversion for each of the gambling categories

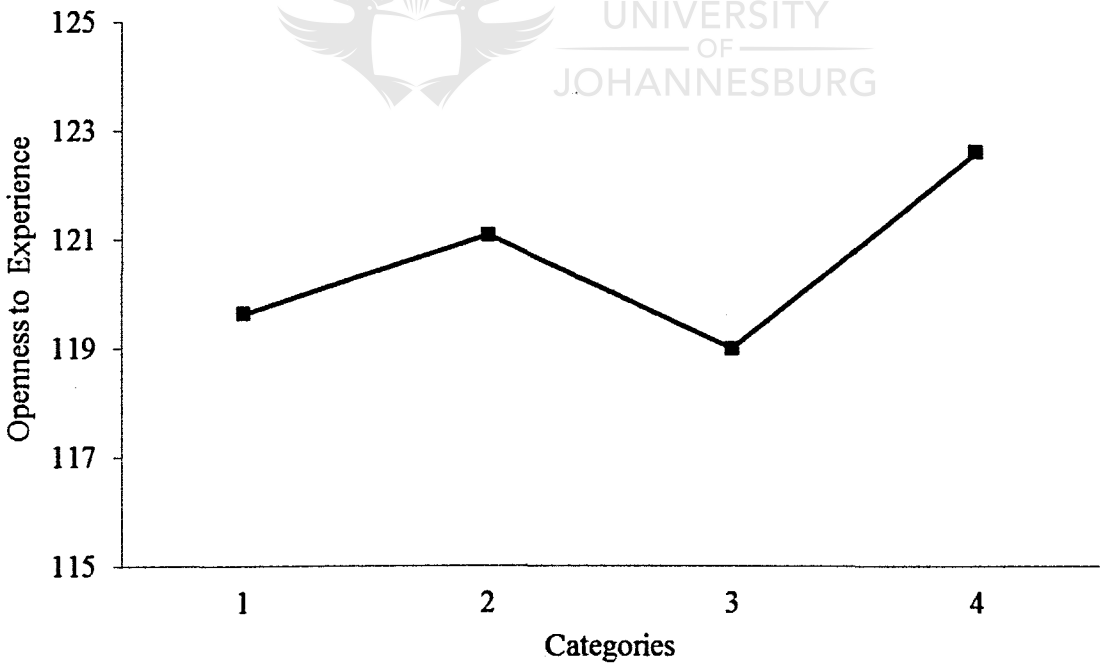

Figure 5.60. Mean scores on Openness to Experience for each of the gambling categories

Discriminant function analysis

A discriminant function analysis was conducted to further investigate and identify those personality traits (or combinations of them) that were best able to distinguish between the different levels of gambling. Box's *M* test revealed that the data met the assumption of equal covariance matrices across the different groups [Box's M = 50.458, F (45, 58173.819) = 1.087; $p = 0.319$].

The results of a discriminant function analysis produced three functions. Taken together, the three functions significantly discriminated between the four grouping variables [$\chi^2(15)$ 25.385, $p < 0.05$; Wilk's $\Lambda = 0.963$]. Upon removal of the first function, the remaining functions failed to significantly discriminate between the groups [$\chi^2(8)$ 3.101, $p = 0.928$; Wilk's $\Lambda = 0.995$]. The results show that only the first function significantly contributed toward the separation of the four grouping variables.

The canonical correlation between the grouping variables and the composite of the five personality traits represented by function one was 0.180, which shows that the multivariate combination of the personality variables shared approximately 3% of its variance with the grouping variables. The canonical correlation for function two was 0.127, which showed that it shares approximately 2% of its variance with the grouping variables.

Table 5.29 showed that the function had a strong positive correlation with Extraversion and a moderate negative correlation with Neuroticism, None of the remaining traits had noteworthy correlations. Overall the results revealed that of the Big Five factors of personality, Extraversion was the most important personality trait that contributed to the separation of the gambling categories.

Table 5.29.

Discriminant Structure Matrix for Gambling

	Function 1	
Personality variable	r_s	r_s^2
Extraversion	.94	87.98%
Conscientiousness	.02	00.05%
Openness to Experience	.17	02.82%
Agreeableness	.01	00.02%
Neuroticism	-.30	09.00%

Table 5.30 indicates the magnitude to which the linear combination of personality variables, as represented in function one, differed across the four gambling categories.

Table 5.30.

Group Centroids for Gambling

Gambling categories	Function 1
0	-.13
1-3	.05
4-9	.26
10+	.56

Figure 5.61 presents the group centroids for Function 1. This shows that individuals who do not gamble are more likely to score lower on Extraversion compared to individuals who gamble more frequently – as indicated by the 10+ category – who are likely to be more extraverted and somewhat less neurotic.

