TURUN YLIOPISTO

THE LATENT STRUCTURE OF THE DARK TRIAD: UNIFYING MACHIAVELLIANISM AND PSYCHOPATHY

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University of Turku

Faculty of Social Science
Department of Psychology and Speech-Language Pathology
Doctoral Programme of Social and Behavioural Sciences

Supervised by

Docent Petri J. Kajonius
Department of Psychology
University West
Trollhättan, Sweden

Professor Antti Revonsuo
Department of Psychology
and Speech-Language Pathology
University of Turku
Turku, Finland

Docent Sakari Kallio
Department of
Cognitive Neuroscience
University of Skövde
Skövde, Sweden

Reviewed by

Associate Professor Vincent Egan
Department of Psychiatry and
Applied Psychology
University of Nottingham
Nottingham, United Kingdom

Senior Lecturer Minna Lyons
School of Psychology
University of Liverpool
Liverpool, United Kingdom

Opponent

Associate Professor Vincent Egan
Department of Psychiatry and
Applied Psychology
University of Nottingham
Nottingham, United Kingdom

The originality of this publication has been checked in accordance with the University of Turku quality assurance system using the Turnitin OriginalityCheck service.

ISBN 978-951-29-7854-0 (PRINT)
ISBN 978-951-29-7855-7 (PDF)
ISSN 0082-6987 (Print)
ISSN 2343-3191 (Online)
Painosalama Oy, Turku, Finland 2019

"*Science is the belief in the ignorance of experts.*"

Richard Feynman

"*Shall I refuse my dinner because I do not fully understand the process of digestion?*"

Oliver Heaviside

Abstract

The Latent Structure of the Dark Triad: Unifying Machiavellianism and Psychopathy

The Dark Triad (DT) has emerged as a popular extension to the extant literature on personality psychology. The DT is comprised of three similar and yet distinct constructs: Machiavellianism, narcissism, and psychopathy. Recent research has criticized the DT for suffering from a number of measurement problems, including a failure of existing Machiavellianism measures to adequately capture the construct. Prior research has chiefly been conducted using domain level information, thus neglecting item level information. The present thesis investigates the possibility of empirically distinguishing between DT constructs with particular focus on Machiavellianism and psychopathy, using item level information. In **Article I**, the Dirty Dozen inventory is analyzed using latent variable models in order to replicate its structural properties. Results indicate that narcissism is more independent from Machiavellianism and psychopathy than the latter two are with each other. These results provide initial evidence that Machiavellianism and psychopathy are empirically indistinguishable. In **Article II**, the Short Dark Triad (SD3) is analyzed in a series of factor analytic models testing whether Machiavellianism and psychopathy can be jointly modeled. The models fit similarly across two and three factor solutions, thus favoring a two factor model based on the principle of parsimony. In **Article III**, the SD3 is modeled using Item Response Theory in order to analyze how much information the SD3 provides across the latent trait continuum. Results indicate that SD3 items from the domain of Machiavellianism may be less severe in content than psychopathy items, thus yielding differential item endorsement rates, albeit along a unitary dimension. In **Article IV**, the overarching literature on Machiavellianism is extended by analyzing Machiavellianism items from 7 different measures using an hierarchical analysis. This analysis is subsequently compared with expert rated Five Factor model prototype scores o<f the DT constructs, in order to uncover the relative similarity between the Machiavellianism structure and prototype descriptions of the DT constructs. These analyses demonstrate that measures of Machiavellianism have a higher relative similarity to prototypical psychopathy and narcissism, than prototypical Machiavellianism. Taken together, these studies suggest that theoretical descriptions of Machiavellianism do not match empirical results, and further that Machiavellianism can be modeled jointly with psychopathy along a single dimension. Thus, the Machiavellianism research literature, which spans from the 1970s, is better conceptualized as psychopathy. The proper place of the DT in the overarching personality psychology literature is discussed.

Acknowledgements

Back in 2011, Petri ignited my interest in psychology at a time when I was more favorably disposed to philosophy. Eventually, he made me become more interested in academic life in general, which is a major reason for why I'm writing this at the moment. He helped in paving the way forward and I simply followed it. Petri probably holds the belief that I'd end up writing this thesis at some point, irrespective of his influence; he may be right, I don't know. What matters to me is that I'm happy with the journey, it's been a good deal of fun! So thanks a lot for leading the way along the road now traveled. I'm curious to see where the road ahead may lead!

I also want to thank my two other supervisors, Sakari Kallio, and Antti Revonsuo, who've been instrumental in making this PhD thesis possible. In addition to providing valuable feedback, they've also had many other roles. They were once my inspiring teachers, both have been my bosses at different points in time, fellow coworkers, and now supervisors. They recommended that I apply to the University of Turku, Finland, instead of trying to find my way in my native Sweden. This turned out to be solid advice, and they've both been very helpful in helping me find my way towards my goal of becoming a PhD, so thank you both!

I also want to extend my gratitude towards Danilo Garcia, one of the nicest (or perhaps I should say most decent) people I've ever had the pleasure of meeting. After a series of circumstances where I got acquainted with Danilo, he gave me the opportunity to conduct original research on my own terms. This opportunity was critical, for without it I probably wouldn't have pursued a career in research and my life would have been quite different. We've recently begun working more closely together, which was long overdue. I look forward to productive years ahead.

Finally, I want to thank my friends and family. I've spent a lot of time at work and everyone have been very understanding of my – at times admittedly excessive – single-mindedness. I have not and I still do not take this support for granted, so thank you all for it! I'd also like to thank Gabriel and Jessica, who've shown me who I am and who I am not.

B. P. — 08/02 -19

Contents

List of Publications

This thesis is based on four original articles. The studies are referred to in the text by the following Roman numerals:

Empirical Studies

I. Kajonius, P. J., Persson, B. N., Rosenberg, P., & Garcia, D. (2016). The (mis)measurement of the Dark Triad Dirty Dozen: Exploitation at the core of the scale. *PeerJ, 4*, e1748. doi:10.7717/peerj.1748

II. Persson, B. N., Kajonius, P. J., & Garcia, D. (2019). Revisiting the structure of the Short Dark Triad. *Assessment, 26*, 3–16. doi:10.1177/1073191117701192

III. Persson, B. N., Kajonius, P. J., & Garcia, D. (2017). Testing construct independence in the Short Dark Triad using item response theory. *Personality and Individual Differences, 117*, 74–80. doi:10.1016/j.paid.2017.05.025

IV. Persson, B. N. (2019). Searching for Machiavelli but finding psychopathy and narcissism. *Personality Disorders: Theory, Research, and Treatment, 10*, 235–245. doi:10.1037/per0000323

The four original studies are presented in the thesis in the order in which they were submitted for publication. The publications are reproduced in the Appendix of the printed version of this thesis with the permission of the copyright holders.

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List of Abbreviations

DT	Dark Triad
FFM	Five Factor Model
DSM	Diagnostic and Statistical Manual of Mental Disorders
PD(s)	Personality Disorder(s)
IPIP	International Personality Item Pool
IPIP-NEO	IPIP Representation of the NEO PI-R™
NPD	Narcissistic Personality Disorder
SD3	Short Dark Triad
DD	Dirty Dozen
MTurk	Amazon's Mechanical Turk
FA	Factor Analysis
EFA	Exploratory Factor Analysis
CFA	Confirmatory Factor Analysis
SEM	Structural Equation Modeling
IRT	Item Response Theory
RMSEA	Root Mean Square Error of Approximation
TLI	Tucker–Lewis Index
CFI	Comparative Fit Index
SRMR	Standardized Root Mean Square Residual
ECV	Explained Common Variance
I-ECV	Item Explained Common Variance

Chapter 1: Introduction

The Dark Triad (DT) is a constellation of three psychological constructs, namely Machiavellianism, narcissism, and psychopathy (Paulhus & Williams, 2002). Together, these three constructs reflect individual differences in manipulative and strategic thinking (i.e., Machiavellianism), entitlement and feelings of superiority (i.e., narcissism), and finally callousness and lack of empathy (i.e., psychopathy). These three constructs are referred to as "dark" because of their common themes of questionable morality, potential for aggression, and otherwise interpersonally dysfunctional characteristics. Such dark phenomena have traditionally been studied by clinical psychologists and psychiatrists. Indeed, psychopathy and narcissism (but not Machiavellianism) are classified as Personality Disorders (PDs) in psychiatric classification systems (e.g., American Psychiatric Association [APA], 2013), and have extensive research traditions in the clinical domain. Tradition notwithstanding, in recent years there has been significant integration of clinical psychology, psychiatry, and personality psychology. This integration consists of the realization that normal and abnormal personality can be conceptualized along dimensions (as opposed to categories, or types) within the unified framework of the Five Factor model (FFM), which consists of the five broad bi-polar domains: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (Costa & McCrae, 1992d).

The DT constructs show considerable overlap, but the main focus of this thesis is their dissimilarities. More specifically, recent research on Machiavellianism and psychopathy suggests that these putatively different constructs are better represented as a unitary phenomenon (e.g., Glenn & Sellbom, 2015; Miller, Vize, Crowe, & Lynam, 2019). The validity of this claim and the utility of a unified model are the main concerns presently. While the distinction between Machiavellianism and psychopathy is the focal point of this thesis, narcissism is nevertheless an important point of discussion in order to contextualize effect sizes across the literature and as a point of comparison for Machiavellianism and psychopathy.

The importance of construct discreteness is substantial. Machiavellianism has been studied since the late 1960s (Christie & Geis, 1970) and continues to be utilized in many applied research areas, including work and organizational psychology (e.g., Belschak, Hartog, & Hoogh, 2018; Palmer, Komarraju, Carter, & Karau, 2017).

While such research is not problematic in itself, the failure to recognize the substantial overlap between Machiavellianism and psychopathy has led to parallel research literatures, which I argue, introduces unnecessary and confusing additions to a research literature that should preferably be merged. This argument is not new. In fact, it was introduced by McHoskey, Worzel, and Szyarto (1998), more than 20 years ago. Neither is this problem unique to Machiavellianism and psychopathy. Indeed, Kelley (1927) introduced the jingle-jangle fallacy to illustrate a common problem in the conceptualization of psychological constructs. Jingle refers to two constructs with equivalent labels that really reflect different phenomena, whereas jangle refers to when one construct is given multiple names. Machiavellianism and psychopathy, I argue, suffers from the latter, the jangle fallacy (cf. Block, 1995).

The DT has emerged as a very popular construct – the seminal introduction of the DT has been cited more than 2,500 times according to Google Scholar (Paulhus & Williams, 2002) – but its construct validity is nevertheless questionable. One issue pertains to the use of short inventories for assessment of the DT, such as the Dirty Dozen (DD; Jonason & Webster, 2010) and Short Dark Triad (SD3; Jones & Paulhus, 2014). These inventories were introduced because of the lengthiness of the extant measures used early DT research, which required at least 91 items (Jonason & Webster, 2010). Thus, when studying the DT in unison with other constructs, the total number of items could easily exceed 100, which in some research contexts can be inefficient. Accordingly, shorter inventories were introduced as remedies, but short measures have both benefits and drawbacks. One particularly pressing issue in this case is the neglect of multidimensionality, or heterogeneity, within each DT construct (Miller et al., 2019). All three DT constructs reflect complex phenomena that are at risk of being oversimplified when measures are shortened. Importantly, there are substantial measurement issues inherent in the longer measures, as well. As this dissertation focuses on the construct validity of the DT, measurement plays a prominent role throughout. The importance of reliable measurement is that it serves as the foundation for the validity of subsequent findings (Borsboom, 2006; Flake & Fried, in press).

The structure of this dissertation is as follows: Before describing the particular research studies conducted by me and my colleagues, a description of the recent integration of personality psychology and psychiatry is necessary. This integration is currently underway and as a consequence, the FFM and Personality Disorder (PD) literatures are merging together. This integration is described in more detail in Chapter 2. The DT is reviewed in more detail in Chapter 3 and its focus is particularly on construct validity and assessment related issues. Being that this thesis takes the distinction (or lack thereof) between Machiavellianism and psychopathy as its focal point, it is also necessary to describe and discuss statistical methods relevant for understanding how psychological constructs are delineated, in particular how the process

of construct validation (Cronbach & Meehl, 1955; Tay & Jebb, 2018) is conducted in personality research. This discussion takes place in Chapter 4. Having presented these necessary foundations, the empirical studies are described in greater detail in Chapter 5 and discussed in Chapter 6. The studies are also briefly described below.

The primary aim in the present studies is to better understand the empirical overlap between Machiavellianism and psychopathy. A secondary aim is to further investigate the utility of the FFM in explaining all three DT constructs. An auxiliary aim is to provide an explanation as to why Machiavellianism and psychopathy produce differential criterion correlations, given their high overlap. Additionally, an overarching goal is to illustrate how personality trait configurations (i.e., personality trait profiles) are different from personality types, which have been the dominant perspective in PD research historically. This gradual change from categorical (i.e., types) to dimensional (i.e., configurations) models has been characterized as a paradigm shift for personality and psychopathology research (John, Naumann, & Soto, 2008; cf. Kotov, Krueger, & Watson, 2018). This change entails the possibility of anchoring disparate personality constructs, such as the DT, in a unified framework, which in turn makes the present research more relevant for the overarching literature on personality and individual differences.

Article I investigates the factor structure of a popular and often-used DT inventory, the DD (Jonason & Webster, 2010). Its factor structure was replicated in a relatively large sample (N = 3,698). Additionally, this inventory was subjected to analyses aimed at better understanding both the commonality across the DT constructs as well as item-specific characteristics. This study was one of the first to suggests that Machiavellianism and psychopathy could be unified and furthermore that interpersonal exploitation seemed to be a common theme in the DT constructs.

Article II consists of three different studies aimed at replicating and extending previous results on the SD3 (Jones & Paulhus, 2014) inventory. Using a priori specified factor models in which Machiavellianism and psychopathy are both modelled jointly and separately, we demonstrate that these putatively different domains can be represented as a single construct. We suggest that a combined (i.e., Machiavellianism + psychopathy) model is preferable based on the principle of parsimony. These findings also have theoretical consequences pertaining to the measurement of Machiavellianism, being that concurrent evidence also suggests that measures of Machiavellianism are more similar in their empirical profiles to psychopathy, thus suggesting that measures of Machiavellianism more closely correspond to what one would expect from psychopathy.

Article III investigates item properties of the SD3 using other analytic techniques than those used previously. Our results again indicate that Machiavellianism and psychopathy indeed are preferable to model together than apart, although it seems that items measuring Machiavellianism are phrased less harshly than psychopathy

items. Thus, although these two domains can be modeled as one, item endorsement rates will likely differ which plausibly affects external correlations. These findings are also extended by illustrating the negative consequences of including narcissism in a combined model (i.e., one model with all three DT constructs). This further suggests that narcissism is more different to Machiavellianism and psychopathy than those two constructs are to each other.

Article IV recognizes the limitations of previous studies (those presented herein and those conducted by others) and thus extends the literature by collecting data on a large set of Machiavellianism items. These items are organized in hierarchical factors and subsequently compared against expert rated profiles of Machiavellianism, narcissism, and psychopathy. The results show that items putatively measuring Machiavellianism are more similar to both psychopathy and narcissism, as rated by experts, than to prototype Machiavellianism. This study shows that inventories purported to measure Machiavellianism more accurately reflect prototypical ratings of psychopathy. It further illustrates the utility of the FFM in describing a wide range of phenomena, including the DT constructs. The importance and relevance of these studies are subsequently discussed in Chapter 6 where they are contextualized within the broader FFM framework.

Chapter 2: Normal and Abnormal Personality

In the past decade, a lot has happened in terms of integrating psychiatric classification and personality assessment. Development in this area has been particularly driven by the most recent revision of the predominant psychiatric classification system, the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM*). In order to place this development in its proper place, this chapter takes the *DSM-III* (APA, 1980) as its starting point. This description includes the particulars of how normal (i.e., adaptive, functional) and abnormal (i.e., maladaptive, dysfunctional)[1] personality have ultimately become integrated in a unified model (Hopwood, 2018). This unification has its roots in the increasing concerns (see Cuthbert & Insel, 2010; Insel et al., 2010; Livesley, 2010) about the fifth edition of the *DSM* (*DSM-5;* APA, 2013), produced and published by the APA.[2] This chapter begins by describing the *DSM*, including a few examples of substantial problems inherent in the *DSM* paradigm. Particular focus is placed on PDs and their relation to the FFM.

2.1 The *DSM* Paradigm

For a long time, mental disorders – including PDs – have been thought of as natural categories, or what is sometimes referred to as taxa (Meehl, 1992). Taxa refer to discrete differences between conditions, such that one is either schizophrenic or not. A dimensional model, on the other hand, posits that an individual may be schizophrenic to some degree. Evidence suggests that most *DSM* disorders are dimensional in nature (Haslam, Holland, & Kuppens, 2012; Widiger & Samuel, 2005; Wright et al., 2013; see also Borsboom et al., 2016). The prevailing paradigm for psychiatric classification was established in the *DSM-III* (APA, 1980). *DSM-III* introduced two major features not present in previous classification systems: diagnostic criteria for

Parts of this chapter have been adapted from Persson (2019a).

[1] The word "maladaptive" in this context does not refer to evolutionary function, but rather what DeYoung and Krueger (2018) refer to as "cybernetic function" (or dysfunction). That is, it refers to the extent to which an individual succeeds or fails to make progress toward important life goals.

[2] For a more detailed review of the development of the different *DSM* editions, see Blashfield, Keeley, Flanagan, and Miles (2014).

each mental disorder category and a multiaxial system (Blashfield et al., 2014). Editions prior to *DSM-III* did not use explicit diagnostic criteria but instead relied only on prose definitions for each mental disorder, which led to poor inter-rater reliability (Blashfield et al., 2014). The multiaxial system was meant to be useful for providing comprehensive diagnosis, as each patient was expected to be diagnosed on five separate axes (see Blashfield et al., 2014). The five axes were meant to describe: (I) the presence of mental disorder categories (e.g., schizophrenia); (II) personality dysfunction and intellectual disability; (III) medical disorders relevant to the patient's psychiatric presentation; (IV) stressors in the social environment; and (V) an assessment of overall adaptive functioning.

The *DSM-III* approach is often referred to as neo-Kraepelinian (Blashfield, 1984), as it shared the philosophy of Emil Kraepelin (1856–1926), in that it moved away from psychoanalysis and toward methods from traditional medicine. The *DSM-III*, like Kraepelin, emphasized signs (observable manifestations), symptoms (subjective reports), and natural history (trajectory over time), instead of psychoanalytic concepts, which were more influential in *DSM-I* and *DSM-II* (see Blashfield et al., 2014; Lilienfeld, Smith, & Watts, 2013; Lilienfeld & Treadway, 2016).

The *DSM-IV* (APA, 1994) grew in size,[3] but not much changed in the approach or underlying philosophy. One of the things that changed was a gradual move towards polythetic diagnostic criteria, which as opposed to monothetic criteria, means that signs and symptoms are neither necessary nor sufficient for diagnosis (Lilienfeld et al., 2013). Monothetic criteria are useful as they maximize homogeneity within PD categories, as all individuals in a diagnostic category share traits. Conversely, the polythetic approach leads to diagnostic heterogeneity. For instance, borderline PD includes 256 different criteria combinations, all yielding the same disorder. Remarkably, for some diagnoses in the *DSM-IV*, it is possible for two patients to have no overlap in diagnostic criteria (Lilienfeld et al., 2013). For a clinician to be expected (perhaps required) to provide the same treatment, for individuals who share no diagnostic criteria, clearly points to an inherent problem in the *DSM-IV* model. Accordingly, polythetic criteria have been criticized for creating overly heterogeneous patient groups (Krueger, 2013), while monothetic criteria suffer from the opposite problem, creating overly narrow groups, thus not allowing for conditional indicators that may not be present in all cases (Widiger & Frances, 1985). The issues surrounding both monothetic and polythetic criteria are well established (see e.g., Cooper, Balsis, & Zimmerman, 2010; Pfohl, Coryell, Zimmerman, & Stangl, 1986).

The *DSM-IV* model contains 10 PDs: Paranoid, Schizoid, Schizotypal, Antisocial, Borderline, Histrionic, Narcissistic, Avoidant, Dependent, and Obsessive-compulsive. There is also an 11th category: PD not otherwise specified (PD–NOS)

[3] Interestingly, while the *DSM* grew in size generally, the PD section decreased in size.

which was meant to be used when none of the other PDs fit a patient's symptoms. Because patients often do not fit neatly into PD categories, patients are either given multiple diagnoses (which is known as the problem of comorbidity, see Cramer, Waldorp, van der Maas, & Borsboom, 2010) or placed in the PD–NOS category (Verheul & Widiger, 2004). Both approaches cause substantial problems in clinical decision making: PD–NOS is unspecific and comorbidity dictates that an individual may fulfill criteria for three different diagnoses, thus raising questions about which diagnosis to treat, and how.

2.1.1 *DSM-5*: Empirical Evidence, Opposition to Innovation, and Steps Forward

One major effort undertaken in the *DSM–5* (APA, 2013) was the attempt at replacing the previous (i.e., *DSM–IV–TR*, text rev.; APA, 2000) categorical model of PD with a dimensional model. This development was predicated on accumulating evidence that PDs are better conceptualized (and modeled statistically) as continuous and not as discrete phenomena (e.g., Markon, Chmielewski, & Miller, 2011; Trull & Durrett, 2005). These findings ran in parallel with the insight that taxonomies of normal personality could help shape models of pathological personality (see e.g., Widiger & Mullins-Sweatt, 2009; Widiger & Trull, 2007).

The effort to replace the categorical model fell short and the *DSM–IV–TR* personality disorder section was copied verbatim into the *DSM–5*. The dimensional model was ultimately placed in a section called "Emerging Measures and Models" (APA, 2013, p. 729). Plenty has been written about issues within the *DSM–5* task force (Frances, 2009; Spitzer, 2009), the inner workings of the Personality Disorder Work Group (e.g., Gunderson, 2013; Skodol, Morey, Bender, & Oldham, 2013; Zachar, Krueger, & Kendler, 2016), including the resignation of two of Work Group members (e.g., Livesley, 2012; Verheul, 2012), and finally reflections about the aftermath and efforts to improve future revisions of psychiatric classification systems (e.g., Lilienfeld, 2014; Widiger & Crego, 2015). The purpose here is merely to expand on how the *DSM* has become increasingly entangled with personality psychology, a process which is likely to go even further in both future *DSM* editions and in psychopathology research more generally.

2.2 Dimensions of Normal and Abnormal Personality

During the *DSM–5* revision process, one concern was that much of the literature reviewed in support of a dimensional model contained studies of normal and not clinical populations. Much of this evidence, undoubtedly, relied on the FFM (Costa, McCrae, & Löckenhoff, 2019; Costa & McCrae, 2017; McCrae & John, 1992), which

is comprised of five broad bipolar personality domains: extraversion, agreeableness, openness to experience, neuroticism, and conscientiousness. Bipolarity refers to that all five domains denote opposing behavioral tendencies on the different sides of the spectrum (e.g., fearfulness vs. fearlessness are descriptors of opposite ends of trait anxiety). There is good theoretical and empirical evidence supporting that this bipolarity is also reflected in maladaptivity at both poles, meaning that both e.g. extremely low and high trait agreeableness can be maladaptive (Widiger & Crego, 2019). This concept is further exemplified in Table 2.1.

