Psychometric properties of the PID-5-BF in an undergraduate sample of South African university students

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Ever since I was a child, I was fascinated by people and their different emotions and different personalities. Obviously, as I was still young, I didn’t understand why people thought or felt or acted differently than I did. But from there, without it being purposeful, I found myself listening and talking to friends and family about their problems – and was dubbed the “little psychologist” (even though I didn’t even know what a psychologist is). I am grateful that this interest of mine did not dissipate, but rather grew into a passion I knew I had to pursue.

It has not been an easy journey though, it was not how I thought the road would follow. There was a stage where I struggled so much and wanted to give up, just to find myself greatly dissatisfied with anything else. So I persevered, and finally, albeit after 8 years, I was selected for the Master’s program. I would however not have made it to that point, or this final stage I am at now, if it wasn’t for the amazing support from my friends and family.

First of all, to both my parents, Piet and Minda: I lack the vocabulary to properly thank you, but I will try. Thank you for your care and support throughout my process. Thank you for not having given up on me, but instead having always encouraged and motivated me to become what you also knew I was meant to be. The appreciation I have for you is more than even I can fathom, and I will never be able to say thank you enough!

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Eugene, my partner: Where to begin? You haven’t been a part of my journey from the beginning, but I do think you entered at the most difficult and worst part of this process. Amidst all the chaos, my mood swings, the research-littered house, you were there and never said a word that was anything but encouraging. I know you didn’t always understand the process, but thank you for the faith you had in me, and the hand you reached out to help me get where I am today. I can honestly say, that if you weren’t part of my life, I would still be struggling with my studies. Thank you so much!

To the rest of my family and friends: I cannot complain about the amount of support you have given me. Your motivation, support and encouragement have helped carry me throughout this process. There are a lot of you, but I want to give special thanks to Roxy, Marica, Lerinda, Shay and the whole Bloemfontein clan, who were always there for me. You were, unwillingly, dragged into my process and had to listen to my whining, but never complained and never failed to continue in your support. Thank you, thank you, thank you.

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Finally, to myself, Heleen: Thank you for having persevered and not having given up, even in the darkest of times. I am proud of you!
SUMMARY

Personality is a central and indispensable concept within the field of Psychology, as it contributes to the clinical presentations and general functioning of clients/patients. It is furthermore imperative to understand the manner in which personality can become disordered. Although research has indicated influential factors for the development of pathology, including biological, social and psychological factors and traumas, there are still some discord regarding the measurement thereof.

Assessments or tests are important within the psychological field to help make a diagnosis, to confirm a diagnosis or to determine therapeutic process and progress. These assessments need to be of high quality and standardised within a South African context in order to yield valid and reliable results. Some tests for personality pathology are used in South Africa, but have been deemed too time-consuming and expensive.

The Personality Inventory for DSM-5 Brief Form (PID-5-BF) was developed to measure maladaptive personality traits (negative affect, detachment, antagonism, disinhibition, psychoticism), based on the “hybrid model” for personality disorders included in the DSM 5 Section III. The hybrid model was developed in response to various limitations presented by the Diagnostic and Statistical Manual of Mental Disorders (DSM) categorical model of personality disorders, such as poor validity of assessments, lack of clinical utility and high comorbidity between personality disorders. Literature has established reliability and validity for the PID-5-BF in other countries and in relation to other tests of similar nature (e.g. NEO-PI-R). Research furthermore indicates support for the DSM-5 hybrid model in comparison to other evidence-based systems of
personality and pathology (e.g. Five Factor Model of Personality), and that it aligns in a theoretically acceptable manner.

The aim of the study was to explore these psychometric properties within an undergraduate South African student population \((n = 283)\) and we used the NEO-PI-R and MINI Subscale K as measures for comparison. The statistical analyses were implemented in Mplus 8.1, which allowed for the implementation of latent variable modelling in a structural equation modelling (SEM) framework.

Our findings showed to be in line with existing literature, and indicated support for the PID-5-BF, both within South Africa and in comparison with assessments of similar nature. Sufficient reliability \((\alpha = 0.69 – 0.84)\), convergent and discriminant validity \((r = 0.35 – 0.72)\) were found. Furthermore, hypothesised correlations between the constructs of the PID-5-BF, NEO-PI-R and MINI Subscale K, were adequately indicated.

More research is needed on the PID-5-BF, especially within the South African population and culture, but our findings suggest it to be a promising assessment tool that could greatly benefit clinicians in the mental health sector.
PREFACE

• This mini-dissertation forms part of the requirements for the completion of the degree Master of Arts in Clinical Psychology at the Potchefstroom Campus of the North-West University. It has been prepared in article format (manuscript to possibly be submitted for publication) with three chapters and complies with the requirements identified by the North-West University in rule: A.4.4.2.9.

• Chapter 1 includes an in-depth literature overview that aims to present the reader with background information and the defining concepts that are relevant to this study. Chapter 2 presents the manuscript that will be submitted to the South African Journal of Psychology for possible publication. The manuscript itself will include a short introduction, the aims of the study and the methodology followed, as well as the findings of the study and a discussion and conclusion on these. Finally, Chapter 3 presents a critical reflection by the researcher on the research process.

• The manuscript in Chapter 2 has been compiled in accordance with the requirements set out by the South African Journal of Psychology, with the goal of possibly submitting it for publication.

• The manuscript and the reference list have been styled according to the specifications of the APA (American Psychological Association, 6th edition) publication guidelines for the purpose of examination. Where journal specifications differ from the APA publication guidelines, the appropriate amendments will be made before submission for publication.

• For the purpose of examination, the pages will be numbered chronologically from the table of content page, ending with the addendum.

• A language practitioner conducted the language editing of this mini-dissertation.

• Data collection for the study (surveys) was conducted in the English language.
• Consent for the submission of this mini-dissertation for examination purposes (in fulfilment of the requirements for the Master of Arts Degree in Clinical Psychology) has been provided by the research supervisor, Dr Ruan Spies.

• Lastly, this mini-dissertation was submitted to Turn-it-in, which established that its content falls within the norms of acceptability regarding plagiarism.
GUIDELINES FOR AUTHORS

Description

This article is presented in the SAGE house style which complies with the requirements of the South African Journal of Psychology. The article will be submitted for possible publication in the South African Journal of Psychology. The South African Journal of Psychology is owned by SAGE Publications which publishes a variety of Southern African and African journal titles. The journal publishes contributions from all fields of psychology in English. Empirical research is emphasised; however, the journal accepts theoretical and methodological papers, review articles, short communications, book reviews and letters commenting on articles published in the journal. Articles relevant to Africa which address psychological issues of social change and development are prioritised.

Instructions for authors

General

In general, the manuscript must be written in a high grammatical standard in English. It must follow the specific technical guidelines that are stipulated in the submission guidelines. The American Psychological Association (APA) 6th edition is followed in the preparation of the manuscript. The research within the manuscript should comply with the accepted standards of ethical practice, presented by the Committee on Publication Ethics (COPE). The journal endeavours to publish accurate, transparent and ethically sound research.

Manuscript style

The South African Journal of Psychology follows the SAGE house style guidelines stipulated in the SAGE UK House Style guidelines. The following format is required for research-based manuscripts:

- The introductory/literature review section requires no heading.
• The following headings/subheadings are necessary:

  o Method (Participants; Instruments; Procedure; Ethical considerations; Data analysis (which includes the statistical techniques or computerised analytic programmes, if applicable); Results; Discussion; Conclusion; References.

• Within the ‘Ethical considerations’ section, the name of the institution which granted ethical approval of the study must be stipulated.

  **Format.** Only electronic files which adhere to the stipulated guidelines are accepted. The format of the manuscript may either be Microsoft Word or LaTeX files. All manuscripts must be double spaced throughout and with a minimum of 3cm for left and right-hand margins as well as 5cm at the head and foot. The text should be a standard 12 points.

  **Keywords and abstracts.** An abstract of no more than 250 words should be included and should aid readers in finding the article online. Up to six alphabetised keywords should be included in the abstract and always highlighted. Key descriptive phrases should be repeated and focused on in the abstract. Thus, the abstract must be written in such a way that it conveys the necessary information/data which assists search engines in finding the article and ranking it on the search results page.

  **Artwork, figures and other graphics.** Illustrations, pictures and graphs, should be provided in the highest quality and in electronic format. Further guidelines include:

  • Format: TIFF, JPEG: Common format for pictures (containing no text or graphs).

  • EPS is the preferred format for graphs and line art as it retains quality when enlarging/zooming in.

  • Placement: Figures/charts and tables created in MS Word should be included in the main text rather than at the end of the document.
• Figures and other files created outside Word (i.e. Excel, PowerPoint, JPG, TIFF, EPS, and PDF) should be submitted separately.

• Resolution: Rasterized based files (i.e. with .tiff or .jpeg extension) require a resolution of at least 300 dpi (dots per inch). Line art should be supplied with a minimum resolution of 800 dpi.

• Colour: Images supplied in colour will be published in colour online and black and white in print.

• Dimension: The artworks supplied must not exceed the dimensions of the journal. Images cannot be scaled up after origination.

• Fonts: The lettering used in the artwork should not vary too much in size and type (usually sans serif font as a default).

**Reference style.** The journal adheres to the APA referencing style. Specific guidelines are provided, and it is the authors’ responsibility to produce an accurate reference list. The references are listed alphabetically at the end of the article while in-text references are referred to by name and year in parentheses. The references are structured as follows:

• Last name and initials of all authors

• The year the reference item was published (in brackets)

• The title of the article

• The name of the publication

• The volume number

• An issue number (if provided)

• The inclusive pages

• Digital object identifier (DOI)
The Publication Manual of the American Psychological Association, 6th Edition can be consulted for accurate formatting of reference. The style and punctuation of the references should conform to the APA style. Illustrated below are examples of different styles:

- **Journal Article**


- **Book**


**English language editing services.** The language used in the manuscript has to be accurate and of adequate quality to be understood by the editors and reviewers during the assessment of the manuscript. The author should consider having a colleague (whose home language is English), review the manuscript for clarity. Submit the manuscript for professional editing. Consider utilising the SAGE Language Service, which can format the manuscript to the specifications of the journal.
CHAPTER 1

LITERATURE REVIEW

Introduction

Practitioners, within the psychological field, all use some form of assessment or test at some point to either help make a diagnosis, to confirm a diagnosis or to determine therapeutic process and progress. These assessments need to be of high quality and standardised within a South African context in order to yield results that are both valid and reliable (Foxcroft, Paterson, Le Roux & Herbst, 2004; Foxcroft & Roodt, 2009). In South Africa, the body responsible for classifying, registering, reviewing and standardising psychometric tests, questionnaires and other measures, is the Professional Board for Psychology of the Health Professions Council of South Africa (HPCSA). Their role is to ensure that measures are valid and reliable within a South African context that is to be culturally sensitive and appropriate to South African languages and norms – taking into account the Constitution of the RSA; Health Professions Act and other relevant regulations and legislation (Foxcroft et al., 2004).

In 2004, Foxcroft and colleagues conducted a survey to determine the need of psychometric tests in South Africa. They used a large sample of psychological practitioners to gather data through postal surveys, focus group meetings and individual interviews. Their results yielded an expressed urgency for tests to diagnose certain personality disorders and pathology. They (psychology practitioners) expressed a further need for measures to distinguish between different types of personality pathologies. This survey also indicated a shared concern amongst the test users about the cost of tests, claiming it to be too expensive. Finally, a need for shorter tests or scales were expressed, as assessment often has to be done within a short amount of time (Foxcroft et al., 2004).

Kumar (2007) reviewed studies on the burnout of psychiatrists, and concluded, that among other factors, high work demands and work overload with limited or inadequate resources are great
contributors to stress within the psychological profession. Furthermore, he stated that it would appear as if workload increases globally, as we are experiencing an increase in population, there now exists a more progressive inclination toward community-based treatment, and an increase in standards of practice (Kumar, 2007).

These studies are somewhat outdated, lacking in a body of research on this topic in more modern times. However, taking into account the seemingly ‘rushed’ manner in which modern day life is approached, and the deceleration in the rate of South Africa’s economic growth (Statistics South Africa, 2016), it can surely be assumed that both Foxcroft and colleagues and Kumar’s findings are still valid. For example, the Department of Health (2012), requires assessment of involuntary health care users within psychiatric hospitals or wards, to be done within 72-hours of admission. This is a short amount of time to assess an overcrowded hospital with inadequate measures, and with scales that take a vast amount of time to administer. Regarding statistics, South Africa bears a population of approximately 54 million people (Statistics South Africa, 2015). The registered number of psychologists in South Africa is 11 875 (HPCSA, 2016), clearly suggesting an imbalance between available resources and demand.

Current tests used to assess personality pathology and disorders are the Eysenck Personality Inventory/Profiler; Minnesota Multiphasic Personality Inventory - 2 (MMPI-2); Milon Clinical Multiaxial Inventory (MCMI-3); Mini International Neuropsychiatric Interview (MINI); NEO Personality Inventory Revised (NEO-PI-R); NEO Five Factor Inventory (NEO-FFI-3); and The Sixteen Personality Factor Questionnaire (16PF), which are all extensive in length and takes a long time to complete. These tests are also quite expensive to purchase and administer. This is why a short form of assessment, such as the Personality Inventroy for DSM-5 Brief Form (PID-5-BF) could greatly benefit a country such as South Africa’s mental health sector, in providing a measure that is not only cost-free, but quick to administer and in line with current views of personality pathology as described by the DSM-5 (APA, 2013), yet needs to be validated and standardised first.
Though research shows validity for the PID-5 and PID-5-BF (as demonstrated above), this has not yet been done within a South African context.

**Personality and Personality Development**

Personality, within the field of psychology, is a central and indispensable concept. In order to understand and help a client, we need to also understand their personality and how it contributes to their clinical presentations and general functioning. Personality may be described as relatively stable and enduring patterns, or styles, of an individual’s way of thinking, feeling and acting that differentiates that individual from another (APA, 2016; Briley & Tucker-Drob, 2014; Kandler 2012). Characteristics or traits, influenced by the individual’s life experiences, his/her environment (i.e. life situations and surroundings) and genetics (APA, 2016; Bleidorn, Kandler & Caspi, 2014; Briley & Tucker-Drob, 2014; Neyer & Asendorpf, 2001; Roberts, Caspi & Moffitt, 2003), such as nervousness, optimism, flexibility or carefulness, are commonly used by an individual to describe him/herself or another individual known to them, as well as guide their behaviour in meaningfully consistent ways (Costa, McCrae & Kay, 1995; Roberts & Davis, 2016; Schofield et al., 2012). Personality traits are furthermore internalised and generalised tendencies reflected in most aspects of an individual’s life (Costa et al., 1995; Roberts & Davis, 2016). Research has indicated evidence that most personality traits may be understood under the Five-Factor Model (FFM) of personality, comprised of five basic dimensions, namely extraversion, neuroticism, openness, conscientiousness and agreeableness (Caspi, Roberts & Shiner, 2005; Digman, 1990; Hopwood et al., 2011; Kandler, Zimmermann & McAdams, 2014; Roberts & DelVecchio, 2000; Roberts, Walton & Viechtbauer, 2006; Soto & John, 2014; Soto, John, Gosling & Potter, 2008; Tackett, Krueger, Iacono & McGue, 2008; Tackett et al., 2012; Terracciano, Costa & McCrae, 2006).

Studies focusing on the development and stability of personality have generally found the key period for personality change to be during late adolescence and early adulthood (Jackson, Hill, Payne, Roberts & Stine-Morrow, 2012; Josefsson et al., 2013; Kanacri et al., 2013; Roberts & Davis, 2016; Roberts & DelVecchio, 2000; Roberts & Mroczek, 2008; Roberts et al., 2006),
although it has further been found to be a lifelong process during which most traits continue to stabilise moderately through late adulthood (Caspi et al., 2005; Fraley & Roberts, 2005; Ganiban, Saudino, Ulbricht, Neiderhiser & Reiss, 2008; Hutteman, Hennecke, Orth, Reitz & Specht, 2014; Kandler, 2012; Klimstra, Hale, Raaijmakers, Branje & Meeus, 2009; Roberts & Davis, 2016; Roberts & DelVecchio, 2000; Roberts et al., 2006). This is also referred to as the plasticity principle (Jackson et al., 2012; Roberts & Davis, 2016).

In contrast to personality change during childhood, adolescence or middle to late adulthood, change during young adulthood is more dramatic and positively inclined (Roberts et al., 2006). These changes include a general incline in emotional stability, agreeableness, extraversion and conscientiousness, with a decrease in neuroticism (Donnellan & Lucas, 2008; Johnson, Hicks, McGue & Iacono, 2007; Josefsson et al., 2013; Klimstra et al., 2009; Ludtke, Roberts, Trautwein & Nagy, 2011; Roberts & Davis, 2016; Roberts et al., 2006; Robins, Fraley, Roberts & Trzesniewski, 2001; Soto, John & Gosling, 2011; Specht, Egloff & Schmukle, 2011; Van den Akker, Deković, Asscher & Prinzie, 2014; Vecchione, Alessandri, Barbaranelli & Caprara, 2012). Increases in levels of openness to experience have also been found, which is paramount in the identity exploration process (Ozer & Benet-Martinez, 2006; Van den Akker et al., 2014). Robins, Fraley, Roberts and Trzesniewski (2001) used the FFM traits in a sample of university students (assessed at the beginning of university and 4 years later, at the end of university), and found mean-level increases in conscientiousness and agreeableness, and a decline in neuroticism. In a study done by Roberts, Caspi and Moffitt (2003), change and stability of Multidimensional Personality Questionnaire (MPQ) personality traits were investigated (at age 18 and again at age 26). Results, at a primary-scale level, showed a decline in aggression and alienation; and a moderate increase in achievement, control and social potency. On the higher-order level, negative emotionality was found to have declined, and constraint and positive emotionality was found to have increased (Roberts et al., 2003). This is supported by findings of other studies showing declines in negative emotionality and increases in constraint (Blonigen, Carlson, Hicks, Krueger & Iacono, 2008). Further, more recent
studies have shown that the traits conscientiousness, agreeableness and openness decline during the period of transition from late childhood to early adolescence, while a rapid incline was found in these traits during late adolescence to early adulthood, which from there showed a gradual incline through to middle adulthood (Denissen, Van Aken, Penke & Wood, 2014; Kandler, 2012; Soto & Tackett, 2015; Soto et al, 2011; Van den Akker et al., 2014).

