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### Abstract

The *Dark Tetrad of Personality* consists of Machiavellianism, Narcissism, Psychopathy, and Sadism. Forensic psychiatric patients are exposed to several prejudices in our society and Dark Tetrad features are easily prematurely attributed to this group. The aim of this study was to investigate to what extent forensic psychiatric patients differ from the general population regarding the Dark Tetrad traits. The current study was the first to investigate the Dark Tetrad in a clinical-forensic setting. A sample of  $N = 35$  forensic psychiatric patients was matched to  $N = 35$  control participants from the general population regarding age, sex, and education. Their scores in four self-rating questionnaires, one for each dark trait, were compared. The results showed moderate effect sizes of the group differences in the Psychopathy subscales Interpersonal Manipulation and Cold Affect as well as a large effect size in Antisocial Behavior. The control group scored higher in Interpersonal Manipulation and the treatment group scored higher in Cold Affect and Antisocial Behavior. A small to moderate effect could be observed in the Narcissism subscale Leadership Ability/Personality, where the control group scored higher than the treatment group. Most people in the treatment group were men with schizophrenia (29 out of 35). When the analysis was limited to this subgroup, all moderate or small to moderate effect sizes were larger, except for Cold Affect, where the effect size was slightly lower than in the full sample. Global Dark Triad and Dark Tetrad scores differed with small effects between  $d = 0.10$  and  $0.14$ , which were statistically nonsignificant. Exploratory analysis over the type of crime revealed that arsonists scored higher in the Psychopathy subscale Impulsive Thrill-Seeking than people who committed crimes against life. In general, the results indicate that forensic psychiatric patients differ in Narcissism, Psychopathy, and Sadism, but not in Machiavellianism. The differences were less strong and less consistent than expected.

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**Abbreviations**

|       |                                                                                  |
|-------|----------------------------------------------------------------------------------|
| AB    | Antisocial Behavior                                                              |
| CA    | Cold Affect                                                                      |
| CI    | Confidence interval                                                              |
| CW    | Cynical worldview                                                                |
| DSM   | Diagnostic and Statistical Manual of Mental Disorders                            |
| EE    | Entitlement/Exploitativeness                                                     |
| G     | Grandiosity                                                                      |
| GE    | Grandiose Exhibitionism                                                          |
| ICD   | International Statistical Classification of Diseases and Related Health Problems |
| IM    | Interpersonal Manipulation                                                       |
| IQR   | Interquartile ranges                                                             |
| LA    | Leadership/Authority                                                             |
| LA/P  | Leadership Ability/Personality                                                   |
| MT    | Manipulative Tactics                                                             |
| NPI   | Narcissistic Personality Inventory                                               |
| PCL-R | Psychopathy Checklist-Revised                                                    |
| PM    | Pragmatic Morality                                                               |
| SRP   | Self Report Psychopathy                                                          |
| SSIS  | Short Sadistic Impulse Scale                                                     |
| StGB  | Strafgesetzbuch                                                                  |
| TDM   | Two-Dimensional Mach-IV                                                          |
| TS    | Impulsive Thrill-Seeking                                                         |

### **The Dark Tetrad in Forensic Psychiatric Patients**

Ted Bundy, Jack the Ripper, or Charles Manson are some of the most well-known examples of psychopaths in history. The idea of a person whose behavior is in no way predictable or comprehensible for oneself is both terrifying and fascinating. Humans who do not follow the rule of normal human behavior, opt out of any framework or inner representation of how our conspecifics should behave. In medieval times, for example, when a child was abnormally aggressive or antisocial, it was often considered possessed by the devil (Katajala-Peltomaa, 2016). This explanation had the advantage that neither the child nor the parents were to blame for the deeds of the aggressive child (Katajala-Peltomaa, 2016). Today, especially in adults, it is rather the acting person him/herself who is held responsible for his/her actions. People acting in an antisocial or aggressive way are aversive (causing rejection) personalities. In modern psychology, we call people showing those traits *dark personalities*. But not all dark personalities are antisocial outsiders. Many of them are perfectly integrated in society and some factors of these dark personalities may even be useful in everyday life. For example, a manager who acts for the maximum profit of his or her organization, without compassion, can be considered more effective than one who shows pity. A political leader who acts calculated and unemotional might achieve his or her political goals more easily than one who hesitates. In personality psychology a distinction is made between different dark personality traits. These are introduced briefly below. The specifics of these dark traits are described in more detail in the theoretical background section. The personality traits that form the Dark Triad are Narcissism (egoistic), Machiavellianism (manipulative), and Psychopathy (impulsive and emotionally cold). The Dark Tetrad additionally contains Sadism (the pleasure of hurting others). Some researchers describe the core of the dark traits as a callous, manipulative, and emotionally cold way of interacting with one's environment (Jones & Figueredo, 2013). Therefore, most aversive and malevolent (productive of harm or evil) behavior can be found somewhere in the four dark traits of the Dark Tetrad.