Together, these domains are both impressive descriptive taxonomies of personality phenotypes, as well as reliable predictors of a great variety of consequential outcomes (Grucza & Goldberg, 2007; Ozer & Benet-Martinez, 2006; Soto, 2019). The FFM allows for individual profile scores, meaning that an individual is assessed on each of the five dimensions. This procedure creates a more refined picture of an individual's personality than placement in a discrete category. In other words, knowing that one belongs to the 87th percentile in extraversion is more informative than being placed in a category of "extraverts" (i.e., a category into which everyone with extraversion scores above the mean is placed).

In commonly used personality inventories, the five domains are further divisible into facets. These facets represent personality at a more detailed level of analysis. In recent years, describing personality at different levels of abstraction has become increasingly common, with analyses of nuances (which refers to individual questionnaire items; Mõttus, Kandler, Bleidorn, Riemann, & McCrae, 2017), aspects (DeYoung, Quilty, & Peterson, 2007), and higher-order factors, or so-called *metatraits*, such as alpha-beta (Digman, 1997), stability-plasticity (DeYoung, 2006), and the general factor of personality (Musek, 2007; Rushton & Irwing, 2008).

During the creation process of the *DSM–5*, the Personality Disorder Work Group ultimately proposed a model inspired by the FFM, which included five broad maladaptive domains (with adaptive FFM equivalents in parentheses) negative affectivity (neuroticism), detachment (introversion), antagonism ((dis)agreeableness), disinhibition (low conscientiousness), and psychoticism (openness to experience). In addition to these five broad domains, the model consists of 25 facets in total. During the process of validating this model, an instrument called the Personality Inventory for *DSM–5* was created (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012; Suzuki, Samuel, Pahlen, & Krueger, 2015), which in recent years has been proven to be psychometrically sound (Hopwood, Thomas, Markon, Wright, & Krueger, 2012; Morey, Krueger, & Skodol, 2013; Thomas et al., 2013), and more clinically useful than the *DSM–IV* model (Morey, Skodol, & Oldham, 2014). It should also be noted that substantial effort has been put into integrating normal and abnormal personality models, both historically (e.g., Cloninger, 1987; Cloninger, Svrakic, & Przybeck, 1993; Eysenck, 1947), and more recently (Markon, Krueger, & Watson,

2005; Widiger & Simonsen, 2005), which has ultimately yielded FFM based models that describe both normal and abnormal personality functioning across multiple levels of abstraction (Caspi et al., 2014; Hengartner, Ajdacic-Gross, Wyss, Angst, & Rössler, 2016a; Kendler et al., 2017; Krueger & Markon, 2014; Mõttus et al., 2017; Rosenström et al., 2018).

Establishing a joint conceptualization of general psychopathology, normal and abnormal personality, and the DT is no easy task, but approximate relations between these domains are presented in Figure 2.1. As the figure suggests, psychopathology is a broad domain of general mental illness. PDs are a subset of psychopathology that can be explained, at least in part, by the FFM. The DT is a partial subset of PDs, because Machiavellianism is not technically a PD. Further, the DT can be explained by the FFM, but the opposite relation does not hold, as the FFM describes far more than the DT. Although not fully recognized in psychiatric nosology, personality trait models are also able to account for some of the variance in psychopathology that are not formally defined as PDs (i.e., Axis I disorders in the *DSM* system), such as substance abuse disorders, phobias, and major depression (e.g., Kotov, Gamez, Schmidt, & Watson, 2010). This diagram is meant to be a rough approximation of the overlap between these domains, mainly for illustrative purposes. Depending on exact definitions of each conceptual domain, the overlap between domains are bound to change to some extent.

2.3 The Lexical Hypothesis

Sir Francis Galton was the originator of the "lexical hypothesis", which states that individual differences in personality are encoded in natural language (Goldberg, 1993). While Galton (1884) may have been first, Allport and Odbert (1936) made the most notable headway in the empirical study of the lexical hypothesis. Initially, they extracted a total of 17,953 terms (roughly 4.5% of the total English vocabulary) from an unabridged English dictionary. Each term was meant to describe some form of human behavior. This list was subsequently reduced, by both Allport and Odbert (1936), themselves, and by others (e.g., Cattell, 1943; Goldberg, 1982; but for a more detailed description, see John, Angleitner, & Ostendorf, 1988).

One pioneer of individual differences research was L. L. Thurstone, who early on analyzed 60 trait adjectives and found that five factors were "...sufficient to account for the coefficients" (Thurstone, 1934, p. 13). Thurstone also managed to capture the essence of what would become the main approach to studying personality in the future.

> It is of considerable psychological interest to know that the whole list of sixty adjectives can be accounted for by postulating only five independent

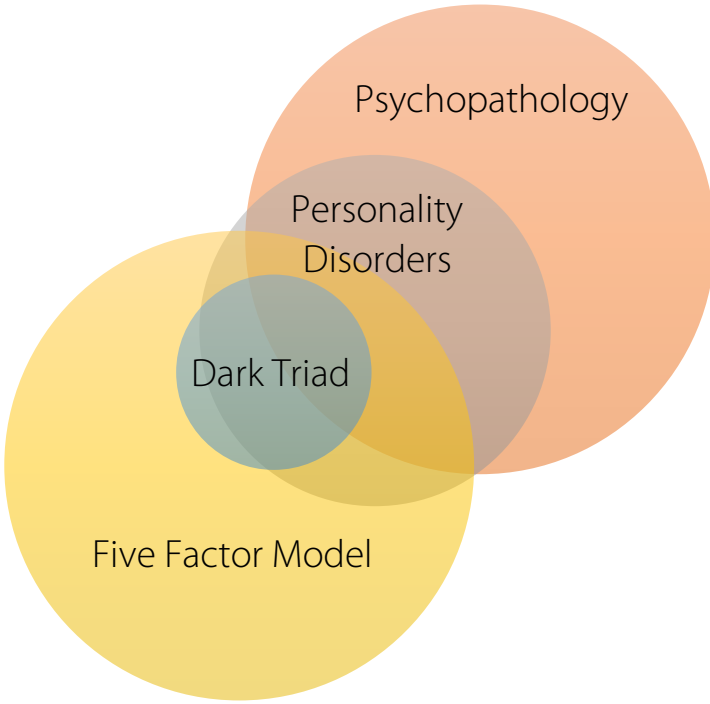

Figure 2.1. The relations between psychopathology, personality disorders, the Dark Triad, and the Five Factor model.

> common factors. It was of course to be expected that all of the sixty adjectives would not be independent, but we did not foresee that the list could be accounted for by as few as five factors. This fact leads us to surmise that the scientific description of personality may not be quite so hopelessly complex as it is sometimes thought to be (Thurstone, 1934, pp. 13–14).

This psychometric line of research generated a plethora of theories and models. Among the more well-known are Cattell's 16PF (Cattell, Eber, & Tatsuoka, 1970; Cattell & Krug, 1986), and Eysenck's Big Three (Eysenck, Eysenck, & Barrett, 1985). However, out of all of the models, only five factors have replicated across a wide variety of data sets (for reviews, see Costa & McCrae, 1992a; Digman, 1990; Goldberg, 1993; although note that there are contrarian views; Block, 1995; Eysenck, 1992).

2.4 Personality Traits

The existence of personality traits have been subject to much dispute, so much so, that Lewis Goldberg (1993, p. 26) opened his most cited paper satirizing the issue: "Once upon a time, we had no personalities (Mischel, 1968)." Here, Goldberg refers to a

seminal book by Walter Mischel (1968), which more or less singlehandedly caused a hiatus in personality research. Mischel (1968, p. 146) argued that "[w]ith the possible exception of intelligence, highly generalized behavioral consistencies have not been demonstrated, and the concept of personality traits as broad dispositions is thus untenable". With this in mind, two things need clarification: one of which is empirical, and the other theoretical. Regarding the former, Mischel (1968) argued that because the correlation between personality and various outcomes is seldom above .30, personality can be disregarded. It is easy to dispute this conclusion, as a correlation of .30 is a substantial effect in social sciences (Gignac & Szodorai, 2016; Meyer et al., 2001). Regarding the latter, theoretical issue, a lot has been said about the so-called person vs. situation debate, which refers to whether situations or personality are most important for determining behavior (e.g., Fleeson, 2004; and references therein, but see also Hogan, 2009). Rorer and Widiger (1983, p. 445) framed the issue nicely:

> In one sense this widespread acceptance [of a situationist viewpoint] seems strange, because we have never met anyone who, from a behavioral viewpoint, was not a trait theorist. If one really believes that situations determine behavior, then there is no reason to test or interview prospective employees for jobs such as police officer, it is only necessary to structure the job situation properly. Picking a mate would simply be a matter of finding someone whose physical characteristics appeal to you. In a properly managed class all students would work up to their abilities. Do you know anyone who believes these things? Obviously not. Why, then, have so many intelligent people come to espouse a theoretical point of view that none of them practices?

Accordingly, while the behavior of an individual certainly differs across situations, from the perspective of contemporary personality psychology, people also follow routines over time, and are thus, to some extent, predictable. More than that, people have relatively stable dispositions (i.e., traits) that are influential in a wide variety of life outcomes (Ozer & Benet-Martinez, 2006; Soto, 2019), including academic achievement (Poropat, 2009), relationship satisfaction (Malouff, Thorsteinsson, Schutte, Bhullar, & Rooke, 2010), psychopathology (Kotov et al., 2010), and most relevant for this dissertation, personality disorders (Samuel & Widiger, 2008).

With that said, the utility of the FFM does not elucidate what a trait actually is and the trait concept is, indeed, contentious. Personality psychologists have long promoted traits as substantively important concepts for explaining a person's behavior. For example, more than 50 years ago, Allport wrote that "Scarcely anyone questions the existence of traits as the fundamental units of personality. Common speech presupposes them. This man, we say, is *gruff* and *shy*, but a *hard worker*; that woman is

fastidious, *talkative*, and *stingy*" (Allport, 1961, p. 332). While scarcely any personality psychologist question traits – at least the utility of trait based measures – traits are nevertheless predicated on a number of assumptions (Wakefield, 1989). Furthermore, personality psychologists are not in complete agreement with regards to what the term "trait" refers to (Pervin, 1994). For instance, Wiggins (1973, as cited in Pervin, 1994) argued that "traits are 'lost causes'; their existence requires, rather than provides, a scientific explanation" (p. 109). Moreover, the traditional definition of traits, namely that they are "relatively enduring patterns of thoughts, feelings and actions" (Costa & McCrae, 2008, p. 160) does not really answer what "a pattern of thoughts" refers to. The interested reader can consult Wakefield (1989) for a philosophical perspective on traits, or a special issue of the *Journal of Research in Personality* for more detailed elaborations on different trait theories (Fajkowska & DeYoung, 2015).

An additional fact, related to the discussion above, requires brief attention. Personality psychology has been largely (but far from entirely) reliant on self-reports, and a lot has been said about what self-reports actually represent. Few, if any, personality psychologists view self-reported behavior as completely veridical. Exactly what is measured in a self-report personality inventory is difficult to say (although the theories alluded to above may provide some idea). One skeptical view is that of Hogan and Foster (2016), who question what they call "self-report theory", which supposedly posits that individuals play back their lives in their heads when asked a question about themselves. They argue that this is factually incorrect, as such a theory fails to acknowledge the importance of human memory. The human brain does not record internal video tapes that represent reality, and so we cannot reliably assess how many books a year we read (which a questionnaire may ask). Indeed, Hogan and Foster (2016) posit that responses to self-report questionnaires is an engagement in reputation control, and are thus not informative about what people are actually like, but what they like to present to others. This view has been criticized by others, who take different stances (DeYoung, 2017; Funder, 2017). Another take on this issue was provided long ago by Paul Meehl (Meehl, 1945), who argued that the scoring of personality tests is not dependent on the responses being true in an objective sense. Meehl used several examples, but one illustration suffices:

> Consider the MMPI [Minnesota Multiphasic Personality Inventory; a standardized test still in use today] scale for detecting tendencies to hypochondriasis. A hypochondriac says that he has headaches often, that he is not in as good health as his friends are, and that he cannot understand what he reads as well as he used to. Suppose that he has a headache on an average of once every month, as does a certain "normal"

> person. The hypochondriac says he often has headaches, the other person says he does not. They both have headaches once a month, and hence they must either interpret the word "often" differently in that question, or else have unequal recall of their headaches. According to the traditional view, this ambiguity in the word "often" and the inaccuracy of human memory constitute sources of error, for the authors of MMPI they may actually constitute sources of discrimination (Meehl, 1945, p. 298).

Accordingly, the MMPI could be used to test for the presence of hypochondriasis; whether the responses were veridical was not necessarily that important. The more important concern is whether individuals believe what they are reporting. These issues are continually discussed in the scientific literature, but there are no simple answers.

2.5 The Five Factor Model and HEXACO

The FFM (Costa & McCrae, 1992b, 2017; McCrae & John, 1992) or the "Big Five" (Goldberg, 1990)[4] describe the five broad personality domains uncovered in the research started by Gordon Allport. Figure 2.2 depicts an example conceptualization of the personality trait hierarchy. Note that the facet names are taken from the International Personality Item Pool Representation of the NEO PI-R™ (IPIP-NEO), and the aspects and higher-order domains are adopted from DeYoung et al. (2007). Nuances are omitted for ease of presentation. Additionally, a sixth factor, Honesty–Humility, from the HEXACO model,[5] is included using dashed lines, to indicate its distinctness from the FFM. The HEXACO model is particularly relevant in this thesis because HEXACO–Honesty-Humility (HH) has been shown to be a viable alternative to the DT. Indeed, a recent study showed a latent variable correlation between HH and DT of .95, suggesting that the two are almost identical (Hodson et al., 2018).

It should be noted that different personality models utilize different terminology and also differ substantively to some extent. For instance, the HEXACO model, in addition to adding a sixth factor, differs in the original five. HEXACO–Agreeableness is meant to capture irritability and temperamentalness, which belongs to emotional stability in the FFM. An incomplete list of trait terms and their organization in FFM language is presented in John et al. (2008, pp. 115, 120). In

[4] Some scholars make a distinction between the FFM and the Big Five (John & Robins, 1993). Goldberg (1993) articulates some of the differences, including that the fourth factor is "emotional stability" in the FFM and the opposite, i.e. "neuroticism" in the Big Five. Such minutiae play a very minor role in the studies presented in this thesis. Accordingly, the FFM and Big Five terms are used interchangeably throughout.

[5] HEXACO is an abbreviation of Honesty-Humility, Emotionality, eXtraversion, Agreeableness, Conscientiousness, and Openness to Experience

six subsequent sections, each trait domain is explored in more detail. Please note, however, that these descriptions are kept relatively short and are merely used as brief descriptions about the contents of each domain. The interested reader is directed towards other, more detailed, literature (Digman, 1990; McCrae & Costa, 1997, 2003; McCrae, Terracciano, & 78 Members of the Personality Profiles of Cultures Project, 2005; Widiger, 2017; Widiger & Costa, 2013).

2.5.1 Agreeableness

John et al. (2008, p. 120) describes high agreeableness as a "prosocial and communal orientation toward others" and contrasts it with low agreeableness, referring to an antagonistic and self-centered orientation. Others have pointed to agreeableness as being fundamentally saturated by a motivation to maintain positive relations with others (Graziano & Eisenberg, 1997). Similarly, the IPIP-NEO (Johnson, 2014) personality trait description (see http://ipip.ori.org/) of agreeableness states that:

> Agreeableness reflects individual differences in concern with cooperation and social harmony. Agreeable individuals value getting along with others. They are therefore considerate, friendly, generous, helpful, and willing to compromise their interests with others'. Agreeable people also have an optimistic view of human nature. They believe people are basically honest, decent, and trustworthy.
>
> Disagreeable individuals place self-interest above getting along with others. They are generally unconcerned with others' well-being, and therefore are unlikely to extend themselves for other people. Sometimes their skepticism about others' motives causes them to be suspicious, unfriendly, and uncooperative.

In the IPIP-NEO (Johnson, 2014), agreeableness consists of six facets: trust, morality, altruism, cooperation, modesty, and sympathy (see also Figure 2.2). In the NEO-PI-R (Costa & McCrae, 1992b), the facets are called: trust, straightforwardness, altruism, compliance, modesty, and tendermindedness. The correlation between the IPIP-300 domain and the NEO-PI-R domain of Agreeableness is .83, with facets ranging from .62 to .78. Previous research at the aspect level of analysis has yielded the higher-order dimensions politeness and compassion, the former perhaps highlighting the more social aspects of agreeableness whereas the latter may suggest deeper emotional content.

In recent years, a multitude of studies has utilized various factor analytic techniques in order to reduce large sets of items supposed to tap one domain (e.g., agreeableness). One such example analyzed a total of 131 items from five different personality inventories, each meant to assess agreeableness (Crowe, Lynam, & Miller,

2017). A series of analyses yielded a five factor solution in which the bipolar factors were labeled compassion vs. callousness, morality vs. immorality, modesty vs. arrogance, affability vs. combativeness, and trust vs. distrust.

2.5.2 Extraversion

Extraversion reflect individual differences in the tendencies to experience and exhibit positive affect (Wilt & Revelle, 2017), which makes it highly relevant to the field of positive psychology (Costa & McCrae, 1980). Extraversion further stands out with regards to personality disorders insofar as it, together with trait neuroticism, forms two separate but correlated trait dimensions indicative of positive and negative affect (Rusting & Larsen, 1997). This dual-aspect of well-being has been documented independently in the well-being literature (e.g., Keyes, 2007), albeit with other terminology. Fundamentally, extraversion has been used to describe differences in the inner life of individuals, with extraverted people being more externally oriented (i.e., more focused on the external world) and introverts being more focused on their own, inner worlds (Wilt & Revelle, 2017). Prior work by scholars such as Allport, Cattell, and Eysenck generated many questions regarding what each trait domain ought to contain. Extraversion is no different (e.g., Eysenck, 1977; Guilford, 1975). I chose, however, not to dwell on these historical details and instead describe the contemporary model of extraversion's lower-order structure. Costa and McCrae (1992b) posit warmth, gregariousness, assertiveness, activity-level, excitement-seeking, and positive emotion as facets of extraversion (cf. Figure 2.2).

2.5.3 Neuroticism

Neuroticism is a broad domain reflecting individual differences in negative affect (Tackett & Lahey, 2017). It has been defined as "the tendency to experience frequent, intense negative emotions associated with a sense of uncontrollability (the perception of inadequate coping) in response to stress" (Barlow, Ellard, Sauer-Zavala, Bullis, & Carl, 2014, p. 481). Although different models describe neuroticism using different terminology (e.g., the HEXACO uses the domain name emotionality and Goldberg's Big Five uses the opposite pole emotional stability, as domain name), they uniformly reflect characteristics such as volatility or aggression, anxiety, depression, nervousness, or what may simply be summarized as emotionality vs. unemotionality. High levels of neuroticism are thus associated with almost all kinds of psychopathology (Caspi et al., 2014; Oltmanns, Smith, Oltmanns, & Widiger, 2018; Widiger, 2011a).

Figure 2.2. The FFM structure across different levels of abstraction. See the main text for a more detailed description.

One developmental theory proposes that neuroticism consists of triple vulnerabilities: (a) general biological (heritable) vulnerability, (b) general psychological vulnerability, and (c) a more specific psychological vulnerability. Vulnerabilities (a) and (b) are believed to mediate risk for (c), which purportedly explains differential developmental pathways for different mental disorders (e.g., panic disorder vs. obsessive-compulsive disorder) (Barlow et al., 2014).

High trait neuroticism does not only reflect a predisposition to psychological distress but also relates to subjective and objective aspects of physical health (Tackett & Lahey, 2017). For instance, neuroticism is positively associated with greater risk for cardiovascular disease and stroke (Jokela, Pulkki-Råback, Elovainio, & Kivimäki, 2014b; Suls & Bunde, 2005), asthma (Huovinen, Kaprio, & Koskenvuo, 2001), diabetes (Jokela et al., 2014a), and irritable bowel syndrome (Spiller, 2007). Additionally, neuroticism predicts longevity in the general population (Smith & MacKenzie, 2006). In a 25-year longitudinal study of Danish participants treated for cancer, those high in neuroticism had a 130% greater death rate than those with low trait neuroticism (Nakaya et al., 2006; cf. Lahey, 2009). Higher trait neuroticism is also associated with lower pain threshold and pain tolerance, and a greater degree of pain catastrophizing (Banozic et al., 2018; Wade, Dougherty, Hart, Rafii, & Price, 1992). In fact, the link between neuroticism and various health factors is so robust that arguments have been made supporting the use of short personality inventories as screening tools for physical health risk in entire populations (Hengartner, Kawohl, Haker, Rössler, & Ajdacic-Gross, 2016b).

2.5.4 Conscientiousness

Conscientiousness consists of a family of traits reflecting one's propensity to be hard working, orderly, self-controlled, achievement-oriented, responsible, and cautious (Jackson & Roberts, 2017). Conscientiousness predicts various important life outcomes, including health (Bogg & Roberts, 2004; Shanahan, Hill, Roberts, Eccles, & Friedman, 2014), work performance (Brown, Lent, Telander, & Tramayne, 2011), marital stability (Roberts, Walton, & Bogg, 2005b), academic achievement (Poropat, 2009). Furthermore, lack of conscientiousness (i.e., high impulsivity) is highly relevant for a variety of psychiatric disorders (Beauchaine, Zisner, & Sauder, 2017).

One aspect of conscientiousness is the famous marshmallow experiments aimed at understanding delay of gratification in children (Mischel, Shoda, & Rodriguez, 1989). The original studies were carried out between 1968 and 1974, but follow-up studies have been conducted on the once young participants. For instance, Schlam, Wilson, Shoda, Mischel, and Ayduk (2013) showed that body mass index was predicted by the delay of gratification task completed 30 years prior. For every minute participants delayed gratification, there was a 0.2 point reduction in body mass index

in adulthood. Other studies have detailed the relationship between personality (conscientiousness and neuroticism are most strongly related) and body mass index, both with and without reference to delay of gratification (Brummett et al., 2006; Murphy, Stojek, & MacKillop, 2014).

In Figure 2.2 and Table 2.1, facets and trait descriptions for high and low conscientiousness are presented. However, a number of studies have investigated the lower-order structure of conscientiousness (Jackson et al., 2010; MacCann, Duckworth, & Roberts, 2009; Roberts, Bogg, Walton, Chernyshenko, & Stark, 2004; Roberts, Chernyshenko, Stark, & Goldberg, 2005a). Throughout these studies, there are certain commonalities, such as the extraction of the factors industriousness and orderliness (cf. MacCann et al., 2009). Studies aimed at uncovering the hierarchical structure found a distinction between inhibitive and proactive aspects of conscientiousness (Jackson et al., 2010; Roberts et al., 2005a). Inhibitive aspects refer to components such as responsibility, impulse control and respect for tradition, whereas proactive features refer to orderliness, organization, cleanliness, and punctuality. Ultimately, the number of facets one is interested in extracting depends on the specific research question one is asking, but these studies illustrate approximately what content can be derived from the overarching domain of conscientiousness.