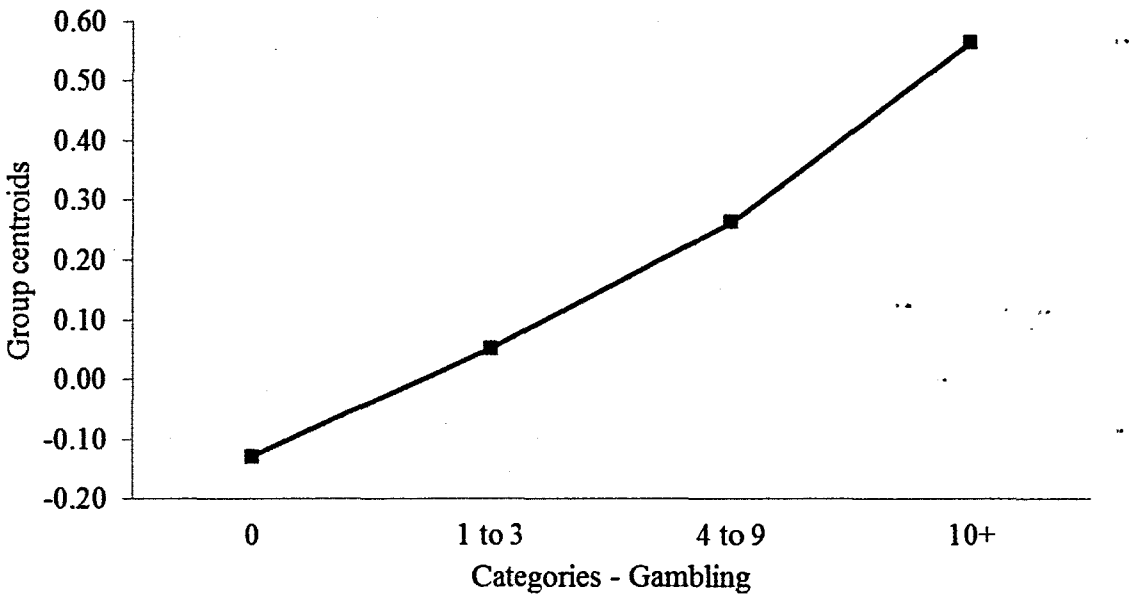

Figure 5.61. Line graph of the group centroids for gambling

The results of follow-up one way ANOVAs indicate that on a univariate level, only Extraversion ($p = 0.000$) discriminated between the grouping variables. Tukey's post-hoc HSD test showed that significant differences were only found between the group of individuals that do not gamble at all and those individuals who gamble more regularly as indicated by the 10+ category ($p = 0.001$).

To summarise the findings reported in this section, Table 5.31 displays an at-a-glance view of the personality dimensions found to be related to each of the risk variables. A (–) sign indicates that low levels of the trait are associated with risk-taking behaviour, and a (+) sign indicates that higher levels of the trait are related to increased risk-taking on that particular risk variable. The relative importance of a trait in the discrimnant fucntion is indicated by numbers one to four, with one being the most important and four being the least important. Table 5.31 also provides the amount of variance explained by each trait in the discriminant function for each risk variable.

Table 5.31

Amount of Variance Explained in the Discriminant Function

Risk variable	E	N	C	O	A
Smoking	+ (2) 17%	+ (4) 11%	- (1) 36%	+ (3) 14%	
Sexual partners	+ (2) 21%		- (3) 15%	+ (1) 39%	- (4) 5%
Illegal substance use	+ (3) 17%		- (1) 39%	+ (2) 24%	
Alcohol use	+ (2) 31%		- (1) 34%	+ (4) 4%	- (3) 6%
Thrill activities	+ (1) 81%	- (2) 11%		+ (3) 9%	
Times arrested	+ (2) 27%	- (4) 16%	- (1) 32%		- (3) 18%
Romantic infidelity	+ (1) 35%		- (2) 23%		- (3) 18%
Starting fights	+ (1) 47%		- (2) 18%	+ (4) 7%	- (3) 8%
Defend fight	+ (1) 38%		- (2) 24%		- (3) 15%
Gambling	+ (1) 88%	- (2) 9%			

Note. E=Extraversion; N=Neuroticism; C=Conscientiousness; O=Openness to Experience; A=Agreeableness; A (+) or (–) sign indicates the type of relationship the trait has with the risk-variable; The number in brackets indictates the relative importance of the trait in the discriminant function, followed by the proportion variance (%) explained in the discriminant function.

5.11 Conclusion

This chapter presented the results from the analyses conducted in this study. Overall the findings seem to suggest that the FFM shows good promise with regard to the prediction of an array of risk-taking behaviours. Mostly, the results are in line with expectations on all the risk-taking variables. The empirical results that were reported in this section will be discussed in the next chapter.