The traits in the Dark Tetrad are considered subclinical. This means that they are not pathological and occur in everyone to a greater or smaller extent. But there are also clinical facets of these traits. Subclinical Psychopathy, Sadism, and Narcissism have clinical equivalents with diagnoses, on which they are based. The clinical traits are pathologic, which means a higher expression and a connection to psychological strain. Clinical, or high expressions of dark traits, especially in Psychopathy, are socially

deviant per definition and additionally connected to deviant behavior such as criminal acts (Harris et al., 1991). Forensic psychiatric patients are people who committed crimes in an exceptional mental state that emerged from a mental illness and are therefore an especially interesting sample regarding dark traits.

In the case of crimes that emerged from such an exceptional mental state, the criminal liability in our jurisdiction is limited. Instead of a prison sentence, a placement in a forensic psychiatric ward is ordered. This has the aim to treat the mental illness that caused the exceptional mental situation and resulting behavior, while being legally domiciled. These measures are normally just applied in case of substantial crimes, not in case of minor crimes like theft or administrative offences. Usually the recovery from such a severe mental illness takes longer than the equivalent time of the legal sentence. If the illness is cured before the end of the sentence, the rest of the time needs to be served in prison. Therefore, the stay in the psychiatric ward is still within the legal framework, which can be helpful for the treatment of mental disorders. In contrast to forensic psychiatric patients, who cannot quit the treatment on their own will, normal psychiatric patients who have not committed crimes have the right to voluntarily terminate the treatment at any time, which can possibly harm the recovery process.

Mentally ill offenders are confronted with many prejudices in our society. One of the most common prejudices is that forensic psychiatric patients are all sexual offenders or even sexual killers. Many communities react with fear and rejection when confronted with mentally disturbed offenders, especially when the image of a sexual perpetrator emerges. Often this happens with great media attention (Ryssok & Oprea, 2011). In reality, these cases are very rare. In a criminal sample the prevalence, which is the proportion of how often an illness is found in a certain population, for Psychopathy was 7%, and in violent offenders 8.8% (Ullrich et al., 2003). Still, very few psychopaths are serial killers. Most people in forensic wards have a schizophrenic disorder (see 1.1.8 Schizophrenia). People with schizophrenia do have a higher risk of committing violent crimes, probably due to the high risk of psychosis and due to an increased risk of substance abuse for the purpose of self-medication. These factors together double the risk of violent offences to be committed by those individuals (Steinert & Traub, 2016). Their crimes can appear to be extraordinary violent due to their delusionary psychotic thought structure and can happen in combination with a strong emotional outburst; but they hardly ever appear as the cold, instrumental, planned crime one would expect of a psychopathic killer.

There are also cases of people who have committed many negligible crimes and have been admitted to general psychiatric wards repeatedly. These stays were often aborted on their own wish. In such cases, that the court sometimes finally accommodates them in a forensic ward. Although this kind of accommodation is usually reserved for people who committed substantial crimes, in some cases an accommodation is necessary for a person's own good. These mentally disturbed petty criminals would get in trouble as soon as they would be released. One of the best chances for a treatment is, in this case, a forensic accommodation.