Research has also focused on the reason for personality change. Studies, including behavioural-genetic, longitudinal and cross-cultural research, stipulate it as being a process comprised of both biological factors, as in trait heritability, and environmental factors, such as learnt behaviours through observation and adapting to new social roles (Blonigen et al., 2008; Casey, Galvan & Hare, 2005; Clark, Kochanska & Ready, 2000; Collins, Maccoby, Steinberg, Hetherington & Bornstein, 2000; Costa & McCrae, 2006; De Fruyt et al., 2006; Galvan et al., 2006; Giedd et al., 1999; Hare et al., 2008; Hopwood et al., 2011; McCrae et al, 2000; Prinzie, Stams, Deković, Reijntjes & Belsky, 2009; Schofield et al., 2012; Shiner & Caspi, 2003; Somerville, Jones & Casey, 2010).

Although genetic or biological influences on personality cannot be discarded, research on longitudinal behavioural genetics has indicated that when genetic effects are controlled for, environmental effects greatly influence personality change and stabilisation (Bleidorn et al., 2014; Bleidorn, Kandler, Riemann, Angleitner & Spinath, 2009; Bleidorn et al., 2010; Briley & Tucker-Drob, 2014; Hopwood et al., 2011; Kandler et al., 2010). One approach supporting personality growth as means to maturation, is social investment theory (Roberts, Wood, & Smith, 2005). Social investment theory proposes that personality changes during early adulthood are stimulated by age-appropriate life transitions. In 1950, Erikson (as cited in Hutteman et al., 2014), already proposed that personality development occurs as the result of certain challenges and crises one must overcome during one’s lifetime. Social investment theory may be seen as a derivation of Erikson’s theory, in which social role investment is described as commitment to and investment in adult social roles, i.e. overcoming life’s challenges and crises. These life transitions, mostly affiliated with
family, work and community domains (Lodi-Smith & Roberts, 2007; Roberts, Wood & Smith, 2005), such as starting a career or a serious relationship, drive individuals to commit to, but also invest in adult social roles. These social roles present the individual with new behavioural expectancies that may be formulated in terms of traits (such as behaving in a more agreeable, conscientious and emotionally stable manner); moral reasoning; and identity formation (Bleidorn, 2012; Bleidorn et al., 2013; Helson, Kwan, John & Jones, 2002; Hill & Roberts, 2010; Lenhart, Neyer & Eccles, 2010; Lodi-Smith & Roberts, 2007; Roberts et al., 2005). It is then postulated that these transitional experiences provide the individual with a reward structure supporting personality maturation, also known as the maturity principle (Arnett, 2000; Blonigen et al., 2008; Caspi et al., 2005; Hogan & Roberts, 2004; Hutteman et al., 2014; Josefsson et al., 2013; Reitz, Zimmermann, Hutteman, Specht & Neyer, 2014; Roberts & DelVecchio, 2000; Roberts & Jackson, 2008; Roberts & Mroczek, 2008; Roberts et al., 2005; Swann, 1987).

Support for the assumptions made by the social investment theory has been established through cross-sectional and longitudinal studies (Bleidorn et al., 2013; Helson et al., 2002; Lenhart et al., 2010; Lodi-Smith & Roberts, 2007; Roberts et al., 2005). In a study done by Bleidorn (2012), the process of personality maturation was investigated in a sample of German students during their transition into early adulthood, i.e. graduating from school and entering university. Most probably preceding the aforementioned life transitions, is the transition an individual has to make through graduating from school (Bleidorn, 2012). Of course, an individual’s school career also serves as an arena for growth and maturation, as there is an expectation for the individual student to take responsibility and commit to the role of school student. These expectations continue to increase throughout the school career and culminate during final exams. The progressive goal of graduating successfully should then create a reward structure promoting personality trait changes towards psychosocial maturation (Bleidorn, 2012). In order to graduate successfully, a student has to be task and goal oriented, organised, needs to follow prescribed norms, be able to delay immediate gratification, and use effortful strategies, all of which are most likely to affect the trait of
conscientiousness regarding personality change and maturation (Bleidorn, 2012; Corker, Oswald & Donnellan, 2012; Jackson et al., 2010). Essentially, these changes will be internalised and the student may generalise it to other demands and domains apart from school (Bleidorn, 2012). The study done by Bleidorn (2012), indicated not only an increase in conscientiousness during the transition from graduating school to becoming a young adult, but also indicated an increase in openness. This has also been found in previous studies focused on personality development during early adulthood (Klimstra et al., 2009; Roberts, Walton, Bogg & Caspi, 2006b). The study furthermore indicated increases in extraversion and decreases in neuroticism (Bleidorn, 2012).

Following the completion of school and university, individuals are faced with the task of starting a career and family. Research has indicated that continuous investment into the individual’s work and career domain, as well as positive work experiences, leads to personality change characterised by increased conscientiousness, extraversion, emotional stability and lowered aggressiveness (Bleidorn, 2012; Denissen, Asendorpf & van Aken, 2008; Roberts et al., 2003; Scollon & Diener, 2006; Specht et al., 2011; Sutin, Costa, Miech & Eaton, 2009; Wille & De Fruyt, 2014). Serious relationships, such as familial and romantic, commonly carry the expectation of more adaptable and stable emotion-regulation, and entering these roles have been found to lead to increased conscientiousness, emotional stability and extraversion, as well as decreased neuroticism (Lehnart et al., 2010; Neyer & Asendorpf, 2001; Neyer & Lehnart, 2007; Noftle & Shaver, 2006; Scollon & Diener, 2006; Srivastava, John, Gosling & Potter, 2003; Terracciano, McCrae, Brant & Costa, 2005). High quality peer relationships have also been found to heighten extraversion, agreeableness and emotional stability (Neyer & Lehnart, 2007; Parker, Lüdtke, Trautwein & Roberts, 2012; Tackett, Kushner, Herzhoff, Smack & Reardon, 2014). To further support the propositions made by the social investment theory, research has also shown that people who participate in more antisocial activities, or people who are de-invested in their social roles, tend to show personality development that is in contradiction to normative findings. This includes for
example, a decrease in conscientiousness and emotional stability (Littlefield, Sher & Steinley, 2010; Roberts & Bogg, 2004; Roberts et al., 2006b).

Another perspective on personality and its development entails looking at the various goals individuals set out to achieve, and how their self-regulatory efforts at achieving their goals, which ultimately leads to habit formation, might induce trait change (Bleidorn et al., 2010; Hennecke, Bleidorn, Denissen & Wood, 2014; Roberts, O’Donnell & Robins, 2004; Shiner, Masten & Tellegen, 2002). Self-regulation may be conceptualised as a modification of thoughts, feelings and behaviour according to an individual’s goals or standards (Baumeister & Heatherton, 1996). The need or want to change traits, from a self-regulatory perspective, may be intrinsically or externally imposed, either as means to achieve a goal, or as means to change a trait itself (Bleidorn et al., 2010; Hennecke et al., 2014; Roberts et al., 2004; Shiner et al., 2002). Once the decision to change has been made, the individual needs to self-regulate, which includes being able to identify goal-relevant situations, invest the necessary self-control to replace and change unwanted or unhelpful behaviours, monitor progress, and adjust the degree of effort invested into the process of change (Bleidorn et al, 2010; Hennecke et al., 2014; Roberts et al., 2004; Shiner et al., 2002). In order for this process to result in sustainable personality or trait change, the individual needs to consider alternative trait-related behaviours which will serve as instrumental in achieving the goal or are viewed as desirable behaviours in and of themselves. The individual further must consider performing these new/alternative trait-related behaviours, and the individual needs to enact, or practice, the new trait-related behaviours frequently in order to transform the self-regulated changes into fixed patterns or habits (Bleidorn et al., 2010; Hennecke et al., 2014; Roberts et al., 2004; Shiner et al., 2002). According to the goal perspective, it could therefore be argued that personality changes, such as reported increases in agreeableness, social dominance, conscientiousness and emotional stability, may be as consequence of individual goal pursuit (Bleidorn et al, 2010; Hennecke et al., 2014; Roberts et al., 2004; Roberts et al., 2006; Shiner et al., 2002).
Although not many studies have focused specifically on gender-related changes, gender-based social experiences as well as biological differences could have an impact on personality development (Bleidorn et al., 2014; Kanacri et al., 2013; Srivastava et al., 2003). The results of the meta-analysis done by Roberts and colleagues (2006), showed no significant difference between genders, although Yet, Ludtke, Roberts, Trautwein, and Nagy (2011), having used a sample of university students, found that women tend to show higher increase in agreeableness, and a lesser decrease in neuroticism in comparison to men. Blonigen and colleagues (2008), found that negative emotionality decreased more significantly for males than for females. The study done by Vecchione, Alessandri, Barbaranelli, and Caprara (2012) focused on gender-specific differences in personality development using a sample ranging between the ages of 16-20 years. They examined the form of trajectory and mean-level change of the big five personality factors separately for gender. Results indicated a linear increase for openness and conscientiousness with no significant difference between males and females (Vecchione et al., 2012). Trajectories of extraversion showed a marked stability for both genders. As with previous research, a difference was found for agreeableness and emotional stability. Regarding agreeableness, an increasing trajectory was only found in the male group. A quadratic trend was found among women, as mean-level change initially showed an increase and then a decline over time (Vecchione et al., 2012). Emotional stability showed to slightly increase in men, but remain stable in women (Vecchione et al., 2012). These differences could therefore also be viewed as the effect of conforming to gender-based social expectations, as proposed by the maturity principle (Arnett, 2000; Blonigen et al., 2008; Caspi et al., 2005; Hogan & Roberts, 2004; Hutteman et al., 2014; Kanacri et al., 2013; Reitz et al., 2014; Roberts & DelVecchio, 2000; Roberts & Jackson, 2008; Roberts & Mroczek, 2008; Roberts et al., 2005; Swann, 1987).

**Personality disorder and the DSM-5**

As with understanding personality and its development, it is imperative to understand the manner in which personality can become disordered. This is important for both adequate assessment
and intervention (Krueger et al., 2011; Krueger, Hopwood, Wright & Markon, 2014). Personality disorders may be described as enduring, pervasive, inflexible and stable patterns of thinking, feeling and behaving in ways different to that of the norm, which causes distress and impacts negatively on, or impairs two or more domains of functioning, usually occupational and interpersonal, sometimes to a debilitating degree (APA, 2013; Clarkin, Meehan & Lenzenweger, 2015; Stewart, Lips, Lakaski & Upshall, 2002). Research has also indicated that personality disorders may be understood as extreme or maladaptive variants of the big five personality traits (Samuel & Widiger, 2008; Widiger & Trull, 2007).

Studies focusing on the prevalence of personality disorders have indicated that approximately one-tenth of the general population and one-third of the clinical population have personality disorders (Clarkin et al., 2015; Schoeneleber & Berenbaum, 2011; Stewart et al., 2002; Trull, Jahng, Tomko, Wood & Sher, 2010). It has also been indicated that majority of hospitalised patients are between the ages of 15-44 years (Stewart et al., 2002), in line with age of onset. Although age of onset for personality disorders are generally between adolescence and early adulthood, some personality disorders only manifests at a later age. For example, narcissistic personality disorder has been found to manifest during mid-adulthood, associated with career or personal losses or limitations, affecting their status (Clarkin et al., 2015). Commonly found with personality disorders, is comorbid alcohol and drug use, anxiety disorders, mood disorders, eating disorders and suicidal behaviours. It has also been indicated that almost half of the prison population presents with antisocial personality disorder, as substance use and violence predisposes individuals to commit crimes (Stewart et al., 2002). Additionally, gender seems to impact on the prevalence of personality disorders, as for example, antisocial personality disorder is found more commonly among men, whereas borderline personality presents more commonly among women (Clarkin et al., 2015; Stewart et al., 2002).

One of the problems when considering assessment of personality disorders, is that merely partial models exist to identify these disorders, which currently needs greater theoretical
understanding and empirical evidence. Conceptualising personality disorders need to include analysis of biological and behavioural traits, emergent processes, such as mental representations, and the individual’s interpersonal environment. Furthermore, models need to include and articulate the dynamic interdependent interactions between the analyses of these different dimensions (Clarkin et al., 2015; Gabbard, 2005; Leichsenring, Leibing, Kruse, New & Leweke, 2011; Skodol et al., 2002; Stewart et al., 2002; Torgersen et al., 2008; Wagner, Baskaya, Dahmen, Lieb & Tadić, 2010).

Over the past decade, research has yielded support for the significant role that biological processes have on the development of not only personality, but also personality pathology (Bechara, Damasio & Damasio, 2000; Casey, Getz & Galvan, 2008; Clarkin et al., 2015; Dahl, 2004; Eshel, Nelson, Blair, Pine & Ernst, 2007; Kuhn, 2006; McCrae et al., 2002; Miller & Cohen, 2001; Pharo, Sim, Graham, Gross & Hayne, 2011; Romer, 2010; Stewart et al., 2002; Zuckerman & Kuhlman, 2000). Indeed biology and genetic factors influence brain development and functioning, but it also creates the blueprint for an individual’s personality structure. This personality structure serves as basis for how an individual will accept and respond to their environmental and social experiences, which in turn forms set patterns of thinking, feeling and behaving (Stewart et al., 2002). Research has indicated that certain impairments or malfunctions in brain circuits and structures may increase an individual’s liability to develop pathological or unhealthy patterns of thinking, feeling and behaving underlying personality disorders (Clarkin et al., 2015; Stewart et al., 2002). Of great significance, is the limbic system and prefrontal cortex which is paramount to emotional and executive functioning, responsible for decision making, emotion regulation, risk assessment and exerting inhibition in contexts of stress or excitement (Bechara et al., 2000; Cardinal, Parkinson, Hall & Everitt, 2002; Casey et al., 2008; Delgado, 2007; Kuhn, 2006; LeDoux, 2000; McCrae et al., 2002; Miller & Cohen, 2001; Ochsner & Gross, 2005; Romer, 2010; Schultz, Dayan & Montague, 1997), which if impaired, will likely lead to dysfunction in these domains.
Pharo and colleagues (2011), examined the relationship between neuropsychological tests for executive functioning, personality traits and risk-taking behaviour in a sample of adolescents and young adults, ranging from ages 13-22 years. Risk taking behaviour may be seen as a pathological personality trait as well as a predisposition to developing certain personality disorders. Cross-sectional research (Lenzenweger & Willet, 2007; Wright, Pincus & Lenzenweger, 2010), supports the concept that personality traits are associated with personality disorder trajectories. Other research, for example done by Warner and colleagues (2005), suggests that personality traits, for example said risk taking behaviour, could also be seen as predictive of future personality disorder symptoms. In line with previous studies, Pharo and colleagues’ (2011), research indicated that traits of sociability, aggression, impulsivity and sensation-seeking correlated with heightened levels of risky behaviour (Arnett, 1992; Eysenck, 1990; Harden & Tucker-Drop, 2011; Stanford, Greve, Boudreaux, Mathias & Brumbelow, 1996; Zuckerman & Kuhlman, 2000; Zuckerman, Kuhlman, Joireman, Teta & Kraft, 1993). Their study furthermore indicated that participants with lower scores on the neuropsychological tests were more involved in risky behaviours, supporting literature on the link between neurological development and risk-taking behaviour (Casey et al., 2008; Dahl, 2004; Eshel et al., 2007; Giedd et al., 1999; Harden & Tucker-Drop, 2011; Pharo et al., 2011; Romer, 2010; Somerville et al., 2010; Sowell, Thompson, Holmes, Jernigan & Toga, 1999; Steinberg, 2008, 2010).

One approach to understanding these results, is the dual systems model (Casey et al., 2008; Harden & Tucker-Drop, 2011; Steinberg, 2008, 2010; Somerville et al., 2010). This model proposes that an imbalance between or impairment of an adolescent’s neurological systems (emotional and cognitive systems), for example an underdeveloped prefrontal cortex or an impaired or immature neural system of integration, may be the cause for risky behaviour. These neurological systems are responsible for a person’s responsiveness to emotion, reward and novelty (Cardinal et al., 2002; Delgado, 2007; LeDoux, 2000; Schultz et al., 1997), as well as the regulation of impulses, emotions and making decisions (Bechara et al., 2000; Casey et al., 2008; Kuhn, 2006; Miller & Cohen, 2001;
Ochsner & Gross, 2005; Romer, 2010). The dual systems model posits that these neurobiological systems vary in the amount of time it takes to develop, resulting in maturity reached at different ages (Harden & Tucker-Drop, 2011; Somerville et al., 2010). The emotional system becomes more sensitive during adolescence, in accordance with changes in puberty (Galvan et al., 2006; Hare et al., 2008), whereas the cognitive system seems to mature during early adulthood (Casey et al., 2005; Giedd et al., 1999). This indicates a heightened response to rewards and emotions while still exhibiting immature inhibition and impulse control, which then gradually stabilises during early adulthood (Harden & Tucker-Drop, 2011; Steinberg et al., 2008). A study done by Harden and Tucker-Drob (2011), examined data focusing on impulsivity and sensation seeking, gathered from the National Longitudinal Study of Youth, Children and Young Adults (CNLSY). This study included over 7000 participants within the age range of 12 to 24 years. In accordance with previous studies done, impulsivity was found to decline linearly from the age of 12 to 24 years, while sensation seeking showed an initial increase from the age of 12 to 16 years (Galvan, Hare, Voss, Glover & Casey, 2007; Harden & Tucker-Drop, 2011; Leshem & Glicksohn, 2007; Steinberg et al., 2008). Sensation seeking was further found to gradually decline towards early adulthood (Harden & Tucker-Drop, 2011). These results corresponded with research indicating the maturation of neurobiological systems at different ages (Casey et al., 2005; Galvan et al., 2006; Giedd et al., 1999; Hare et al., 2008; Somerville et al., 2010).