CHAPTER 6: DISCUSSION OF RESULTS AND CONCLUSION

The aim of the present study was to investigate the extent to which personality is associated with risk-taking behaviour. The main objective of the study was to investigate the relationship between the FFM of personality and an array of risk-related behaviours. It was hoped that this study would shed further light on the way that these five personality dimensions are uniquely or similarly related to different risk behaviours.

This purpose of this chapter is to discuss the main findings reported in the previous chapter. In what follows, the relationship between risk-taking and each of the five factor dimensions will be discussed. The results of the discriminant analysis will be integrated with previous research for each of the five factors. Next, the findings obtained in the present study will be related back to each of the postulates. The overall value of personality as predictor of risk behaviour will be evaluated, the limitations of the study discussed, and recommendations made for further research.

6.1 Extraversion

Of all the personality dimensions investigated in the present study, Extraversion was the only one found to be associated with all ten risk variables. It was the largest contributor to the discriminant function for half the risk variables including thrill-seeking activities, romantic infidelity, starting fights, defending oneself in a fight and gambling. It also played a major role in all the remaining risk variables, explaining no less than 17% of the variance in any one case.

Of all the risk variables in this study, the role of Extraversion deserves special mention in two cases. For thrill-seeking activities and gambling, Extraversion explained 81% and 88% of the variance in the discriminant function respectively. This is to be expected, when considering

that the Excitement Seeking facet scale of the BTI is located on the Extraversion dimension. As discussed in Chapter 3, the content of Excitement Seeking is conceptually similar to sensation seeking, in particular the Thrill and Adventure subscale of the SSS. The finding that Extraversion is so strongly related to these two risk variables is also in line with the Eysencks' (1975, 1985, 1990) theory that extraverts are stimulation seekers. Both thrill-seeking activities and gambling can reasonably be expected to provide high levels of stimulation.

The results obtained in this study are in line with those reported by Tok (2011) who also found Extraversion to be predictive of high risk and adventure sports participation. These include motorcycling, scuba-diving, surfing, skiing, sky-diving, etc. (Tok, 2011).

With regards to gambling, previous research has not typically found Extraversion to be predictive of gambling, although the excitement seeking elements of personality have been strongly related to gambling (Bagby et al., 2007; Eysenck, 1975). With the Excitement Seeking facet scale of the BTI being part of the Extraversion dimension, it is expected that Extraversion would be strongly associated with gambling. However, in the absence of facet level analysis, it is not possible to determine the extent to which Excitement Seeking alone accounts for this relationship.

The finding that Extraversion is associated with alcohol consumption (Flory et al., 2002; Hampson et al., 2006; Luhtanen & Crocker, 2005) was also supported by the results of this study. Overall, previous research investigating the relationship between personality and alcohol use has consistently implicated Extraversion as an important trait in this relationship although not necessarily the strongest one (Hong & Paunonen, 2009). The findings from the present study are in line with previous research overall and very similar in terms of the general strength of this relationship.

The relation between Extraversion and drug use is more ambiguous. For example, Gorman and Derzon (2002) reported research that identified behavioural traits resembling Extraversion to be related to drug use. Kornor and Nordvik (2007) reported a relationship with heroin use that did not extend to cocaine and marijuana use. Terracciano et al. (2008) also found no relationship for Extraversion as a whole but they found that Excitement Seeking was consistently related to all types of drug use. In the present study, Extraversion was also related to drug use but contributed substantially less to the discriminant function than Conscientiousness and Openness to Experience.

The relation between Extraversion and smoking is similar to drug use, although the association here is much more consistent and robust (Breslau et al., 1994; Eysenck, 1985; Kassel et al., 2003; Munafo et al., 2007; Smith, 1970). Overall, the results from this study support previous research that consistently found Extraversion to be an important personality trait related to smoking. Although not the strongest predictor of smoking, in the present study Extraversion accounted for the most variance in discriminant function following Conscientiousness.

Two aggression-related risk behaviours were included in the present study. The extent to which an individual starts physical fights or finds him/herself in situations where self-defence may be required was considered to be a function of an aggressive disposition. The literature investigating five factor personality dimensions and aggression has not previously implicated Extraversion in this relationship. The results from this study did however find Extraversion to be associated with a tendency to get involved in physical fights. The reason for this finding is not clear. Given the conceptual relation of the Excitement Seeking facet scale on the Extraversion dimension to sensation seeking, it is possible that this trait could partially account for the relationship, because sensation seeking has been empirically associated with an array of antisocial behaviours including aggression (Zuckerman, 2004). However more

research is required at the facet level to account for this finding. It is also possible that something other than aggression may underlie this relationship.

Extraversion was also found to be related to sexual promiscuity in this study. This is in line with other studies that found higher levels of Extraversion to be associated with sexual risk-taking in general and having more sexual partners in particular (Hoyle et al., 2000; Miller et al., 2004). Extraversion was the second most important contributor to the discriminant function after Openness to Experience. The strength of the relationship is not surprising given that the facet scale of Gregariousness has previously been associated with having many sexual partners and Excitement Seeking with sexual activity at a young age (Miller et al., 2004).