If we want to improve society's perception of mentally disturbed offenders, it makes sense to check the assumptions at the level of well-conceived research in different psychiatric settings and to disseminate the examples in the popular media. For the rest of this thesis, the term 'forensic psychiatric patient' is used instead of the term usually used in literature, which are "mentally disturbed", or "mentally ill" offender, (e.g., Jakobwitz & Egan, 2006; Mokros et al., 2011; Tsang et al., 2018; Williams et al., 2007), due to its unprejudiced framing. The term 'mentally disordered offender' stresses the offence and implies that the offender is additionally mentally disordered. Since the legal framework requires the offence to be *based* on an exceptional psychological state which is in turn based on a mental disorder, the disorder needs to be *prior* to the offence. The term therefore should stress the disorder underlying the offence, and not the offence with the addition of a disorder. The term 'forensic psychiatric patient' fulfils this purpose.

The core of this study is the investigation, whether forensic psychiatric patients show different expressions in the Dark Tetrad than the general population.

### **1.1 Theoretical Background**

The Dark Triad and the Dark Tetrad are theoretical conceptions on how dark personality traits relate to one another. The Dark Triad consists of three, and the Dark Tetrad of four elements. The Dark Triad includes Narcissism, Machiavellianism, and Psychopathy. The Dark Tetrad includes the Dark Triad plus Sadism. These constructs are considered as personality traits, which last over time and situations, instead of states that are more fluctuant.

**1.1.1 Narcissism.** The term Narcissism originates from Greek mythology, where Narcissus is punished by the Gods with eternal self-love and perishes as a result. The clinical-pathological equivalent of the subclinical Narcissism trait of the Dark Tetrad is the narcissistic personality disorder, which is also anchored in the International

Statistical Classification of Diseases and Related Health Problems (10th ed.; *ICD-10*; World Health Organization, 2004) and the Diagnostic and Statistical Manual of Mental Disorders (5th ed.; *DSM-5*; American Psychiatric Association, 2013). It is characterized by grandiosity, the need of excessive admiration, and a lack of empathy (Falkai & Wittchen, 2015). In the construct of Narcissism some researchers differentiate between an adaptive part, which is characterized by self-enhancement, a strive for success, and a positive view of the self and a maladaptive part, characterized by arrogant attitudes and interpersonal behaviors like exploitativeness, sense of entitlement, or exhibitionism (Ackerman et al., 2011). Narcissism is considered as a dark personality trait because the interaction with someone who is behaving egoistically causes rejection and anger in people (Leary et al., 1997), and this makes it socially aversive.

With the publication of the *Narcissistic Personality Inventory*, *NPI*, by Raskin and Hall (1979) that measures subclinical Narcissism, but was largely based on the clinical definition in the DSM (Campbell & Foster, 2007), the construct Narcissism gained attention in the literature.

Regarding normal personality traits, Narcissism is the only dark trait that is positively related with *Extraversion* (sociable, dominant, adventurous, active) in the HEXACO-model and the Big Five (Book et al., 2016; Johnson et al., 2019; Muris et al., 2017). The HEXACO-model is a popular personality model and Extraversion is one of six factors (Lee & Ashton, 2004). The Big Five is another prominent personality construct and Extraversion is one of five factors (Costa & MacCrae, 1992).

Vater et al. (2013) compared NPI scores (subclinical expressions) of a clinical sample consisting of patients with narcissistic personality disorder and a healthy control sample. They found slightly higher values in the clinical sample but with a negligible effect size of  $d = 0.04$ . An analysis of indirect effects revealed that the differences were suppressed by a low self-esteem of the patients. They concluded that the NPI was no valid indicator for pathological Narcissism.

Wright et al. (2017) conducted clinical interviews with psychiatric outpatients (patients who are no longer accommodated on a psychiatric ward and do not stay there overnight, but still visit the hospital at regular intervals) to investigate pathological Narcissism and social interaction. The results showed that others acting in a dominant way predicted quarrelsome behavior, and this link was potentiated by Narcissism. So Narcissistic people showed more quarrelsomeness when they perceived others to be

acting more dominantly. Surprisingly, Narcissism did not moderate the link between dominance of others and own dominance perception.