Although biological processes are significant for the understanding of personality disorders and how they develop, the influence of psychological and social factors cannot be discarded as it increases an individual’s vulnerability to develop personality pathology (Christensen & Kessing, 2006; Clarkin et al., 2015; Gabbard, 2005; Hopwood, Wright, Ansell & Pincus, 2013; Kotov, Gamez, Schmidt & Watson, 2010; Lahey, 2009; Leichsenring et al., 2011; Skodol et al., 2002; Stewart et al., 2002; Torgersen et al., 2008; Wagner et al., 2010).

One key concept is emotion regulation (APA, 2013; Gratz, Rosenthal, Tull, Lejeuz & Gunderson, 2006; Schoeneleber & Berenbaum, 2011). Emotion regulation may be described as
conscious or unconscious attempts exerted by an individual to try and control the effect and
duration of emotions when they arise. This further includes an attempt to influence the behavioural
expression or physiological impact these emotions might have (Schoeneleber & Berenbaum, 2011).
Schoeneleber and Berenbaum (2011), proposed that maladaptive shame-regulation might be central
to personality pathology. Therefore, the assumption is that an inability, or diminished ability, to
effectively regulate emotions in order to avoid or alleviate shame – a subjective experience in which
an individual considers him/herself as defected, elicited in situations highlighting the individual’s
flaws, i.e. negative self-beliefs – is a key factor in both the development and maintenance of some
personality disorders (De Hooge, Breugelmans & Zeelenberg, 2008; Schoeneleber & Bernebaum,
2011; Tangney, Miller, Flicker & Barlow, 1996; Whelton & Greenberg, 2005). Literature on shame
supports the assumption that shame is detrimental to an individual’s functioning. Studies have
repeatedly indicated that shame is associated with various psychological problems, not only
personality pathology, and that shame does not serve any adaptive function (De Hooge et al., 2008;
Thompson & Berenbaum, 2006; Whelton & Greenberg, 2005).

Tying in with shame and negative-self beliefs is the assumptions made by the cognitive-
affective processing systems model (Eaton, South & Krueger, 2009; Mischel & Shoda, 2008). This
model proposes that personality is comprised of distinct internalised cognitive-affective components
existent in a structured network which mediates between an individual’s environmental situation
and behavioural response. These cognitive-affective components are thought to capture individuals’
encoding and interpretations of their situations, their beliefs and perceptions about the world, their
affective tendencies, values, morals and goals, and their self-regulatory competencies (Clarkin et
al., 2015; Eaton et al., 2009; Mischel & Shoda, 2008). When these cognitive-affective components
are rigid and limited in breadth, individuals are more likely to dysregulate emotions and feel
unmoored by new experiences, to which they will therefore most probably respond to in a negative
manner. The cognitive-affective processing systems model does not regard personality pathology as
comprised of extreme dispositional traits, but emphasises the stability or rigidity of the individual’s
behavioural style within which traits are observed (Clarkin et al., 2015; Eaton et al., 2009; Mischel & Shoda, 2008).

In line with research and a growing consensus that self-and-other functioning is also a core concept of personality functioning and disorders (Clarkin et al., 2015; Gunderson & Lyons-Ruth, 2008; Hengartner, Müller, Rodgers, Rössler & Ajdacic-Gross, 2014; Hopwood et al., 2013; Krueger, 2013; Pincus, 2005), Hopwood and colleagues (2013), proposed that personality dysfunction operates within a complex relational matrix and that basic aspects of personality pathology could therefore be viewed in terms of the extremity of problematic behaviours exhibited in interpersonal relations, such as rigidity of interpersonal behaviours and styles, which impairs the ability of the individual to adapt and respond to different relational needs and demands (Clarkin et al., 2015; Hopwood et al., 2013). These include a distrust in others; social detachment and avoidance; interpersonal difficulties, such as instability in relationships and a decreased capacity to form and maintain close relationships; excessive attention seeking; submissiveness and clinging behaviour; an obsession with interpersonal control, conflict or aggression; and a dysfunction in moral reasoning, such as a lack of empathy and dishonesty (APA, 2013; Clarkin et al., 2015). This model however, does not merely conceptualise personality pathology as interpersonal problems of extreme and rigid types. Rather, personality pathology is seen as significantly interacting with interpersonal dispositions within a pathoplastic relationship, therefore taking into account neural systems proposing that personality and interpersonal dysfunction mutually influence each other and shape each other’s manifest expression (Clarkin et al., 2015; Farmer, 2000; Widiger, 2011; Hopwood et al., 2013). Support for a pathoplastic relationship, and presentation of personality disorders, have been indicated in various longitudinal studies where it has been shown that personality disorder symptoms are unstable and plastic (Johnson et al., 2000; Lenzenweger, Johnson & Willett, 2004; Shea et al., 2002; Zanarini, Frankenburg, Hennen & Silk, 2003).

As mentioned before, literature on personality pathology indicates that biological, psychological and social factors influence the development of personality pathology, and that
premorbid personality traits, especially neuroticism, can predispose individuals to be more vulnerable to stress (Christensen & Kessing, 2006; Hopwood et al., 2013; Kotov et al., 2010; Lahey, 2009; Leichsenring et al., 2011; Stewart et al., 2002; Torgersen et al., 2008; Wagner et al., 2010). For example, individuals high in neuroticism are more likely to respond to stressful situations with significant levels of distress and anxiety. In turn, the individual’s response to stress might lead to poor decision-making or elicit negative reactions from others which therefore might increase and reinforce the original distress experienced, creating a cycle of poor and rigid emotional dysregulation.

Research focused on personality development during early adulthood (18-21 years), has also shown how personality traits influence development of pathology. Maturity is described as being comprised of low neuroticism, high conscientiousness and high agreeableness, whereas the inverted profile, i.e. high neuroticism, low conscientiousness and low agreeableness, has been related to personality pathology (Clarkin, Lenzenweger, Yeomans, Levy & Kernberg, 2007; Wright, Pincus & Lenzenweger, 2011). As personality may influence psychopathology, psychopathology may also influence personality. For example, an individual who suffered a severe psychological disorder, such as major depression or psychoses, could experience a change in feeling, thinking and relating to others, which in turn could then cause new personality traits or characteristics to develop (Widiger, 2011). Wright and colleagues (2011) used data from the Longitudinal Study of Personality Disorders, to examine the role that personality disorder plays in basic personality trait development. They found that as personality disorder symptoms declined over time, personality showed more growth toward maturation, and in contrast, that personality growth stagnated or regressed as personality disorder symptoms developed (Wright et al., 2011), once again supporting the plastic nature of pathology (Johnson et al., 2000; Lenzenweger et al., 2004; Shea et al., 2002; Zanarini et al., 2003).

The Diagnostic and Statistical Manual 5th edition (DSM-5) is the first edition to include a more dimensional and empirically-based model entailing maladaptive personality traits (APA,
Dating back to previous versions of the Diagnostic and Statistical Manual of Mental Disorders (DSM), already starting with the DSM-III, experts and clinicians started exploring and discussing alternative approaches to the categorical model of personality disorders in order to deal with aforementioned difficulties in diagnosing personality disorders, such as poor validity of assessments, a lack of clinical utility and high comorbidity between the personality disorders (Clarkin et al., 2015; Eaton, Krueger, South, Simms & Clark, 2011; Few et al., 2013; First & Westen, 2007; Hyman, 2010; Kim & Tyrer, 2010; Krueger et al., 2014; Lenzenweger, Lane, Loranger & Kessler, 2007; Livesley, 1998; Morey et al., 2011; Paris, 2007; Ryder, Bagby & Schuller, 2002; Shedler & Westen, 2004; Trull & Durrett, 2005; Verheul, 2005; Walters & Ruscio, 2013; Westen & ArkowitzWesten, 1998; Widiger & Samuel, 2005; Widiger & Trull, 2007; Widiger, Simonsen, Krueger, Livesley & Verheul, 2005). Probably the most significant problem with the DSM-IV categorical model for personality disorder diagnosis (APA, 2000), is that personality pathology was organised in the form of ten disorders, conceptualised as separate dichotomous categories that are discontinuous with normal or general personality variation (Bernstein, Iscan & Maser, 2007; Krueger & Markon, 2014; Livesley, 2012), in contrast to research indicating the opposite. Existing data on personality disorders and related psychopathology, seems to fit better with models suggesting continuous variation (Conway, Hammen & Brennan, 2012; Hallquist & Wright, 2014; Stepp et al., 2012; Suzuki, Samuel, Pahlen & Krueger, 2015). Studies have furthermore consistently indicated validity for the Five-Factor Model’s (FFM) general personality traits and its relationship to DSM-IV personality disorders, and has therefore increasingly been considered in the formulation of alternative models with the view that personality disorders could be considered maladaptive variants of these general personality traits (APA, 2013; Bach, Markon, Simonsen & Krueger, 2015; Clarkin et al., 2015; Few et al., 2013; Gore & Widiger, 2013; Markon, Krueger & Watson, 2005; Samuel & Widiger, 2008; Sellbom, Smid, De Saeger, Smit & Kamphuis, 2014; Thomas et al., 2013; Widiger & Costa, 1994; Widiger & Simonsen, 2005; Widiger et al., 2005; Wright et al., 2012; Zimmermann et al., 2015). Another problem entails that
these disorders were polythetic in nature, deeming a diagnosis possible on any variation of criteria (symptoms). For example, if a disorder is conceptualised in terms of eight different criteria, only four of those are necessary to make a diagnosis (Krueger et al., 2014). The problem is that persons meeting diagnostic criteria for specific personality disorders are heterogeneous, even though specific criteria may not be shared (example of any 4 criteria met) (Krueger et al., 2014). It is important to note individual differences that may exist between two people diagnosed with the same personality disorder.

In response to these limitations, the DSM-5 Personality and Personality Disorder work group was formally tasked to develop an alternative, more valid and clinically applicable approach for diagnosing and conceptualising personality disorders and proposed a model differing radically from previous models. The process for development of DSM-5 began in December 2004, with a sense of openness to new ideas pertaining classification, and the DSM leadership worked towards developing dimensional assessment tools for the DSM-5 (Krueger et al., 2014). Subsequently, in 2007, the formal appointment of the DSM-5 Personality and Personality Disorder work group occurred (Krueger & Markon, 2014), and they delivered first draft revisions for the hybrid model in February 2010, which they made open for professional and public comment (Bornstein, 2011).

Initially, they proposed retaining five personality disorders, namely antisocial, borderline, schizotypal, avoidant and obsessive-compulsive, however modified. Patients would then be assessed on six broad trait domains, which include negative emotionality, antagonism, introversion, schizotypy, disinhibition and compulsivity, with 4-point ratings pertaining to a trait’s degree of presence. Patients who may be diagnosed with a personality disorder would then also be assessed on a 5-point rating scale reflecting self and interpersonal functioning, i.e. impairment (Bornstein, 2011).

Furthering their research, the work group described 37 maladaptive traits, which appeared to represent all DSM-IV diagnostic personality disorder symptoms, which were sorted into six broader domains. The work group members formulated items for each trait that resulted in 381 items in
total, which were tested in a series of field trials of community and clinical samples (Krueger et al., 2011). This resulted in a reduced set of 25 trait scales delineated in five higher-order domains (Krueger & Eaton, 2010; Krueger et al., 2011; Widiger & Simonsen, 2005; Wright et al., 2012). The domains are organised hierarchically: negative affectivity; detachment; antagonism; disinhibition and psychoticism (Krueger et al., 2011; Wright et al., 2012). In line with research having indicated convergence between the FFM and pathological personality traits, the structure of maladaptive traits as proposed by the hybrid model clearly resembles the structure of normal personality and therefore that personality functioning and traits are represented in various degrees, and not, as the categorical model suggests, either present or absent (APA, 2013; Bach et al., 2015; Morey et al., 2011). Specifically, the DSM-5 trait of negative affectivity seems to be akin to the FFM trait of neuroticism; DSM-5 trait of detachment to low FFM extraversion; antagonism akin to low FFM agreeableness; disinhibition to low conscientiousness; and the DSM-5 trait of psychoticism to the FFM trait openness (Anderson et al., 2013; Few et al., 2013; Gore & Widiger, 2013; Hopwood, Thomas, Markon, Wright & Krueger, 2012; Krueger et al., 2011; Strickland, Drislane, Lucy, Krueger & Patrick, 2013; Thomas et al., 2013; Widiger, 2011; Wright & Simms, 2014; Wright et al., 2012).

The final version of the hybrid model was finalised between 2011 and 2012 and retained six personality disorder types, namely avoidant, schizotypal, borderline, antisocial, narcissistic and obsessive-compulsive, with diagnostic criteria for level of impairment/personality functioning as criteria A and characteristic personality trait patterns as Criteria B (Bender, Morey & Skodol, 2011; Krueger, Derringer, Markon, Watson & Skodol, 2012; Zimmerman et al., 2015).

The rationale behind Criterion A, was that the personality disorder system in the DSM-IV confounded the severity and style of personality disorders. This led to multiple personality disorder diagnoses capturing the core features of general severity surrounding personality dysfunction. This in turn caused diagnostic comorbidity and limited clinical utility of an individual personality disorder diagnosis (Clarkin et al., 2015; Eaton et al., 2011; Few et al., 2013; Hyman, 2010; Kim &
Tyrer, 2010; Krueger et al., 2014; Morey et al., 2011; Walters & Ruscio, 2013). Hence the DSM-5 Section III model of personality dysfunction includes two broad domains, (i) Self: comprised of identity and self-direction, and (ii) Interpersonal: comprised of empathy and intimacy. These domains were operationalised using the LPFS (Levels of Personality Functioning Scale), used to assess personality impairment pertaining to these domains (APA, 2013; Bach et al., 2015; Bender et al., 2011; Few et al., 2013; Morey et al., 2011).

The rationale behind Criterion B rested primarily on existing research that supports the advantages of using dimensional models for personality in both the conceptualisation and assessment of personality disorders (Clarkin et al., 2015; Gore & Widiger, 2013; Krueger & Eaton, 2010; Lowe & Widiger, 2009; Stepp et al., 2012; Suzuki et al., 2015; Trull & Durrett, 2005; Widiger & Trull, 2007; Widiger et al., 2005; Yalch & Hopwood, 2016). Criterion B sets out to capture personality disorder-associated, maladaptive personality traits, and is in essence hierarchically organised and comprised of five broad trait domains including 25 subordinate trait facets operationalised by the Personality Inventory for DSM-5 (PID-5) (Krueger 2013; Krueger et al., 2012; Morey et al., 2011; Suzuki et al., 2015).

Research using the LPFS and PID-5 in both clinical and non-clinical samples have indicated reliability and validity (Bender et al., 2011; Few et al., 2013; Gore & Widiger, 2013; Hopwood et al., 2012; Krueger et al., 2012; Morey & Skodol, 2013; Quilty, Ayearst, Chmielewski, Pollock & Bagby, 2013; Watson, Stasik, Ro & Clark, 2013; Wright et al., 2012; Yalch & Hopwood, 2016) and convergence with the higher order structure of the PID-5 and 5 factor models of personality, such as the NEO Personality Inventory (APA, 2013; Ashton, Lee, De Vries, Hendrickse & Born, 2012; De Fruyt et al., 2013; Few et al., 2013; Gore & Widiger, 2013; Thomas et al., 2013; Yalch & Hopwood, 2016).

Potential benefits for the hybrid model include a likelihood that comorbidity among personality disorders would decrease as personality disorder categories have been reduced and a more trait-specified personality diagnosis can be made. The inclusion of self and interpersonal
functioning ratings, based on elevations in maladaptive traits, could also indicate underlying dynamic processes of personality pathology, as well as an indication of impairment in functioning (Bornstein, 2011; Yalch & Hopwood, 2016). Yam and Simms (2014), for example, set out to evaluate the strength of Section III personality disorder traits in predicting traditional personality disorder criterion; whether non-specified personality disorder traits predict traditional personality disorder criterion; and Section III diagnosis rates within a psychiatric sample. In line with other studies (Few et al., 2013; Hopwood et al., 2012; Morey & Skodol, 2013; Samuel, Hopwood, Krueger, Thomas & Ruggero, 2013), their results indicated that both specified and non-specified personality disorder traits predicted traditional personality disorder criteria, although some specified traits predicted multiple traditional personality disorders.