The results of this study found Extraversion to be strongly related to infidelity in romantic relationships. Of the five factor dimensions, Extraversion was the largest contributor to the discriminant function by a substantial margin. Although not all studies investigating the relationship between the FFM and infidelity have found significant relationships for Extraversion (Buss & Schackelford, 1997; Schmitt, 2004), other studies reported significantly higher scores for romantic cheaters on this trait (Orzek & Lung, 2005). This study provided further evidence in support of Extraversion being associated with infidelity.

6.2 Neuroticism

Neuroticism emerged as an important predictor for four of the risk variables in the present study including smoking, thrill-seeking activities, times arrested and gambling. When compared to the other four dimensions of the FFM, Neuroticism played a relatively less important role as a predictor of risk-related behaviour overall. Nonetheless, for these four risk behaviours, Neuroticism made a substantial contribution to the discriminant function, accounting for 9% -16% of the variance in each case. In contrast to Extraversion, where only

high levels of the trait were related to the risk variables, for Neuroticism, both high and low levels of the trait were related to different risk behaviours.

The results from this study revealed that higher scores on Neuroticism were associated with smoking. This finding is in line with Eysenck and Eysenck's (1985) theory that neurotic individuals are more likely to smoke to reduce tension levels. Overall, the results from this study are similar to those reported in previous research that has consistently found Neuroticism to be related to smoking (Breslau et al., 1994; Kassel et al., 2003; Munafo et al., 2007; Terracciano et al., 2008). In contrast to some of this research, Neuroticism was not one of the strongest predictors of smoking in this study (cf. Munafo, Zetteler, & Clark, 2007; Terracciano et al., 2008). In fact, it made only the fourth largest contribution to the discriminant function

Neuroticism was also found to be associated with thrill-seeking activities. This finding is in line with Tok's (2011) research that reported lower scores on Neuroticism for high risk sports participants. Tok hypothesised that thrill-seekers would need to manage their anxiety effectively to engage in such activities. In the absence of an alternative explanation for this finding, the result from this study seems to provide further evidence in support of Tok's theory.

Neuroticism was also related to the number of times an individual has been arrested. Even though it was the least important contributor to the discriminant function when compared to Conscientiousness, Extraversion and Agreeableness, it still accounted for a large portion of the variance in the analysis. Similar to thrill-seeking activities, it is likely that to engage in behaviour that may result in possible arrest, one would require higher levels of emotional control (or low scores on Neuroticism).

Low Neuroticism scores were related to gambling in the present study. Compared to the vast amount of variance that Extraversion (88%) accounted for, Neuroticism contributed a much smaller (9%), yet important portion thereof. Previous research investigating the relation between gambling and neurotic tendencies has reported ambiguous results. For example, Langewisch and Frisch (1998) found no evidence that neurotic-related constructs were associated with gambling, In contrast, other studies have reported low levels of emotional constraint and high levels of negative emotionality related to gambling (Slutske,.Caspi, Moffit, & Poulton, 2005) and higher scores on Neuroticism using the NEO PI-R (Bagby et al., 2007). The results of this study stand in contrast to previous findings, in that this study suggests that individuals who gamble more are in fact more emotionally stable (or less neurotic). This finding makes sense if one considers that gambling is likely to elicit anxiety, which would need to be managed appropriately. From a different perspective, one could wonder if individuals who suffer from anxiety or who tend to be somewhat more emotionally volatile would be able to manage the negative emotions that frequently accompany losses or potential losses while gambling.

6.3 Conscientiousness

Conscientiousness emerged as one of the strongest predictors of risk-taking behaviour when considering all the risk variables together. Whereas Extraversion was associated with all ten risk variables, Conscientiousness was related to eight. Only for thrill-seeking activities and gambling were no relation found with Conscientiousness. In all the cases discussed in the next few paragraphs, low Conscientiousness was consistently related to these risk behaviours. This seems to suggest that high levels of Conscientious seem to inhibit risk-taking behaviour in general.

Conscientiousness was the strongest predictor of smoking by a substantial margin when compared to the other personality dimensions. Not all studies investigating the relationship between personality and smoking have found Conscientiousness or related constructs to be associated with smoking (Breslau et al., 1994; Kassel et al., 2003; Munafo et al., 2007; Vollrath et al., 1999). However, there is considerable evidence that Conscientiousness is indeed related to smoking (Booth-Kewley & Vickers, 1994; Terracciano & Costa, 2004; Vollrath & Torgersen, 2002). In a study where the relation between the FFM and smoking was investigated in a similar way to the present study, only Conscientiousness and Neuroticism were found to be predictive of smoking (Terracciano, 2008). Powerful evidence from a 24-year longitudinal study also found only low levels of Conscientiousness to be predictive of smoking (Kubicka et al., 2001). Overall, the results from the present study are in line with, and further support the research that previously identified Conscientiousness as a strong predictor of smoking.