2.5.5 Openness to Experience

The domain openness to experience has been the most controversial factor (De Raad & Van Heck, 1994). It was originally described as "Culture" (Tupes & Christal, 1961/1992), and it is increasingly referred to as openness/intellect (DeYoung, Quilty, Peterson, & Gray, 2014). Fundamentally, openness to experience reflects behavioral variations in creativity, interest in aesthetics, ideas, values, and culture, depth of feeling, and flexibility in action (cf. Figure 2.2). Traditionally, agreeableness and extraversion have been labeled as the domains reflecting interpersonal phenomena (Wiggins, 1979). However, McCrae argued that while "openness is usually portrayed as an intrapsychic dimension" (McCrae, 1996, p. 323) there are macrosocial influences on culture, social attitude and political affiliation that are caused by trait openness. For instance, political orientation is chiefly influenced by openness, with high trait openness being associated with progressive views, and low trait openness with conservative views (Carney, Jost, Gosling, & Potter, 2008). On that note, there is evidence that authoritarianism is closely associated with low trait openness (r = -.57; Trapnell, 1994). Similarly, when holding levels of agreeableness constant, low trait openness individuals are more suspicious of out-group members than high trait openness individuals (Sibley & Duckitt, 2008). Accordingly, while one's level of openness may not be as obviously associated with interpersonal behavior, it is nevertheless easy to understand how openness relates to concrete social consequences. Consider family

life, where parents with low openness will run families more rigidly, maintain more traditional sex roles, value traditions, whereas high openness parents will be more liberal, less rigid, less interested in tradition and traditional values (McCrae, 1996).

While extremely low levels of openness reflect alexithymic cognition (i.e., difficulty identifying feelings, difficulty describing feelings, and externally oriented thinking), dogmatism and rigidity, extremely high levels have more self-evident psychopathological consequences. In fact, there are a great number of studies on the topic of psychoticism (see Harkness & McNulty, 1994) and maladaptively high openness, as such concepts are strongly linked with bizarre interests, schizotypy (i.e., detecting causal connections that do not exist), eccentricity, and peculiar or otherwise extreme modes of thinking (Widiger, 2011b). The domain of openness has been split into the two aspects openness and intellect, where high levels of the former is positively correlated with psychoticism, whereas the latter is negatively related (Chmielewski, Bagby, Markon, Ring, & Ryder, 2014; DeYoung, Grazioplene, & Peterson, 2012).

Alternative solutions have also been discussed. Using the HEXACO model Ashton and Lee (2012) found that psychoticism traits loaded on a seventh factor and thus posited the existence of a seventh schizotypy-dissociation factor, separate from FFM openness (cf. Ashton, Lee, de Vries, Hendrickse, & Born, 2012). Others have interpreted these data as really representing a five factor structure (Krueger & Markon, 2014). These alternative interpretations to FFM openness originally sprung from the fact that measures of normal personality (e.g., the NEO–PI–R) did not reliably predict maladaptive openness. Gore and Widiger (2013) argued that this peculiar finding was due to the relatively late integration of openness into the FFM; Costa and McCrae simply did not conceptualize openness as having any maladaptive variant. Instead, they initially viewed openness as only containing ideal personality traits such as self-actualization, an open mind, and self-realization.

2.5.6 HEXACO Honesty–Humility and Agreeableness

The conceptualization and categorization of personality traits in the HEXACO model diverge from the FFM in notable ways. The HEXACO–Agreeableness (HEXACO–A) domain consists of facets Forgivingness, Gentleness, Flexibility, and Patience (Lee & Ashton, 2004). These domains describe, respectively, tendencies to be trusting vs. holding a grudge (i.e., forgivingness), being mild and lenient vs. being critical of others (i.e., gentleness), being willing to compromise and cooperate vs. being stubborn and argumentative (i.e., flexibility), and finally one's tendency to have a high tolerance before expressing anger vs. having a short fuse (i.e., patience). HEXACO–A is certainly similar to FFM agreeableness, but the main important distinction between models is that HEXACO–A includes temperamentalness and irritability, which is categorized as neuroticism in the FFM taxonomy.

The HH domain consists of facets Sincerity, Fairness, Greed Avoidance, and Modesty. Sincerity reflects one's tendency to be genuine in interpersonal relations vs. being manipulative. Fairness reflects one's disposition to take advantage of others vs. a willingness to cheat, steal or defraud. Greed avoidance describes the tendency to be uninterested in wealth and luxury vs. being greedy, wanting high social status and wealth. Finally, modesty reflects a tendency to be unassuming. It is worthwhile to note that HH–Modesty is similar to NEO–PI–R–Modesty, but they are not identical. The low pole of the former emphasizes a sense of entitlement, whereas the low pole on the latter tends to emphasize bragging (Ashton & Lee, 2005). The HEXACO domains and their relations with the FFM are described in more detail elsewhere (Ashton & Lee, 2005, 2007, 2008). It should also be noted that the FFM has been more explicitly modeled to mesh with the literature on PDs. In part, this is because integration of normal and abnormal personality models started long before the HEXACO came into existence (see e.g., Costa & McCrae, 1992d; Trull, 1992). This is not to say that the HEXACO cannot be used for the prediction of PDs. Especially on the domain level, it generates similar predictions to the FFM (cf. Ashton et al., 2012; De Fruyt et al., 2013). The HEXACO model is particularly relevant to the DT, as especially HH is a robust predictor of Machiavellianism, narcissism, and psychopathy (Lee & Ashton, 2014).

2.5.7 Interfacing the Dark Triad and Five Factor Model

Having introduced the FFM in more detail, a brief description of how the DT constructs can be described using FFM terminology is in order. The DT is introduced in more detail in the subsequent chapter, but interested readers may want to compare typical trait term descriptors from Table 2.1 with expert-rated FFM prototypes of Machiavellianism, narcissism, and psychopathy in Table 3.4. Expert-ratings are ratings of PDs made by academics or clinicians which can be used for translation of PD criteria into FFM terminology (Lynam & Widiger, 2001; Miller, 2019). These prototype descriptions can be used for establishing whether there is consensus among experts and also whether theoretical and empirical domains agree. The subsequent description of each domain is mainly based on expert-ratings rather than results obtained from self-reports, which are presented in Chapter 3.

All three DT constructs show low agreeableness scores, indicating that such individuals can be expected to be suspicious, deceptive, combative, boastful, and callous. Inherent in the domain of agreeableness is empathy (or in the case of the DT constructs, lack thereof), which is a construct that carries a large role in all three constructs, but perhaps most crucially so for psychopathy, where it has been labeled as the central deficit (Soderstrom, 2003; Verschuere et al., 2018). One may reason

that Machiavellianism should be related to higher levels of empathy, as understanding another perspective is perhaps necessary for successful exploitation (cf. Christie & Geis, 1970). However, the situation is complicated, as empathy is typically divided into cognitive and affective dimensions, where the former reflects the ability to understand others (i.e., theory of mind), and the latter reflects the ability to be aware of and experience other people's emotions (Keysers & Gazzola, 2014). The most recent study on this topic (Turner, Foster, & Webster, 2019) showed that affective empathy was strongly negatively related (βs ranging from -.48 to -.65) to all three DT constructs, while cognitive empathy was positively related to narcissism (β = .41) and Machiavellianism (β = .31), but unrelated to psychopathy (β = .06). This suggests that Machiavellianism (and narcissism) are inversely related to empathy. These findings are questionable, as empathy is arguably an ability and not a trait, insofar as empathizing requires effort (Cameron, Hutcherson, Ferguson, Scheffer, & Inzlicht, 2016; Keysers & Gazzola, 2014). This entails that empathy is perhaps more appropriate to measure using behavioral tests and not self-report methodology. Curiously, self-reported empathy and behavioral tests of empathy are uncorrelated (Kelly & Metcalfe, 2011; Melchers, Montag, Markett, & Reuter, 2015), suggesting that empathy is a multifactorial construct. Alternatively, self-reported empathy and behavioral tests of empathy may tap into different psychological processes.

Expert-rated conscientiousness is higher for Machiavellianism than the other two DT constructs. In particular, orderliness, self-discipline, and deliberation are higher. Psychopathy is associated with low conscientiousness and narcissism is intermediate. Accordingly, the main difference in conscientiousness is that Machiavellians are theoretically more organized, dependable, has greater self-discipline, and are more purposeful (i.e., more achievement-striving), than especially psychopaths, who are notoriously careless, irresponsible, and aimless (Cleckley, 1988).

Extraversion is quite similar across the three constructs, with relatively high mean values across the board. The facet warmth is low for all three, while gregariousness, assertiveness, activity level, and excitement-seeking (for narcissism and psychopathy) are above average. This translates to adventurousness, high energy, forceful or dominant behavior, and sociable, in cases attention-seeking (especially in narcissism) characteristics.

Neuroticism presents a more complicated picture, with psychopathy being associated with very low levels of anxiety (i.e., fearlessness), high levels of anger, low levels of depression, self-consciousness, and emotional vulnerability (i.e., optimistic, glib, and fearless), and high levels of impulsiveness (i.e., undercontrolled). Narcissism displays an even more complex pattern because of multidimensionality within the construct. Narcissism is divisible into vulnerable and grandiose features, where the former is particularly prone to neuroticism and the latter has a general lack thereof. With vulnerable narcissism, the most distinct neurotic features are self-consciousness and

vulnerability which relates to the individual's fragile self-image which is in constant need of external support. In fact, recent contributions have identified that vulnerable narcissism is mostly synonymous with neuroticism (Miller et al., 2018). Finally, Machiavellians are theoretically more prone to depression, which is likely tied to their cynical outlook on life, but are otherwise slightly less neurotic than average.

Openness to experience is the least significant domain with regards to the DT. Narcissism is more strongly related to openness to fantasy than the other two, suggesting that narcissists are more imaginative while Machiavellians are more practically oriented in their thinking. Psychopathy and narcissism are also more strongly related to actions than is Machiavellianism. Perhaps the most interesting facet is openness to emotions, where expert-rated profiles suggest Machiavellians are above average, while narcissists and psychopaths are below average. Extremely low openness to emotions is also described as alexithymia, or the inability to identify and express one's own emotional states, while its opposite is highly intense self-awareness. Research on whether these relations are accurate unfortunately paints a rather unclear picture (see e.g., Wastell & Booth, 2003).

2.5.8 A FFM-PD Example: Antisocial Personality Disorder

The content of this chapter has hitherto been focused on how PDs are currently conceptualized by trait theorists, but this approach is rather abstract. Thus, I provide a brief outline of how antisocial personality disorder can be conceptualized using a trait model. Antisocial personality disorder is defined by the *DSM-IV* (APA, 1994, pp. 649–650) in accordance with seven polythetic criteria:

> (A) There is a pervasive pattern of disregard for and violation of the rights of others occurring since age 15 years, as indicated by three (or more) of the following:

1. failure to conform to social norms with respect to lawful behaviors as indicated by repeatedly performing acts that are grounds for arrest
2. deceitfulness, as indicated by repeated lying, use of aliases, or conning others for personal profit or pleasure
3. impulsivity or failure to plan ahead
4. irritability and aggressiveness, as indicated by repeated physical fights or assaults
5. reckless disregard for safety of self or others
6. consistent irresponsibility, as indicated by repeated failure to sustain consistent work behavior or honor financial obligations
7. lack of remorse, as indicated by being indifferent to or rationalizing having hurt, mistreated, or stolen from another.

There are also additional criteria, such as (B), that the individual is at least 18 years of age, but the presence of the criteria described above is most relevant here. As an alternative approach to that outlined above, Lynam and Widiger (2001) had experts describe prototypical cases of the ten *DSM-IV* (APA, 1994) PD diagnostic categories using a FFM inventory. Each PD was described using all 30 facets. For antisocial personality disorder, the characteristic facets were high angry hostility and impulsiveness, low anxiousness and self-consciousness, all part of neuroticism; high levels of assertiveness, activity, and excitement-seeking, which are all part of extraversion; low agreeableness on all six facets; low dutifulness, self-discipline, and deliberation, which are all part of conscientiousness; and finally high openness to actions. Intercorrelations among prototypes were also reported. Narcissistic personality disorder and antisocial personality disorder prototypes correlated .80. Antisocial personality disorder further correlated -.74 with dependent personality disorder, which is characterized by, as one may expect, high levels of neuroticism, relatively low levels of extraversion, and high levels of agreeableness. This brief example shows how traits relevant to PD can be conceptualized and further that the presence of PD is heterogeneous. For more information about expert-ratings, FFM–PD meta-analytic results, the clinical utility of trait models and more, see Miller (2019).

Table 2.1

Terms Associated with Adaptive and Maladaptive Variants of Five Factor Model Facets

Trait	Maladaptively low	Normal low	Normal high	Maladaptively high
Agreeableness				
Trust	Suspicious	Cautious	Trusting	Gullible
Straightforwardness	Deceptive	Savvy	Honest	Guileless
Altruism	Manipulative	Greedy	Frugal	Selfless
Compliance	Combative	Critical	Cooperative	Generous
Modesty	Boastful	Confident	Humble	Yielding
Tender-mindedness	Callous	Strong	Empathic	Self-denigrating
Extraversion				
Warmth	Distant	Formal	Affectionate	Intense attachments
Gregariousness	Isolated	Independent	Sociable	Attention-seeking
Assertiveness	Submissive	Passive	Forceful	Dominant
Activity-level	Lethargic	Slow-paced	Energetic	Frantic
Excitement-seeking	Dull	Cautious	Adventurous	Reckless
Positive emotions	Grim	Serious	High-spirited	Melodramatic
Neuroticism				
Anxiousness	Fearless	Relaxed	Vigilant	Fearful
Angry hostility	Exploitable	Even-tempered	Defiant	Rageful
Depressiveness	Overly optimistic	Not easily discouraged	Pessimistic	Depressed
Self-consciousness	Shameless	Self-assured	Embarrassed	Uncertain of self
Impulsivity	Overly restrained	Restrained	Self-indulgent	Unable to resist impulses
Vulnerability	Invincible	Resilient	Fragile	Helpless

Continued from previous page

Trait	Maladaptively low	Normal low	Normal high	Maladaptively high
Conscientiousness				
Competence	Disinclined	Casual	Efficient	Perfectionistic
Order	Careless	Disorganized	Organized	Obsessively organized
Dutifulness	Irresponsible	Easy-going	Dependable	Rigidly principled
Achievement	Aimless	Carefree	Purposeful	Workaholic
Self-discipline	Negligent	Leisurely	Self-disciplined	Single-minded
Deliberation	Hasty	Quick to make decisions	Thoughtful	Ruminative
Openness				
Fantasy	Concrete	Practical	Imaginative	Unrealistic
Aesthetics	Disinterested	Minimally interested	Aesthetic interests	Bizarre interests
Feelings	Alexithymic	Constricted	Self-aware	Intense
Actions	Mechanized	Predictable	Unconventional	Eccentric
Ideas	Closed-minded	Pragmatic	Creative	Peculiar
Values	Dogmatic	Traditional	Open	Radical

Note. Table contents are based on Widiger and Lowe (2008), but see also Lynam (2012).

Chapter 3: The Dark Triad: Machiavellianism, Narcissism, and Psychopathy

3.1 Structure of Literature Review

The DT refers to three different, but overlapping, constructs: Machiavellianism, narcissism, and psychopathy (Paulhus & Williams, 2002). These three constructs refer to subclinical personality traits that can be conceptualized as (a) part of the Big Five (O'Boyle, Forsyth, Banks, Story, & White, 2015), (b) as an extension (i.e., a sixth factor) of them (Lee & Ashton, 2005, 2014), or (c) in addition to the Big Five (Paulhus & Williams, 2002). The term "subclinical" refers to constructs that have typically been studied in clinical populations but are now studied in both clinical and non-clinical settings. Such an approach is reasonable given that traits exist along dimensions, but researchers nevertheless tend to emphasize this difference in sampling. There is often an implicit assumption that subclinical refers to a less severe version of a disorder, but that assumption is not necessarily true, being that subclinical samples naturally cover wider ground and thus also include extreme cases (Furnham, Richards, & Paulhus, 2013; Ray & Ray, 1982). It should be noted that Machiavellianism is technically not a PD – as it is not recognized by psychiatric classification systems such as the *DSM* – which both narcissism and psychopathy are (the latter is sometimes erroneously referred to as antisocial personality disorder; Hare, 1996).

The clinical counterparts of narcissism and psychopathy both have extensive literatures that are somewhat distinct from the personality (i.e., subclinical) literature. To add further complexity, the DT consists of three constructs, each with very large nomological networks (Cronbach & Meehl, 1955), thoroughly reviewing each construct goes far beyond the present scope. Thus, I place a number of restrictions on this necessarily brief literature review. Each construct is introduced using historical descriptions and with reference to its clinical (where applicable) description. Particularly important inventories, such as the Mach-IV (Christie & Geis, 1970), Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979; Raskin & Terry, 1988), and *Psychopathy Checklist-Revised* (*PCL-R*; Hare, 2003) are introduced to provide conceptual coverage of each construct. As this thesis is concerned with the psychometric status of the DT constructs – that is, to what extent they do and do not empirically

overlap – I focus on studies aimed at validating these inventories. The structures of these three inventories are highly important because of the large role they have played, and continue to play, since their joint use in Paulhus and Williams' (2002) seminal contribution.[1] As a consequence, more applied findings are deemphasized.

3.2 Machiavellianism

The concept of Machiavellianism is derived from the writings of the 16th-century Italian political philosopher and diplomat, Niccolò Machiavelli. In his treatises, *The Prince* (1532/1992) and *The Discourses* (1531/2007), Machiavelli presented his view of people as untrustworthy, self-serving, and malevolent, and argued that a ruler would better maintain power by utilizing exploitative and deceitful tactics. About four centuries later, during the 1950s and 60s, psychologist Richard Christie became interested in the relation between personality and political ideology, and this led to an investigation of Machiavellian attitudes such as having a cynical view of human nature, low level of interpersonal affect, and minimal concern for conventional morality. Ultimately, it led Christie towards the development of a theory which proposed that the tendency to accept Machiavelli's world view was a measurable individual difference variable (Christie & Geis, 1970).

In the landmark manuscript *Studies in Machiavellianism*, Christie and Geis (1970) described a number of characteristics believed to be important in Machiavellianism. First, a relative lack of affect in interpersonal relationships. The rationale behind this characteristic is that in order to get what one wants, interpersonal distance and lack of empathy helps in being able to use psychological leverage, manipulation and influence. A second characteristic is a lack of concern for conventional morality, by which the authors mean that the Machiavellian cannot have qualms about lying, cheating, or being deceitful. Third, having a gross lack of psychopathology is a reasonable hypothesis as it enables the manipulator to stay in good contact with goals. If an individual has low-functioning reality testing, manipulating others would likely be more difficult because the evaluation process of one's manipulations would likely be impeded. Fourth and finally, low ideological commitment refers to the idea that in order to be a successful manipulator, one cannot let strongly held principles or ideologies get in the way. Ends need to be met through pragmatic means.

In the attempt at trying to describe such an individual, Christie and Geis (1970) collected statements from Machiavelli's writings and asked participants how much they agreed with them, and why. After much item discrimination and analysis, this became the questionnaire that has now been in use for over 40 years. Christie and Geis developed five renditions of the Mach scale. The vast majority of research has

[1] Technically, Paulhus and Williams (2002) used the Self-Report Psychopathy Scale (SRP; Paulhus, Neumann, & Hare, in press) and not the PCL-R, but the SRP is derived from the PCL-R.

been performed using Mach-IV (see table 3.1; Fehr, Samsom, & Paulhus, 1992), because the Mach-V, according to some critics, created more problems than it resolved (Fehr et al., 1992; Hunter, Gerbing, & Boster, 1982; Ray, 1983).

The Mach-IV consists of 20 items in total which were reduced from a pool of 71 items (Mach-I and II; Christie & Geis, 1970). These items were intended to reflect Machiavelli's views of tactics and strategizing, morality, distrust, manipulation, and other central themes Christie and Geis (1970) ascertained from Machiavelli's writings. Ultimately, the common themes were subjected to factor analysis, and a three factor solution with factors "Morality", "Tactics", and "Views", was suggested. The items and proposed factor solution are presented in Table 3.1. Although the Mach-IV has been highly influential in the field, and is still used to this day, a lot of criticism has been leveled against the inventory. One large inconsistency has been the inability to find replicable factor solutions supported by reasonable theory. In my literature review, solutions ranging from one to eight factors have been found (see Table 3.2). Ultimately, most current research using the Mach-IV simply employ a total score for the entire inventory.

The validity of the Mach-IV is questionable: some regard it reliable and valid (Jones & Paulhus, 2009; Ramanaiah, Byravan, & Detwiler, 1994), while others hold the opposite view (Panitz, 1989; Rauthmann, 2012b, 2013; Rauthmann & Will, 2011). For instance Rauthmann and Will (2011) criticized it for alleged shortcomings concerning response style, varying reliability, varying factor structures, insufficient content and construct validity. Various factor solutions have been proposed for the Mach-IV (see Tables 3.1 and 3.2). The factor solutions do not only differ numerically but also in content, which led Rauthmann and Will (2011) to argue that Machiavellianism needs to be assessed in multiple dimensions containing cognitive, emotional, motivational, and behavioral core themes. Ultimately, Rauthmann and Will (2011) propose an outline for the development of a new assessment tool: the "Multidimensional Machiavellianism Inventory". Unfortunately, such an inventory does not yet exist. Although, a new inventory purportedly measuring Machiavellianism from a FFM perspective was recently created (Collison, Vize, Miller, & Lynam, 2018).

Since the publication of *Studies in Machiavellianism*, some things have been established about Machiavellians. The construct helps to explain a variety of behavioral outcomes, including career choice and success (Moore, Katz, & Holder, 1995; O'Connor & Morrison, 2001), empathy, interpersonal perception (Rauthmann, 2012a), deceit (Jones & Paulhus, 2017), and many other outcomes (for reviews, see Christie & Geis, 1970; Corzine, 1997; Fehr et al., 1992; Jones & Paulhus, 2009; Wilson, Near, & Miller, 1996).

Table 3.1

Mach-IV Item Content and Original Factor Labels

No.	Item	Scoring	Factor
1.	Never tell anyone the real reason you did something unless it is useful to do so.	+	Tactics
2.	The best way to handle people is to tell them what they want to hear.	+	Tactics
3.	One should take action only when sure it is morally right.	-	Tactics
4.	Most people are basically good and kind.	-	Views
5.	It is safest to assume that all people have a vicious streak and it will come out when they are given a chance.	+	Views
6.	Honesty is the best policy in all cases.	-	Tactics
7.	There is no excuse for lying to someone else.	-	Tactics
8.	Generally speaking, men won't work hard unless they're forced to do so.	+	Views
9.	All in all, it is better to be humble and honest than important and dishonest.	-	Morality
10.	When you ask someone to do something for you, it is best to give the real reasons for wanting it rather than giving reasons which might carry more weight.	-	Tactics
11.	Most people who get ahead in the world lead clean, moral lives.	-	Views
12.	Anyone who completely trusts anyone else is asking for trouble.	+	Tactics
13.	The biggest difference between most criminals and other people is that criminals are stupid enough to get caught.	+	Views
14.	Most men are brave.	-	Views
15.	It is wise to flatter important people.	+	Tactics
16.	It is possible to be good in all respects.	-	Tactics
17.	Barnum was very wrong when he said there's a sucker born every minute.	-	Views
18.	It is hard to get ahead without cutting corners here and there.	+	Views
19.	People suffering from incurable diseases should have the choice of being put painlessly to death.	+	Morality
20.	Most men forget more easily the death of their father than the loss of their property.	+	Views

Note. The item order has been reported differently in many publications. We report the original (Christie & Geis, 1970) order and their content suggestion in the column "Factor".