However, when the DSM-5 was finalised, the Board of Trustees of the American Psychiatric Association decided to mention the alternative model in Section III of the DSM-5, and rather keep to the existing DSM-IVTR categorical model for personality disorders in Section II in order to “preserve continuity with current clinical practice” (p. 761, APA, 2013; Bagby, Sellbom, Costa & Widiger, 2008; Krueger & Markon, 2014; Krueger et al., 2014; Krueger, Skodol, Livesley, Shrut & Huang, 2007), although a comprehensive survey done by Morey and colleagues (2014), suggested that mental health clinicians indeed do find the hybrid model more useful than the categorical and Axis models, in line with research favouring a dimensional approach to personality pathology (Bernstein et al., 2007; Clarkin et al., 2015; Gore & Widiger, 2013; Lowe & Widiger, 2009; Trull & Durrett, 2005; Verheul, 2005; Widiger & Samuel, 2005; Widiger & Trull, 2007; Widiger et al., 2005; Yalch & Hopwood, 2016). Personality disorder, in Section II of the DSM-5, is then defined as an enduring pattern of both inner experiences (thinking and feeling) and behaviour that deviates significantly from individual cultural expectations. This pattern is seen in the way the individual thinks about him/herself and others; his/her emotional responses; his/her way of relating to others; and the individual’s way of controlling his/her own behaviour (APA, 2013). Furthermore, a personality disorder is inflexible and pervasive; has a peak onset in adolescence or early
adulthood; it is generally stable over time; and leads to impairment and distress (APA, 2013). The hybrid model defines personality disorders mainly in the same way, but places more focus on the impairment of personality functioning as well as pathological personality traits (APA, 2013). Thus, included in this new model, are two central components – assessment of self and interpersonal functioning (Criterion A); and the use of pathological personality traits to describe personality disorders (Criterion B), (Miller, Few, Lynam & MacKillop, 2015; Suzuki et al., 2015).

**Personality Inventory for DSM-5**

In the operationalisation of the DSM-5 hybrid model for personality disorders, Krueger and colleagues (2012), developed an instrument (Personality Inventory for DSM-5/PID-5) to make publically available for clinicians, for the measurement of Criterion B, i.e. maladaptive personality traits. They began by identifying a hypothesised set of domains known to cover maladaptive personality variations in existing models and instruments. Members of the Personality and Personality Disorders work group, as well as consultants, generated a preliminary list of 37 facets covering specific personality traits, after which Krueger and colleagues (2012), wrote brief definitions for the individual facets aimed at informing the writing of item content for the facets. The initial construction process of the instrument involved two rounds of data collection. This was aimed at measuring the reliability of each facet, and examining if these facets could be collapsed, or if items should be reassigned among the facets. Data was collected through an on-line panel of respondents who were specifically chosen to optimise generalisability to the United States population (The Knowledge Networks Panel; Dennis, 2010; Krueger et al., 2012). Respondents were selected from the Knowledge Networks Panel if they responded “yes” to the question: “have you ever seen a therapist for psychological or psychiatric counselling or therapy”. Their factor analysis led to a reduction in constructs, narrowing it down to a list of 25 traits delineated under five higher-order domains, which were measured to be reliable (Cronbach’s alpha ranged .72-.96, median = .86), (Krueger et al., 2011). The 25 traits scales were made up of four to 14 items, rendering the PID-5 consisting of a total of 220 items (Fossati, Krueger, Markon, Borroni & Maffei,
Literature surrounding the DSM-5 trait model and PID-5 has grown substantially since its development and numerous studies have indicated its reliability and validity as well as its internal consistency (Al-Dajani, Gralnick & Bagby, 2016; Anderson et al., 2013; Ashton et al., 2012; Bagby, 2013; Furnham, Milner, Akhtar & De Fruyt, 2014; Hopwood & Sellbom, 2013; Hopwood et al., 2013; Krueger et al., 2012; Morey, Benson, Busch & Skodol, 2015; Quilty et al., 2013; Watson et al., 2013; Wright et al., 2012). For example, Few and colleagues (2013), tested the reliability and validity of self-reported pathological traits using the PID-5 as assessment tool, and found good internal consistency for both domains and facets. Their findings indicated a median coefficient alpha of .87, which is similar to previous findings (e.g. Hopwood et al., 2011, Mdn α = .86; Krueger et al., 2012, Mdn α = .86). Wright and colleagues (2015), examined the PID-5’s test-retest reliability in a clinical sample across an average of 1.44 years and indicated high mean-level and rank-order stability of the personality disorder traits. Having used Cohen’s $d$ (Cohen, 1988), their results yielded a median $d$ of -.12, indicative of little to no change. Small changes were found in submissiveness (-.30); withdrawal (-.21); restricted affectivity (-.25); irresponsibility (-.22); risk taking (-.22) and rigid perfectionism (-.20). The study also indicated rank order stability ($r .68$; Wright et al., 2015) which is comparable to stability estimates of other psychopathology self-report measures (e.g. Samuel et al., 2011). Furthermore, results indicated that these traits also significantly predicted psychosocial dysfunction as well as life satisfaction, indicating the DSM-5 traits serving an important prognostic function. This further supports the construct validity of the DSM-5 personality disorder trait model as previously shown to demonstrate great association with patterns of interpersonal dysfunction (Wright et al., 2012).

Research indicates support for the DSM-5 hybrid model in comparison to other evidence-based systems pertaining to personality and pathology, and that it aligns in a theoretically acceptable manner (Austin & Deary, 2000; De Clercq, De Fruyt, Van Leeuwen & Mervielde, 2006; 2013; Griffin & Samuel, 2014; Krueger et al., 2012; Morey, Krueger & Skodol, 2013; Wright et al., 2012).
De Fruyt et al., 2013; Gore & Widiger, 2013; Kendler et al., 2011; Markon, 2010; Nestadt et al., 2008; Piedmont, Sherman, Sherman, Dy-Liacco & Williams, 2009; Thomas et al., 2013; Watson, Clark & Chmielewski, 2008; Widiger, Livesley & Clark, 2009). Miller and colleagues (2015), using a clinical sample, tested the validity of the personality disorder trait count portion as articulated in the DSM-5 Section III through examining the correlation thereof with DSM-IV personality disorders and whether it yielded personality and psychopathology profiles consistent with those that are created by the DSM-IV personality disorder categories. Their research demonstrated substantial convergence between DSM-5 personality disorder trait counts and DSM-IV personality disorder categories (Miller et al., 2015). Their findings also corroborated with Samuel, Hopwood and colleagues’ (2013) findings, who used self-reported data from an undergraduate sample.

Given the overall status of the FFM (Costa & McCrae, 1992), as a widely supported and accepted model describing universal personality, it served as theoretical underpinning of the PID-5’s maladaptive personality traits (Al-Dajani et al., 2016). Within this framework, the general hypothesis is that negative affect would correlate with neuroticism; detachment would correlate negatively with extraversion; antagonism would correlate negatively with agreeableness; and disinhibition would correlate negatively with conscientiousness. Seeing as research has yielded inconsistencies for the correlation between psychoticism and openness, it is not a correlation hypothesised, but one still being explored (Al-Dajani et al., 2016; De Fruyt et al., 2013; Gore & Widiger, 2013; Griffin & Samuel, 2014; Thomas et al., 2013; Wright & Simms, 2014).

Crego and colleagues (2015), set out to examine the discriminant validity of the PID-5. This was done through cross-domain correlations having used three independent samples; correlations between the 25 trait scales; as well as the specificity of the relationships between the 25 trait scales and general personality. Their study involved the use of the NEO-PI-R (Costa & McCrae, 1992); the International Personality Item Pool-NEO (IPIP-NEO; Goldberg et al., 2006), the Inventory of Personal Characteristics (IPC; Almagor, Tellegen & Waller, 1995), the HEXACO Personality Inventory-Revised (HEXACO-PI-R; Lee & Ashton, 2004) and the 5-Dimensional Personality Test
Sample one comprised 445 undergraduate university students who completed the NEO-PI-R, IPC and the 5DPT. Sample two consisted of 330 MTurk participants who completed the HEXACO PI-R, and sample three included 296 MTurk participants who completed the IPIP-NEO. Sample three participants furthermore had a history of having had utilised mental health treatment (Crego, Gore, Rojas & Widiger, 2015). The results indicated high correlations between most of the 25 PID-5 trait scales and their respective general personality domains (Crego et al., 2015).

In line with existent research (e.g. Quilty et al., 2013; Watson et al., 2013), weak correlations were found between the three PID-5 psychoticism subscales and the openness scale of the NEO-PI-R and IPIP-NEO. However, their results indicated convergence between the psychoticism scale with the IPC scale conventionality and the 5DPT scale absorption. Furthermore, relatively low convergent validity was obtained for restricted affectivity with the NEO-PI-R and IPIP-NEO, 5DPT neuroticism and IPC negative emotionality, which instead correlated with the NEO-PI-R and 5DPT scales extraversion and IPC positive emotionality (Crego et al., 2015). The PID-5 scale suspiciousness also showed a relatively weak relation to the NEO-PI-R, IPIP-NEO and 5DPT extraversion, and showed a correlation with NEO-PI-R and IPIP-NEO antagonism, as well as 5DPT insensitivity. These results may suggest for alternative placements for the DSM-5 traits restricted affectivity and suspiciousness (Watson et al., 2013). In addition, a weak correlation between PID-5 risk taking and rigid perfectionism with the NEO-PI-R, IPIP-NEO and HEXACO PI-R conscientiousness, and IPC dependability were found, which were inconsistent with their expectations (Crego et al., 2015). Crego and colleagues’ (2015), results further indicated cross-domain correlations, for which psychoticism yielded the strongest correlation, although negative affectivity showed a substantial correlation with detachment across all samples (.62 – .65). Average cross-domain correlations yielded were .22 for the NEO-PI-R; .28 for the IPIP-NEO; .34 for IPC; .21 for HEXACO PI-R; and .20 for the 5DPT, in comparison to the PID-5 averages .57 for sample one; .42 for sample two; and .47 for sample three (Crego et al., 2015). Discriminant validity was
found to be generally good for some, although not all, of the PID-5 trait scales in their relationship to their respective general personality domains. Strong validity was especially found for emotional liability, submissiveness, separation insecurity, and anxiousness (negative affectivity); manipulativeness and grandiosity (antagonism); withdrawal (detachment); and impulsivity, distractibility and irresponsibility (disinhibition). However, problematic discriminant validity was found for restricted affectivity, hostility, perseveration (neuroticism); suspiciousness, intimate avoidance and depressivity (detachment); deceitfulness (antagonism); risk-taking and rigid perfectionism (disinhibition); and perceptual dysregulation, eccentricity and unusual beliefs/experiences (psychoticism) (Crego et al., 2015).

Griffin and Samuel (2014), administered a joint exploratory factor analysis of the 30 NEO-PI-R trait scales and the 25 PID-5 trait scales having used a sample of 388 undergraduate psychology students. Their results indicated a five-factor structure similar to the FFM, as supported by previous research having indicated the same (Anderson et al., 2013; De Fruyt et al., 2013; Griffin & Samuel, 2014; Krueger et al., 2012; Thomas et al., 2013; Wright et al., 2012). Their results furthermore indicated that the five joint factors obtained represent the same five factors materialised by normal-range personality measures. Their findings also extended to the domain of openness. In line with previous research (De Fruyt et al., 2013; Gore & Widiger, 2013; Thomas et al., 2013), they found NEO-PI-R openness facets (ideas, fantasy and aesthetics) loaded primarily onto the PID-5 psychoticism factor (unusual beliefs/experiences, perceptual dysregulation and eccentricity) (Griffin & Samuel, 2014).

Research has also demonstrated that the self-report PID-5 structure is replicable across both samples and countries (De Fruyt et al., 2013; Fossati et al., 2013; Wright et al., 2012), and that the structure generalises to clinician ratings of their patients (Morey et al., 2013) and is as such more useful to clinicians (Morey et al., 2014). Replicability is important, as it demonstrates preservation of the psychometric properties, even when items and instructions are translated to a language other than that in which it was developed. In 2013, De Fruyt and colleagues examined the replicability of
the DSM-5 personality trait model. They used a Dutch version of the PID-5 (checked via independent back translation) and furthermore explored the common structure of the PID-5 and the NEO-PI-3 (De Fruyt et al., 2013). The findings presented support for the validity of hierarchical conceptualisation of personality traits, with both general and maladaptive traits being organised under an umbrella of higher-order domains (Anderson et al., 2013; Thomas et al., 2013). More specifically, it would seem as though Negative affect (DSM-5) relates to Neuroticism (FFM); Detachment (DSM-5) is akin to low Extraversion (FFM); Antagonism (DSM-5) to low Agreeableness (FFM); and Disinhibition (DSM-5) to low Conscientiousness (FFM). A link between DSM-5 Psychoticism and FFM Openness could however not be clearly established. This study did however provide support for construct validity of the DSM-5 trait model and underscored the psychometric properties of the PID-5. Lastly, it suggested that the NEO measures can be used to supplement the PID-5 when both general and maladaptive traits want to be assessed (De Fruyt et al., 2013).

**Personality Inventory for DSM-5 Brief Form**

In addition to the original PID-5, a brief form was developed focused only on the five trait domains (APA, 2013b). Similar to the PID-5, the brief form is rated using a 4-point scale (APA, 2013b). The PID-5-BF assesses the five maladaptive trait domains (negative affectivity, detachment, antagonism, disinhibition and psychoticism), with each domain scale comprised of five items which furthermore generates a score for the overall measure. This brief version is not proposed as a fine-grained measure set out to assess the DSM-5 personality traits, but rather intends to screen for possible personality disorder. The easy accessibility of the PID-5-BF and routine utility thereof, could potentially allow for earlier detection of personality pathology, possibly preceding the development of more severe psychopathology, such as externalising problems (e.g. substance abuse, self-harming behaviour or aggressive behaviour), and internalising disorders (e.g. depression or anxiety) (Fossati, Somma, Borroni, Markon & Krueger, 2017). It should however, be noted that the PID-5-BF is not designed to measure impairment in Criterion A core functions, but
rather aims to recognise elevation of the maladaptive trait dimensions. Personality dysfunction as operationalised in Criterion A yields information regarding severity of the disorder, and not personality ‘style’ reflected through traits (Fossati et al., 2017). Although some research exists indicating that pathological traits may influence or capture dysfunction (e.g. Few et al., 2013), the total score obtained from the PID-5-BF should not be considered as evidence for Criterion A, but should rather be seen as a possible indication for thorough clinical assessment of Criterion A functioning and the severity of impairment (self and interpersonal) (Fossati et al., 2017).

Fossati and colleagues (2017), examined the reliability and construct validity of the PID-5-BF (APA, 2013c), in an Italian adolescent sample having used the Measure of Disordered Personality Functioning (MDPF; Parker et al., 2004). They also examined gender roles on the PID-5-BF scores. Their results suggested that, at least in the Italian-translated version, the PID-5-BF could be proficient in capturing personality psychopathology. They detected adequate internal consistency for all of the 5 PID-5-BF scales as measured by the mean interim correlation (MIC; Clark & Watson, 1995). Their results showed that gender has a significant effect on the PID-5-BF scores, suggesting that the adolescent version of the PID-5-BF might require differentiated norms while retaining the same internal consistency (Fossati et al., 2017). Specifically, significant gender differences with regards to scores on the negative affectivity, antagonism, detachment and psychoticism, may be of particular importance for early detection, and thus prevention, of personality disorders in adolescents. The study also involved a longitudinal evaluation, where a subsample of the original sample of adolescents re-administered the PID-5-BF two months later. The results indicated intra-class $r$ coefficients suggestive of adequate consistency for both domain and total scores. Furthermore, they found moderate factor inter-correlations (median $r = .24$) indicative of the PID-5-BF measuring distinguishable constructs (Fossati et al., 2017). As expected, regression analysis indicated that an overall elevation of PID-5-BF total score positively and significantly predicted MDPF scale scores (non-coping scale and non-cooperative scale).
However, having used an adolescent sample, generalisability to adult populations are questionable. Bach and colleagues (2016), also evaluated the PID-5-BF’s psychometric properties, as well as the PID-5 and PID-5-SF (PID-5 short form, 100 items) in a large Danish sample made up of both psychiatric and community respondents. Their results, in line with Fossati and colleagues’ (2017) findings, also indicated acceptable reliability, internal consistency and evidence for the PID-5-BF’s factor structure. Their results furthermore indicated that the PID-5-BF is able to differentiate between psychiatric and community participants and showed evidence for the measure’s utility in assessing the categorical (Section II) personality disorders (Bach, Maples-Keller, Bo & Simonsen, 2016). In conclusion, their findings indicated similar results across all three versions of the measure. Although these studies indicated support for the clinical use of the PID-5 measures, these studies did not use the official English version of the measure.

Hence, in 2018, Anderson and colleagues set out to evaluate the psychometric properties of the PID-5 using the original English version. They specifically focused on the internal consistency reliability and the internal structure of the PID-5-BF, with the goal of confirming the five-factor structure which has been included in this measure. In addition, they examined the associations between the PID-5-BF domains and the categorical personality disorders, the PSY-5 (Personality Psychopathology- Five) model of personality disorders or personality psychopathology, as well as broadband measures of both externalising and internalising psychopathology. Lastly, they set out to evaluate the consistency of the associations found in the PID-5-BF with associations found in the PID-5 and PID-5-SF (Anderson, Sellbom & Salekin, 2018).

They used three samples, which included 347 undergraduate university students; archival data from 285 undergraduate university students; and an archival community sample focused on participants who reported potentially psychopathological traits. In order to assess the associations between external criteria measures and the PID-5-BF domains, a variety of measures presumed to be associated with personality disorders were used, which included the PSY-5 (Harkness &
McNulty, 1994) – included in the MMPI-2-RF; Ben-Porath & Tellegen, 2008 – the Inventory for Depression and Anxiety Symptoms-2 (IDAS-2; Watson et al., 2007), and the Externalising Spectrum Inventory (ESI; Krueger et al., 2007).