Conscientiousness was also associated with sexual promiscuity in this study. Previous research concerning the relationship between sexual risk-taking and Conscientiousness has reported a weak relationship with some sexually risk-taking behaviour, but not for having multiple sexual partners in particular (Miller et al., 2004). However, the result obtained in this study provides empirical evidence that low scores on Conscientiousness are indeed related to promiscuous behaviour.

Research conducted by Gorman and Derzon (2002) did not yield any evidence in support of a relationship between Conscientiousness and drug use. In most other studies, Conscientiousness has been associated with various categories of drug use both indirectly (Kornor & Nordvik, 2007) and directly (Bogg & Roberts, 2004; Terraciano et al., 2008). In fact, Terracciano et al. (2008) found all the Conscientiousness facet scales, with the exception of Order, related to heroin, cocaine and marijuana use. The results in the present study are in

line with this research with Conscientiousness emerging as the strongest predictor of illegal substance use in the discriminant analysis. It is noteworthy that Conscientiousness accounted for almost double the amount variance explained by the second strongest predictor - Openness to Experience.

Conscientiousness was again found to have the strongest relationship with alcohol consumption. This finding is not surprising given that alcohol use also qualifies as substance use, but it is differentiated because alcohol is legal and socially more acceptable than drugs. Overall, the finding obtained in the present study is in line with previously reported results (Elkins et al., 2006; Flory et al., 2002; Hong & Paunonen, 2009; Terracciano & Costa, 2004; Trull & Sher, 1994; Walton & Roberts, 2004) and provides further empirical evidence that increased alcohol consumption is strongly related to lower levels of Conscientiousness.

The research concerning the relationship between Conscientiousness and infidelity has not been consistent in the past. Whereas some studies found a positive relationship between Conscientiousness and infidelity (Orzek & Lung, 2005), others reported a negative relationship (Buss & Schackelford, 1997; Schmitt, 2004) where low Conscientiousness scores was predictive of unfaithfulness in romantic relationships. The results of this study found evidence that supports the finding that low Conscientiousness scores are related to higher frequencies of cheating in romantic relationships.

It is interesting that low Conscientiousness scores were predictive of both the physical fighting variables in this study, since studies investigating the relationship between personality and aggression have consistently implicated Agreeableness and Neuroticism but not Conscientiousness (Bettencourt et al., 2006; Jensen-Campbell, Gleason, et al., 2003; Jensen-Campbell & Graziano, 2001; Martin et al., 2000; Sharpe & Desai, 2001). Since aggression may not be the only explanation for why individuals become involved in physical

fights, it is possible that the function of low Conscientiousness in this relationship may be reflected in bad choices – going to venues or locations where physical fights are not uncommon – rather than having to do with the actual conflict situation.

Low Consciousness was also found to be the strongest predictor of the number of prior arrests in the present study. This makes sense from a theoretical perspective, in that high Conscientiousness would suggest organised, planful, deliberate and controlled behaviour (Taylor, 2004), which should not typically result in ill-conceived decisions that may bring one into conflict with the law. It is however also conceivable that a conscientious individual might employ these favourable behavioural traits for the purposes of pre-meditated criminal acts.

6.4 Openness to Experience

Openness to Experience was related to six of the ten risk variables of this study. Overall, Openness was not one of the strongest predictors of risk behaviour in general, when compared to Extraversion and Conscientiousness. Given its empirical association with sensation seeking, a stronger relationship for this dimension was expected.

Openness to Experience was found to be associated with smoking in the present study. Although it was only the third most important variable in the discriminant function, it accounted for a substantial portion of the variance. In previous research where the relation between smoking and personality has been investigated, no noteworthy associations have been reported for Openness to Experience (Munafo et al., 2007; Terracciano et al., 2008; Vollrath & Torgersen, 2002), making the finding from this study somewhat surprising. From a theoretical perspective, this result is not unexpected since one would expect individuals open to experience to be more likely to experiment with cigarettes, and some portion thereof to continue with the habit.

High Openness to Experience was also related to having multiple sexual partners. Although not exactly similar, this result speaks to the findings reported by Miller et al. (2004), who found an association between high Openness to Experience scores and the tendency to start sexual activity at a young age and also to have children at a young age. Miller et al. further found that these individuals tend to have sex without condoms and curiously, they reported that low scores on the fantasy subscale of the NEO PI-R was related to sexual activity and having borne children at a young age. The research finding from this study supports previous research that suggests that high Openness to Experience scores are related to sexual risk-taking in general.