Table 3.2

A Chronological Overview of Previous Factor Analyses of the Mach-IV

Study	Suggested solution	*N*
Christie and Geis (1970)	**3 factors:** Tactics, Views, Morality	–
Christie and Lehmann (1970)	**5 factors:** The analysis was not only of the Mach-IV, but also included items from an anomia index.	1482
Williams, Hazleton, and Renshaw (1975)	**4 factors:** Communication Ethics, Manipulative Strategies and Assumptions, Dispositions Toward People, Moral behavior.	246
Kuo and Marsella (1977)	**5 factors:** Two different solutions for Chinese and American context respectively. See publication for details.	128
Ahmed and Stewart (1981)	**5 factors:** no factor names provided	122
Hunter, Gerbing, and Boster (1982)	**4 factors:** Deceit, Flattery, Immorality, Cynicism	351
Vleeming (1984)	**4 factors:** Honesty, Flattery, Views, Cynicism	123
O'Hair and Cody (1987)	**3 factors:** Deceit, Cynicism, Immorality	791
Panitz (1989)	**7 and 8 factors:** no factor names provided	133/117
Corral and Calvete (2000)	**4 factors:** Positive Interpersonal Tactics, Negative Interpersonal Tactics, Positive View of Human Nature, Negative View of Human Nature	346
Andrew, Cooke, and Muncer (2008)	**4 factors:** The authors conclude that Corral and Calvete's (2000) model is "most acceptable".	250
Rauthmann (2013)	**A unidimensional IRT model** used for abbreviating the Mach-IV to a five item short scale.	528
Monaghan, Bizumic, and Sellbom (2016)	**2 factors based on 10 items:** Views and Tactics	1696

Note. IRT = Item Response Theory (an introduction to IRT is available in Morizot, Ainsworth, & Reise, 2009). The solution in Christie and Geis (1970) is not factor analytic, but is included here because they presented a viable idea of what to expect from such an analysis (cf. Christie & Lehmann, 1970).

3.3 Narcissism

The concept of narcissism comes from the legend of Narcissus in Greek mythology: a dismally vain hero who fell in love with his own reflection. This classic account was later used as the foundation for conceptualizing narcissistic personality disorder (NPD) at the end of the 19th century (Ellis, 1898). NPD drifted through a construct transformation alongside the rest of the *DSM*, which first yielded vastly improved assessable criteria, and subsequent dimensionalization and integration with the rest of personality psychology: a process currently taking place.[2]

Narcissism is a very complex construct due to its inconsistent definitions in different fields (i.e., clinical psychology, personality psychology). With the various turns the *DSM* has taken, it is difficult to disentangle the terms narcissism and NPD. Many support the notion that some narcissistic tendencies are healthy and even beneficial, whereas when those same traits are excessively present they become problematic and pass into the realm of abnormal and maladaptive behavior (Ronningstam, 2005).

The APA (2013, pp. 669–670) defines NPD using a general description and nine specific behavioral criteria.

> A pervasive pattern of grandiosity (in fantasy or behavior), need for admiration, and lack of empathy, beginning by early adulthood and present in a variety of contexts, as indicated by five (or more) of the following:

1. Grandiosity with expectations of superior treatment from other people
2. Fixated on fantasies of power, success, intelligence, attractiveness, etc.
3. Self-perception of being unique, superior, and associated with high-status people and institutions
4. Needing continual admiration from others
5. Sense of entitlement to special treatment and to obedience from others
6. Exploitative of others to achieve personal gain
7. Unwilling to empathize with the feelings, wishes, and needs of other people
8. Intensely envious of others, and the belief that others are equally envious of them
9. Pompous and arrogant demeanor

The study of NPD is still highly active, but as with all other PDs, it is also increasingly being studied in the general population. Most researchers would agree that NPD emphasizes the grandiose features of narcissism, as opposed to the vulnerable features

[2] A plethora of material is available regarding the topic of narcissism. The reader interested in history is directed to Levy, Ellison, and Reynoso (2011); for a thorough take on construct development, see Pincus and Lukowitsky (2010); and an extensive review of narcissism is available in Ronningstam (2005).

(Miller et al., 2011b). The former reflects a sense of superiority, need of admiration from others, exploitation and antagonism, whereas the latter describes insecurity, defensiveness, and emotional instability (Wink, 1991). There are many different models of narcissism currently being studied. Some of these models are particularly concerned with understanding the differences between grandiose and vulnerable narcissism (see e.g., Weiss & Miller, 2018). One way to investigate such differences is by the use of expert rated FFM profiles, which are reported Table 3.3. From the perspective of the FFM, grandiose narcissism is positively associated with extraversion and negatively with neuroticism. Vulnerable narcissism shows the opposite pattern, with particularly conspicuous neurotic features (Miller et al., 2018). Both domains share low agreeableness, albeit with slightly different configurations.

The multidimensionality in terms of grandiosity and vulnerability has been difficult to reconcile, especially considering that grandiose and vulnerable narcissism can produce opposite external correlations (Kaufman, Weiss, Miller, & Campbell, 2018). One suggestion based on clinical observations is that a narcissistic individual may present with patterns of fluctuations between these two states. Studies assessing within-individual variability using ambulatory assessment are currently being conducted (see e.g., Edershile et al., 2019). Another suggestion for how these dimensions can be reconciled is the narcissism spectrum model, which specifies self-importance, or entitlement, as a central feature binding grandiosity and vulnerability together (Krizan & Herlache, 2018). Yet another model is the narcissistic admiration and rivalry concept (Back et al., 2013), which emphasizes that grandiose narcissism is heterogeneous and can be divided into narcissistic admiration and narcissistic rivalry.

In subclinical samples, narcissism is most commonly studied with the Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979; Raskin & Terry, 1988). In fact, the frequency with which the NPI has been used has been criticized as being too commonplace (e.g., Brown, Budzek, & Tamborski, 2009; Pincus & Lukowitsky, 2010). Cain, Pincus, and Ansell (2008) noted that the NPI has been the main or only measure of narcissistic traits in approximately 77% of social and personality psychology studies since 1985. However, Miller and Campbell (2011) argued that the criticism of NPI has been blown out of proportion, but nevertheless agree that a better assessment instrument can and should be developed.

The underlying factor structure of the NPI has been investigated by several research groups, ultimately yielding various unstable results with two (Corry, Merritt, Mrug, & Pamp, 2008), three (Ackerman et al., 2011; Kubarych, Deary, & Austin, 2004), four (Emmons, 1984, 1987), and seven (Raskin & Terry, 1988) factors. Raskin and Terry (1988) sought roughly eight components – because *DSM-III* specified eight behavioral dimensions for NPD – but ultimately proposed a seven factor solution. Neither the factor structure nor the issue of the relative merits of the various scales have been resolved (Miller, Price, & Campbell, 2012b).

Table 3.3

Expert Rated FFM Profiles of Grandiose and Vulnerable Narcissism

	Narcissism	
Facet Scale	Grandiose	Vulnerable
Neuroticism		
Anxiety	−.32	.60
Angry hostility	.14	.61
Depression	−.31	.60
Self-consciousness	−.39	.58
Impulsiveness	.07	.46
Vulnerability	−.24	.62
Extraversion		
Warmth	.13	−.42
Gregariousness	.28	−.30
Assertiveness	.51	−.34
Activity	.44	−.29
Excitement seeking	.26	.10
Positive emotions	.21	−.47
Openness to Experience		
Fantasy	−.03	−.05
Aesthetics	.08	−.17
Feelings	.04	.01
Actions	.14	−.41
Ideas	.04	−.17
Values	−.18	−.23
Agreeableness		
Trust	−.08	−.50
Straightforwardness	−.43	−.40
Altruism	−.29	−.34
Compliance	−.32	−.26
Modesty	−.60	−.13
Tender mindedness	−.16	−.24
Conscientiousness		
Competence	.14	−.44
Order	.13	−.07
Dutifulness	.03	−.19
Achievement striving	.34	−.21
Self-discipline	.24	−.29
Deliberation	−.25	−.22

Note. Positive values indicated a positive bivariate correlation, negative values indicate negative bivariate correlations. Ratings are taken from (Miller et al., 2014).

In recent years, a number of narcissism inventories have been introduced to the literature, some of which are anchored in the FFM (e.g., the Five-Factor Narcissism Inventory Glover, Miller, Lynam, Crego, & Widiger, 2012). There are elaborate theories specifying relations between psychological processes in different forms of narcissism, but here I have settled with describing broad empirical relations between grandiose narcissism, vulnerable narcissism, and the FFM. Readers interested in the conceptualization of narcissism may consult Weiss, Campbell, Lynam, and Miller (2019) and Crowe, Lynam, Campbell, and Miller (2019).

3.4 Psychopathy

Psychopathy is a personality disorder characterized by self-centeredness, callousness, and a profound lack of empathy, which hinders the individual from forming warm and healthy emotional relationships with others (Hare, 1999). In 1941, Hervey Cleckley published the seminal work *The Mask of Sanity*, which is still used as a reference for describing how psychopaths behave. Cleckley described the typical psychopath on the basis of clinical observations of adult male patients categorized as "psychopathic". He introduced 16 characteristics typical of the psychopath: superficial charm, absence of delusions, absence of nervousness or psychoneuroticism, unreliability, insincerity, lack of remorse, antisocial behavior, poor judgment, pathologic egocentricity and incapacity for love, lack of affect, specific loss of insight, unresponsiveness in interpersonal relations, fantastic and uninviting behavior, suicides rarely carried out, impersonal sex life, and failure to meet life plans. These criteria were used as a starting point for Robert D. Hare during the creation of the *Psychopathy Checklist* (*PCL*) and in the subsequent development of the *Psychopathy Checklist-Revised* (*PCL-R*; Hare, 2003). The *PCL-R* has since become the standard assessment instrument for psychopathy (Patrick, 2006) against which new measures of psychopathy are often compared.

The *PCL-R* is comprised of 20 criteria assessed on a 3-point ordinal scale (0, 1, or 2), for a maximum of 40 points. Although norms differ, norms from the U.S. are such that a score of 30 tends to be the diagnostic threshold for psychopathy. The criteria are assessed as part of a semi-structured interview, which requires special qualifications. The standard *PCL-R* model divides the 20 items among two factors with two facets each. Factor 1 is divided into the facets "Interpersonal" and "Affective", while Factor 2 consists of facets "Lifestyle" and "Antisocial". Thus, Factor 1 describes more emotional (or lack thereof) aspects of psychopathy such as lack of remorse or glibness, while Factor 2 reflects externalizing behaviors such as impulsivity and criminality (Hare & Neumann, 2008). Evidence suggest that the *PCL-R* is dimensional, both globally and at the factor level in a four factor model (Guay, Ruscio, Knight, & Hare, 2007). This has a number of implications, including that psychopathy seems to

be "a coalescence of extremes on numerous dimensional traits" (Hare & Neumann, 2005, p. 62). For further discussion about this, the reader is directed to Hare, Neumann, and Mokros (2018).

While the popularity of the *PCL-R* is unrivaled, it also has certain limitations. Probably the main limitation is that it takes the form of a semi-structured interview which entails that special training is necessary for its administration, which in turn leads to that it is almost exclusively applied in clinical settings. Based on the realization that personality disorders, including psychopathy, are dimensional and not categorical (Edens, Marcus, Lilienfeld, & Poythress, 2006), quicker alternative assessment procedures for assessing psychopathy were needed. Thus, a number of self-report inventories have been developed for both clinical and subclinical use. Some of these measures were explicitly modeled after the *PCL-R* – one such example being the SRP (Paulhus et al., in press) – whereas other measures included features not emphasized in Hare's model. Developments in this area have recently been reviewed (Sellbom, Lilienfeld, Fowler, & McCrary, 2018).

Perhaps the main difference between these emerging measures is the differential emphasis on fearless dominance, otherwise known as boldness. The relevance of boldness is intimately linked with another point of contention, namely the importance of aggression and violence to psychopathy (Hare & Neumann, 2010; Skeem & Cooke, 2010). The triarchic model of psychopathy (Patrick, Fowles, & Krueger, 2009) describes psychopathy as a joint constellation of boldness (i.e., social dominance, fearlessness, emotional resilience, and stress immunity), meanness (i.e., aggressiveness, social detachment, and callousness), and disinhibition (i.e., impulse control deficits and externalization of blame) (Patrick et al., 2009). Some have argued that if boldness is excluded, psychopathy looks much like antisocial personality disorder (Wall, Wygant, & Sellbom, 2015), which is an equivocation Hare argued against more than two decades ago (Hare, 1996). Others argue that boldness is irrelevant to psychopathy because it is modestly correlated with the two *PCL-R* factors and others measures of externalizing behavior (Lynam & Miller, 2012). Whether boldness should be included in psychopathy is a difficult judgment, because it hinges on whether psychopathy as a concept should be anchored in theoretical descriptions, such as Cleckley's seminal contributions, or whether it should be anchored empirically. Some scholars have made the argument that boldness should not be included because it is does not predict clinically relevant criteria beyond meanness and disinhibition (Gatner, Douglas, & Hart, 2016). Another line of reasoning is that boldness is particularly relevant for describing successful psychopathy (Persson & Lilienfeld, 2019). This discussion is ongoing and opinions differ greatly about how the field should move forward (Miller & Lynam, 2015; Patrick et al., 2019). Going further into the intricacies of these positions is unnecessary for the present purposes. Suffice it to say that the triarchic model is utilized in the present thesis because it arguably maps particularly well onto

successful psychopathy (Persson & Lilienfeld, 2019). In FFM terminology, boldness is highly positively correlated with emotional stability (r = .73; Lilienfeld et al., 2016), negatively with all facets of neuroticism with the exception of impulsivity, positively correlated with surgent extraversion and openness, negatively correlated with straightforwardness and modesty (both facets of agreeableness), as well as moderately positively correlated with competence (Poy, Segarra, Esteller, López, & Moltó, 2014).

A number of models attempt to explain the differences between subclinical and clinical psychopathy.[3] There are three common models that deserve brief attention (Hall & Benning, 2006; Hall, Venables, & Benning, 2018; Lilienfeld, Watts, & Smith, 2015). First, perhaps the most intuitive view that's descended from Cleckley, is the differential-severity model, which implies a less extreme variant of psychopathy. That is to say a difference in degree, not in kind. In this view the same core traits are believed to be manifested, albeit to a lesser extent, than in clinical psychopathy. Second, the moderated-expression model suggests that subclinical psychopaths are more intact, meaning that there may be protective factors at play contributing to adaptivity. Logically, this must go both ways, meaning that it is possible that clinical psychopathy is an exacerbated variant of subclinical psychopathy. Third, the differential-configuration model suggests that the relative contribution of traits to behavior is different in subclinical psychopathy. This view is particularly relevant for the triarchic model of psychopathy, which specifies psychopathy as a joint constellation of boldness, meanness, and disinhibition (Patrick et al., 2009). It should be noted that these three different models, though developed for psychopathy, are not necessarily limited only to psychopathy. In the DT, narcissism, too, is a subclinical construct. There is no associated clinical condition for Machiavellianism, but a persuasive case has been made that Machiavellianism is embedded within psychopathy (Miller & Lynam, 2015). Thus, it stands to reason that Machiavellianism itself could be a differential-severity, moderated-expression, or differential-configuration type of phenomenon, insofar as it could be a milder variant of psychopathy.

3.5 The Dark Triad

The DT emerged as a consequence of the substantial commonalities between Machiavellianism, narcissism, and psychopathy (Paulhus & Williams, 2002). The seminal contribution made by Paulhus and Williams (2002), was to illustrate that these three constructs showed both substantial similarity and dissimilarity, hence favoring their joint study. Since this contribution, a lot of work has been conducted on trying to (a) better understand the nomological networks of the respective constructs, (b) whether

[3] Subclinical psychopathy can, for the present purposes, be defined negatively, thus referring to individuals who are not institutionalized (cf. Persson & Lilienfeld, 2019).

the DT share a common core, (c) the developmental pathways of the DT constructs, (d) the respective factorial structures for measures of each construct.

Regarding (a), the nomological networks of these constructs is not of central interest presently. Suffice it to say that the DT has been studied in relation to a large set of variables, including: normal personality (Jakobwitz & Egan, 2006), mating strategy and other evolutionary phenomena (e.g., Jonason, Li, Webster, & Schmitt, 2009; Lyons, Khan, Sandman, & Valli, 2018), work behavior (Forsyth, Banks, & McDaniel, 2012), impulsivity and self control (Jonason & Tost, 2010; Jones & Paulhus, 2011b), intelligence (O'Boyle, Forsyth, Banks, & Story, 2013), values and morality (Jonason, Strosser, Kroll, Duineveld, & Baruffi, 2015; Kajonius, Persson, & Jonason, 2015), Internet behavior (Buckels, Trapnell, & Paulhus, 2014; Curtis, Rajivan, Jones, & Gonzalez, 2018), and deceitfulness (Jones & Paulhus, 2017). A number of reviews have been published that describe these and other findings in more detail (Furnham et al., 2013; Furnham, Richards, Rangel, & Jones, 2014; Koehn, Okan, & Jonason, 2018; Muris, Merckelbach, Otgaar, & Meijer, 2017; Paulhus, 2014). A book has also recently been published summarizing this diverse literature (Lyons, 2019). Furthermore, FFM rated expert prototypes of all three DT constructs have been generated such that observed scores can be matched to theoretical expectations. These profiles are reported in Table 3.4.

Regarding (b), the common core in the DT, a number of suggestions have been made, including: disagreeableness (Jakobwitz & Egan, 2006; Paulhus & Williams, 2002), low trait HH (Hodson et al., 2018), exploitation (Jonason et al., 2009; Kajonius, Persson, Rosenberg, & Garcia, 2016), low empathy (Jones & Paulhus, 2011a), and manipulation–callousness (Jones & Figueredo, 2013). These suggestions are not mutually exclusive. In fact, all of them arguably overlap to a great degree, albeit differ in specificity (e.g., exploitation is more specific than disagreeableness).

Regarding (c), a large literature exist about the development of psychopathy and narcissism, but less focus has been put into the DT studied jointly, although there are exceptions (e.g., De Clercq, Hofmans, Vergauwe, De Fruyt, & Sharp, 2017). Accordingly, there is a substantial literature on various aspects of the DT, but the remainder of this thesis focuses on (d), specifically the factorial structures of the DT constructs.

The extant measures (i.e., the Mach-IV, NPI, and SRP) of the DT constructs required the administration of more than 100 items. For that reason, two important short measures were developed for the joint study of all three DT constructs. These are the 27 item SD3 (Jones & Paulhus, 2014) and the 12 item DD (Jonason & Webster, 2010). As noted above, both the Machiavellianism and narcissism literatures have been plagued by measurement difficulties. The psychopathy literature has arguably been more successful, although controversy certainly remains (Hare & Neumann, 2010; Skeem & Cooke, 2010).

Table 3.4

Expert Rated FFM Profiles of Dark Triad Traits

	DT Trait		
FFM Domain/Facet	Machiavellianism	Narcissism	Psychopathy
Agreeableness	1.55	1.40	1.30
Trust	1.42	1.42	1.73
Straightforwardness	1.28	1.83	1.13
Altruism	1.28	1.00	1.33
Compliance	2.08	1.58	1.33
Modesty	1.89	1.08	1.00
Tender-mindedness	1.36	1.50	1.27
Conscientiousness	3.54	2.81	2.42
Competence	3.69	3.25	4.20
Order	3.97	2.92	2.60
Dutifulness	2.53	2.42	1.20
Achievement-striving	3.86	3.92	3.07
Self-discipline	3.42	2.08	1.87
Deliberation	3.78	2.25	1.60
Extraversion	3.15	3.52	3.47
Warmth	2.06	1.42	1.73
Gregariousness	3.39	3.83	3.67
Assertiveness	4.14	4.67	4.47
Activity	3.78	3.67	3.67
Excitement-seeking	2.81	4.17	4.73
Positive emotions	2.72	3.33	2.53
Neuroticism	2.42	2.74	2.30
Anxiety	2.39	2.33	1.47
Angry hostility	3.28	4.08	3.87
Depression	2.94	2.42	1.40
Self-consciousness	1.92	1.50	1.07
Impulsiveness	2.08	3.17	4.53
Vulnerability	1.92	2.92	1.47
Openness to Experience	2.85	3.10	2.98
Fantasy	2.28	3.75	3.07
Aesthetics	2.77	3.25	2.33
Feelings	3.31	1.92	1.80
Actions	2.94	4.08	4.27
Ideas	2.78	2.92	3.53
Values	3.03	2.67	2.87

Note. Mean values (range = 1–5) on each trait are reported for the expert prototypes. Sources for the expert rated prototypes are found in (Machiavellianism; Miller, Hyatt, Maples-Keller, Carter, & Lynam, 2017b; narcissism; Lynam & Widiger, 2001; and psychopathy; Miller, Lyman, Widiger, & Leukefeld, 2001).

Because of these existing problems, it was logical to investigate the properties of the more recently developed short measures closely, as well. Not long after the introduction of these two measures, substantive criticism was published, especially regarding the DD (Maples, Lamkin, & Miller, 2014; Miller et al., 2012a), which was deemed to be too brief to be useful (although see also; Jonason & Luévano, 2013).

3.5.1 Machiavellianism and Psychopathy: One or Two?

Whether Machiavellianism and psychopathy are distinct has been revisited relatively recently (Miller et al., 2019; Miller, Hyatt, Maples-Keller, Carter, & Lynam, 2017b; Persson, Kajonius, & Garcia, 2017, 2019). Originally, the distinctiveness of the DT constructs was disputed by McHoskey and colleagues (McHoskey, 1995; McHoskey et al., 1998). They argued that in nonclinical samples, such as student samples, all three constructs are equivalent. Their arguments posed a significant threat to the discriminant validity of, especially, Machiavellianism. Subsequently, Paulhus and colleagues published a series of articles confirming their overlap but establishing sufficient discriminant validity to recommend measuring all three variables simultaneously (e.g., Paulhus & Williams, 2002). The authors argued that a failure to include the other two DT members renders ambiguous any research on one member alone. This sentiment was echoed by others "by controlling for shared variance, the relationship between each of the [DD] subscales and the Big Five can be assessed without the contamination of the other two Dark Triad traits" (Jonason, Kaufman, Webster, & Geher, 2013, p. 83).

McHoskey et al. (1998) were first in elaborating on the supposed distinctiveness of Machiavellianism and psychopathy, and argued that such distinctiveness does not exist. They argued that the purported difference Machiavellianism and psychopathy arose from the fact that the former was studied by social psychologists, and the latter by clinical psychologists. As these fields were not – and still to this day are not – substantially integrated, that allowed for two parallel streams of research on ostensively the same topic.