As expected, their results indicated support for the utility of the PID-5-BF as a brief screening measure for maladaptive personality traits, as well as a brief measure of dimensional personality psychopathology. Although specific hypotheses on categorical diagnoses cannot be made using the PID-5-BF, clinicians could manage to broadly describe areas of dysfunction or potential preliminary diagnoses, which will inform the need for additional assessments. In line with previous research (Bach et al., 2016; Fossati et al., 2017; Krueger et al., 2012; Wright et al., 2012), their findings indicated acceptable internal consistency for the scales within each sample and showed support for model fit (via CFA) with the FFM used to inform the 25 PID-5-BF items. Furthermore, their results stipulated support for the associations between measures of Section II personality disorders and the PID-5-BF, PSY-5 scales, PID-5 and PID-5-SF, and measures of broad externalising and internalising psychopathology, consistent with previous findings (Anderson et al., 2013, 2015; Finn, Arbisi, Erbes, Polusny & Thuras, 2014; Sellbom et al., 2014). In addition, their results showed that externalising PID-5-BF domains predicted ESI scores and internalising PID-5-BF domains predicted IDAS scores. Finally, analyses indicated PID-5-BF associations with external measures to be consistent with correlation patterns found when using the PID-5 and PID-5-SF, as also found by Bach and colleagues (2016).

**Methodology**

The following section is focused on the methodology specifically used in this research study as well as justified rationales for its use.

**Research design**

The approach of this study was quantitative, which can be described as a process that is both systematic and objective as it uses data, collected and presented as numerical, from a selected
population, to be summarised, analysed and interpreted through statistical procedures, in order to
generalise findings to the population being studied (Goodwin & Goodwin, 2014; Gravetter &
Forzano, 2016; Maree & Pietersen, 2010b). Quantitative research can furthermore be described as
an approach used to test objective theories through examining the relationship existent between
variables. These variables are measured through the use of instruments or tests so as to be analysed.
These theories are tested deductively, as it is done to generalise and replicate findings (Creswell,
2014).

A cross-sectional research design was used, which can be described as the gathering of data
at one point in time, creating a snapshot of a social circumstance. Cross-sectional research can
furthermore be exploratory, explanatory or descriptive. This research design is used to examine
information of multiple cases at one point in time (Lawrence Neuman, 2014). Cross-sectional
research studies are primarily used when determining prevalence. Prevalence is equal to the amount
of cases in a population at a certain point in time, thus all measurements done on each person, are
done so at one point in time (Mann, 2003). Prevalence is important to clinicians as it influences the
likelihood of diagnosis, as well as the predictive value pertaining any investigation. As only one
group of participants are used, data are collected once and variables can be compared or multiple
outcomes examined, this method of study is relatively inexpensive (Institute for Work & Health,
2015; Mann, 2003). Many cross-sectional studies use questionnaires as method of data collection,
as was used in the current study (Mann, 2003).

In order to determine validity of the PID-5-BF, or any other measure, constructs (variables)
need to be statistically compared, justifying the use of a cross-sectional research design.

The classic perspective, dating back to the 1950’s, of Cronbach and Meehl (1955), is that
psychological constructs are unobservable. Traits, such as neuroticism and depression cannot be
directly observed. The existence of such traits is merely inferred as it contributes to the
understanding and explaining of human behaviour, and hence given operational definitions in order
to empirically investigate them and develop measures/tests for them (Goodwin & Goodwin, 2014;
A construct can be described as a hypothetical factor which is developed within a theory in order to help explain a phenomenon, or which is created to use as a shorthand term for describing a certain cluster of behaviours (Goodwin & Goodwin, 2014). Therefore, a core focus of social science research is the observation of human behaviour through using different measurement instruments, thereby quantifying it (Drost, 2011). This is done through establishing reliability and validity for the measurement.

Reliability refers to the repeatability of a test, as in similar results should be expected when a test is conducted by different people, under different conditions, on different occasions in comparison to other measurements of the same constructs (Drost, 2011). For a measurement to show internal consistency reliability, estimates of reliability focus on average inter-correlations between all single items of the test, most commonly measured by the coefficient alpha; more popularly referred to as Cronbach’s alpha (Cronbach, 1951; Drost, 2011), for which the general accepted standard is .70 and above (Krizman, 2011; MacKenzie, Podsakoff & Podsakoff, 2011; Nunnally & Bernstein, 1994; Tavakol & Dennick, 2011). If Cronbach’s alpha is indicated as low, the measurement might be too short or items might not correspond with each other.

Validating these constructs are very important and needed for standardisation, especially pertaining studies in which measures are used for variables that cannot be directly observed. Before a test or instrument can be classified as being standardised, construct validity needs to be examined and shown to be present. If such a test or psychological instrument lacks construct validity, results yielded would be difficult and quite useless to interpret (Pietersen & Maree, 2010; Westen & Rosenthal, 2003; White & McBurney, 2013).

When considering construct validity, this question can be asked: “what construct is the instrument actually measuring?” (Brink, Van Der Walt & Van Rensburg, 2012: p168). In order to validate measures for these hypothetical constructs, it must be established if indicators of the focal construct accurately represents the underlying construct; if indicators show an adequate capture of the dimensional nature of the construct; whether the indicators of one construct are distinguishable
from others; and if the indicators and constructs are related to other measures of the same indicators and constructs, as well as with the theoretical framework as its foundation (Campbell & Fiske, 1959; Cronbach & Meehl, 1995; Drost, 2011; MacKenzie et al., 2011; Tavakol & Dennick, 2011), i.e. the extent to which a situation or concept is accurately represented by research findings. Construct validity entails the effectivity and sufficiency of the translation and transformation of the concept, e.g. behaviour, into an operating and functioning measure (Drost, 2011). Thus, for hypothetical constructs, construct validity can be established through a quantitative, statistical procedure examining and analysing whether the scores on the measure conforms to a certain theory (the construct is a part of), and is connected to the operational definition (Coolican, 2014; Cronbach & Meehl, 1995; Brink et al., 2012; Goodwin & Goodwin, 2014; Pietersen & Maree, 2010; Roodt, 2009; Smith, 2005; Westen & Rosenthal, 2003; White & McBurney, 2013). It refers to the degree in which the intended construct is measured, as opposed to irrelevant constructs (Welman, Kruger & Mitchell, 2005). A behavioural test will therefore be valid when it measures what the researcher claims it to measure (Goodwin & Goodwin, 2014; Welman et al., 2005; Westen & Rosenthal, 2003).

In order to establish construct validity, a combination of theory and hypothesis testing is used to demonstrate that the measure is valid. Pertaining to construct validity, theory is used to generate hypotheses, which is used to predict relationships expected to be found between measures and a series of other variables (Coolican, 2014; Goodwin & Goodwin, 2014; Ruane, 2005). During the process of examining these different measures and theories, evidence and supportive research consistently found for the same hypothesis, will gradually and in an inductive manner, increase confidence in the hypothesis, even though it will never be fully proven, but rather established as ‘very likely’ (Coolican, 2014; Goodwin & Goodwin, 2014; Smith, 2005). The emphasis however, should not be on merely recording successful correlations, but on making inferences about the meaning of these correlations (Cronbach & Meehl, 1955).
Construct validity is furthermore established through assessing content validity and convergent and discriminant validity. Content validity discerns the extent to which indicators or items tap the meaning and content of a concept or construct as it has been defined by the researcher (Drost, 2011). Straub and colleagues (2004, p. 424), further states that content validity concerns “the degree to which items in an instrument reflect the content universe to which the instrument will be generalized.” Two related judgments must therefore be made in the assessment of content validity: when considering the content of the construct, are the individual items representative of the content domain?; and do the items collectively represent the whole of the construct’s content domain? (MacKenzie et al., 2011).

Construct validity is supported by high correlations with other tests or measures pertaining to the same construct, with other variables it is supposed to (theoretically) correlate with (convergent validity), as well as a weak relationship or low correlation with measures of different constructs or variables with which it should differ (discriminant validity), (Campbell & Fiske, 1951; Drost, 2011; Goodwin & Goodwin, 2014; Krizman, 2011; MacKenzie et al., 2011; Nunnally & Bernstein, 1994; Roodt, 2009; Tavakol & Dennick, 2011; Welman et al., 2005; Westen & Rosenthal, 2003). Thus research showing a strong relationship between two theoretically-linked measures would strengthen the construct validity because convergent validity would have been demonstrated. On the other hand, research showing that two measurements are not related or only weakly related, would establish discriminant validity, again strengthening construct validity (Goodwin & Goodwin, 2014).

Population sample

The sample population chosen for this study will include 300 undergraduate university students, specifically from the North-West University Potchefstroom campus. The age range will thus be between 18 and 22 years, and all participants must have an adequate understanding of the English language (hence it may be their second language). Furthermore, the sample group will be made up of both female and male participants, and there will be no restriction or preference
according to race or culture. The sample population is chosen in this way as to represent a homogeneous group.

According to the Students Statistics of the NWU (2018), the current number of enrolled students totals at 68,260, of which 43,394 are contact (on-campus) students, and 54,725 are undergraduates. The undergraduate population is made up of 66.6% female students and 33.4% male students. The undergraduate population further consists of 67.2% African students, 27.2% White students, 4.7% Coloured students and a combined 0.8% of Indian and Asian students. The information provided however, does not specify whether these statistics are relevant to all NWU campuses, or just Potchefstroom campus.

Arguments have been made that the use of university students is appropriate in research studies where emphasis is placed on psychological processes or the theory tested is related to human behaviour, thus being independent of sample characteristics (Druckman & Kam, 2009; Kardes, 1996; Lucas, 2003; Peterson, 2001). According to Sherman and colleagues (as cited in Peterson, 2001), in 1999 the percentage of subject-based articles with student participants found in the Personality and Social Psychology Bulletin, were 86%, and 63% in the Journal of Personality and Social Psychology.

When assessing a study, regardless of what the nature of the participants may be, it is important to do so in light of the goal it is set out to reach; the larger research agenda to which the specific study wishes to contribute to (Druckman & Kam, 2009). When considering external validity, it does not refer to a study or research project generating the same results when performed again on a different sample. Rather, it refers in a more general sense, to relationships that are deemed conceptually equivalent found across people, times, places and operationalisations (Druckman & Kam, 2009). Particularly regarding studies focused on theory, the goal is not to parallel observed behaviours outside of the study, but to generalise findings to the specific parameters put forth, both within the theory and the current study (Banerjee & Chaudhury, 2010; Druckman & Kam, 2009; Peterson, 2001). As mentioned previously, the aim of this study is not to
generalise findings to the wider South African population, but to get an indication of whether the PID-5-BF yields similar results in terms of validity, than that obtained in other countries and settings. In most of these studies, the nature of the participants is not of great relevance, especially when efforts are put in place to ensure that the preference or motivation for using a particular population sample is in line with what is set out in theory (Druckman & Kam, 2009). Consequently, a student sample may qualify as research participants for fundamental research as well as theory testing (Bello, Leung, Radebaugh, Tung & Van Witteloostuijn, 2009; Pernice, Van der Veer, Ommundsen & Larsen, 2008).

Furthermore, university students may be seen as appropriate research samples in certain situations, especially if they are representative of a certain population of interest (Peterson & Merunka, 2014). Since the DSM-5 (APA, 2013) states that the onset age of personality disorders is generally in late adolescence to early adulthood, which is also when personality is still quite unstable (Arnett, 2000; Blonigen et al., 2008; Caspi et al., 2005; Roberts & DelVecchio, 2000; Roberts & Mroczek, 2008; Roberts, Caspi & Moffit, 2001; Roberts et al., 2006; Robins et al., 2001), university students in this study can be seen as adequate research participants, especially since the preference or motivation for using this population sample is in line with what is set out in theory (APA, 2013; Arnett, 2000; Blonigen et al., 2008; Caspi et al., 2005; Druckman & Kam, 2009; Roberts & DelVecchio, 2000; Roberts & Mroczek, 2008; Roberts et al., 2001; Roberts et al., 2006; Robins et al., 2001). In addition, student populations, or participants in early adulthood, are frequently used in validation studies, like the CAPE (e.g. Mossaheb et al., 2012); MMPI-2 (e.g. Svanum, McGrew & Ehrmann, 1994); NEO-PI (e.g. McCrae, Zonderman, Costa Jr., Bond & Paunonen, 1996); PID-5 (e.g. De Fruyt et al., 2013) to name but a few.

However, when considering using university students, especially through convenience sampling, some forms of vulnerability must be considered. Participants may be seen as vulnerable when they are not respected or valued as autonomous agents and their voluntariness to participate is in some way compromised (Mrdjenovich, 2016). A relevant form of vulnerability to this study, is
institutional vulnerability, which refers to participants subjected to authority with the risk of consent being coerced (Institutional Review Board for Social and Behavioural Sciences, 2012; Mrdjenovich, 2016). For example, a student-lecturer relationship could be considered as carrying institutional vulnerability. University students are frequently used as population samples in research studies pertaining to social and behavioural sciences. What causes concern, is the relationship between the student and researcher, as it frequently involves a lecturer known to the students. This might lead students to feel pressure or coercion to participate in the research study, furthermore inhibiting their voluntariness to participate (Institutional Review Board for Social and Behavioural Sciences, 2012; University of Utah Institutional Review Board, 2012). Another issue raised with regards to this relationship, is the possible incentive of receiving extra course credits when participating in the research study. This is also viewed as a method of coercion (UCI Office of Research, 2015; University of Utah Institutional Review Board, 2012; Mrdjenovich, 2016). This research study does not provide students with the opportunity to better their grades through participation, and the student-lecturer relationship is furthermore controlled through excluding students that receives any classes from the involved researchers, lowering both the risk of coercion and institutional vulnerability.

What is expected of researchers, is to treat vulnerable populations with respect, equitability and allowing free will, therefore excluding any inducements, coercion or prejudice (Shivayogi, 2013). In order to do so, it is important to clearly define population representatives as well as any special procedures related to the population representatives (Shivayogi, 2013). Furthermore, controlling means of data collection and obtainment of consent, could lessen this vulnerability. Making use of a third party in these instances, as well as collecting data anonymously, serves to eliminate any conflicts of interest (Institutional Review Board for Social and Behavioural Sciences, 2012; Mrdjenovich, 2016; University of Utah Institutional Review Board, 2012). Another way to lessen vulnerability, is to collect data in a general sense, thus making use of all students and not those enrolled in specific courses or courses taught by any involved researchers. This can be
achieved through making use of advertisements posted around the university, providing maximum exposure to all students (University of Utah Institutional Review Board, 2012).

Sample size is important for several reasons. Firstly, power is dependent on the sample size. Hence, a larger sample size will increase the probability of finding an effect (given that it really exists), and decrease the chance of making a Type II error (Cohen, 1962; Schweizer & Furley, 2016). Many researchers are also not aware that smaller sample sizes show a higher likelihood of producing false positives that is to yield a significant test even though the effect does not exist. Low power will negatively affect the likelihood of nominally, statistically significant findings actually reflecting true effects (Button et al., 2013).

Small sample studies have the likelihood of being affected by biasing influences, such as the researcher’s degree of freedom, also known as publication bias. Since smaller samples have more variation, more variation exists that may be exploited by the researcher’s degree of freedom in choosing what ‘worked’, and hence what to publish (Button et al., 2013; Simmons, Nelson & Simonsohn, 2011). Furthermore, small sample sizes have a greater likelihood of yielding an effect size larger than the true effect. Thus effect sizes will be biased upwards, as smaller samples will more likely be affected by chance variation. Data vary randomly, and thus effects fluctuate (Button et al., 2013; Schweizer & Furley, 2016). Within a small sample, the influence of only a few strong variations will be higher. Simultaneously, only large effects will pass the statistical significance filter (Button et al., 2013; Schweizer & Furley, 2016). Previous studies done surrounding validity and reliability of the PID-5 and PID-5-BF, had samples ranging in size from 109 to 877 (e.g. Miller et al., 2015; Fossati et al., 2017).

A sample size too small will not be adequately generalised. Statistical power analysis indicated that the sample must be made up of at least 300 students. This is a fairly large sample, and is expected prove adequate for statistical implementations.
Sampling method

The sampling method used was convenience sampling. With any research project, it would be formidable to use the entire population, but as the population, in most cases, is almost infinite, this is not always possible. This is the rationale for using sampling techniques, such as convenience sampling, for most researchers (Etikan, Musa & Alkassim, 2016). Convenience sampling can be classified as a type of non-random or non-probability sampling method. Participants selected for the study will be done so because they meet certain practical criteria, e.g. accessibility, availability, geographical proximity, or the willingness to participate (Dörnyei, 2007; Maree & Pietersen, 2010a). A student sample from within the researcher’s institution, is one of the most common examples of a convenience sample (Dörnyei, 2007). Convenience sampling is a method that is affordable and easy to administer as subjects or participants are readily available. Furthermore, in most cases, the choice of sampling method usually rests in the researcher’s feasibility, especially regarding time and resources (Banerjee & Chaudhury, 2010). The main assumption regarding convenience sampling, is that the population is homogeneous. That is, whether using a random sample, a cooperative sample, a nearby sample or any other sample from the target population, there should be no difference regarding the research results (Banerjee & Chaudhury, 2010; Etikan et al., 2016).