Results also revealed that Openness to Experience was a good predictor of drug use. This is in line with Gorman and Derzon's (2002) research that reported relationships on Openness to Experience-related traits. When considering Terracciano et al.'s (2008) research, it appears that the relationship between drug use and Openness to Experience is more nuanced that first thought. They found no association between Openness and hard drugs such as cocaine and heroin but a positive relation with marijuana use. Given that the sample in the present study comprised of students, and that marijuana is a very popular student drug, it is questionable whether this finding would generalise to the population as a whole.

Openness to Experience was also found to have some relationship to alcohol use, although the relative contribution it made is small in comparison to Conscientiousness and Extraversion. In line with previous research using the FFM to investigate this association, the relationship of Openness to Experience to alcohol consumption is not particularly noteworthy, but in combination with Conscientiousness, Extraversion and Agreeableness, it made a noteworthy contribution to the separation of groups of individuals who consume different amounts of alcohol on a regular basis.

Tok (2011) argued that Openness to Experience represents the cognitive element required to fully understand high risk sports participation. In his study, Openness to Experience was indeed found to be related to thrill-seeking sports. Similarly, Openness to Experience was found to be associated with thrill-seeking activities in the present study. Overall, the results from this study seem to support Tok's (2011) theory as a whole, in that Extraversion – where the Excitement Seeking facet is located – accounted for most of the variance on the thrill-seeking risk variable. Low Neuroticism, which Tok argued is needed to manage the anxiety involved in such activities, also contributed to the discriminant function, followed by Openness to Experience. This may represent the cognitive component of thrill-seeking activities. Even though this does not represent conclusive evidence for Tok's (2011) theory, it does appear to support it.

With regards to the relationship between personality and aggression, the five factor dimensions consistently implicated are Agreeableness and Neuroticism. It is interesting then, that Openness to Experience was found to be associated with the tendency to start fights in the present study. The reason for this relationship is not clear. From a theoretical perspective, one could speculate that being high on Openness to Experience, and specifically the need for novel experiences, situations and people, may lead an individual into unsavoury situations and conversations where the presence of such an individual may be unwelcome. Nevertheless, there may be many different reasons, but it is clear that further research is required to better understand this finding.

6.5 Agreeableness

Agreeableness was associated with six of the risk variables in the present study. Its relative importance to these risk variables was lower in general, when considering its overall contribution to the discriminant function in comparison to the other dimensions of

personality. The relationship of Agreeableness to each of the risk variables was negative, which shows that an Antagonistic (opposite of Agreeableness) disposition seems to be associated with selected forms of risk-related behaviour.

The results of this study found a negative association between Agreeableness and having more sexual partners. Even though it seems to be counterintuitive that more Antagonistic individuals can successfully find many sexual partners, these results are in line with previous research (Hoyle et al., 2000; Miller et al., 2004). In fact, Miller et al. (2004) found that from the five factor dimensions, low Agreeableness was related to the most forms of sexual risk-taking including a high number of sexual partners, substance use before or during sex, sex with people other than the primary partner, and an early sexual debut. Based on Miller et al.'s findings, a stronger association was expected for the relation between Agreeableness and an individual's number of previous sexual partners. Only Neuroticism had a weaker association to this risk variable.

The results from this study further revealed that Agreeableness was associated with alcohol consumption. This finding is in line with previous research that has reported similar results (Hong & Paunonen, 2009). The reason for this relation is not entirely clear and represents somewhat of an anomaly when Agreeableness is compared with the other forms of substance use in the present study such as smoking and illegal substance use (drugs). No association between Agreeableness and these substances were found in the present study. Even though Agreeableness was the weakest contributor in the discriminant function for this risk variable, the reason for this finding remains unclear.

Low Agreeableness was also related to the number of times individuals reported being arrested. This suggests that an antagonistic or hostile attitude is related to increased chances of engaging in criminal risk-taking behaviour. It is also possible that these self-reported

arrests are not necessarily due to deliberate criminal acts. Instead they might be due to behaviours such as drunk driving or other irresponsible behaviours resulting from a no-care attitude, that eventually result in a legal violation. However more research would be required to gain a comprehensive understanding for this association.

The finding that low Agreeableness is associated with infidelity in romantic relationships supports previous research in this area (Buss & Schackelford, 1997; Miller et al., 2004; Schmitt, 2004). By contrast, Orzek and Lung (2005) did not find any relation for Agreeableness in their study. Although Agreeableness had a strong association in its own right with infidelity in the present study, its contribution in the analysis was much smaller than that of Extraversion. From a theoretical perspective, this finding could reflect a lack of consideration for the hurt that often accompanies the experience of being cheated on in romantic relationships.