One key issue was the characterization of individuals with high levels of Machiavellianism as having "gross lack of psychopathology" (Christie & Geis, 1970, p. 3), which goes against the idea that Machiavellianism and psychopathy are the same thing. However, the subject gets complicated by the fact that evidence suggests that Machiavellianism is mostly related to the PCL Factor 1, which describes affective problems, while Factor 2 describes antisociality (Fehr et al., 1992). The authors posited that these findings reflect "…that psychopaths simply may be high Machs who have run up against the law." (Fehr et al., 1992, p. 87). Accordingly, Fehr et

al. (1992) seemingly subsume psychopathy under Machiavellianism, which if nothing else is counter-intuitive given the much longer history of psychopathy.[4] In any case, regarding the supposed "gross lack of psychopathology", multiple studies have found moderate positive correlations between Machiavellianism and anxiety (Fehr et al., 1992), which goes against the view that Machiavellians are stable individuals with intact self-control resources. Furthermore, Machiavellians were believed to be scheming individuals with higher levels of intelligence, but such evidence has not been found (O'Boyle et al., 2013). Similarly, Machiavellianism is theoretically linked with intact self-control, but this, too, has not panned out empirically. Although results are mixed, with some finding theoretically expected results (Jones & Paulhus, 2011b). Nevertheless, meta-analytic findings have shown a positive association between impulsivity and Machiavellianism (Vize, Lynam, Collison, & Miller, 2018b). It is difficult to understand how Machiavellians can be long-term planners who carefully manipulate their surroundings in order to achieve their goals while at the same time being impulsive.

Concurrently with the studies presented in this thesis, two meta-analyses were conducted that established the empirical overlap among DT constructs. Vize et al. (2018b) showed that the nomological networks of Machiavellianism and psychopathy overlap substantially, while narcissism is slightly more independent. Indeed, the similarity in nomological networks were: narcissism and psychopathy r_{ICC} = .60, narcissism and Machiavellianism r_{ICC} = .57, and Machiavellianism and psychopathy r_{ICC} = .86 (Vize et al., 2018b). One limitation of this study is that it was conducted using domain level information. The authors themselves also make the point that many of the samples were student and Amazon's Mechanical Turk (MTurk) samples, and high Machiavellianism may be more likely to be found in competitive environments.

These findings were subsequently updated in another meta-analysis (Vize, Collison, Miller, & Lynam, 2018a). This study utilized meta-analytic structural equation modelling (MASEM) in order to control for shared variance among the DT constructs. In this way, the authors could analyze the effects of partialling variance from the other constructs (partialling will be discussed in more depth later on). The main takeaway, the authors argue, is that partialling variance can substantially alter the meaning of constructs. For instance, they found that residualized narcissism was actually dissimilar to residualized psychopathy and Machiavellianism, which clearly shows that the constructs have changed in content (Vize et al., 2018a).

Most recently, Miller et al. (2019) and Lyons (2019) independently synthesized the conceptual and methodological difficulties that have become evident in recent years. Miller et al. (2019) concisely summarize these shortcomings in five points:

[4] Furthermore, I would argue that this debate should be settled empirically, in particular by way of establishing which construct has the widest nomological network (i.e., greatest construct validity) and can best be explained theoretically (Cronbach & Meehl, 1955).

> 1) failure to recognize the multidimensional nature of the three DT constructs, 2) failure of existing Machiavellianism measures to adequately capture the construct, 3) failure to acknowledge the interpretive perils posed by the prescribed multivariate approach to data analysis, 4) failure to adequately test claims of differential validity among DT constructs, and 5) over-reliance on cross-sectional studies using single methods in samples of convenience.

In addition to this list, Lyons (2019, pp. 6–7) also highlight a lack of replication in DT research and post-hoc inventions of hypotheses. An additional point not mentioned in either source is that the DT constructs also seems to be possible to subsume under normal personality models (see next section), which leads to questions regarding the utility of the DT model, more generally.

3.5.2 The DT or Normal Personality Models

As we have seen, numerous studies have covered the nomological network of Machiavellianism, both by itself and with reference to the other DT constructs. Another stream of research has attempted to describe the DT content using normal personality models, such as the FFM and HEXACO. Meta-analytic estimates of the relations between the DT constructs, FFM, and HEXACO are presented in Table 3.5. Probably the most important study on this topic is a meta-analysis investigating both the relation between the DT constructs and FFM domains (O'Boyle et al., 2015), but also between FFM facets and narcissism and psychopathy (at that point, there were not enough data to analyze FFM facets and Machiavellianism). The most substantial correlations corrected for unreliability between Machiavellianism and the FFM were: -.50, for agreeableness, and -.27 for conscientiousness. The FFM domains explained 30% variance in Machiavellianism. Findings for psychopathy were highly similar, as agreeableness correlated -.53 and -.39 for conscientiousness. This model explained 41% of the variance in psychopathy. As opposed to the two other DT constructs, narcissism was more strongly related to extraversion than agreeableness, although both were substantial correlates, with the former coefficient being .49 and the latter -.36. This FFM model explained 63% of the variance in narcissism (O'Boyle et al., 2015).

The authors went further and tested previously proposed FFM facet models of narcissism and psychopathy. The 18 facets proposed for psychopathy explained 88% of the variance in psychopathy, which suggests that FFM facet models can basically replace other self-report measures of psychopathy. For narcissism, the effects were a bit smaller, with the entire model consisting of 13 facets explaining 42% of the variance. The authors note that psychopathy and Machiavellianism were highly similar and argue that if one construct is to be subsumed in the other, it is more appropriate to subsume Machiavellianism in psychopathy. Many existing models of psychopathy

Table 3.5

Meta-Analytic Relations between Normal Personality Domains and Dark Triad Traits

		O'Boyle et al.		Muris et al.	
DT Trait	Trait	r	r_c	r	$r_{partial}$
Machiavellianism	Agreeableness	−.39	−.50	−.43	−.25
	Conscientiousness	−.21	−.27	−.25	−.13
	Extraversion	−.01	−.01	−.08	−.16
	Neuroticism	.09	−.11	.07	.13
	Openness	−.04	−.05	−.05	−.05
	Honesty-Humility			−.61	−.23
Narcissism	Agreeableness	−.29	−.36	−.21	−.03
	Conscientiousness	.09	.11	−.01	.16
	Extraversion	.40	.49	.31	.37
	Neuroticism	−.16	−.20	−.04	−.05
	Openness	.20	.25	.15	.19
	Honesty-Humility			−.41	−.26
Psychopathy	Agreeableness	−.42	−.53	−.46	−.28
	Conscientiousness	−.31	−.39	−.27	−.23
	Extraversion	.04	.05	.01	−.05
	Neuroticism	.05	.06	−.07	−.10
	Openness	.04	.05	−.03	−.08
	Honesty-Humility			−.54	−.28

Note. O'Boyle et al. = data from (O'Boyle, Forsyth, Banks, Story, & White, 2015); Muris et al. = data from (Muris, Merckelbach, Otgaar, & Meijer, 2017). *N*s vary between 607–8,500 (Muris, Merckelbach, Otgaar, & Meijer, 2017) and 11,326–45,885 (O'Boyle, Forsyth, Banks, Story, & White, 2015). r_c = correlation corrected for unreliability. $r_{partial}$ = effect sizes that were controlled for the shared variance among the three traits.

contain components that are clearly Machiavellian, such as manipulation (sometimes explicitly so, e.g., the "Machiavellian Egocentricity" subscale in the psychopathic personality inventory; Lilienfeld & Andrews, 1996).

Another important study was a smaller meta-analysis conducted recently (Hodson et al., 2018). In this study, 1,402 participants from four different studies were analyzed in a latent variable model using DT domains and facet level HEXACO data. Their meta-analytic estimates between HH and DT domains was near identity, with a latent correlation of -.95. The authors argue in favor of using HEXACO over "*ad-hoc* combinations of the Big Five and Dark Triad" (Hodson et al., 2018, p. 128), because the HEXACO accounts for more variance in various outcomes. What construct to choose, and whether one construct should replace another, are difficult questions that will be discussed in more depth in the discussion. Those issues notwithstanding, numerous studies have now indicated that Machiavellianism can be subsumed under

psychopathy, and that normal personality trait models such as the FFM and HEXACO show very high overlap with the DT. A recent addition to the literature has been the suggestion of reconceptualizing HH as a domain of selfishness (Diebels, Leary, & Chon, 2018), although this suggestion need further study. In any case, these developments naturally leads to questions regarding whether the DT model adds to or subtracts from the overarching personality literature.

Chapter 4: Methods

The present chapter describes two mostly unrelated methodological topics. First, I briefly introduce latent variable models (distinctions between Confirmatory Factor Analysis (CFA), Exploratory Factor Analysis (EFA) and Item Response Theory (IRT), especially) and what these models are used for, including assessment of dimensionality, reliability, and validity. Second, I briefly describe online data collection, which is a relatively new phenomenon that has increased in popularity in the last few years. In particular, I briefly describe the use of MTurk as a strategy of data collection. Both of these topics are highly relevant for the present thesis. Collecting data online (as opposed to via paper-and-pencil) is particularly useful when large sets of data are required, which is preferable in the process of validating psychological constructs. Latent variable models are explained in some detail because such models are of great importance for establishing a foundation of measurement for the constructs psychologists are interested in. Indeed, Crede and Harms (2019, p. 19) provide a clear summary of the importance of latent variable models for applied research:

> The findings from CFA-based measurement models are typically used to establish the discriminant and convergent validity of scores on measures of a set of variables. Specifically, researchers frequently use CFA to assess whether the hypothesized item–construct relationships (e.g. responses to items from scale A reflect only construct X_1, responses to items from scale B reflect only construct X_2, etc.), and the hypothesized distinction among latent constructs (e.g. construct X_1 is distinct from X_2) are reflected in the observed data. This finding is then used to justify the aggregation of certain scores (e.g. responses to items from scale A) into overall indicators of constructs that are then, in turn, used in all subsequent analyses (e.g. multiple regression, HLM [hierarchical linear models], path analyses). That is, the findings from CFA-based measurement models are used to make the argument that variables have been appropriately measured and that the necessary-but-not-sufficient condition of measurement quality has been met.

Thus, latent variable models are typically used as a foundation on which subsequent empirical research rests. One of my main arguments in this thesis is that the

importance of good measurement has been been given insufficient attention in DT research. The models utilized herein are particularly useful for determining dimensionality, or how many sources of variance a given set of data contains. This is crucial in the determination to what extent the DT constructs overlap and diverge, and by extension informs the investigation of whether these constructs should be studied together, apart, or perhaps be substituted.

4.1 Latent Variable Models

Psychologists typically use unit-weighted composite scores (e.g., the mean or sum score for some set of items) in statistical analyses (e.g., regression analyses). In such analyses, reliability is assumed to be perfect (i.e., 1) and the underlying structure of the composite score is assumed. In order to account for measurement error and to better understand what such scores represent, Factor Analysis (FA) is employed as the standard statistical method among personality psychologists. FA is a subset of a broader statistical framework called Structural Equation Modeling (SEM; Kline, 2016).[1]

The history of factor analytic models is not relevant here, but one may note that many of the models used today have their origin in the study of intelligence (Spearman, 1904). The fundamental logic of FA lies in the attempt to explain, or account for, observed scores using a statistical model. This is done for the purpose of explaining observed scores (i.e., manifest or indicator variables) in a reduced set of unobserved factors (i.e., latent variables). In such models, observed scores are assumed to be caused by the latent variable, which means that the covariance between indicators should be zero when the latent variable is present (Hoyle & Duvall, 2004).[2] This is predicated on a so-called common cause model (e.g., Borsboom, 2008; Fried & Cramer, 2017; Schmittmann et al., 2013), meaning that observed responses are caused by a common factor. For instance, one may collect data on a psychological construct such as empathy, and posit based on previous theory (e.g., Shamay-Tsoory & Aharon-Peretz, 2007) that there are two factors (i.e., two different common causes) underlying the responses. In such a case, one would use either EFA or CFA in order to explore (i.e., EFA) or test one or multiple hypotheses (i.e., CFA) whether two factors are sufficient explanation for the observed data.

[1] There are also other related statistical techniques, such as Item Response Theory (IRT; Morizot, Ainsworth, & Reise, 2009; Reise & Waller, 2009), which are together usually discussed under the broad label latent variable models (see e.g., Borsboom et al., 2016).

[2] Latent variable models where latent variables are believed to cause the responses (i.e., observed scores) are called reflective models. There are also formative models, where the opposite relation holds, meaning that the indicators are believed to constitute the latent variable (Bollen & Lennox, 1991; Fried, 2017).

FA specifies a statistical model in which the relationship between manifest and latent variables are referred to as factor loadings (λ).[3] In EFA, all factor loadings are freely estimated whereas in CFA a stricter model is specified that typically forces some loadings to zero. These loadings are called target (or primary) and non-target (or secondary) loadings. Factor loadings tend to be standardized in publications and can thus be interpreted as analogous to standardized regressions coefficients. Latent variable models also allow for computation of factor scores, which are typically used to determine a participant's score on a latent variable (Brown, 2015, pp. 31–32). Factor score estimation is a complex issue that entails a number of different problems in their own right (Grice, 2001).

One can specify an unlimited number of different models, but four models are particularly relevant here. They are: (A) the unidimensional model, (B) the correlated factor model, (C) the second-order model, and (D) the bifactor model. These models are represented in Figure 4.1, where manifest variables are depicted as squares and latent variables as circles. The DT is used to highlight how a measurement model of these particular constructs can be presented graphically. The logic of the unidimensional model is that one factor can account for the variance in all observed scores. The correlated factor model introduces multiple factors that are allowed to correlate, which is a realistic strategy given that psychological variables are almost never uncorrelated. The second-order model and bifactor models are relatively similar. The former is potentially applicable when lower-order factors are substantially correlated and there is a higher-order factor hypothesized to account for relations among those lower-order factors. Bifactor models are more appropriate when one believes there is substantial commonality between items and also multiple specific domains that are independently valuable, having partitioned variance from the general factor. The main difference between these models is that the second-order model entails that shared variance in specific factors is caused by the general factor (Gignac, 2016).

The benefits of FA for psychological research is that psychologists tend to be interested in decomposing complex processes into smaller parts (Gustafsson & Åberg-Bengtsson, 2010). In many cases one may need multivariate statistical tools in order to do so. However, there are numerous issues with the different varieties of latent variable models – ranging from the esoteric, such as the common cause assumption (Schmittmann et al., 2013) – to more concrete issues such as indicator skewness and sample size (Gorsuch, 1974; Schmitt, Sass, Chappelle, & Thompson, 2018; Sellbom & Tellegen, 2019). Furthermore, there are well known issues with applying CFAs, especially to longer personality inventories, as model fit (i.e., how well the factor model

[3] For deeper introductions to FA and SEM, excellent and relatively non-technical texts have been written detailing the procedure (Brown, 2015; Kline, 2016). More technical literature is also available (Mulaik, 2009; Pedhazur, 1997; Raykov & Marcoulides, 2012).

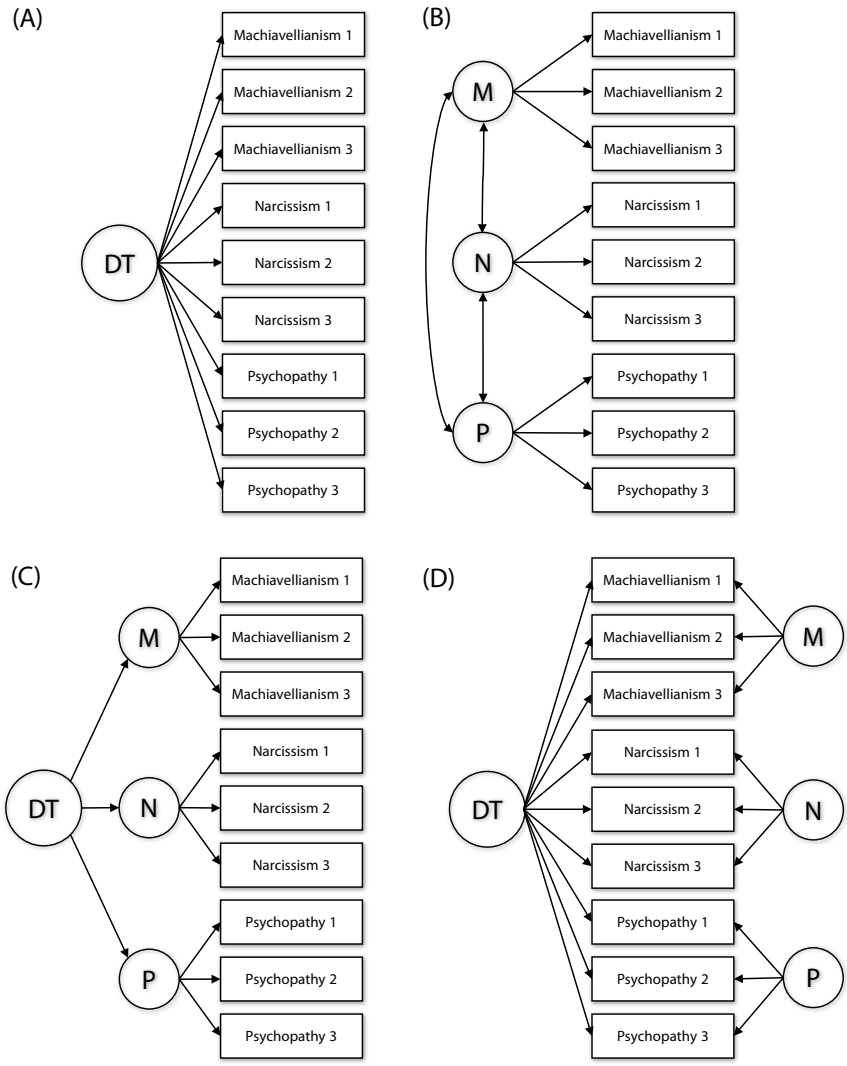

Figure 4.1. Examples of common factor models. A = Unidimensional, B = Correlated factors, C = Higher–Order, and D = Bifactor.

accounts for the observed data) is often far below recommendations in such circumstances (Hopwood & Donnellan, 2010). This issue is caused by the rigidity of CFA, as CFA models freely estimate primary loadings but force secondary loadings to zero, which is unlikely the true population value, thus leading to model misfit. As a consequence, less restrictive models have been developed. One such popular framework is Exploratory Structural Equation Modeling (ESEM; Asparouhov & Muthén, 2009). A flowchart of the decision process covering the appropriate use of models from the FA family has recently been published (Schmitt et al., 2018), but is not elaborated

on here. Suffice it to say that model choice is complex decision making process in its own right.

4.1.1 Item Response Theory

IRT models are another kind of latent variable models commonly used for closer inspection of item properties. In contrast to classical test theory (Lord & Novick, 1968) – where reliability is constant across the latent trait – IRT models allow estimation of conditional reliability (Nicewander, 2018). This means that reliability can be assessed across different levels of the latent trait. As with FA models, there are many different variants of IRT models. The one relevant to this thesis is called the Graded Response Model (GRM). It is used for estimating two item parameters, alpha (α) and beta (β).[4] The α parameter, also known as the discrimination parameter, is similar to a factor loading. The α parameter shows how strongly an item relates to a given latent trait theta (θ) and an item with high discrimination entails better differentiation of individuals. The converse, a low discrimination parameter, means that endorsement rates do not change substantially across the latent trait. The β parameter is a location or threshold parameter. The number of β parameters are set to *k*-1, where *k* is the number of response categories in need of estimation. This means that for five response categories, each β parameter (i.e., β_1–β_4) relates to the level of the latent trait at which the next higher response category has at least 50% probability of being endorsed (e.g., β_1 denotes answering option 1 vs. 2, 3, 4, and 5). The β parameter can be conceptualized as an indication of item difficulty, meaning that higher β values reflect that higher levels of the latent trait is required for item endorsement (Morizot et al., 2009).

The GRM model rests on a number of assumptions that are beyond the scope of this thesis (but see e.g., de Ayala, 2013), but one assumption deserves attention as it directly relates to the topic of this thesis: the problem of dimensionality, or the problem of how many factors to extract, which is a fundamental problem in latent variable models. It also a fundamental problem in this dissertation, as psychopathy is theoretically one dimension and Machiavellianism a second dimension. The question of what number of factors to extract is a difficult one; it has been discussed for a long time (e.g., Cattell, 1966; Kaiser, 1960), and multiple factor retention methods have been developed, including the scree method (Cattell, 1966), parallel analysis (Horn, 1965), the Kaiser criterion (Kaiser, 1960), minimum average partial (Velicer, 1976), and more recently exploratory graph analysis (Golino & Epskamp, 2017). With the

[4] α should not be confused with Cronbach's alpha, which is an internal consistency coefficient. Similarly, β should not be confused with standardized regression coefficients.

exception of exploratory graph analysis, details about these common extraction methods can be found in Timmerman, Lorenzo-Seva, and Ceulemans (2018). The issue of dimensionality is revisited in a subsequent section.

4.1.2 Fit Indices

The point of fitting data to a latent variable model, as we have seen, is to obtain estimates of model parameters (e.g., factor loadings) in order to produce a variance-covariance matrix (usually denoted Σ) which reproduces the sample variance-covariance matrix (usually denoted $\boldsymbol{S}$) as closely as possible (Brown, 2015, pp. 62–67). Exactly how this is done is beyond the scope of this thesis, but the crucial principle is to estimate model parameters (ordinarily using maximum likelihood) given some sample, such that the model parameters are maximally likely to be reproduced in new data from the same population (Brown, 2015). A large number of statistical indices exist for determining how well the original data and implied model correspond, for instance the χ^2 (see e.g., Brown, 2015), root mean square error of approximation (RMSEA; Steiger, 1990), standardized root mean square residual (SRMR; Hu & Bentler, 1999). Tucker–Lewis index (TLI; Tucker & Lewis, 1973), and comparative fit index (CFI; Bentler, 1990). A few general notes on these indices are provided next.

The χ^2-test is a statistical test used to test goodness-of-fit. Specifically, it can be used to test whether there is any departure between the covariances predicted by the model, given the parameter estimates, and the population covariance matrix. This test is conducted using a typical null-hypothesis significance testing framework, such that a model may be rejected based on a given p-value. For a variety of reasons, the χ^2-test is almost always reported, but rarely used for decisions in applied research. One of its more pervasive problems is that it is highly sensitive to sample size, which means that when N is small, the underlying distribution will likely not follow the χ^2-distribution. Conversely, if the sample size is large, the χ^2-test is almost always significant, because the hypothesis that $\boldsymbol{S} = \Sigma$ is very strict (Brown, 2015; but see also Ropovik, 2015).

There are also so-called approximate fit indices (e.g., RMSEA, SRMR, CFI, TLI), which do not necessarily rely on exact statistical tests, but are instead continuous measures of the correspondence between data and model (i.e., whether $\boldsymbol{S} = \Sigma$). These tests can be divided further into different classes, such as absolute, incremental, parsimony-adjusted, and predictive fit indices (Kline, 2016, pp. 265–267). The nuances among these categories are not important for the present purposes. More important are the traditional model fit guidelines (Hu & Bentler, 1999), although strict adherence to those guidelines by no means guarantee correctly specified models (Ropovik, 2015). Under maximum likelihood estimation, Hu and Bentler (1999)

recommended that RMSEA should be close to $\leq .06$, SRMR should be close to $\leq .08$, and both TLI and CFI should be close to $\geq .95$. There has been a lot of discussion regarding these guidelines, and Hu and Bentler (1999) were very careful with pointing out that guidelines should not be turned into laws that replace thinking. They also offered rather complex combinatorial rules for joint use of indices. Model fit is further complicated as a function of reliability (McNeish, An, & Hancock, 2018).