**1.1.2 Machiavellianism.** The concept of Machiavellianism is based on the writings of Niccolò Machiavelli, *The Prince* (Machiavelli, 1532) and *The Discourses* (Machiavelli, 1531). Machiavelli describes a leadership style for the capture and conservation of political power where the use of reckless, immoral, and deceptive methods is justifiable if they help political leaders to reach their goals (Externbrink & Keil, 2018). This was translated into a personality trait, that shows low empathy, a tendency to manipulate others, acting to one's own advantage, and a cynical view on the world (Christie & Geis, 1970). Morality is seen pragmatically, as an instrument for publicity reasons (Externbrink & Keil, 2018), and can clearly be attributed to a consequentialistic-ethical world view. A consequentialistic-ethical world view means that the consequences justify the ways they were achieved. Therefore, every method that leads to the desirable consequence is ethically permitted within this worldview. Machiavellianism, in contrast to the other traits, is not based on a clinical disorder.

Jones and Paulhus (2009) argued for the addition of a strategic component, which describes the ability to renounce short-term benefits for the achievement of long-term benefits. Also, this strategic planning is important to differentiate the construct from other dark traits. For example, Machiavellians would cultivate a favorable reputation whereas psychopaths would not care much about reputation (Jones & Paulhus, 2009). Machiavellians are often described as cold manipulators that would not hesitate to use others for achieving their own goals. In a recent meta-analysis, Vize et al. (2016) suggested that Machiavellianism should be included in Psychopathy, due to an overlap of their nomological networks (the representation of at least two interesting constructs in a study, their manifestations, and interrelations).

**1.1.3 Psychopathy.** The subclinical personality-trait Psychopathy arose from a clinical construct of Psychopathy. The foundation for the measurement and conceptualization was laid by Hervey Cleckley (1941) in his monograph "The Mask of Sanity". The construct is overlapping with dissocial personality disorders in the ICD-10 (World Health Organization, 2004) and antisocial personality disorders in the DSM-5 (American Psychiatric Association, 2013), but it reaches further than just the antisocial or dissocial component. Many psychopaths have antisocial personality disorders but just a small part of those with an antisocial personality disorder are psychopaths. One of the most prominent approaches for the measurement of Psychopathy is the conception of

Hare et al. (1990). This consists of four facets on two factors: (a) a deceptive and manipulative interpersonal style, (b) a flattened affect and emotional coldness, that form the *Factor 1*, as well as (c) an impulsive, and irresponsible Lifestyle and (d) antisocial behavior, that form *Factor 2* (Hare et al., 1990). In short words, Factor 1 is characterized by interpersonal-affective deficits and Factor 2 by antisocial-deviant behavior. Modern approaches treat each of the facets as own factors that are distinct but intercorrelated (Williams et al., 2003; Williams et al., 2007). The measurement instrument that is based on this concept, the *Psychopathy Checklist-Revised (PCL-R*; Hare et al., 1990), is not only used for diagnosing but also for risk evaluation in violent offenders. Psychopathy is a good predictor for future crimes (Harris et al., 1991).

As a subclinical personality trait, Psychopathy is mostly measured through self-report questionnaires, e.g., the *Self-Report-Psychopathy* scale (*SRP-I*) (Hare, 1985). The four subscales in the SRP mirror the four facets in the Psychopathy construct: Interpersonal Manipulation, Cold Affect, Impulsive Thrill-Seeking, and Antisocial Behavior (Williams et al., 2003).

Psychopathy is also negatively related to *Conscientiousness* (self-discipline, aim for achievement) in the HEXACO-model (Book et al., 2016). Psychopathy and its connection with crime is a well-researched topic. In a study with Canadian offenders, Woodworth and Porter (2002) found homicides committed by psychopaths to be more instrumental than homicides by non-psychopaths. This was in line with their expectations, due to the cold-heartedness of psychopaths or their instrumental interpersonal style. Homicides of non-psychopaths, on the other hand, are more likely to be “crimes of passion” (Woodworth & Porter, 2002, p. 442). Harris et al. (1991) investigated released, mentally disordered psychopathic violent offenders over an average 10-year period. Their results indicated that psychopaths show a high risk for violent offences for a long time.

**1.1.4 Sadism.** In the conceptualization of Sadism, it is important to distinguish between everyday Sadism (Buckels et al., 2013), which is the basis of the subclinical trait in the Tetrad and pathological Sadism. These two components can be distinguished in sexual Sadism and non-sexual Sadism. The term originates from a series of short stories by the French nobleman Marquis de Sade in the 18<sup>th</sup> century. De Sade mixed pornography with violent rituals, which subsequently made him the namesake for the joy of torturing and humiliating others (Freeman, 2002).