The biggest disadvantage of convenience sampling, is selection bias (Mackey & Gass, 2005). Therefore, convenience sampling should not be seen as representative of the whole population, as generalisability is limited. However, when generalisation is not intended as the objective of the study, as it is in this case, it should not be seen as a limiting factor (Banerjee & Chaudhury, 2010). The results would still be deemed valid for the specified sample, and may furthermore serve as pointer for future research. (Banerjee & Chaudhury, 2010). The necessary steps must be taken to ensure that uncertainty and bias are controlled. This can be done through assessing the sample’s representativeness, to add some diversity and to use more data (Skowronek & Duerr, 2009).
In order to reduce selection bias and increase the study’s usefulness, the representativeness of the sample must be controlled and assessed. The sample obtained must attempt to be a miniature version of the target population (O’Connell, 2000; Skowronek & Duerr, 2009). Diversity is also an additive of strength to convenience sampling. For example, when using a university sample, diversity might be achieved through distributing questionnaires at different places on campus or focusing on students from different departments. An attempt should also be made to be objective, as in not to make judgements regarding including participants based on demographic factors (Skowronek & Duerr, 2009). Hence the current research study attempted to select a sample representative of the specified target population, that is, undergraduate students at the North-West University Potchefstroom campus, chosen for their representativeness of young adults. In order to ensure diversity, students from various faculties (excluding those enrolled in Psych courses taught by research supervisors), were selected. Furthermore, students of both male and female gender, as well as different races were selected.

A third way to increase control over bias and uncertainty, is to collect more data, hence to use larger samples (Skowronek & Duerr, 2009). With an increase in sample size, the statistical power of a convenience sample also increases. Using a big enough sample, enhances the success of the study as it gives leeway to be able to exclude participants who might damage the homogeneity of the sample and so the validity of the findings (Farrokhi & Mahmoudi-Hamidabad, 2012). That is why deciding on ranges and criteria for the sample is important, as it serves as a guide through the selection process. It represents the rigour the researcher wishes to exert, and stipulates which participants to include or exclude from the study (Etikan et al., 2016; Farrokhi & Mahmoudi-Hamidabad, 2012). This is done to ensure transparency and factual accuracy. The sample size selected for this study was done on the basis of statistical power analysis, which indicated that the sample must be made up of at least 300 students. This sample size was expected to prove adequate for statistical implementations, especially since the aim of the study was focused on the psychometric properties of the PID-5-BF and not on generalisation of results.
Data Collection

Data was collected through the administration of self-report questionnaires. This included the PID-5-BF, comprised of 25 questions, NEO-PI-R, comprised of 240 questions, and MINI (Version 6.0) (subscale K), comprised of 15 questions.

Internal consistency and construct validity for the PID-5-BF has been established. The study done by Fossati and colleagues’ (2017) findings indicated coefficients ranging from 0.59-0.83. This is in line with other studies having indicated reliability and validity for the PID-5-BF.

Psychometric properties for the NEO-PI-R has shown to be valid and reliable. The NEO-PI-R’s internal consistency (Cronbach alpha) for the five factors has been indicated to be approximately 0.9, and ranges between 0.5 – 0.7 for the facets, with construct validity supported by the facets’ high factor loadings on the relevant predicted and theoretical factors (Costa & McCrae, 1992; Källmén, Wennberg & Bergman, 2011; Soto & John, 2009; Terracciano et al., 2005). High correlations between the NEO-PI-R facets and other personality scales, indicates sufficient convergent and discriminate validity (Gaughan, Miller & Lynam, 2012; Källmén et al., 2011; Maples, Guan, Carter & Miller, 2014). Furthermore, the NEO-PI-R has been translated into numerous languages and administered among various cultures, age ranges and gender, with consistent psychometric results, indicating good generalisability (e.g. Allik & McCrae, 2004; Bleidorn et al., 2009; Costa, McCrae & Dye, 1991; Costa et al., 1995; Goldberg, 1990; Ispas, Iliesco, Ilie & Johnson, 2014; Källmén et al., 2011; McCrae, Kurtz, Yamagata & Terracciano, 2011; McCrae & Terracciano, 2005; Terracciano et al., 2010; Yang et al., 1999).

The Mini International Neuropsychiatric Interview (MINI) can be used to diagnose a variety of disorders, including Criterion A psychotic symptoms of Schizophrenia. The MINI was validated through a cross-sectional study using a sample of more than 600 participants (Sheehan et al., 1998). Excellent test-retest and interrater reliability, as well as good convergent validity using the CIDI and the SCID, have been established for the English and French versions of the MINI (Lecrubier et
al., 1997; Sheehan et al., 1997). Psychotic disorders obtained the following kappa values: diagnosis of current disorder (0.69), current psychotic syndrome (0.68), current psychotic symptoms (0.76), and diagnosis of lifetime disorder (0.70), lifetime psychotic syndrome (0.75), and lifetime psychotic symptoms (0.82). Furthermore, reliability (inter-rater) for the MINI was very high (0.88-1.0) and the test-retest reliability for psychotic disorder specifically was 0.90 (Lecrubier et al., 1997). Amorim and colleagues (1998) also used The CIDI to explore the concordance between the MINI and CIDI and found satisfactory Kappa values ranging from 0.65 to 0.82 (Amorim, Lecrubier, Weiller, Hergueta & Sheehan, 1998). The MINI has been translated into 43 different languages, and validity and reliability has been established for the Italian (Rossi et al., 2004), Japanese (Otsubo et al., 2005), Moroccan (Kadri et al., 2005) and Norwegian (Mordal, Gunderson & Bramness, 2010) versions.

**Data Analysis**

The statistical analyses were implemented in Mplus 8.1 (Muthén & Muthén, 2015). Mplus allows for the implementation of latent variable modelling in a structural equation modelling (SEM) framework. Specifically, confirmatory factor analysis (CFA) was used to establish a measurement model, i.e. to create the factor structures based on the items (Brown, 2015). SEM may be described as a combination of confirmatory factor analysis and multiple regression (Schreiber, Stage, King, Nora, & Barlow, 2006). CFA, as a form of SEM, enables the investigation of relationships between variables. The terms exogenous and endogenous are furthermore associated with SEM, and refers to independent (exogenous) and dependent (endogenous) variables (Schreiber et al., 2006). The CFA represents the pattern of the observed variables. The CFA may be used to test reliability of the observed variables, as well as examine the covariances between constructs. Furthermore, SEM allows for testing relationships between constructs and the directionality thereof (Schreiber et al., 2006). The results generated by the Mplus program are interpreted in the light of any relationships between the specific constructs measured on the different assessment tools. Strong positive relationships will therefore indicate good correlation, contributing to the validity of the PID-5-BF.
To consider the fit of the factor structure to the data, the following indices was considered: Comparative fix index (CFI), Tucker-Lewis index (TLI) and root mean square error of approximation (RMSEA). Fit is considered to be adequate when CFI and TLI values are >.90; values of >.95 are considered better. The TLI aims at correcting complexity, but is sensitive to a sample that is small in size. It might also become >1.0, which is interpreted as over-fitting, in other words more complex than is needed. The RMSEA examines the closeness of fit with a cut-off value of <.08 (Van de Schoot, Lugtig, & Hox, 2012). A value of <.5 is better. Furthermore, the RMSEA is insensitive to the size of the sample, but is sensitive to the complexity of the model.

The CFA also generates a Pearson correlation matrix to consider the relationships between the variables, specifically aspects of convergent and discriminant validity will be considered by means of correlations. Effect sizes for the correlational relationship was considered as medium for values of \( r = 0.30 \) up to \( r = 0.49 \), and large for values of \( r = 0.50 \) to \( r = 0.84 \) (Cohen, 1992). Correlations of 0.85 and above were used as the cut-off points to consider discriminant validity issues, i.e. the measurement of the same construct which confounds the measurement model (Brown, 2015). Furthermore, a test for discriminant validity is established by constraining the correlation between [the two variables of interest] to unity (1.00) and then comparing it to a model where the correlation remains unconstrained by means of a chi-square difference test. A non-significant chi-square comparison \( (p \geq 0.05) \) would indicate that the constrained model was a better model compared to the unconstrained model – and that discriminant validity did not exist between the two variables.
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CHAPTER 2

ARTICLE

Psychometric properties of the Personality Inventory for DSM-5 Brief Form in an undergraduate sample of South African university students

Abstract

Assessments are regularly used amongst clinicians within Psychology, yet many are deemed too time-consuming and expensive. The Personality Inventory for DSM-5 Brief Form (PID-5-BF) was developed to measure maladaptive personality traits (Negative Affect, Detachment, Antagonism, Disinhibition, and Psychoticism), based on the “hybrid model” for personality disorders included in the DSM 5 Section III. Literature indicates that reliability and validity for the PID-5-BF has been established in other countries. We explored these psychometric properties within a South African population using the NEO Personality Inventory Revised and MINI Subscale K: Psychotic disorders and mood disorder with psychotic features, as measures for comparison. Our results indicated support for the PID-5-BF with sufficient reliability, convergent and discriminant validity. More research is needed on the PID-5-BF, especially in South Africa, but our findings indicate it to be a promising assessment tool that could greatly benefit clinicians in the mental health sector.

Key words

Personality disorder; PID-5-BF; NEO-PI-R; Construct validity; Convergent validity; Discriminant validity
Introduction

Psychometric assessments are important tools within the psychology field to aid in the formulation of diagnoses enabling the application of effective treatment. These assessments need to be of high quality and standardised within a South African context in order to yield valid and reliable results (Foxcroft, Paterson, Le Roux & Herbst, 2004; Foxcroft & Roodt, 2009).

A survey regarding psychometric tests in South Africa expressed urgency for tests to specifically diagnose personality disorders and pathology. This survey also indicated concern that tests are too time-consuming and expensive (Foxcroft et al., 2004). Considering the rushed manner of modern-day life, and the decline of South Africa’s economic growth (Statistics South Africa, 2016), psychopathology is a problem not currently dissipating (Fearon et al., 2017; Kliewer et al., 2017; Shulman & Scharf, 2018), and it can surely be assumed that the findings of Foxcroft and colleagues (2004) are still valid. Therefore, the Personality Inventory for DSM-5 Brief Form (PID-5-BF) could greatly benefit South Africa’s mental health sector in providing a measure that is not only cost-free, but quick to administer and in line with contemporary views of personality pathology as described by the DSM-5.

Personality, within the field of Psychology, is a central and indispensable concept, as it contributes to the clinical presentations and general functioning of clients or patients (McWilliams, 2011; Montag & Panksepp, 2017; Roberts & Davis, 2016). Personality may be described as relatively stable, enduring patterns of thinking, feeling and acting that differentiates one individual from another (Briley & Tucker-Drob, 2014; Kandler 2012). Characteristics or traits, influenced by the individual’s life experiences, his or her environment and genetics (Bleidorn, Kandler & Caspi, 2014; Briley & Tucker-Drob, 2014), are internalised to guide his or her behaviour in consistent ways (Roberts & Davis, 2016). Research has indicated that most personality traits may be understood from the Five-Factor Model (FFM) of personality, comprised of five basic dimensions, namely extraversion, neuroticism, openness, conscientiousness, and agreeableness (e.g., Kandler, Zimmermann & McAdams, 2014).
It is furthermore imperative to understand the manner in which personality may become pathological. This is important for both adequate assessment and intervention (Krueger et al., 2011; Krueger, Hopwood, Wright & Markon, 2014). Research indicates that personality disorders are influenced by both biological factors, that is, impairments and malfunctions of the brain (Clarkin, Meehan & Lenzenweger, 2015; Pharo, Sim, Graham, Gross & Hayne, 2011; Romer, 2010); trauma and psychosocial factors, including emotion-dysregulation, negative self-beliefs, and rigidity of interpersonal behaviours and styles (Clarkin et al., 2015; Hopwood, Wright, Ansell & Pincus, 2013; Krueger, 2013).

In response to various limitations presented by the Diagnostic and Statistical Manual of Mental Disorders (DSM) categorical model of personality disorders (i.e., poor validity of assessments; lack of clinical utility, and high comorbidity between personality disorders), a more dimensional and empirically-based approach, the “hybrid model”, was developed and included in the DSM-5 Section III (APA, 2013; Clarkin et al., 2015; Krueger et al., 2014). Personality disorders, in Section II of the DSM-5, are defined as enduring patterns of inner experiences and behaviour deviating significantly from individual cultural expectations, seen through how individuals think about themselves and others; their emotional responses; way of relating to others; and how they control their own behaviour (APA, 2013). Furthermore, personality disorders are inflexible, pervasive, and generally stable; peaking during adolescence/early adulthood, and causing impairment and distress (APA, 2013). The hybrid model (Section III) defines personality disorders similarly but places more focus on the impairment of personality functioning (Criterion A), as well as pathological personality traits (Criterion B), (APA, 2013; Miller, Few, Lynam & MacKillop, 2015; Suzuki, Samuel, Pahlen & Krueger, 2015).

In the operationalisation of the hybrid model, Krueger and colleagues (2012), developed an instrument (Personality Inventory for DSM-5/PID-5) for the measurement of Criterion B, that is, maladaptive personality traits. In addition, a brief form was developed focusing on five trait domains, namely negative affectivity, detachment, antagonism, disinhibition, and psychoticism.
The easy accessibility of the PID-5-BF and routine utility thereof could potentially allow for earlier detection of personality pathology. It should, however, be noted that the PID-5-BF is not designed to diagnose personality disorders or measure impairment in Criterion A core functions, but rather aims to recognise elevation of the maladaptive trait dimensions to indicate whether there is a need for further assessment (Fossati, Somma, Borroni, Markon & Krueger, 2017).

Literature surrounding the DSM-5 hybrid model and PID-5/PID-5-BF has expanded substantially since its development and have indicated reliability and validity, as well as internal consistency (Al-Dajani, Gralnick & Bagby, 2016; Anderson, Sellbom & Salekin, 2018; Bach, Maples-Keller, Bo & Simonsen, 2016; Fossati et al., 2017). Research furthermore indicates support for the DSM-5 hybrid model in comparison to other evidence-based systems of personality and pathology, and that it aligns in a theoretically acceptable manner (Gore & Widiger, 2013; Thomas et al, 2013). However, research on the PID-5-BF has not yet been done in South Africa.

**Methodology**

The approach of this study was quantitative, and a cross-sectional research design was used. The aim of the study was to explore the psychometric properties of the PID-5-BF within a South African context. The objectives were to examine the construct validity, as well as convergent and discriminant validity of the measuring instrument as compared to similar constructs of the NEO Personality Inventory Revised (NEO-PI-R) and the Mini International Neuropsychiatric Interview’s (MINI) Subscale K: Psychotic disorders and mood disorder with psychotic features.

We hypothesised that construct validity and reliability for the PID-5-BF will be present in a South African sample when compared with conceptually similar measures and coefficients found in other studies. We further hypothesised that, based on research, Negative Affect would correlate positively with Neuroticism; Detachment negatively with Extraversion; Antagonism negatively with Agreeableness; and Disinhibition negatively with Conscientiousness (Gore & Widiger, 2013;
Krueger et al., 2011; Thomas et al., 2013). Although a significant positive relationship between Psychoticism and Openness has not yet been empirically proven, it was still hypothesised that there would be some correlation found between the scales. To better investigate construct validity for Psychoticism, it was measured against the MINI Subscale K.

**Participants**

The sample included 283 undergraduate university students from the North-West University Potchefstroom campus. The age range fell between 18 and 22 years, and all participants had an adequate understanding of English. Furthermore, the sample group was made up of both female (77.7%) and male (21.6%) participants, and no restriction or preference according to race or culture was made.

**Table 1: Sample distribution (n = 283)**

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<td>Female</td>
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<td>Coloured</td>
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<tr>
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<td>21.2%</td>
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</tbody>
</table>

**Procedure**

*Sampling method*

Convenience sampling was used to recruit students through advertisements, that is, posters on notice boards and pamphlets handed out in classrooms.
Data Collection

Data was collected through the administration of self-report questionnaires. This included the PID-5-BF, comprised of 25 questions, MINI (Version 6.0) Subscale K, comprised of 15 questions, and the NEO-PI-R comprising 240 questions.

**PID-5 BF**

The Personality Inventory for DSM-5 Brief Form (PID-5 BF) is measured on a 4-point Likert scale, with the following responses: Very false/Often false, Sometimes/Somewhat false, Sometimes/Somewhat true/Very true/Often true. Internal consistency and construct validity for the PID-5-BF has been established, Fossati and colleagues (2017) found coefficients ranging from 0.59-0.83, in line with other studies indicating reliability and validity for the PID-5-BF.

**NEO-PI-R**

The NEO Personality Inventory Revised (NEO-PI-R) focuses on the measurement of personality constructs as theorised by the big-five personality structure, or FFM. Questions are rated on a 5-point Likert scale: Strongly disagree, Disagree, Neutral, Agree, Strongly disagree. Internal consistency for the five factors has been indicated to be approximately 0.90, and ranges between 0.50-0.70 for the facets (Costa & McCrae, 1992; Soto & John, 2009). High correlations between the NEO-PI-R facets and other personality scales, indicates sufficient convergent and discriminant validity (Gaughan, Miller & Lynam, 2012; Maples, Guan, Carter & Miller, 2014).

**MINI Subscale K**

The Mini International Neuropsychiatric Interview (MINI) can be used to diagnose a variety of disorders, including Criterion A psychotic symptoms of Schizophrenia. Subscale K: Psychotic disorders and mood disorder with psychotic features, specifically focuses on symptoms of a psychotic nature. The MINI has been proved valid and reliable, with excellent test-retest and interrater reliability values (0.88-1.0), and good convergent validity values (0.69-0.82) (Lecrubier et al., 1997; Sheehan et al., 1988).
Ethical considerations

As a student sample was used, the risk level was medium. The risk of possible coercion was lessened by excluding students from the Psychology or Industrial Psychology classes lectured by the co-authors, as well as excluding incentives such as course credits for participation. Informed consent was obtained by an independent party, and questionnaire protocols were numbered beforehand as to maintain anonymity of participants and avoid any stigmatisation or confidentiality breeches.