4.1.3 Dimensionality and Statistical Indices for Bifactor Models

The bifactor model recently regained its popularity after a long hiatus (Markon, 2019; Reise, 2012). The bifactor model specifies a general factor on which all indicator variables load, and a number of specific factors onto which construct specific indicators load. This process allows researchers to decompose variance from a general factor (e.g., a general DT core) and orthogonal specific factors (e.g., Machiavellianism, narcissism, and psychopathy). The bifactor model is not unproblematic (Eid, Geiser, Koch, & Heene, 2017). One issue is that bifactor models are known to overfit data, meaning that they are flexible enough to display superior fit because of accommodation of implausible response patterns regardless of population structure (Bonifay, Lane, & Reise, 2017; Markon, 2019). Thus, it may be good advice to start with testing a bifactor structure and subsequently move on to more restrictive models.

The bifactor model is, however, very appropriate for partitioning, or decomposing, different sources of variance. This is particularly relevant for DT research, as partialling has been raised as a substantial issue due to the highly correlated nature of DT constructs (Lynam, Hoyle, & Newman, 2006; Sleep, Lynam, Hyatt, & Miller, 2017b). The problem of partialling is knowing what a (residualized) construct means once variance from another, related construct, has been removed from the original. In the bifactor case, what does the specific factors represent once the general factor has been accounted for? Theoretically, this leads to the problem of what Machiavellianism means once variance in psychopathy has been partialled from the construct? This issue is by no means limited to bifactor models, but the bifactor model is a particularly clear example of when partialling variance is an explicit goal for the researcher. Accordingly, this feature is both a strength and a weakness. One reason for the recent increase in popularity of bifactor models is the possibility of calculating a number of statistical indices that help researchers understand a given construct's structure and utility. These indices have been described at length elsewhere (Rodriguez, Reise, & Haviland, 2016a, 2016b), but brief notes on each will be provided subsequently.

The traditional route in test construction and development is for researchers to calculate Cronbach's α (1951) for a set of items. If α is sufficiently high, the scale is likely deemed "internally consistent", "unidimensional" or perhaps "reliable"; putatively suggesting that the measure reflects the construct it is purported to measure

with minimal error variance. There are, however, a number of issues with such terminology (Sijtsma, 2009), and with taking this route in general, including specific issues with α. These issues are intricate and psychometrically complex (see e.g., Dunn, Baguley, & Brunsden, 2014; McNeish, 2018; Sijtsma, 2009; Zinbarg, Revelle, Yovel, & Li, 2005), and will thus only be briefly elaborated on here. Cronbach's α rests on a set of rather rigid statistical assumptions that are unlikely to be met in practice. One of them is tau equivalence, which entails that all items contribute equally to the total score. Another is that errors between items are assumed to be uncorrelated, which means that item responses cannot be related to one another if not caused by the construct being measured. Cronbach's α also assumes unidimensionality, which is the degree to which items measure the same construct.[5]

Fortunately, there are many alternatives to α, one of which is coefficient omega (ω) and its derivatives, which relaxes these assumptions. ω is a factor analytic model-based reliability estimate, typically estimated using standardized factor loadings. Importantly, ω is a composite based reliability estimate, which means that the reliability of a unit-weighted (i.e., added up raw scores that constitute a scale score) composite can be estimated. The most important difference between α and ω is, for the present purposes, that ω indices can be used to better understand subscale reliability. Cronbach's α does not easily allow for partition of variance from a general factor, and thus subscale αs can be highly exaggerated. This distinction will become more evident in the coming pages. For more details about the intricacies of α and ω, the reader is directed to other sources (Dunn et al., 2014; Hoekstra, Vugteveen, Warrens, & Kruyen, 2018; McNeish, 2018; Rodriguez et al., 2016b).

In a bifactor structure, ω can be calculated using the matrix of standardized factor loadings. Specifically, it is calculated by placing the general and specific factors in the numerator, and the general and specific factors plus unique variance in the denominator:

$$\omega = \frac{(\sum \lambda_g)^2 + (\sum \lambda_{s1})^2 + (\sum \lambda_{s2})^2 + (\sum \lambda_{s_n})^2}{(\sum \lambda_g)^2 + (\sum \lambda_{s1})^2 + (\sum \lambda_{s2})^2 + (\sum \lambda_{s_n})^2 + \sum (1 - h^2)} \tag{4.1}$$

In the case of the 27 item (9 items per scale) SD3 (Jones & Paulhus, 2014), the equation becomes

[5] Unidimensionality and internal consistency are difficult concepts to disentangle. The interested reader is directed to McNeish (2018) and references therein.

$$\omega_{SD3} = \frac{(\sum_{i=1}^{27} \lambda_{DT})^2 + (\sum_{i=1}^{9} \lambda_{Mach})^2 + (\sum_{i=10}^{18} \lambda_{Narc})^2}{(\sum_{i=1}^{27} \lambda_{DT})^2 + (\sum_{i=1}^{9} \lambda_{Mach})^2 + (\sum_{i=10}^{18} \lambda_{Narc})^2} + \frac{(\sum_{i=19}^{27} \lambda_{Psych})^2}{(\sum_{i=19}^{27} \lambda_{Psych})^2 + \sum_{i=1}^{27}(1 - h_i^2)} \tag{4.2}$$

The ω indices have the added benefit of being extendable to only the general factor, in which case it's known as omega hierarchical (ω_{H}) or only the specific factors (omega hierarchical subscale ω_{HS}), in which case the general factor is partitioned out. ω_{H} is computed as:

$$\omega_{\mathrm{H}} = \frac{(\sum \lambda_g)^2}{(\sum \lambda_g)^2 + (\sum \lambda_{s1})^2 + (\sum \lambda_{s2})^2 + (\sum \lambda_{s_n})^2 + \sum(1 - h^2)} \tag{4.3}$$

ω_{H} is informative insofar as it tells us how much of the reliable common variance in a total score is attributable to the general factor. As a corollary, ω_{HS} informs us about how much reliable variance there is in a subscale after removal of general factor variance:

$$\omega_{\mathrm{HS}} = \frac{(\sum \lambda_{s1})^2}{(\sum \lambda_g)^2 + (\sum \lambda_{s1})^2 + (\sum \lambda_{s2})^2 + (\sum \lambda_{s_n})^2 + \sum(1 - h^2)} \tag{4.4}$$

Thus, ω_{HS} reflects how much reliable variance there is in a subscale after partitioning of variance from the general factor. This is different from calculating e.g. Cronbach's α for a subscale, in which case general factor variance is not partitioned out. By extension, this means that many published findings on measures believed to be multidimensional in fact contain a large degree of general factor variance (Rodriguez et al., 2016a). Together, the different ω indices inform about what sources of variance contribute to total and subscale scores. There are, however, other bifactor-relevant indices that help inform about to what extent data are unidimensional, to what extent a factor is likely to replicate, and the viability of using a factor in a SEM. These indices are discussed subsequently.

One of the more pressing issues in FA is the fact that factor scores are indeterminate (Grice, 2001), meaning that an infinite number of factor scores that are equally consistent with the factor solution can be computed. Thus, two researchers can use different methods and arrive at negatively correlated factor scores based on the same

data. The degree to which the factor scores are determinate can be estimated, and enables the researcher to confidently "assume that individual differences on the factor score estimates are good representations of true individual differences on the factor" (Rodriguez et al., 2016b, p. 142). One approach to computing factor determinacy has been provided by Beauducel (2011):

$$FD = diag(\Phi\Lambda^{\mathrm{T}}\Sigma^{-1}\Lambda\Phi)^{1/2} \tag{4.5}$$

where Φ is a matrix of factor intercorrelations, which in the bifactor model will always be an identity matrix (i.e., ones on the diagonal) because the bifactor model is orthogonal. Λ is a $k \times m$ matrix of standardized factor loadings, where k is the number of factors, and m is the number of items. Finally, Σ is a $k \times k$ matrix containing the model implied correlation matrix. *FD* is recommended to be .90 or greater (Rodriguez et al., 2016b).

Importantly, *FD* is only relevant when factor scores are extracted. When specifying a SEM, the degree to which the indicators represent the latent variable is more relevant. Assessing the quality of the indicators can be done using Hancock and Mueller's (2001) *H*:

$$H = 1/\left[1 + \frac{1}{\sum_{i=1}^{k} \frac{\lambda_i^2}{1-\lambda_i^2}}\right] \tag{4.6}$$

where λ refers to standardized factor loadings. *H* can be calculated for each factor. It can be thought of as a quality index which indicates how likely a latent variable is to be stable across studies, and thus how appropriate it would be to specify a latent variable using the specific set of indicators under study (cf. Rodriguez et al., 2016b). Hancock and Mueller (2001) suggested .70 as a lower criterion for *H*. Thus, for models where $H \leq .70$, confidence in estimated path coefficients should be more modest.

Another index, Explained Common Variance (*ECV*; Ten Berge & Sočan, 2004), is used for assessing the degree of multidimensionality, or in the bifactor case, the relative strength of the general to specific factors. *ECV* is computed accordingly:

$$ECV = \frac{(\sum \lambda_g^2)}{(\sum \lambda_g^2) + (\sum \lambda_{s1}^2) + (\sum \lambda_{s2}^2) + (\sum \lambda_{s_n}^2)} \tag{4.7}$$

where λ are standardized factor loadings. The computed value is standardized between 0 and 1 and indicates how many percent of the common variance is attributable to the general factor. A value of .70 thus indicates that 70% variance is explained by the general factor, and 30% by the specific factors. *ECV* can also be extended to the item level, in which case it is referred to as Item Explained Common Variance (*I-ECV*). Stucky and Edelen (2014) proposed that the *I-ECV* could be used to create

so-called "essentially unidimensional"[6] scales in order to create "pure" measures of a specific construct (cf. McGrath, 2005).

4.2 Online Data Collection

In order to successfully use multivariate models, a large number of participants are generally required (e.g., Hirschfeld, von Brachel, & Thielsch, 2014). With this in mind, participants were recruited using MTurk. MTurk enables individuals and businesses to request so-called Human Intelligence Tasks against an amount of money. In this case, the collection of psychological data from relatively large samples of people. Plenty of concerns have been raised regarding the utility of MTurk, including whether the respondents provide a good representation of the population. This issue will soon be discussed, but first keep in mind that psychology, as an entire field, has been called into question for essentially providing a description of "WEIRD" people. That is, Western, Educated, Industrialized, Rich, and Democratic, which is hardly representative of the world in general (Henrich, Heine, & Norenzayan, 2010). It has been suggested that crowdsourcing alternatives, such as MTurk, can be valuable assets in providing non-WEIRD samples (Gosling, Sandy, John, & Potter, 2010).

Concerns have been raised regarding the crowdsourcing methodology. For instance, whether MTurk participants differ significantly from the general population, whether unreliable and invalid data is produced, and whether MTurk workers are insufficiently attentive to the task at hand. Regarding the latter issue, it is common for researchers to exclude participants on the basis of inattentiveness (usually measured by a failure to correctly answer obvious questions). This exclusion has also been cause for concern, as it may potentially bias the post-exclusion sample. These concerns have been thoroughly investigated and will be briefly reviewed.

Using data from the years 2012–2015, Stewart et al. (2015) estimated that the pool of MTurk workers consisted of around 7,300 individuals, in any quarter year. In each quarter year, 20% of the workers retire and new workers begin. MTurk provides more representative samples than typical lab studies (Casler, Bickel, & Hackett, 2013). The test-retest reliability on psychometric inventories are similar to those collected in the lab (Buhrmester, Kwang, & Gosling, 2011; Shapiro, Chandler, & Mueller, 2013). The prevalence of psychopathology is higher than in the general population (Shapiro et al., 2013). MTurk workers are more comfortable with disclosing private information online, despite not being completely anonymous (Shapiro et al.,

[6] The term "essentially unidimensional" reflects the fact that it is very rare to see any measure being completely unidimensional, but under certain conditions, multidimensional data can be fit to unidimensional structures (the reliable variance in a factor is influenced primarily by a single source), which is what essential unidimensionality refers to. This concept has been elaborated upon elsewhere (e.g., Bonifay, Reise, Scheines, & Meijer, 2015; Ip, 2010; Reise, Moore, & Haviland, 2010).

2013). Importantly, MTurk workers have been shown to provide reliable information (Rand, 2012; Shapiro et al., 2013). Using multiple screening questions has been recommended, in order to make sure that workers pay attention (Berinsky, Margolis, & Sances, 2014). Finally, MTurk has also been endorsed for research in the personality disorder domain (Miller, Crowe, Weiss, Maples-Keller, & Lynam, 2017a). For a review of the current state of MTurk research, see (Thomas & Clifford, 2017).

4.3 Ethics

Before delving into the details of the articles, a short note on ethics is in order. Psychological experiments are full of potentially problematic aspects, but being that the present studies are not experiments (i.e., no manipulation is present), there is far less impact on the participants. Indeed, the main concern for the present studies was making sure that participants freely participated after having been informed about the study. In a few of the studies presented subsequently, I downloaded anonymous data from online sources. Having no control over the collection of this data, my main ethical concern was ensuring qualitative and trustworthy analysis. In cases where I personally collected data, I ensured that all procedures were performed in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards (World Medical Association, 2013). All data is anonymous and will be made available upon request.

Chapter 5: Empirical Studies

5.1 Article I

Title: The (mis)measurement of the Dark Triad Dirty Dozen: Exploitation at the core of the scale (Kajonius et al., 2016)

The DD (Jonason & Webster, 2010) has been previously validated (Jonason & Luévano, 2013; Webster & Jonason, 2013), translated into a number of languages, and been utilized in a large number of studies.[1] However, it had also been subjected to criticism for being too short, thus not providing a substantial amount of construct validity (Maples et al., 2014; Miller et al., 2012a). Thus, replicating the factor structure using a large sample and examining the construct validity of the DD was a much needed addition to the literature. In a sample of 3,698 participants, EFA, CFA, and IRT were used to study the factor structure and item level characteristics of the DD. The EFA showed considerable cross-correlation between factors, with multiple salient loadings (i.e., >|.40|) across all three factors. Factor structures were, however, highly similar in men and women. The CFA confirmed that a bifactor model could reproduce the data with excellent model fit (normed fit index = .98, RMSEA = .05).

The IRT analysis showed that two items contributed most information toward the total score. These items were exploitation ("I tend to exploit others towards my own end") and manipulation ("I tend to manipulate others to get my way"), and had α values of 3.33 and 2.73, respectively. Both of these items theoretically belong to the Machiavellianism subscale. With that said, the freely estimated loadings (i.e., in the EFA) for the item exploitation were .78, .60, and 36, for Machiavellianism, psychopathy, and narcissism. The manipulation item's loadings were .81, .54, and .34.[2] These two particular items also had the highest general factor loading in the bifactor CFA. These items were also quite highly skewed, such that individuals needed θ values between 0 and 2.5 for the items to be informative. This pattern was found in the total score as well, indicating that the DD provides information only for relatively high endorsement rates on the DT traits. This is to say that low scores on the DD are unreliable, and that their meaning is thus cast in more uncertainty.

[1] As of 2018-10-22, Jonason and Webster (2010) has been cited 631 times on Google Scholar.
[2] The loadings were similar in men and women. The loadings reported here are from the male sample.

Although not reported in the published paper, the bifactor-relevant indices can be computed and provide valuable information. For the general factor, Machiavellianism, narcissism, and psychopathy, respectively, the indices were: *FD* = .94, .70, .81, .89, *H* = .89, .33, .59, .77, *ECV* = .56, ω = .91, and $\omega_{H/HS}$ = .73, .07, .36, .59. This indicates that full scale reliability is high, as indicated by ω.[3] If one estimates factor scores, those scores can be said to be reliable in the general factor case, and perhaps for psychopathy (the traditional recommendation is $\geq$ .90 Gorsuch, 1983), but not for Machiavellianism and narcissism. Construct replicability, as indexed by Hancock's *H* shows the same pattern, as the recommendation is $\geq$ .70, which neither Machiavellianism or narcissism meets. This suggests that these two variables are not well-defined by their respective indicators. Regarding dimensionality, the *ECV* was .56, which means that 56% of the variance was explained by the general factor, and 44% by the other three factors. This is not particularly high, although as far as I know, there are no published recommendations for *ECV* yet. This indicates that if a unidimensional model was fit to the data, one could expect the loading patterns to be quite different from those of the general factor. This would not be the case if *ECV* is very high. Finally, $\omega_{H/HS}$ indicated that a lot of the variance in the total score is accounted for by the general factors, and also to some extent by the psychopathy subscale. Comparing ω_H with ω, we get .73/.91 = .80, which means that 80% of the reliable variance in the total score is attributable to the general factor.

This study made three important additions to the literature. First, it was one of the first studies reintroducing the suggestion (McHoskey et al., 1998) that Machiavellianism and psychopathy could be jointly modeled as one factor (cf. Glenn & Sellbom, 2015). A second and related point of discussion, is that narcissism deviates more from psychopathy and Machiavellianism than the latter two do with each other. This relative independence could be caused by many different factors, one suggestion is that narcissism may be more socially acceptable, insofar as it is not as socially undesirable.[4] Third, the notion that Machiavellianism is a less severe form of psychopathy was tested, albeit in a limited way, by illustrating bimodal frequency distributions in the DD. Specifically, item endorsement rates were much lower for narcissism than Machiavellianism and psychopathy, and psychopathy items were much less endorsed than Machiavellianism items. This could indicate that Machiavellianism is a less severe form of psychopathy and that although the two constructs can be modeled together, the constructs may have differing meaning across the latent trait (cf. Tay & Jebb, 2018). This idea is investigated in more detail for the SD3 in Article III.

[3] These numbers are all lower than those reported in Rodriguez et al. (2016a), who also provide a solid background on all of these indices (cf. Rodriguez et al., 2016b).

[4] An example narcissism item in the DD is "*I tend to want others to admire me*" compared with Machiavellianism "*I tend to exploit others towards my own end*", and psychopathy "*I tend to be callous or insensitive*".

5.2 Article II

Title: Revisiting the structure of the Short Dark Triad (Persson et al., 2019)

In 2014, Jones and Paulhus created the SD3 and validated it across four different studies in a total of 1,063 participants. The SD3 was created in part as a reaction to the lackluster validity of the DD (Miller et al., 2012a) and also to reduce the large number of items needed to capture all three DT constructs. Jones and Paulhus (2014) were able to produce a 27 item inventory through the use of EFA and ESEM. The authors further showed reasonable internal consistency estimates (Cronbach's α), concurrent validity coefficients, and observer ratings. The SD3 quickly became popular and used in a great number of studies (the SD3 has now been cited almost 500 times, approximately four years after its publication). Despite this popularity, no one attempted a replication of the factor structure of the SD3. Neither did anyone attempt to model it using CFA, which was troubling given that Jones and Paulhus (2014) reported rather poor CFA model fit and further did not report factor loadings, or any other details about these analyses. Accordingly, Article II was rooted in the idea that the SD3 needed to be both replicated and more formally tested using stricter models. These tests were conducted across three different studies.

5.2.1 Study I

The study was conducted using a sample of 1,487 participants (n_{men} = 608, n_{women} = 879) recruited via MTurk. Initial analyses showed similar results to those expected from Jones and Paulhus (2014). The analyses were conducted so as to map as closely as possible onto the initial study (Jones & Paulhus, 2014). This included using EFA with oblique (promax) rotation. Solutions ranging between 2–7 factors all showed relatively poor model fit; the best one being the seven factor model (χ^2 = 474.523, *df* = 183, TLI = .921, RMSEA = .044). Although not reported in the published study, Tucker's Congruence Coefficient (TCC, or ϕ), which is a measure of similarity between factor solutions (Lorenzo-Seva & Ten Berge, 2006), is suitable for determining the degree to which the factor structure was replicated. TCC is computed as

$$\phi(x, y) = \frac{\sum x_i y_i}{\sqrt{\sum x_i^2 \sum y_i^2}} \tag{5.1}$$

where x_i and y_i are factor loadings for each variable i on factors x and y, respectively. In this case, the vectors are pattern coefficients for the respective DT constructs. Values indicating good factorial similarity are usually considered >.95 (Lorenzo-Seva & Ten Berge, 2006). In this case, the TCC indicated fair, but below recommended

Table 5.1

EFA Based Tucker Congruence Coefficients for the SD3 in Study 1

	Machiavellianism	Narcissism	Psychopathy
Machiavellianism	.81	-.01	.47
Narcissism	.20	.87	.07
Psychopathy	.45	.06	.76

Note. Coefficients were not reported in original study. See Lorenzo-Seva and Ten Berge (2006) for information about Tucker's Congruence Coefficients.

thresholds (cf. Table 5.1). The relatively poor TCC could be a consequence of sample size, as EFA factor loadings are known to sometimes require more than 1,000 participants before they stabilize (Hirschfeld et al., 2014).

In addition to this analysis, an exploratory bifactor analysis was conducted in order to determine general factor saturation. This is particularly important for the DT, as the justification for the utility of these three constructs are predicated on both their convergent and discriminant validity. Modelling a general factor may thus illuminate the extent to which all items are saturated by a common theme. Surprisingly, this analysis generated an empty specific factor, meaning that there were no loadings larger than .05 on the specific psychopathy factor. The Machiavellianism items showed disparate loadings, while the narcissism items clustered relatively well together on their own factor. I learned subsequently that empty specific factors are not altogether uncommon (Eid et al., 2017). In any case, the *ECV* was .62, suggesting that 62% of the variance was accounted for by the general factor. Furthermore, as noted in the publication "the mean I-ECV for all items was .54, but a modest .21 for narcissism, .63 for Machiavellianism and .78 for psychopathy" (Persson et al., 2019, p. 5). This suggests that the psychopathy items were most affected by the general factor, which could be interpreted in accordance with Glenn and Sellbom (2015), who argued that DT inventories are mostly saturated by psychopathy. Crucially, being that the narcissism items were the only ones that clustered relatively well together, the question of whether Machiavellianism and psychopathy could be modelled together arose.

5.2.2 Study II

In Study II we set out to test five different, but tenable, models of the SD3, with the addition of also testing the unidimensionality of each individual factor. This was done using a sample of 17,740 participants (freely available from http://www.personality-testing.info/_rawdata). The five prespecified models were: (A) a model with all 27 items loading on one factor (i.e., unidimensional); (B) a correlated two-factor model where psychopathy and Machiavellianism items were subsumed under

one factor; (C) a correlated three-factor model; (D) a bifactor model with two specific factors following the same logic as Model 2; and (E) a bifactor model with three specific factors. Thus, Models B and D were tests of the specific hypothesis that Machiavellianism and psychopathy could be modelled together.