Lastly, it was also found that both of the risk variables related to fighting were associated with Agreeableness. This was expected and is line with research that consistently reported a relation between low levels of Agreeableness and aggression (Bettencourt et al., 2006; Jensen-Campbell, Gleason, et al., 2003; Jensen-Campbell & Graziano, 2001; Martin et al., 2000; Sharpe & Desai, 2001). This result is not surprising, since research has also found that in contrast to Neuroticism, where aggressive behaviour is only likely to follow in reaction to provocation, Antagonism (low Agreeableness) is more likely to ensue in a variety of situations irrespective of provocation.

6.6 Domain Specific Risk-taking

The risk variables investigated in this study can, to some extent, be divided into the risk domains suggested by Weber et al. (2004). This would allow for a level of comparison between the results of studies that made explicit use of the DOSPERT scale (e.g., Soane,

2010) and the results obtained in the present study. Accordingly, smoking, the number of sex partners, alcohol consumption and the physical fighting variables could be categorised in the Health and Safety Domain. Thrill activities would be categorised in the Recreational Domain, whereas times arrested and the romantic infidelity variable could be categorised in the Ethical Risk-Taking domain. Lastly gambling had its own match with the gambling category on the DOSPERT.

When comparing the results obtained in the present study to those reported by Soane et al. (2010), which were discussed in Chapter 3, some similarities and differences become apparent. Also, Soane et al. were not able to identify a well-fitting SEM model for the health and safety domain, so it is not possible to directly compare findings on this domain. Since health-related risk variables comprised half the number of risk behaviours investigated in the present study, it is nevertheless worthwhile to see if a stable pattern emerged for this cluster of risk variables.

A pattern was indeed observable, in that all five health risk variables were predicted primarily by Conscientiousness, Extraversion and Openness to Experience. Further, for the substance-related variables including smoking, illegal substance use (drugs) and alcohol consumption, low Conscientiousness was the best predictor by a large margin in all three cases. In contrast however, Openness to Experience was the best predictor of having many sexual partners by a substantial margin. This was the only risk variable for which Openness to Experience played a primary role. For the physical fighting variables, it turned out that Extraversion was the best predictor of this type of behaviour by a large margin when compared to Conscientiousness and Openness to Experience.

The implications from this domain specific view are insightful for a few reasons. First, it does support the idea that because risk behaviour cannot be generalised from one domain to the

next, personality traits would be differentially related to different risk behaviours. This is the reason why Weber et al. (2004) insist that risk research should be done in different risk domains to determine how personality is associated to each type of risk behaviour. This advice has indeed been followed in subsequent research (cf. Nicholson et al., 2005; Soane et al., 2010).

However, results from the present study also demonstrate that despite some overlap in the Health and Safety domain, there are still many differences between risk behaviours within the same domain. Thus, it is not possible to conclude that health risk behaviours are homogenous to the extent that we can assume that the same personality traits are equally associated to all of them. Rather, it seems that more work needs to be done with regard to the identification of more nuanced clusters of meaning like substance-related health risk behaviours.

In addition, it also brings into question the generalisability of the DOSPERT method. Or alternatively, if the same personality structure is identified for each of the Health and Safety items on the DOSPERT scale, it is questionable whether their definition of this domain is sufficiently comprehensive.

Moving on to the remaining domains where some level of direct comparison was possible, on the Ethical domain, Soane et al. (2004) reported direct associations with Conscientiousness and Agreeableness and an indirect relation with Neuroticism. Similarly, results from the present study found associations with Conscientiousness and Agreeableness, but also found Extraversion to be an important predictor for these variables. A negative relationship with Neuroticism was found for the number of previous arrests, but no relation was reported for infidelity.

There were also important differences for gambling. Soane et al. (2010) reported associations for all the five factor dimensions with the exception of Openness to Experience. In the present study, Extraversion and Neuroticism similarly emerged as important predictors of gambling, but no relationships were found for Conscientiousness and Agreeableness.

On the Recreational domain, Soane et al. (2010) reported associations for all the five factor dimensions with the exception of Agreeableness. Only indirect relationships were found for Openness to Experience and Neuroticism. In the present study, Extraversion, Openness to Experience and a negative relationship for Neuroticism were found to be related to thrill-seeking activities.

Important to note is that despite gambling and thrill-seeking being located on two different risk domains (Gambling and Recreation respectively on the DOSPERT scale), the personality pattern related to both these risk variables was very much alike with regards to the amount of variance that was accounted for by Extraversion in the present study. This stands in contrast to Soane et al.'s (2010) study, and is somewhat surprising given that the Excitement Seeking facet – located on the Extraversion dimension in both studies – is thought to be important in both gambling and thrill seeking activities.

6.7 Summary

Postulate 1 stated that personality as measured by the FFM will be able to differentiate among the categories of risk-taking behaviour, for each of the risk variables investigated in this study. The results reported in Chapter 5 revealed that a statistically significant discriminant function comprising a unique combination of the five factor dimensions was able to separate the categories of behaviour for each of the risk variables included in the present study. Thus, it appears that Postulate 1 is well supported by the results of this study.