Participants were exposed to reflections regarding their personalities with the risk of inducing psychological distress. Debriefing services were made available to any participant who required it after survey completion. No participants made use of this opportunity.

Data Analysis

The statistical analyses were conducted using Mplus 8.1 (Muthén & Muthén, 2018), which allowed for the implementation of latent variable modelling in a structural equation modelling (SEM) framework. Specifically, confirmatory factor analysis (CFA) was used to establish measurement models, that is, to create the latent factor structures based on the items in the case of the PID-5 BF; and the personality factors were based on the total score for their sub-dimensions as the items. Latent variables are more desirable to normal total or mean scores as it considers measurement error (Brown, 2015). In terms of parameter estimation, the mean- and variance-adjusted weighted least squares (WLSMV) implementation was used and this implementation has been found to work well in samples that exceed 200 participants (Li, 2016), outperforming maximum likelihood estimation.

With regards to the fit of the factor structure to the data, the following indices were considered: Comparative fix index (CFI), Tucker-Lewis index (TLI) and root mean square error of approximation (RMSEA). For the CFI and TLI the rule of thumb of 0.90 would be used and for the RMSEA 0.80 and below (Van de Schoot, Lugtig, & Hox, 2012). The CFA analysis also generated a
correlation matrix that examined the relationships between the variables, specifically aspects of convergent and discriminant validity. Effect sizes for correlational relationships were considered medium for values of \( r = 0.30-0.49 \) and large for correlations from \( r = 0.50-0.84 \). Correlations of 0.85 and above was used as the cut-off point to consider discriminant validity issues (Brown, 2015). Furthermore, a test for discriminant validity was implemented by constraining the correlation between two variables of interest to unity (1.00), and then having compared it to a model where the correlation remained unconstrained by means of a chi-square difference test.

**Results**

Please see sections below for fit of the models and corresponding correlation matrices. For each NEO-PI-R factor, for example, *Neuroticism*, it was estimated as a single factor with the PID-5-BF represented by its individual components. Investigation also included the subcomponents of the NEO-PI-R facets in the correlation matrices. Therefore, a series of models were tested.

**PID-5-BF factor structure: 5-factors versus higher-order 6-factor model**

In the consideration of model fit to the data of the PID-5-BF instrument, two models were considered. The first model was a 5-factor model consisting of the individual components of the PID-5-BF, and the second was a 6-factor (2nd order/higher-order) model that contained an additional factor for the score as a higher-order latent variable consisting of the five components of the first model. For the initial 5-factor model all items were assigned to their respective factors \( (\chi^2 = 556.89; \text{df} = 242; \ CFI = 0.94; \ TLI = 0.94; \ RMSEA = 0.07) \). However, in this initial 5-factor model item Q13 ("I steer clear of romantic relationships"), had a low loading (0.27) in context of the other items and was removed to re-test the 5-factor model. As can be seen, the revised first (5-factor) model indicated best fit to the data as it had the lowest chi-square and RMSEA values and higher CFI and TLI values. Further data analyses were therefore based upon the 5-factor model.
Table 2: PID-5-BF Model-Fit Statistics

<table>
<thead>
<tr>
<th>Description</th>
<th>$\chi^2$</th>
<th>df</th>
<th>CFI</th>
<th>TLI</th>
<th>RMSEA</th>
</tr>
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<tbody>
<tr>
<td>5-factor model</td>
<td>556.89</td>
<td>242</td>
<td>0.94</td>
<td>0.94</td>
<td>0.07</td>
</tr>
<tr>
<td>6-factor model</td>
<td>724.31</td>
<td>390</td>
<td>0.90</td>
<td>0.89</td>
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</tbody>
</table>

Notes: $\chi^2$ = Chi-square; df = Degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; $p < .001$

Table 3: Correlations between PID-5-BF Constructs

<table>
<thead>
<tr>
<th></th>
<th>$\alpha$</th>
<th>M</th>
<th>SD</th>
<th>NEG AFF</th>
<th>DETACH</th>
<th>ANTAG</th>
<th>DISIN</th>
<th>PSYCH</th>
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<tbody>
<tr>
<td>NEG AFF</td>
<td>0.73</td>
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<td>7.21</td>
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<tr>
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<td>4.40</td>
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<td>DISIN</td>
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<tr>
<td>PSYCH</td>
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<td>7.94</td>
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<td>0.72</td>
<td>0.54</td>
<td>0.69</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Furthermore, comparison between the scales also yielded good correlations for most relationships. The highest correlations found were between Dormatment and Negative affect ($r = 0.71$; large effect) and Detachment and Psychoticism ($r = 0.72$; large effect). All other relationships between scales (e.g., Disinhibition and Psychoticism), had values of between 0.54 and 0.69 (large effects). However, Antagonism had the weakest correlation coefficient values in correlation to the other scales. It correlated most significantly with Disinhibition ($r = 0.55$; large effect) and Psychoticism ($r = 0.54$; large effect). Furthermore, correlational values for its relationship to Detachment showed a medium effect ($r = 0.38$), as well as for the correlation to Negative Affect ($r = 0.35$).

In general, as can be seen, the PID-5-BF showed adequate convergent validity, as all coefficients represented medium to large effects, and none were above 0.85, indicative of discriminant validity (an additional discriminant validity for the Psychoticism scales are performed below). Internal consistency was also established with sufficient Cronbach’s alpha coefficients ($\alpha = 0.69-0.84$). Although the traditional cut-off for Cronbach’s alpha is 0.70, the difference of 0.01 for Detachment was considered insignificant, and did not warrant its exclusion.
Table 4: Factor loadings (5-factor model)

<table>
<thead>
<tr>
<th>Factor and item</th>
<th>Loadings</th>
<th>S.E.</th>
<th>p-value</th>
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<tr>
<td>Negative affect</td>
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<tr>
<td>Q8</td>
<td>0.49</td>
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<tr>
<td>Q9</td>
<td>0.54</td>
<td>0.07</td>
<td>0.001</td>
</tr>
<tr>
<td>Q10</td>
<td>0.46</td>
<td>0.07</td>
<td>0.001</td>
</tr>
<tr>
<td>Q11</td>
<td>0.54</td>
<td>0.06</td>
<td>0.001</td>
</tr>
<tr>
<td>Q15</td>
<td>0.65</td>
<td>0.06</td>
<td>0.001</td>
</tr>
<tr>
<td>Detachment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>0.69</td>
<td>0.06</td>
<td>0.001</td>
</tr>
<tr>
<td>Q14</td>
<td>0.48</td>
<td>0.07</td>
<td>0.001</td>
</tr>
<tr>
<td>Q16</td>
<td>0.52</td>
<td>0.06</td>
<td>0.001</td>
</tr>
<tr>
<td>Q18</td>
<td>0.46</td>
<td>0.07</td>
<td>0.001</td>
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<tr>
<td>Antagonism</td>
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<td>Q17</td>
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<td>Q19</td>
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<td>0.001</td>
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<tr>
<td>Q20</td>
<td>0.48</td>
<td>0.07</td>
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<tr>
<td>Q22</td>
<td>0.82</td>
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<td>0.001</td>
</tr>
<tr>
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<td>0.05</td>
<td>0.001</td>
</tr>
<tr>
<td>Disinhibition</td>
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<td></td>
<td></td>
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<tr>
<td>Q1</td>
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<td>0.001</td>
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<tr>
<td>Q2</td>
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<td>0.06</td>
<td>0.001</td>
</tr>
<tr>
<td>Q3</td>
<td>0.70</td>
<td>0.05</td>
<td>0.001</td>
</tr>
<tr>
<td>Q5</td>
<td>0.81</td>
<td>0.05</td>
<td>0.001</td>
</tr>
<tr>
<td>Q6</td>
<td>0.59</td>
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<td>0.001</td>
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<tr>
<td>Psychoticism</td>
<td></td>
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<tr>
<td>Q7</td>
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<td>Q12</td>
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</tr>
<tr>
<td>Q21</td>
<td>0.56</td>
<td>0.06</td>
<td>0.001</td>
</tr>
<tr>
<td>Q23</td>
<td>0.71</td>
<td>0.05</td>
<td>0.001</td>
</tr>
<tr>
<td>Q24</td>
<td>0.69</td>
<td>0.05</td>
<td>0.001</td>
</tr>
</tbody>
</table>

As can be seen the best-fitting 5-factor model’s items loaded onto their constructs in a significant manner (cut-off value = >0.50). It should be noted that Q8 (0.49) and Q10 (0.46) just did not meet the cut-off loading on to Negative Affect. The same was found for Q14 (0.48) and Q18 (0.46) for Detachment, and Q20 (0.48) for Antagonism. However, given the proximity to 0.50 in terms of rounding it was decided to keep these items for further analysis.

Scale correlations

**Relationship between NEO-PI-R Neuroticism PID-5-BF**

The Cronbach’s alpha coefficient was found to be adequate ($\alpha = 0.79$) for Neuroticism. The model containing the PID-5-BF components and NEO-PI-R Neuroticism scale indicated adequate data fit ($\chi^2 = 724.31$; df = 390; CFI = 0.90; TLI = 0.89; RMSEA = 0.06).
Table 5: Correlations between Neuroticism and PID-5-BF

<table>
<thead>
<tr>
<th></th>
<th>NA</th>
<th>DET</th>
<th>ANT</th>
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<th>DEP</th>
<th>SC</th>
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<td>0.72</td>
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<tr>
<td>NEUROTICISM</td>
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<td>0.14</td>
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<td>0.31</td>
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<td>Self-Consciousness</td>
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<td>0.07</td>
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<td>0.27</td>
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<td>Impulsiveness</td>
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<td>0.28</td>
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<td>0.14</td>
<td>0.25</td>
<td>0.48</td>
<td>0.29</td>
<td>0.25</td>
<td>0.15</td>
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<td>Vulnerability</td>
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<td>0.31</td>
<td>0.30</td>
<td>0.28</td>
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</tbody>
</table>

Negative Affect and Neuroticism (relationship primarily investigated), showed a significant positive relationship ($r = 0.78$; large effect). Furthermore, all subscales of Neuroticism showed medium effect correlations, apart from depression which showed a small effect size ($r = 0.24$). Neuroticism also showed correlations of large effect with Detachment ($r = 0.58$) and Psychoticism ($r = 0.51$).

Relationship between NEO-PI-R Extraversion and PID-5-BF

Extraversion showed an adequate Cronbach’s alpha of 0.78. The model for the PID-5-BF components with the NEO-PI-R Extraversion fit the data adequately ($\chi^2 = 975.12$; df = 388; CFI = 0.91; TLI = 0.90; RMSEA = 0.07). Table 6 below presents the correlations based on the model.

Table 6: Correlations between Extraversion and PID-5-BF

<table>
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<tr>
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<th>PSY</th>
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<th>GRE</th>
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<th>ACT</th>
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</table>

---

Extraversion showed an adequate Cronbach’s alpha of 0.78. The model for the PID-5-BF components with the NEO-PI-R Extraversion fit the data adequately ($\chi^2 = 975.12$; df = 388; CFI = 0.91; TLI = 0.90; RMSEA = 0.07). Table 6 below presents the correlations based on the model.
The PID-5-BF scale of Detachment correlated negatively with the NEO-PI-R Extraversion scale ($r = -0.51$; large effect). Half of the subscales showed medium effect sizes, although assertiveness, activity and excitement-seeking indicated coefficients of small effects (i.e., <0.29), in a negative direction.

**Relationship between NEO-PI-R Openness and PID-5-BF**

The Cronbach’s alpha for Openness was 0.66. In general, for reliability to be adequate, Cronbach’s alpha should be $\alpha \geq 0.70$, although for the Openness factor other studies have also found the coefficient to be below 0.70 (e.g., $\alpha = 0.68$; Sherry, Hewitt, Flett, Lee-Baggley & Hall, 2007), indicating lower internal consistency for this factor. Once again due to rounding, it was decided to keep this factor for further analysis. The model indicated adequate fit to data ($\chi^2 = 927.36; \text{df} = 390; \text{CFI} = 0.91; \text{TLI} = 0.90; \text{RMSEA} = 0.07$).

**Table 7: Correlations between Openness and PID-5-BF**

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<tr>
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<th>PSY</th>
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<td>-0.30</td>
<td>-0.13</td>
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<td>-0.24</td>
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<tr>
<td>Altruism</td>
<td>-0.07</td>
<td>-0.11</td>
<td>-0.24</td>
<td>-0.10</td>
<td>-0.10</td>
<td>0.31</td>
<td>0.12</td>
<td>0.24</td>
<td>1.00</td>
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</tbody>
</table>

In terms of correlational relationships, no large correlation between Psychoticism and Openness was found ($r = 0.31$; medium effect). All subscales of Openness correlated with the PID-5-BF Psychoticism scale to a small effect, and actions were found to have a statistically nonsignificant correlation ($r = 0.03; p > 0.05$).

**Relationship between NEO-PI-R Agreeableness and PID-5-BF**

Agreeableness yielded an adequate Cronbach’s alpha coefficient of $\alpha = 0.70$. Again, as with previous models, data fit the model adequately ($\chi^2 = 1013.72$; df = 387; CFI = 0.91; TLI = 0.90; RMSEA = 0.08).
Antagonism was strongly negatively correlated with Agreeableness in the negative ($r = -0.76$; large effect), and Antagonism strongly correlated with two Agreeableness subscales, namely straightforwardness ($r = -0.59$) and tendermindedness ($r = -0.52$).

**Relationship between NEO-PI R Conscientiousness and PID-5-BF**

The Cronbach’s alpha coefficient indicated good internal consistency for Conscientiousness ($\alpha = 0.88$). Furthermore, the model containing the PID-5-BF and NEO-PI-R Conscientiousness components indicated good fit to data ($\chi^2 = 849.52$; df = 390; CFI = 0.94; TLI = 0.94; RMSEA = 0.07).

**Table 9: Correlations between Conscientiousness and PID-5-BF**

<table>
<thead>
<tr>
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<th>DET</th>
<th>ANT</th>
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Disinhibition and Conscientiousness showed a significant negative correlation \( (r = -0.70; \) large effect). PID-5-BF Disinhibition additionally correlated negatively with all Conscientiousness subscales. All correlated in a significantly negative manner with large effect size, that is, order = -0.52; dutifulness = -0.55; achievement-striving = -0.52; self-discipline = -0.61; and deliberation = -0.55; except for competence which showed a medium effect size \( (r = -0.48)\).

MINI Subscale K and PID-5-BF

As mentioned previously, all correlations were below the 0.85 guideline set by Brown (2015) for discriminant validity issues in CFA analysis. However, an additional discriminant validity test was conducted. For this test, the MINI Subscale K and PID-5-BF Psychoticism scale were both best operationalised comprising factors based on items of each construct, as indicators of the respective latent factors \( (\chi^2 = 1015.89; \) df = 684; CFI = 0.92; TLI = 0.91; RMSEA = 0.04).

Table 10: Correlations between MINI Subscale K and PID-5-BF

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The test for discriminant validity was conducted with the DIFFTEST option in Mplus, comparing two correlated models: i) where the correlation between the MINI Subscale K and PID-5-BF Psychoticism scale remained unconstrained, and ii) where the correlation between the two variables was constrained to unity (1.00). The result of the chi-square difference test was significant \( (p < 0.001)\), indicating that the model in which the MINI Subscale K and PID-5-BF was constrained to unity was not a better model. However, it should still be noted that a large positive correlation
existed between the constructs ($r = 0.66$; large effect), still indicating a significant overlap between the two concepts ($R^2 = 43.56\%$; large effect).

**Discussion**

Literature has consistently indicated validity for the FFM’s general personality traits and its relationship to DSM-IV personality disorders and has therefore increasingly been considered in the formulation of alternative models with the view that personality disorders could be considered maladaptive variants of these general personality traits (Bach, Markon, Simonsen & Krueger, 2015; Clarkin et al., 2015; Gore & Widiger, 2013; Thomas et al., 2013). In line with research having indicated convergence between the FFM and pathological personality traits, the structure of maladaptive traits as proposed by the hybrid model clearly resembles the structure of normal personality and therefore that personality functioning and traits are represented in various degrees, and not, as the categorical model suggests, either present or absent (APA, 2013; Bach et al., 2015). Specifically, the DSM-5 trait of *Negative Affect* seems to be akin to the FFM trait of *Neuroticism*; DSM-5 trait of *Detachment* to low FFM *Extraversion*; *Antagonism* akin to low FFM *Agreeableness*; *Disinhibition* to low *Conscientiousness*; and the DSM-5 trait of *Psychoticism* to the FFM trait *Openness* (Gore & Widiger, 2013; Krueger et al., 2011; Thomas et al., 2013).

The results yielded from the current study proved to be in line with these findings. Reliability for the PID-5-BF was found to be adequate with Cronbach’s alphas ranging between 0.69-0.84. Although the cut-off for Cronbach’s alpha is 0.70, we found the difference of 0.01 for *Detachment* ($\alpha = 0.69$) statistically insignificant, and thus viewed it as an adequate representation of reliability.

As hypothesised, the predicted correlational relationships between the constructs of the PID-5-BF (hybrid model) and NEO-PI-R (FFM) were found, as well as between the PID-5-BF and MINI Subscale K. In general, adequate convergent validity coefficients were found ($r = 0.35$; medium effect, to 0.72; large effect), and as no correlations were above 0.85, discriminant validity
was also indicated. Factorial validity was found for most questions as they loaded strongly onto the expected factor. Some were however below the expected cut-off level of >0.5 (0.46-0.49), which included two questions under Negative affect (“I worry about almost everything” and “I fear being alone in life more than anything else”); two questions under Detachment (“I’m not interested in making friends” and “I rarely get enthusiastic about anything”), as well as Q20 (“I often have to deal with people who are less important than me”) under Antagonism. The reason for this might be a presence of “faking good” responses. The questions are asked in a very unipolar fashion which possibly urged participants to respond in an overly positive way so as to downplay negative or extreme characteristics that would in general be perceived as falling outside of the norm.