The model fit indices for the initial unidimensional models for each DT construct were not very impressive. CFI and TLI were >.95 for all three factors, but RMSEA values were .104, .079, and .095 for Machiavellianism, narcissism, and psychopathy, respectively. Given that each construct only consists of 9 items (model *df* = 27), almost perfect model fit is desired, if perhaps not expected. Subsequently to publication, it was learnt that there is a complex relation between model fit and reliability (McNeish et al., 2018). If standardized loadings are very high ($\lambda \approx .90$), an RMSEA of .20 can be acceptable, while the converse relation also holds. With low standardized loadings ($\lambda \approx .40$), significant model misfit can be present even with very low RMSEA (<.06). In the unidimensional models, mean standardized loadings were .70, .60, and .60, for Machiavellianism, narcissism, and psychopathy. The lower means for the latter two is due to several reversed items, which are not present in the Machiavellianism scale.

Models A–E fit the data surprisingly well, though the RMSEA values were somewhat large ($\approx .080 - .100$). When studying the residuals, it was evident that this misfit was, at least in part, caused by local strain within each construct, which was also evident in the previously tested unidimensional models. Importantly, Model D fit better than Model E, suggesting that Machiavellianism and psychopathy could indeed be modelled together. Additionally, the latent variable correlation between Machiavellianism and psychopathy was .90 in Model C, which is tantamount to unity (Brown, 2015). In both Models D and E, narcissism showed substantially higher specific factor loadings than did Machiavellianism and psychopathy, thus suggesting that it was more independent of the general factor. In fact, that this was so was tested more formally using ECV, I-ECV, and ω indices. Results from both Model D and E across all three studies are presented in Table 5.2. On the surface, these results seem to suggest that there is a relatively strong general factor. However, upon close inspection it is clear that general factor saturation is an artefact, which de facto means that Machiavellianism and psychopathy can be subsumed onto one factor that makes the general factor appear relatively prominent. In other words, Machiavellianism and psychopathy cluster together much more closely than does narcissism, suggesting that the former two can possibly be modelled together as a single construct.

5.2.3 Study III

In Study III, a smaller MTurk sample (N = 496) was used, mainly for replication. But in addition to replicating the CFA models from Study II, factor scores were extracted

from Models D and E and compared to extant measures of the DT. Specifically, the Mach-IV (Christie & Geis, 1970), a 16 item version of the NPI (Ames, Rose, & Anderson, 2006), the psychoticism scale from the Eysenck Personality Questionnaire–Revised Short Form (EPQR-S; Eysenck et al., 1985), and the DD scales (Jonason & Webster, 2010). Convergent validity coefficients (i.e., zero-order correlations) were such that the general factor always yielded the higher convergent correlations than specific factors, with the sole exception of the NPI, which had greater convergence with the specific narcissism factor. These results confirmed that narcissism splits from Machiavellianism and psychopathy into its own factor, and consequently that the general factor provides more reliable variance (i.e., higher convergent validity coefficients) for external Machiavellianism and psychopathy correlates.

Although not reported in the publication, it was also possible to estimate CFA models across all three samples and thus to determine the stability of factor solutions using the TCC (see Equation 5.1). For Model E, ϕ was $\geq .96$ for the general factor, Machiavellianism, and narcissism across all three samples. Psychopathy had values of .90, .94, and .87, in the three respective studies, suggesting that psychopathy did not replicate as well as the other three latent variables. In conclusion, it seems that Machiavellianism and psychopathy are not distinct constructs and are more appropriate to model together than apart. These results are, however, limited to SD3.

In a similar study McLarnon and Tarraf (2017) used ESEM to both the DD and SD3. The authors were able to show that ESEM bi-factor models provided good fit to the data, especially to the DD inventory. Although ESEM does not force all non-target items to zero (which CFA does) a similar factor loading pattern was observed for the SD3. General and specific factor reliability indices were also similar to previously reported results: $\omega_{H/HS}$ = .66, .16, .35, .16, for the general factor, Machiavellianism, narcissism, and psychopathy, respectively.[5] This suggests that although a less rigorous (and thus better fitting) model was fit to the data, a similar pattern of results emerged.

[5] These indices were not reported in the original publication but computed based on the factor loading matrix reported as supplementary information (McLarnon & Tarraf, 2017). Whether ω indices are applicable to ESEM models is questionable given that non-target loadings are non-zero. In this case, ω indices were computed on the basis of all loadings across all factors, not just target loadings.

Table 5.2

Summary of Bifactor Model Indices for all Three Studies

Two Factor Model (i.e., Model D)

	Study I			Study II			Study III		
Index	DT	MP	N	DT	MP	N	DT	MP	N
FD	.94	.75	.83	.96	.76	.82	.95	.72	.72
H	.88	.52	.69	.93	.52	.66	.93	.50	.51
ECV	.65	0	0	.75	0	0	.70	0	0
ω	.87	0	0	.92	0	0	.92	0	0
$\omega_{H/HS}$	.75	.01	59	.86	.01	.42	.81	.13	.18

Three Factor Model (i.e., Model E)

	Study I				Study II				Study III			
Index	DT	M	N	P	DT	M	N	P	DT	M	N	P
FD	.93	.72	.83	.70	.95	.72	.82	.72	.93	.70	.87	.71
H	.88	.53	.69	.50	.93	.50	.67	.51	.89	.50	.76	.51
ECV	.58	0	0	0	.70	0	0	0	.58	0	0	0
ω	.87	0	0	0	.92	0	0	0	.89	0	0	0
$\omega_{H/HS}$	.69	.19	.58	.21	.81	.13	.43	.18	.71	.16	.62	.21

Note. DT = Dark Triad, M = Machiavellianism, N = Narcissism, P = Psychopathy, MP = Machiavellianism and psychopathy subsumed in one factor. See main text for description of indices. Zeroes are present because *ECV* and ω are not applicable to subscales.

5.3 Article III

Title: Testing construct independence in the Short Dark Triad using item response theory (Persson et al., 2017)

McHoskey et al. (1998) took note of the fact that Machiavellianism and psychopathy are highly similar constructs. Having carried out a number of analyses, they argued that "the vast literature on [Machiavellianism] can be interpreted as an explication of the dispositions and interpersonal tendencies of relatively successful yet antisocial people" (p. 207). Thus, the arguments that Machiavellianism and psychopathy are mostly the same, and that Machiavellianism may be better conceptualized as be a less severe variant of psychopathy, were spawned.

Article III focused on two ideas: previous findings were extended by the use of IRT and we tested the notion that Machiavellianism may be a less severe form av psychopathy. Samples from Studies 1 and 3 (Persson et al., 2019) were pooled, for a total *N* of 1,983 MTurk participants. A total of seven IRT models were estimated: one for each SD3 scale, three models where two constructs were subsumed in the same model (i.e., M + P, M + N, and N + P), and finally a model for the entire SD3.

As in the previous article, the models showed that Machiavellianism and psychopathy are indeed more easily modeled together in one model, than if narcissism is included. This was indicated by the fit indices, which dropped dramatically in models where narcissism was included. This result provides more evidence that items measuring the constructs Machiavellianism and psychopathy are essentially indistinguishable from the perspective of dimensionality (i.e., the items measure the same phenomenon).

Second, the results also indicate that items measuring the domain of Machiavellianism are indeed more frequently endorsed than are psychopathy items (see Figure 5.1). Indeed, the mean values for β_1 was -2.19 for Machiavellianism and -0.09 for psychopathy, indicating that there was more than two standard deviations difference in the latent trait (i.e., θ) required for the first response option. This trend was close to linear for the first three β-values, but the mean value was dramatically larger for β_4. This suggests that when moving up on the latent trait continuum, item locations become more similar for Machiavellianism and psychopathy.[6] This can be interpreted in a number of ways. First, it could indicate that Machiavellianism is a less severe form of psychopathy, although both constructs belong on the same latent dimension. It could also be interpreted as if the two constructs become more similar at a higher

[6] The reported pattern was highly similar when Machiavellianism and psychopathy were combined in one model. Mean values for $\beta_{1\text{-}4}$ (split models reported before slash) were: β_1 = -2.60/-2.18, β_2 = -1.21/-0.98, β_3 = 0.17/0.23, β_4 = 2.62/2.38 for Machiavellianism; and β_1 = -0.19/-0.09, β_2 = 1.38/1.23, β_3 = 2.28/2.03, β_4 = 3.87/3.37 for psychopathy.

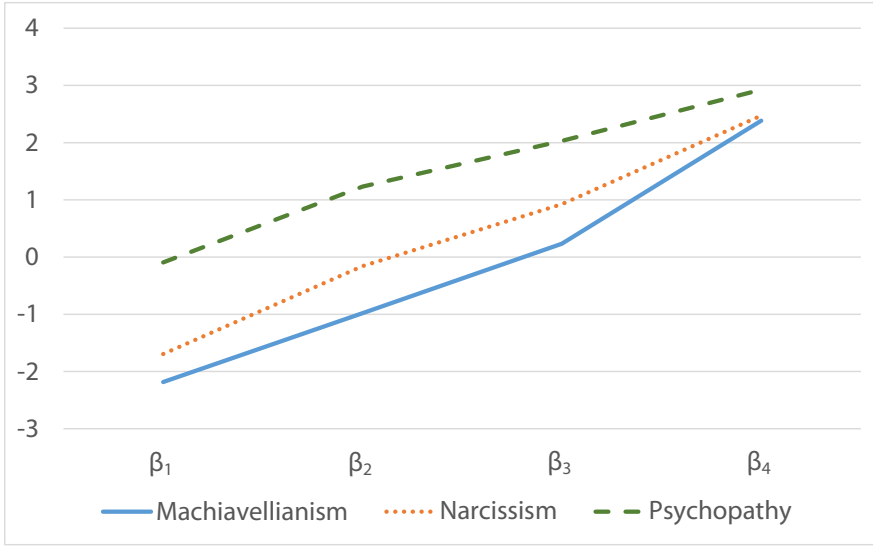

Figure 5.1. Mean values for each location parameter (i.e., β_1–β_4) for each SD3 domain.

θ, thus implying less similarity at lower levels. The meaning of scores across the construct continuum is one of several issues in construct specification (Tay & Jebb, 2018). Whether low scores on any of the DT constructs simply reflect absence of such traits, or the opposite (e.g., altruism, compassion), is unknown. It is important to note that this hypothesis was not tested with reference to external variables. Indeed, it would be interesting to (a) test if the same response pattern would hold in other inventories; and (b) whether Machiavellianism and psychopathy produce differential external correlations across the latent trait continuum. One way of doing this would be to use an extreme group design (Preacher, Rucker, MacCallum, & Nicewander, 2005) where extremely low and extremely high scorers on both constructs were compared against relevant outcomes. Such a study has not been conducted as of yet. A further possibility would be to apply non-parametric or ideal point IRT models, but the intricacies of such approaches is beyond the scope of the present thesis.

5.4 Article IV

Title: Searching for Machiavelli but finding psychopathy and narcissism (Persson, 2019b)

The three articles presented hitherto have all focused on the DD and SD3, but conclusions about Machiavellianism, in its entirety, are necessarily limited when analyzing only those two relatively short inventories. Accordingly, in Article IV, I collected

data on 7 different Machiavellianism scales (15 measures in total), for a total of 65 items tapping the Machiavellianism domain. The inventories putatively measuring Machiavellianism were the DD (Jonason & Webster, 2010), SD3 (Jones & Paulhus, 2014), Mach-IV (Christie & Geis, 1970), Mach-VI (Paulhus & Jones, 2015), the scales deceitfulness and manipulativeness from the The Personality Inventory for *DSM-5* (PID-5; Krueger et al., 2012), and six items from the International Personality Item Pool (IPIP) representation of the Jackson Personality Inventory (JPI-R Jackson, 1994) measuring social boldness. These inventories were collected in a sample of 591 MTurk participants.

I used Goldberg's (2006) Bass-Ackwards approach, which is a method of iteratively extracting (principal) components from a data set in order to analyze its hierarchical structure. This means that each iteratively extracted component can be compared with preceding components (i.e., Level 3 components with Level 2 components). In this case, the hierarchical structure of Machiavellianism was investigated. The fundamental premise of the study was that multiple studies had shown that measures of Machiavellianism failed to generate results one would expect. These studies had one of two problems in common: They either (a) were conducted on facet level variables (not taking item information into account) or (b) they were limited to a small set of items. Thus, using a large item pool of Machiavellianism items ensured that both conditions (a) and (b) were satisfied. In the best case scenario, the Bass-Ackwards approach could illuminate nuances within the construct hierarchy that had previously gone undetected.

I extracted four components and compared them to prototype descriptions of the

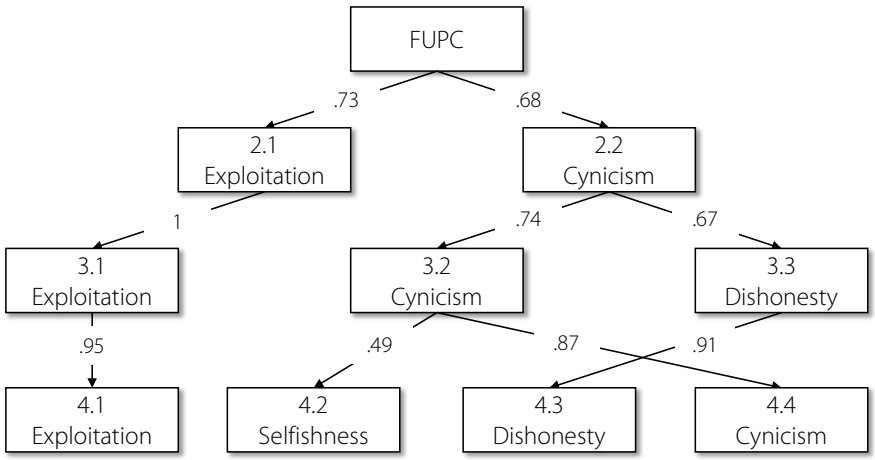

Figure 5.2. Hierarchical representation of the Bass-Ackwards structure extracted from Machiavellianism items. FUPC = First unrotated principal component. Coefficients smaller than .40 have been omitted for ease of presentation.

respective DT constructs. The relations among the different levels of the construct hierarchy are presented in Figure 5.2. The prototype comparison analysis was possible because expert rated FFM prototype profiles have been published in extant literature (for Machiavellianism, see; Miller et al., 2017b; for narcissism, see; Lynam & Widiger, 2001; and for psychopathy, see; Miller, Lyman, Widiger, & Leukefeld, 2001). Thus, by calculating correlations between each extracted component and IPIP-NEO facets, the relative similarity[7] (which is computed as a simple Pearson correlation) between each component and expert rated prototypes could be computed. In this case, the relative similarity indicates which component is most similar to prototype descriptions of the respective DT constructs. If a particular component is more closely related to Machiavellianism than the other two constructs, that could serve as a further foundation for understanding why that is. However, if the opposite results are received, it suggests that even measure of Machiavellianism do not seem to contain information particularly relevant to the Machiavellianism construct, as rated by experts. Four components were retained using the Bass-Ackward analysis.

Every component at each level was correlated with the IPIP-NEO facets and domains, and subsequently compared with prototype profiles (i.e., those reported in Table 3.4). The profile similarities between components and expert prototypes are reported in Table 5.3. The extracted content from measures of Machiavellianism were less related to the Machiavellianism prototype than to both narcissism and psychopathy prototypes. This result held true throughout the hierarchy, although the effects differed on different levels (e.g., narcissism was more similar to the first unrotated principal component).[8]

In addition to the analyses described above, I analyzed the extracted component scores from the four component solution via hierarchical multiple regressions against external measures in order to assess the incremental validity of measures of Machiavellianism (these analyses are not part of the publication). These external measures were, in addition to the SD3 and DD, the Narcissistic Admiration and Rivalry Questionnaire Short Scale (NARQ-S; Leckelt et al., 2018), Narcissistic Personality Inventory-13 (NPI-13; Gentile et al., 2013), Psychological Entitlement Scale (PES; Campbell, Bonacci, Shelton, Exline, & Bushman, 2004), Hypersensitive Narcissism Scale (HSNS; Fossati et al., 2009), Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), the impulsivity facet from the PID-5 (Krueger et al.,

[7] Computation of profile similarity is a rather complex issue, in particular with regards to absolute similarity (McCrae, 1993, 2008; Wood & Furr, 2016).

[8] A reviewer commented that this result may be an artefact caused by orthogonal rotation (varimax), which is the recommended procedure (Goldberg, 2006). Oblique rotation (promax and oblimin) – i.e. rotation that allows factor intercorrelation – did not change profile similarity results significantly, although specific correlations between facets and components differed, sometimes radically, between factor solutions. This change is, however, merely caused by the different weighting schemes employed by different rotation algorithms. The fact that the relative similarity was consistently higher for psychopathy and narcissism did not change.

Table 5.3

Correlations between Components and Expert Prototypes

Profile Similarities	Machiavellianism	Narcissism	Psychopathy
FUPC	.31	.60	.56
2.1: Exploitation	.47	.73	.79
2.2: Manipulation	.03	.22	.11
3.1: Exploitation	.47	.72	.79
3.2: Cynicism	.09	.22	.06
3.3: Dishonesty	.01	.23	.18
4.1: Exploitation	.49	.71	.80
4.2. Selfishness	.14	.39	.30
4.3: Dishonesty	.00	.21	.15
4.4: Cynicism	.05	.05	-.13

Note. FUPC = First unrotated principal component. Profile similarities are Pearson correlations between expert prototypes and components. The expert rated prototypes are taken from the extant literature (Machiavellianism; Miller, Hyatt, Maples-Keller, Carter, & Lynam, 2017b; narcissism; Lynam & Widiger, 2001; and psychopathy; Miller, Lyman, Widiger, & Leukefeld, 2001).

2012), the domains Boldness, Meanness, and Disinhibition from the Triarchic Psychopathy Measure (TriPM; Somma, Borroni, Drislane, Patrick, & Fossati, 2018), and Levels of Personality Functioning Scale-Self Report (LPFS; Morey, 2017). Put briefly, the NARQ-S is a measure of grandiose narcissism, or more specifically the dimensions admiration and rivalry. These two dimensions theoretically reflect agentic aspects driven by self-enhancement (i.e., admiration) and antagonistic aspects driven by self-defense (i.e., rivalry). The NPI-13 is a short measure of grandiose narcissism. The PES measures entitlement, which has been theorized to be the central component in narcissism, connecting grandiose and vulnerable features (Krizan & Herlache, 2018). The HSNS measures hypersensitive, or vulnerable, narcissism. SWLS is a five-item measure of subjective well-being, or a global cognitive judgment of satisfaction with one's own life. This was included because the SWLS has been used in the prediction of both healthy and unhealthy behaviors, and because it could potentially inform about the affective components in Machiavellianism, narcissism, and psychopathy (recall that Machiavellianism and psychopathy are substantially different in trait depression, cf. Table 3.4). The impulsivity facet of PID-5 was included because Machiavellianism and psychopathy are theoretically very different in terms of impulsivity. The TriPM serves as a global measure of psychopathy. Boldness refers to high dominance and low anxiousness and thus could reflect so-called "successful" features of psychopathy (cf. Persson & Lilienfeld, 2019). Meanness reflects callousness and cruelty and disinhibition reflects impulsivity and failures in taking responsibility

(Patrick et al., 2009). Finally, the LPFS is intended to measure personality dysfunction (i.e., Criterion A) in the alternative model of personality disorders (Widiger et al., 2018c).

Results from the regressions are presented in Table 5.4. In this analysis, I first added all FFM factors in Step 1, HEXACO–A and HH as a second step, and finally the component scores from the fourth level of the Bass-Ackwards analysis in Step 3. Together, these analyses illuminate, on the one hand, whether HEXACO adds meaningful variance beyond the FFM and on the other hand, whether Machiavellianism adds information beyond both of these previous steps. As expected, all FFM factors generated well-known effects: agreeableness displayed strong relations with multiple outcomes, most notably on DD psychopathy (β = -.58) and meanness (β = -.54). Conscientiousness was mainly associated with impulsivity ($\beta_{\text{PID5–I}\textit{mpulsivity}}$ = -.57) and disinhibition (β = -.40). Extraversion was associated with measures of narcissism (e.g., $\beta_{\text{SD3N}\textit{arcissism}}$ = .39). Neuroticism was associated with vulnerable narcissism (β = .42), negatively with boldness (β = -.49), and positively with personality dysfunction (β_{LPFS} = .43). Finally, openness to experience was more or less unrelated to all measures. HEXACO–A added relatively little variance beyond FFM domains, with the largest effect on SD3 psychopathy (β = -.25).

In Step 2, HH proved to be a better predictor of narcissism than psychopathy, especially grandiose features ($\beta_{\text{DDN}\textit{arcissism}}$ = -.74, $\beta_{\text{SD3N}\textit{arcissism}}$ = -.48, $\beta_{\text{NARQ–S}}$ = -.53, $\beta_{\text{NPI–13}}$ = -.54, β_{PES} = -.51, β_{HSNS} = -.24). Step 2 added between 9 and 21% explained variance (i.e., $\Delta R^{2\text{-Adj}}$) beyond Step 1 in grandiose narcissism-related outcomes. It was not as promising for the other constructs (cf. Table 5.4). In Step 3, the components added an average of 3% explained variance (i.e., $\Delta R^{2\text{-Adj}}$) beyond the previous steps. Because of this rather lackluster result, interpretation of individual coefficients is difficult to justify. Taken together, these results suggest that the FFM does a good job predicting a variety of outcomes (albeit these criteria are admittedly biased insofar as they are mostly relevant for the DT). Because HH was particularly relevant in the prediction of I also ran regression analyses using only agreeableness and HH facets. These analyses were also partly predicated on the fact that previous research has pointed out that HH may be particularly well-suited (perhaps excessively so) to predicting grandiose narcissism, as the HEXACO arguably contains elevated or oversaturated content from modesty and straightforwardness (Miller, Gaughan, Maples, & Price, 2011a). These analyses are presented in Table 5.5.

This second set of regression analyses expectedly show that some of the outcomes were much more poorly predicted by excluding four out of five FFM factors. PID-5 Impulsivity, for instance, lost 20% explained variance when the other domains were removed. Between the two steps, it became evident that HH facets modesty and greed-avoidance were particularly good predictors of grandiose narcissism. It is difficult to draw strong conclusions based on this analysis, because the IPIP-NEO-120

facet modesty contain a mere 4 items, while HH-modesty contains 10 items. Exactly how much incremental validity one should reasonably be able to expect from each added item is certainly debatable. In any case, these analyses tentatively suggest that the IPIP-NEO-120 would be better able to predict grandiose narcissism had additional items tapping modesty and greed-avoidance been included.

This study aligned with multiple previous studies in showing that measures of Machiavellianism do not conform to theoretical descriptions, but instead show greater overlap with psychopathy and in this case also narcissism. Throughout the construct hierarchy prototype Machiavellianism showed lesser overlap with these measures than did psychopathy and narcissism prototypes. Additionally, Machiavellianism added relatively little variance beyond normal personality traits, which adds further reasons to question its utility. The various inventories used for assessment of Machiavellianism should be used with caution, as they show greater overlap with psychopathy and narcissism than with the construct they are purported to measure. These findings are discussed in more breadth and depth in the subsequent chapter.