Postulate 2 stated that all five personality dimensions will not be equal contributors to the discriminant functions of different risk variables. From the results section and discussion above it is clear that each of the five factor dimensions are differentially related to each of the risk behaviours. This demonstrates that a personality dimension such as Openness to Experience may be strongly predictive of some risk behaviours but irrelevant to others. The results obtained in this study therefore provide good evidence in support of Postulate 2..

Postulate 3 stated that the most important contributors to overall group separation in the discriminant functions would be Extraversion, Conscientiousness and Openness to Experience. Inspection of the summary table in Chapter 5 provides support for this postulate in that Extraversion was related to all 10 risk variables investigated. Conscientiousness proved to be the second best predictor of a risk-taking overall. However, the predictive power of Openness to Experience was less than expected, given its association with sensation seeking.

The finding that Extraversion was related to all 10 risk behaviours in this study also seems to support Postulate 4. This postulate stated that Extraversion would be related to each of the risk variables due to the Excitement seeking facet scale contained in the Extraversion dimension. In order to conclusively determine the overall importance of Excitement Seeking, facet level analyses would have to be conducted separately on each of the risk variables. Thus, it would be premature to conclude that this facet scale of Extraversion is the reason why this dimension is related to all the risk variables investigated in this study, although it is not unlikely.

Considered as a whole, the results from the present study seemed to correspond to those findings reported by so-called WEIRD countries. With the exception of a few differences, this study provides empirical support for the idea that much of what is known about the

relationship between personality and risk-taking behaviour in WEIRD countries can be generalised to the South African context. Further support for the robust nature of this claim is that the psychological constructs investigated in this study were measured with an instrument developed and validated specifically for the South African context.

6.8 Limitations and Recommendations

Although the sample size of the present study was sufficiently large for the purpose of analysis, the sample was still overrepresented by White respondents. Future studies should endeavour to have a better representation of Black, Coloured (mixed race) and Indian respondents to ensure that the results are equally robust for these demographic groups.

Although a number of risk variables were investigated in the present study, a limitation is that there are numerous risk behaviours that were not included. The results of this study also made it clear that these unexamined risk behaviours would each require individual research to determine how it is related to personality. Future studies would therefore make valuable contributions to this research by investigating some other risk-taking behaviours not included in this study, providing they use a similar research design.

From a personality perspective, another limitation is that only the composite dimensions of the FFM were investigated in this study. The facet scales comprising each of the dimensions were not considered. Thus, it cannot be assumed that when a five factor dimension such as Conscientiousness has a strong relationship to a risk variable such as smoking, this will apply to each of the facet scales contained within this composite dimension. Further research regarding the relationship between the FFM and risk-taking therefore needs to be conducted at the facet-scale level.

Another limitation was the "hot" and "cold" affective processes discussed in Chapter 3 (Figner et al., 2009). In the absence of clear criteria for such a classification, it is important to remember that some of the risk variables investigated in this study could be considered "hot" which would imply that adolescents and young adults – such as the respondents of this study – would have indicated higher frequencies of risk-taking on these variables compared to older age groups. Thus, caution should be taken to generalise the results reported in this study to the broad population without research supporting these findings with more neurologically mature age groups. Thus, to further investigate the robustness of the results obtained in this study, future research of this kind should make use of samples where mature age groups are better represented, or ideally with samples containing no adolescents and young adults.

6.9 Conclusion

The findings of the present study showed that personality can indeed be considered an important predictor of risk-taking behaviour. This study made a unique contribution to the literature by investigating multiple forms of risk-taking behaviour across several predictors simultaneously. In contrast to other studies where single risk behaviours are examined in relation to one predictor, or a narrow range of predictors, the multivariate nature of this study contributed to the generalisability of the results.

The multivariate nature of this study further showed that the relationship between personality and different risk behaviours is complex and nuanced, but it also allowed for the identification of important patterns that would not easily be detected with a univariate research design. For example, some personality dimensions of the FFM, such as Conscientiousness and Extraversion in particular, appeared to be salient predictors of most of the risk variables investigated in this study. A particularly important pattern was that

Conscientiousness appeared to be a trait critical for an understanding of substance-related health-risk behaviours.

Overall, the empirical evidence presented on the personality structure underlying different risk behaviours proved to be extremely informative. This knowledge should be used creatively to devise ways and means of reducing the destructive impact of risk-taking behaviour. It is hoped that such efforts may eventually contribute in some small way to the prevention of unnecessary deaths and the improvement of life for many people. In a monetary context, it is also hoped that that some of the knowledge generated in this study might help to reduce financial costs to organisations at a micro-economic level which might even extend to a macro-economic benefit. However, much more work needs to be done before this will happen, but it is believed that this study represents a step in the right direction and also points to a path that holds promise for future research of this type.

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