Question 13 (“I steer clear of romantic relationships”), had a significantly low loading (0.27) onto Detachment in context to other items. Perhaps, an avoidance of romantic relationships would better load on to Negative Affect as it includes aspects of anxiousness, separation insecurity and emotional lability, with the suggestion then that avoiding romantic relationships are more based on social anxiousness than emotional withdrawal/detachment. These are mere speculations and warrants further investigation.

Pursuant to literature (Gore & Widiger, 2013; Krueger et al., 2011; Thomas et al., 2013), our results indicated a strong positive relationship between PID-5-BF Negative Affect and NEO-PI-R Neuroticism (r = 0.78). This finding is not only significant in that it shows good construct validity for the Negative Affect component, but also that it supports existing theory. Literature on personality pathology have indicated that premorbid personality traits, especially Neuroticism (anxiety, angry hostility, depression, self-consciousness, impulsiveness, vulnerability; Costa & McCrae, 1992), akin to Negative Affect (emotional lability, anxiousness, separation anxiety; APA, 2013c), can predispose individuals to be more vulnerable to stress (Hopwood et al., 2013; Kotov, Gamez, Schmidt & Watson, 2010; Leichsenring, Leibing, Kruse, New & Leweke, 2011). For example, individuals high in neuroticism are more likely to respond to stressful situations with significant levels of distress and anxiety. In turn, the individual’s response to stress might lead to poor
decision-making or elicit negative reactions from others which therefore might increase and reinforce the original distress experienced, creating a cycle of poor and rigid emotional dysregulation. This is not only relevant to the trait *Negative Affect*. As indicated by our results, *Neuroticism* correlated with *Detachment* \( (r = 0.58) \), as well as with *Psychoticism* \( (r = 0.51) \), showing support for the influence neuroticism/negative affect may have on one’s functioning and personality related to other domains.

The PID-5-BF scale of *Detachment* correlated negatively with the NEO-PI-R *Extraversion* scale \( (r = 0.51) \), indicating convergent and discriminant validity. This inverse relationship has been established by various research studies (Gore & Widiger, 2013; Krueger et al., 2011; Thomas et al., 2013). *Detachment*, which includes characteristics such as withdrawal, anhedonia and intimacy avoidance, interpersonal inhibition (APA, 2013c; Pettersen et al., 2014), may therefore be seen as the opposite of extraversion. *Extraversion* is characterised by Costa & McCrae (1992), as including traits of warmth, gregariousness, assertiveness, excitement-seeking, activity and positive emotions. In line with this description, others have indicated that being outgoing, talkative, having the need for external and social stimulation further describes the construct *Extraversion* (Acton, 2003). McCabe and Fleeson (2012) investigated the purpose of extraversion and stipulated as being a facilitator for having fun and entertaining people, and connecting to others, which indicates a stark contrast to the construct detachment, as shown through the inverse correlational relationship found between the two constructs.

The correlation found between *Psychoticism* and *Openness* was positive, yet medium in effect \( (r = 0.31) \). Seeing as research has yielded inconsistencies for the correlation between *Psychoticism* (unusual beliefs and experiences, eccentricity, perceptual dysregulation; APA, 2013c) and *Openness* (fantasy, aesthetics, feelings, actions, ideas, values; Costa & McCrae, 1992), it is not a correlation hypothesised, but one still being explored (Al-Dajani et al., 2016; Gore & Widiger, 2013; Griffin & Samuel, 2014; Thomas et al., 2013). In response, we utilised the MINI Subscale K as alternative measure of psychoticism to be correlated with the PID-5-BF *Psychoticism* scale. As
of yet, there has not been a study that specifically compared the PID-5-BF *Psychoticism* scale with the MINI Subscale K, which specifically measures psychotic components. Since validity and reliability for the MINI (Lecrubier et al., 1997; Sheehan et al., 1998), has been established, it is safe to assume its relevance as sufficient for comparison purposes. The correlation found between *Psychoticism* and MINI Subscale K proved to be sufficient ($r = 0.66; R = 43.56\%$). In that regard, the PID-5-BF *Psychoticism* scale may be seen as adequately assessing the probability of psychotic symptoms. It should be noted though that whereas the MINI Subscale K focuses on more severe psychosis (e.g., hallucinations/delusions present with schizophrenia), the PID-5-BF scale of *Psychoticism* focuses on psychotic symptoms related to personality pathology, such as dissociation. We recommend that the *Psychoticism* scale therefore be compared to other, more similar in construct, scales in future research.

The construct *Agreeableness* comprises empathy, compassion, trust, compliance and cooperation, altruism, modesty and tendermindedness (Costa & McCrae, 1992; John & Srivastava, 1999; Laursen, Pulkkinen & Adams, 2002). It has been mentioned that *Agreeableness* plays a key role in psychological well-being, as positive affect and healthy, friendly interpersonal relationships help to anchor resilience, in turn facilitating efficacy and success (Laursen et al., 2002). On the other hand, *Antagonism*, which may be described as manipulativeness, deceitfulness, grandiosity (APA, 2013c), being exploitative, violent and volatile (Pettersen et al., 2014), uncontrolled, hostile and impulsive (Laursen et al., 2002), predisposes one to maladaptive or antisocial behaviour. This, together with existing literature, therefore suggests that *Agreeableness* and *Antagonism* are each other’s inverses. Our study indicated that *Antagonism* was strongly correlated with *Agreeableness* in the negative ($r = -0.76$), supporting theory, indicating very good construct validity, and also convergent and divergent validity. Furthermore, *Antagonism* negatively correlated with two *Agreeableness* subscales, namely *straightforwardness* ($r = -0.59$; large effect) and *tendermindedness* ($r = -0.52$; large effect).
Conscientiousness may be described as the propensity to stay within social norms, as in controlling one’s impulses, delaying gratification and to be goal-directed (John & Srivastava, 1999). Costa and McCrae (1992) emphasises Conscientiousness as entailing traits of dutifulness, self-discipline, deliberation, achievement-striving, order and competence. In contrast, disinhibition refers to irresponsibility, impulsivity and distractibility (APA, 2013c). Disinhibition and Conscientiousness showed a significant negative correlation ($r = -0.70$). PID-5-BF Disinhibition additionally correlated negatively with all Conscientiousness subscales. Our results, in line with research, indicates an overlap between Disinhibition and a lack of Conscientiousness, which may be reflective of the trait domain’s temperamental core (Bogg & Roberts, 2004). This trait may have significant implications for, not only psychological well-being, but physical health as well. Individuals who are more disinhibited and therefore less conscientious, are more likely to engage in reckless and risky behaviour, such as alcohol or drug use (Acton, 2003; Bogg & Roberts, 2004; Vaidya, Latzman, Markon & Watson, 2010).

The results of our study indicate adequate construct validity for the PID-5-BF, as all constructs indicated to sufficiently measure the trait domain it was set out to measure, in a convergent and discriminant way in relation to similar assessments. The results also support existing literature on the PID-5-BF and FFM, further indicating support for the hybrid model of personality disorders as well. The use thereof in clinical settings may therefore be suggested. The PID-5-BF is not proposed as a fine-grained measure set out to assess the DSM-5 personality traits, but rather intends to screen for possible personality pathology, as specific hypotheses on categorical diagnoses cannot be made using only the PID-5-BF. However, the PID-5-BF can broadly describe areas of dysfunction to inform the need for additional assessments. It may also potentially allow for earlier detection of personality pathology, possibly preceding the development of more severe psychopathology, such as externalising problems (e.g., substance abuse, self-harming behaviour or aggressive behaviour), and internalising disorders (e.g., depression or anxiety) (Fossati et al., 2017), as these are commonly found to be comorbid with personality disorders.
Some limitations regarding the current study are noted. Although reliability was established for the PID-5-BF, it was done through establishing internal consistency reliability with Cronbach’s alpha values. This is a common method of investigating reliability, but test-retest analysis might establish more credible coefficients. Another limitation was possible common method variance as only one manner of data gathering was used. In future, it could be beneficial to use surveys, as was done in this study, in conjunction with other methods, for example, interviews, to increase objectivity and lessen method bias.

This study entailed a sample of 283 participants, and although power analysis indicated it as sufficient, a bigger sample could yield more statistically significant results. The sample was furthermore made up of a very specific demographic group (i.e., NWU students, 18-22 years), and future research could focus on extending the sample size and demography. Valuable information could also be obtained by assessing the psychometric properties within the South African mental health sector, as this is where the PID-5-BF would predominantly be used.

Conclusion

In conclusion, our study found the psychometric properties of the PID-5-BF to be in line with what has been indicated in literature. The PID-5-BF showed adequate reliability and validity when measured within a South African sample and correlated as expected in comparison to measurements of similar constructs. Our findings suggest that, although more research needs to be done, the PID-5-BF could be a promising tool to use in South African mental health facilities where time and economy are limited.
REFERENCES


doi:10.1177/1073191115621793


doi:10.1037/a0032822


doi:10.1521/pedi.2013.27.3.270


CHAPTER 3

CRITICAL REFLECTION

This chapter focuses on my personal reflection regarding the research process. It is centred around my experiences over the last few years – some positive, some negative, but all valuable to my learning. This process took me somewhat longer than initially planned.

For 8 years I had to push myself and keep myself motivated in pursuing my passion. After the third try, I was finally accepted for the Master’s program in Clinical Psychology and could not contain my excitement. This however changed quite drastically as soon as classes started. I had a completely different idea of what “research” meant, and only then learned about the various processes, and possible stumbling blocks I will be faced with. To be honest, I was taken aback and experienced an amount of anxiety like never before! Was I even capable of doing this? Or should I just quit while I’m a head? Spoiler alert: I didn’t quit!

Getting started

The original topics I wanted to work with, i.e. psychopathology amongst criminals, was quickly deemed as idealistic and unrealistic. I did not understand this, as at that stage I did not understand the major role ethics played in research. Hence, my supervisor suggested we look at new developments, such as the “hybrid model” for personality disorders in the DSM-5 Section III. As soon as he said “personality disorders” I immediately said yes. However, once we got started and contemplated the layout of the study (focused on the PID-5-BF), anxiety once again reared its unwelcome head. I realised that most of the study would focus on statistical analysis – something, I’ll admit, I had little to no experience with. But as my passion involves personality disorders, and working in state hospitals, I felt that this study might have an actual impact on clinical practice and policy, and somehow got the courage to face the challenge. That is how we decided on “The
psychometric properties of the PID-5-BF in an undergraduate sample of South African university students”.

**Ethics**

The process of receiving ethical clearance and going through three panels of ethical approval, proved to be a bigger struggle than expected. The process of getting approval from the first two panels was relatively straightforward and was easy enough to comply with. But my experience with HREC proved to be somewhat more of a challenge. Some of the problems I experienced with HREC will be mentioned here, some under subsequent headings.

Firstly, I made the mistake of attending my research’s HREC feedback meeting. I would not recommend that to any student – it was unnerving listening to other people criticising my work, without me having the opportunity to defend the reasoning behind certain things. I left the room with an intense mixture of emotions – ranging from fury, to sadness, to happiness. I also found the fact that only two of the people in the room was psychologists – and could not fathom how someone from a completely different field of study has the authority to comment on my research. At that stage I felt it to be a big problem as scope of practice indicates that a psychologist needs to assess and guide psychological research. What I came to learn and understood is that a multidisciplinary team is needed for an evaluation like this, especially since the main focus lies on following correct ethical procedures.

That said, even though this was a horrible experience I will never forget, there were some positive aspects I could take with me – this was the eventual feeling of happiness. Firstly, I got clearance, with some changes, which was amazing as now I could continue. I sent in my rebuttal and was granted final clearance. I also learnt about the ethical process and the influence it has on research. I became more aware of certain considerations I did not perceive as being unethical and learnt to be patient with the process and trust those more knowledgeable in the field.
This was however not the last contact I had with HREC. I submitted a request for amendment – I needed to change one of the tests I was going to use to another version of the same test. I waited seven weeks for feedback and approval, which severely slowed the progress of my study, as without approval I could not gather data. I feel this waiting period was exceptionally and unnecessarily long. It was brought to their attention and they did apologise as this was also not acceptable to the HREC panel. Probably, some form of miscommunication took place, and seeing as the members of HREC are overwhelmed with work and pressure, I completely understand this.

**The (actual) research process**

My biggest frustration throughout the entire experience, was that of gathering data. My method of data gathering was limited through HREC’s ethical approval, and as result I was only allowed to advertise through posters on campus boards and pamphlets handed out in classes. Having been a student on campus for several years, I know how people react to these types of recruitment – usually, though not in all cases, with a level of ignorance. I felt that this process of recruiting was sure to inevitably inhibit my process. And it did. It took months to gather data which ultimately almost slowed my progress to a stop. I really struggled to accept this and felt that sometimes ethical considerations are taken to an extreme. I understand that ethical principles are not necessarily imposed by the HREC committee but do feel like certain requirements or “taboos” are a bit unnecessary. If I may suggest, research on students’ perceptions of coercion and the use of incentives is needed to better understand their needs for participating in someone else’s research study. It does take a lot of time and perhaps giving a “thank you” (i.e. a sweet) should not be viewed as unethical.

But data was finally gathered, and analyses could commence. Obviously, as mentioned before, my lack of knowledge on statistics made this a very daunting experience. Luckily my data could be read into a statistics analysis program. I have to give great thanks to my co-supervisor for all his help regarding this. He also taught me a lot about statistics, and although I am not on expert level, my knowledge on statistics grew, as well as my confidence to write up results.
I was left with the final task of writing up the rest of my article for submission. I had to spend hours looking at others’ research, but I found it extremely interesting and satisfying linking my results to existing literature, in a way that assimilated! I never before regarded myself as a researcher, but have to admit that it was a great experience through which I grew and gained confidence in a field I was not particularly familiar with.

**Theory and practice**

After all these hurdles and hiccups I experienced, I managed to finish my dissertation. And even if I have to say so myself, I feel very proud of the end result. I believe that my research, albeit a very small foot in the door, could potentially benefit the South African mental health sector.

Our findings proved to be in line with existing literature on both the DSM-5 hybrid model and the PID-5-BF. Understand however, that the PID-5-BF still needs a lot of investigation in South Africa. We live in such a beautifully diverse country, and research on this test administered in different provinces, different cultures and demographics, would be both interesting and meaningful, especially if this can help the PID-5-BF be a registered test on the HPCSA’s list.

**Final words**

I experienced a difficult few years, albeit not without “ups”, but am extremely proud, and relieved, that it is now over. I grew as a researcher, in that I know finally understand statistics and am able to interpret findings, I understand the process of research, especially in South Africa a lot better and I have a better understanding of ethics. I do feel a need for South African research committees to revise policy, as proper, meaningful research is sometimes retrained when the amount of considerations seen as unethical weighs more than those deemed ethical.

I also grew as an individual. I learnt to be patient and accept certain processes as they are. I learnt that in some cases I am not in control, and I am allowed to not take it personally, but understand the impact of external forces. I gained a level of perseverance I did not have before, and
learnt how to encourage and motivate myself in situations where it was extremely difficult to do so.

I learnt that I am not too bad of a researcher, and actually quite enjoy it.

I leave you with words from my favourite psychologist:

“The privilege of a lifetime is to become who you truly are”

- Carl Gustav Jung
APPENDIX A

DECLARATION OF LANGUAGE EDITING

DECLARATION BY LANGUAGE EDITOR

Heleen Venema
37 Nature's Own
Dakota Avenue
Helderkruiin

I hereby declare that I have language-edited the mini-dissertation by Heleen Venema (student number [21629137]):

Psychometric properties of the PID-5 BF in an undergraduate sample of South African university students

submitted in the fulfilment of the requirements for the Master's degree in Clinical Psychology, North West University, Department of Humanities

to the satisfaction of the student.

Date: 7 February 2019

Dr A. D. Kotze

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APPENDIX B

SOLEMN DECLARATION

SOLEMN DECLARATION AND PERMISSION TO SUBMIT

1. **Solemn declaration by student**

   **Heleen Venema**

   declare herewith that the thesis/dissertation/mini-dissertation/article entitled *(exactly as registered/approved title)*.

   Psychometric properties of the PID-5-BF in an undergraduate sample of South African university students

   which I herewith submit to the North-West University is in compliance/partial compliance with the requirements set for the degree:

   **M.A. Clinical Psychology**

   is my own work, has been text-edited in accordance with the requirements and has not already been submitted to any other university.

   **LATE SUBMISSION:** If a thesis/dissertation/mini-dissertation/article of a student is submitted after the deadline for submission, the period available for examination is limited. No guarantee can therefore be given that (should the examiner reports be positive) the degree will be conferred at the next applicable graduation ceremony. It may also imply that the student would have to re-register for the following academic year.

   **Signature of Student**

   **Heleen Venema**

   **University Number**

   21629137

   Signed on this **11** day of **February** of **2019**

2. **Permission to submit and solemn declaration by supervisor/promoter**

   The undersigned declares that the thesis/dissertation/mini-dissertation complies with the specifications set out by the NWU and that:

   - the student is hereby granted permission to submit his/her mini-dissertation/ dissertation/thesis:
     - Yes ☐
     - No ☐

   - that the student’s work has been checked by me for plagiarism (by making use of Turnitin software for example) and a satisfactory report has been obtained:
     - Yes ☐
     - No ☐

   **Signature of Supervisor/Promoter**

   **Ruan Spies**

   **Date**

   11/02/2019

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