Table 5.4

Hierarchical Multiple Regression Analyses showing Incremental Effects of Machiavellianism Items Beyond the Five Factor Model and IPIP-HEXACO

	Step 1 – FFM						Step 2 – HEXACO			Step 3 – Machiavellianism				
Criterion	A	C	E	N	O	$R^{2\text{-Adj}}$	H–A	HH	$\Delta R^{2\text{-Adj}}$	4.1	4.2	4.3	4.4	$\Delta R^{2\text{-Adj}}$
DD Narcissism	−.36	−.08	.50	.31	.00	.33	−.03	−.74	.21	−.06	−.06	−.22	.05	.03
DD Psychopathy	−.70	−.13	−.11	−.05	.03	.59	−.06	−.10	.00	.13	.11	.00	.00	.01
SD3 Narcissism	−.50	.04	.62	.02	.08	.53	.05	−.48	.09	.04	−.11	−.10	.06	.02
SD3 Psychopathy	−.61	−.27	.24	.02	.06	.54	−.26	−.26	.05	.19	.19	.12	.03	.02
NARQ-S	−.62	.01	.42	.20	−.07	.49	.02	−.53	.11	.08	.12	−.05	.05	.01
NPI-13	−.59	.08	.58	.14	.01	.53	.02	−.54	.11	.18	.04	−.14	.04	.04
PES	−.51	.04	.37	.12	.00	.32	.10	−.51	.10	.06	.19	−.07	.07	.03
HSNS	−.34	.09	.01	.62	−.03	.55	−.14	−.24	.03	−.01	.23	−.06	.12	.05
SWLS	.04	.15	.32	−.24	−.15	.34	.05	.15	.01	.00	.01	−.15	−.17	.03
PID-5 Impulsivity	−.15	−.56	.37	.13	.00	.43	−.12	−.06	.00	.17	.23	.05	−.03	.02
TriPM Boldness	−.29	.03	.42	−.52	.15	.70	.05	−.15	.01	.22	−.13	−.08	.07	.06
TriPM Meanness	−.76	−.18	.05	−.10	−.03	.66	−.11	−.11	.01	.18	.22	.17	−.09	.03
TriPM Disinhibition	−.27	−.42	.20	.27	.04	.50	−.17	−.21	.03	.22	.19	.17	.01	.03
LPFS Total	−.32	−.12	.05	.53	−.05	.60	.01	−.24	.02	.11	.32	.02	.05	.05

Note. A = Agreeableness, C = Conscientiousness, E = Extraversion, N = Neuroticism, O = Openness to Experience, H–A = HEXACO Agreeableness, HH = HEXACO Honesty-Humility. The columns 4.1 to 4.4 are component scores from Bass-Ackwards analysis. Standardized beta coefficients (β) are reported. $R^{2\text{-Adj}}$ = Adjusted R^2 values. $\Delta R^{2\text{-Adj}}$ = Change in adjusted R^2 between current and previous step.

Table 5.5

Hierarchical Multiple Regression Analyses showing Incremental Effects of Honesty-Humility Facets Beyond IPIP-Agreeableness Facets

	Step 1 – Agreeableness							Step 2 – Honesty-Humility				
Criterion	A1	A2	A3	A4	A5	A6	$R^{2\text{-Adj}}$	HH1	HH2	HH3	HH4	$\Delta R^{2\text{-Adj}}$
DD Narcissism	.02	−.36	.08	−.10	−.34	.03	.34	−.18	.05	−.46	−.21	.26
DD Psychopathy	−.18	−.23	−.29	−.13	−.06	−.18	.59	−.08	−.11	.07	−.08	.01
SD3 Narcissism	.00	−.17	.20	−.12	−.59	−.02	.47	.11	.03	−.31	−.38	.15
SD3 Psychopathy	−.13	−.27	−.04	−.42	−.12	.00	.56	−.03	−.32	−.01	−.15	.07
NARQ-S	−.10	−.28	.03	−.19	−.39	−.08	.50	−.12	−.02	−.28	−.17	.11
NPI-13	−.04	−.26	.14	−.14	−.53	−.05	.51	.01	.04	−.37	−.23	.14
PES	−.10	−.21	.04	−.07	−.44	−.05	.35	.01	−.02	−.37	−.16	.12
HSNS	−.27	−.24	−.09	−.13	.04	−.04	.30	−.30	.06	−.15	.01	.07
SWLS	.30	.15	.25	.06	−.33	−.23	.27	.00	.09	.11	.18	.03
PID-5 Impulsivity	−.04	−.26	−.12	−.28	.02	.17	.23	−.12	−.11	−.04	−.12	.02
TriPM Boldness	.15	.05	.17	.06	−.56	−.05	.34	.24	−.15	−.04	−.21	.04
TriPM Meanness	−.06	−.17	−.28	−.32	−.08	−.20	.68	.03	−.19	.01	−.12	.02
TriPM Disinhibition	−.17	−.33	−.08	−.34	.11	.14	.40	−.18	−.30	−.04	−.05	.07
LPFS Total	−.29	−.33	−.14	−.16	.13	.04	.41	−.27	.05	−.11	−.09	.07

Note. A1 = Trust, A2 = Morality, A3 = Altruism, A4 = Cooperation, A5 = Modesty, A6 = Sympathy, HH1 = Sincerity, HH2 = Fairness, HH3 = Greed-Avoidance, HH4 = Modesty. Standardized beta coefficients (β) are reported. $R^{2\text{-Adj}}$ = Adjusted R^2 values. $\Delta R^{2\text{-Adj}}$ = Change in adjusted R^2 between current and previous step.

Chapter 6: Discussion

The primary issue in the present thesis is whether Machiavellianism and psychopathy are meaningfully distinct or the same phenomenon. At this point, a significant number of studies have been conducted that have consistently shown that Machiavellianism and psychopathy are: (a) not factorially distinct; (b) the profile similarity for measures of Machiavellianism more closely align with prototype psychopathy than prototype Machiavellianism; (c) profiles of predicted outcomes are nearly identical across the two constructs (i.e., both constructs have highly similar empirical profiles); and (d) both constructs can be explained rather well by by the FFM and HEXACO personality trait models. The studies presented herein have been conducted using diverse approaches, including studying particular inventories (Article I, II, and III), using item, facet, and domain level information (Articles I–IV), and using expert-rated profiles from the extant literature (Article IV). There are numerous issues to discuss, ranging from the remaining evidence supporting the independence of Machiavellianism from psychopathy, to what the future may hold for the DT – including how the DT fits into the overarching literature on normal personality and PD – more broadly. These questions will be dealt with in turn, beginning with the most relevant for this thesis' aim: should Machiavellianism be subsumed under psychopathy (and why not the other way around?), and what are the consequences of such construct unification?

6.1 Reinterpret Machiavellianism as Psychopathy

Numerous studies have now shown that Machiavellianism and psychopathy are almost identical from a psychometric perspective (although not from a theoretical perspective), while narcissism is a little bit more independent. Because of such data, Miller et al. (2017b) boldly suggested that Machiavellianism is better reinterpreted as psychopathy and that measurement of Machiavellianism needs to be thoroughly reconsidered (cf. Collison et al., 2018). I echo both of these sentiments. Before elaborating, it is worth noting that from a mathematical perspective, the present findings are only sufficient to declare Machiavellianism and psychopathy linear transformations of each other. Accordingly, decisions about which construct to retain ultimately

needs to be rooted in logical argument and cannot be settled exclusively with reference to empirical research.

There are two good reasons for why Machiavellianism ought to be subsumed under psychopathy, and not the other way around. First, Machiavellianism tends to produce effects that are expected from psychopathy, but the opposite is not the case (McHoskey et al., 1998). This is not to say that the extant literature on Machiavellianism is poorly conducted or meaningless. It simply means that the inventories purportedly measuring Machiavellianism produce results that do not accord with theoretical accounts of Machiavellianism, but do accord with theoretical accounts of psychopathy. Hence, the most convenient way forward seems to be to reinterpret the original studies as if they were conducted on psychopathy. A second reason is historical, namely that psychopathy is a broader and older construct with larger nomological network.[1] Ceteris paribus, retaining the older and greater theoretical foundation seems logically stronger than doing the opposite.

6.2 Remaining Evidence for Construct Independence

I have presented four articles questioning the factorial structure of Machiavellianism vis-à-vis psychopathy. It is important to qualify that there are definitely dissenting voices, who make a strong – but in my view incomplete – case for the distinctness of Machiavellianism and psychopathy. In addition to this, alternative conceptualizations have begun to emerge that attempt to expand the DT so that it includes a broader range of constructs. One such endeavour is the Dark Tetrad (which includes the fourth domain sadism; Paulhus, 2014), and more recently a bi-factor model composed of nine constructs was proposed. The authors refer to the general factor in this model as the "Dark Factor" (henceforth "D"; Moshagen, Hilbig, & Zettler, 2018). I divide my discussion of these positions into two, first dealing with the claim that Machiavellianism and psychopathy are indeed distinguishable; and secondly discussing the most recent proposal, the D factor, which also includes sadism (Moshagen et al., 2018).

6.2.1 Oversimplification or Necessary Reductionism?

Perhaps the strongest defense of Machiavellianism can be found in a book chapter by Jones (2016). He argues that merging psychopathy and Machiavellianism is an inappropriate oversimplification which leads to a loss of conceptual nuance between

[1] As a psychological or psychiatric construct, psychopathy can be traced back to Pinel (1801), who described psychopathy as a condition of mania without delusion ("manie sans délire"). For a historical treatment of psychopathy, see Arrigo and Shipley (2001). The existing research literature on psychopathy thus stretches far longer back in time and covers broader ground (i.e., is anchored in both the clinical psychology and personality psychology literature) than the Machiavellianism literature.

the constructs. Jones' (2016) claim is fundamentally that Machiavellians are strategic and long-term planners, while narcissists and psychopaths are not. Jones (2016, p. 90) writes:

> Unlike psychopathy, Machiavellianism has no association with short-term thinking when properly assessed (Jonason & Tost, 2010, Study 1). Furthermore, although psychopathy and narcissism have unique links with impulsivity, Machiavellianism does not (Jones & Paulhus, 2011b). It should be noted that both Machiavellianism and psychopathy predict stealing (Jones, 2013), sexual infidelity (McHoskey, 2001), and academic dishonesty (Williams, Nathanson, & Paulhus, 2010). However, unlike psychopathic individuals (e.g., Hare, 1996), Machiavellian individuals use caution when stealing (e.g., Cooper & Peterson, 1980; Jones, 2014), maintain relationships in the face of infidelity (Jones & Weiser, 2014), and do not engage in impulsive forms of academic dishonesty (Williams et al., 2010).

Jones (2016) go on by positing that self-reported behavior of hypothetical situations is not enough to properly distinguish between the constructs, but instead, behavioral outcomes ought to be pursued. While I agree in principle (self-reported behavior certainly has limitations), behavioral outcomes are almost always dependent on self-report questionnaires to some extent. The same is true for the neuroscientific evidence[2] that Jones cite and the more recent experimental DT research (e.g., Curtis et al., 2018; Jones & Paulhus, 2017) which is sometimes believed to resolve construct validity issues. The main problem with these studies is that they use DT inventories to classify whether a behavioral outcome was associated with the DT trait in question. In other words, the results are contingent on, or bounded by, the inventories assessing the traits (i.e., on self-reports). The issue is, if the results presented herein are to be relied upon, that the inventories do not produce two different dimensions (i.e., Machiavellianism and psychopathy), which makes the entire argument circular.

Jones (2016, p. 90) produces a list of testable claims, an effort that is certainly commendable. He writes that

> Machiavellianism is likely unrelated to a series of variables with known connections to psychopathy, narcissism, and dispositional sadism, specifically: (a) recklessness or impulsivity (e.g., petty theft, street crimes,

[2] In addition to the self-report nature such studies are predicated on, there are well-known statistical problems with personality neuroscience studies (Vul, Harris, Winkielman, & Pashler, 2009). For instance, Yarkoni (2009) showed that much larger sample sizes (preferably in excess of 200 participants) are required in personality neuroscience, because of the correlational nature of the studies. Such requirements were rarely, if ever, met in the early personality neuroscience literature. To the best of my knowledge, there are no high powered neuroscience studies on Machiavellianism.

> drug-related crimes); (b) reactivity/emotionality (e.g., domestic violence, physical abuse); (c) social pressure (e.g., drug use, vandalism); (d) ego threat (e.g., responses to insults, anger); (e) sadistic desires (e.g., Internet trolling); (f) deficits in impulse control (e.g., sexual coaxing or coercion); or (g) low socioeconomic status, poverty, or desperation (e.g., robbery).

My overarching criticism of these ideas is that we lack a framework for how to interpret the data if we were to conduct studies in these areas (although some have certainly been carried out, already). Take (a) recklessness or impulsivity as an example, which was the only one (out of 15 outcomes) where Machiavellianism and psychopathy significantly differed in meta-analytic findings (Vize et al., 2018b), although this difference was small (weighted effect sizes were .35 for psychopathy and .23 for Machiavellianism).

If a new study on this topic was to be conducted using self-reports for Machiavellianism and psychopathy, together with either self-reported or more objective measures of recklessness and impulsivity, my hypothesis is that Machiavellianism would be positively related to impulsivity, but not as much as psychopathy. To digress briefly, I think this is because Machiavellianism presents as "a less severe form of psychopathy" (Vize et al., 2018b, p. 108), which in turn is caused by differences in item phrasing in the inventories, which in turn produces different item endorsement rates (cf. Persson et al., 2017). Assuming that such results were obtained, what should we make of them? The conclusions we can draw from one moderate and one large correlation are highly limited, and that is a limitation intrinsic to contemporary social science. One of the points of criticism raised by Miller et al. (2019) is the lack of dependent correlations (i.e., formal statistical testing) in the DT literature. While they may have a point, running such an analysis and finding that Machiavellianism and psychopathy are differently related to impulsivity generates limited new information. Finding a significantly different effect would also be a function of sample size, since the null hypothesis is "quasi-always false" (Meehl, 1967; Meehl, 1978). Thus, the practical significance of the effect, or whether it is substantive in some way would have to be adjudicated in some other fashion than using mere null-hypothesis significance testing.

Jones (2016) worry that the literature may become oversimplified by merging constructs. I am more worried that we have to oversimplify, because there is too much noise in our data to make precise claims (Meehl, 1978; Morey & Lakens, 2016). In my opinion, we know too little about the response process and the various sources of measurement error to draw particularly strong conclusions about correlations that differ by small magnitudes. The recent advances in terms of preregistering hypothesis and eliminating questionable research practices are certainly beneficial (Munafò et al., 2017; Nosek et al., 2015), but they do not resolve the noisiness of our data.

6.2.2 Proposed Expansion of the Dark Triad

A recent article detailed the extension of the DT by adding six constructs (i.e., egoism, moral disengagement, entitlement, sadism, self-interest, and spitefulness), in order to arrive at a broader and perhaps more cogent view of antisocial traits (Moshagen et al., 2018). The researchers' approach is highly similar to that conducted herein, insofar as a bifactor model was applied to all nine constructs in order to extract general and specific sources of variance. This piece of research was rigorously conducted and well-thought through, but the results nevertheless demonstrate a correlation between the D factor and agreeableness of -.69, and -.80 for HH. The FFM model explained 54% variance in D and HEXACO explained 70%. The authors nevertheless concluded that D is more than just HH by showing incremental validity of D over and above HH against a set of well-chosen criteria. For instance, the D factor added 11% variance beyond HH in explaining self-centeredness. While this interpretation is strictly speaking correct, as self-centeredness cannot only be explained by HH, it is doubtful that the D factor would add very much variance beyond the entire HEXACO or FFM models (as opposed to just the HH domain).

Another issue is that the D factor adds more than 5% variance beyond HH for just five of nine criteria. Although the authors do not report zero-order correlations between FFM or HEXACO and their criterion set, they do report zero-order correlations between self-centeredness and the original nine constructs comprising D. These correlations are all between .30 and .62. For instance, the correlation between self-centeredness and SD3 psychopathy is .62. We know based on Table 5.4 reported previously that SD3 psychopathy is not only explained by agreeableness or HH, but also relates to low conscientiousness and high extraversion. Similar cases can be made for all reported criteria. Thus, it seems doubtful that the six added constructs will add substantial information beyond the FFM or HEXACO.

Two questions need consideration that cannot be satisfactorily answered here: (a) how much added variance (beyond a normal personality model) should be considered good enough in order to justify the use of additional constructs, or even additional items? and (b) is it preferable (and if so, why?) to use e.g. nine dark constructs instead of HH? Regarding the former question, numerous scientific and practical concerns need balancing, such as how much data can be collected, the goal of the study, whether reliable measurements can be made and so forth (see Smith, Fischer, & Fister, 2003). Regarding (b), I think the principle of parsimony likely favors a normal personality model over a collection of diverse constructs. With that said, the issue is not necessarily that easily resolved, as there is little to no agreement in the personality psychology literature with regards to why (theoretically, not psychometrically) e.g. agreeableness facets positively covary. The same is true for dark constructs. Why should the former be privileged? In my opinion, I think the FFM should be privileged because it

was built from the very foundations of language (i.e., the lexical hypothesis). I find this hypothesis sufficiently convincing to conclude that the FFM covers a great deal of conceptual ground which should be taken advantage of. The rest of the discussion will elaborate on how the DT literature rests inside the FFM framework, and what implications this may have for future revisions to psychiatric nosologies, such as the *DSM*.

6.3 The Five Factor Model as a Meta-Structure

In Chapter 2, a number of examples were provided showing how the FFM relates to psychopathology in general, and PDs, more specifically. Indeed, the FFM has been proven to provide a solid meta-structure for organizing personality. Normal personality trait inventories such as the IPIP-NEO can be used to produce so-called PD trait counts, meaning that *DSM-IV* PD types can be captured using specific FFM facets (Miller, 2012; Miller, Few, Lynam, & MacKillop, 2015). Such scores could, in turn, be used clinically, although there are certainly limitations to such use (e.g., Ben-Porath & Waller, 1992; Costa & McCrae, 1992c).

Because of these developments and the fact that the FFM also provides good explanatory power over the entire DT model, I suggest moving from the DT towards a broader FFM framework. There was only partial movement in the *DSM-5* revision process, but the other major nosology, the 11th edition of the *International Classification of Diseases and Related Health Problem* (*ICD*), currently under production by the World Health Organization, have finally settled on a dimensional classification system of PDs (Tyrer, Mulder, Kim, & Crawford, 2019). While the system is not identical with the FFM, the five proposed domains are nevertheless highly similar (see Tyrer et al., 2019).

An alternative to both *DSM* and *ICD* is the Hierarchical Taxonomy of Psychopathology (HiTOP; Kotov et al., 2017), which is a data-driven framework specifying dimensional phenomena across levels of abstraction. The HiToP framework is deeply rooted in personality, insofar as it currently specifies six broad spectra: somatoform, internalizing, thought disorder, externalizing disinhibited, externalizing antagonistic, and detachment, which are all interrelated with FFM personality traits (Conway et al., 2019a; Kotov et al., 2017; Widiger et al., 2018a). Thus, the FFM is getting more and more integrated in models specifying general psychopathology. In testing different models, Conway, Mansolf, and Reise (2019b) showed that HiToP model offers ecological validity and can be practically useful in clinical assessment, while categorical diagnoses showed more limited utility. While a lot more work remains to be done, it looks like the future holds a dimensional system of psychopathology in which personality traits play a large role. Studies on the DT can serve a small

role in that process by providing better understanding of, mainly, the domains agreeableness, extraversion, and conscientiousness. But such understanding begins by solid measurement practices (Clark & Watson, 2019; Flake & Fried, in press).

6.4 Limitations

Like all studies, the present work has a number of limitations. The conducted studies exclusively rely on self-report information, which introduces potential method effects and does not allow for the benefits of multi-method measurement (Campbell & Fiske, 1959). This also entails the problem of self-knowledge and accuracy of responses, as there are important concerns about how honestly participants report their levels of dishonesty. Meta-analytic results suggest that distorted responding is not a major issue in psychopathy research (Ray et al., 2013; for similar findings about narcissism, see Sleep, Sellbom, Campbell, & Miller, 2017a), as long as there are no incentives to distort responses (e.g., parole; Kelsey, Rogers, & Robinson, 2014). Because the present research is mostly concerned with the factorial or structural validity of the DT inventories, response patterns are noteworthy but not a central limitation. Much of the data has been collected from participants about whom little to nothing is known, although quality checks have been conducted by others.[3] The benefits of these methods is that large amounts of data can be collected quickly which enables relatively stable parameter estimates, but with the drawback that little is known about sample specific characteristics.

With the increasing popularity of bifactor models, increasing concerns with respect to their validity has also grown. One known issue is that bifactor models are highly flexible, which entails that they can exhibit good model fit even in the presence of nonsense responses (Bonifay et al., 2017). This may be a good reason to begin construct validation by fitting a bifactor model, subsequently adding constraints in order to arrive at a model less likely to fit noise. This relates to a broader shortcoming amongst researchers (myself included) in that alternative models are rarely specified or tested. Typically, researchers have a model in mind and they test only that model, but the strong Popperian principle of introducing potential falsifiers is thus neglected (Crede & Harms, 2019; Tomarken & Waller, 2003; Watts, Poore, & Waldman, 2019). Illustrating that a particular model does not fit a given data structure can be very important in the process of eliminating alternative hypotheses.

[3] The quality of MTurk data has been studied rigorously (Thomas & Clifford, 2017) and the larger publicly available data set used in Article II has been subjected to some rudimentary quality checks: https://openpsychometrics.org/_rawdata/validity/.

6.5 Conclusion

A number of conclusions can be drawn based on the present work. Starting with narrow conclusions based on the present studies: Machiavellianism should be reconceptualized as psychopathy. First, because the two dimensions are nearly identical, and second because findings from Machiavellianism correspond more closely to what one would expect from psychopathy. From a slightly broader perspective, there is also good evidence that the DT should be integrated more deeply into the FFM or HEXACO or perhaps be subsumed by it. The DT may unfortunately add more confusion than clarity, as each DT domain can be explained by basic trait models. Indeed, in their relatively recent meta-analysis, Muris et al. (2017, p. 196) commented that:

> These results suggest that the dark triad concept largely is redundant and has little to add to traditional personality models, although it is clear that more research is needed on forensic populations, experimental situations, and behavioral outcomes for investigators to draw a more definitive conclusion.

Thus, there are certainly issues that have not been resolved, but numerous voices within the DT field now seem to have converged around the idea that the DT may produce more problems than it resolves.

Taking a broader perspective, the evidence is clear that both adaptive and maladaptive traits are aspects of the same underlying dimensions (Widiger et al., 2018b), PD categories can be estimated using dimensional trait indicators (Strickland et al., 2018), and we are gaining a better understanding of what it means to have more or less the opposite of PD, namely a healthy personality (Bleidorn et al., 2019). There is a lot of work left to be done before personality psychologists can make precise predictions, especially at the individual level (cf. Yarkoni & Westfall, 2017), but descriptions of personality are powerful tools that have come and long way.

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UNIVERSITY OF TURKU

Painosalama Oy, Turku, Finland 2019

ISBN 978-951-29-7854-0 (PRINT)
ISBN 978-951-29-7855-7 (PDF)
ISSN 0082-6987 (Print)
ISSN 2343-3191 (Online)