Sexual Sadism is anchored in the ICD-10 as a diagnosis for sadomasochism and in the DSM-5 as diagnosis for sexual sadistic disorder (American Psychiatric Association, 2013; World Health Organization, 2004), which are mainly used in forensic settings. Forensically relevant non-sexual Sadism is quite rare. By law, it is usually treated like forensic sexual Sadism. Sadism is defined by a person's gain of arousal through the physical or mental suffering of another person, either to gain power and dominance or for pleasure (O'Meara et al., 2011). In sexual Sadism the dominance part might be explained by reproductive strategies originating from primitive group hierarchies (Jozifkova & Konvicka, 2009). Sexual Sadism can be forensic when connected to sexual crimes or non-forensic, when consensually practiced (Jozifkova, 2013).

Most of Sadism research in the past decades was focused on sexual offenders and conducted in forensic settings (e.g., Mokros et al., 2014; Nitschke et al., 2012). O'Meara et al. (2011) found a form of Sadism in a community sample, decoupled from sex and crime. Buckels et al. (2013) found behavioral evidence for this trait through two experiences in a community sample and called it "everyday Sadism". People with higher Sadism scores intentionally chose to hurt others, whereas people with low Sadism scores would have rather endured pain than hurting another living being. Regarding normal personality constructs, Sadism, along with the other dark traits, also showed a negative relation to *Agreeableness* (kind, sympathetic, warm) and *Conscientiousness* in the HEXACO-model and the Big Five (Book et al., 2016).

**1.1.4.1 Delimitation of Sadism.** In their experiments, Buckels et al. (2013) found evidence that sadistic aggression was substantially different from context dependent Dark Triad aggression. Psychopaths would not hesitate to harm others, but they would not like to invest much time or effort (Jones & Paulhus, 2012). Machiavellians would be too calculating to risk punishment without sufficient benefits (Jones & Paulhus, 2010) and narcissists would harm people only if their ego was threatened (Campbell et al., 2004). But sadists would invest time and effort to harm others even without any personal benefit (Buckels et al., 2013).

Furthermore, people that exhibit strong Dark Triad traits are known to show little empathy, whereas with Sadism this is a more complex matter. Some previous findings indicate a relation between Sadism and a lack of empathy (Mokros et al., 2011). This was supported by analysis of Pajevic et al. (2018), where Sadism was correlated negatively to both affective and cognitive empathy. In the comparison

between sexual sadists and non-sadistic sexual offenders, sexual sadists showed significantly more cognitive empathy than the non-sadistic sex offenders (Nitschke et al., 2012). Also, it seems impossible to enjoy someone else's pain, without at least a bit of empathizing and perspective taking. Therefore, the matter of empathy is still unclear in Sadism and maybe even distinguishes the construct from the other dark traits.

**1.1.5 Dark Triad.** Paulhus and Williams (2002) conceptualized the Dark Tetrad of personality from the three most prominent malevolent personality traits: Narcissism, Machiavellianism, and Psychopathy. In this first study, they proposed to handle them as “overlapping but distinct constructs” (Paulhus & Williams, 2002, p. 556), which developed into a new field of research that has since grown considerably. The strong gain in research interest for the Dark Triad is illustrated in the number of respective studies published since 2002. More than 800 articles concerning the Dark Triad have been published and more than 400 contain “Dark Triad“ in the article title (SCOPUS hits on 09.03.2020 845 and 426 respectively).

Machiavellianism, like described above (1.1.2 Machiavellianism), was constructed on a theoretical basis using descriptions of behavior in the writings of Machiavelli. Unlike the other dark traits, it does not have a clinical basis. Narcissism, Psychopathy, and Sadism share a clinical tradition. In the clinical definition of disorders, there is often the need for cut-off values that determine whether e.g., a narcissistic personality disorder is present or whether it is not. This is important for making a diagnosis. In the construct of the Dark Triad, the traits are considered *dimensional*, this means that they occur in every human to a certain extent.

If traits are not dimensional but *taxonomic*, meaning either the presence or absence of a feature with a relatively clear cut-off, a diagnosis can be made if this cut-off is exceeded. In dimensional traits, experience-based but artificial cut-offs are often set for diagnostic reasons. The Dark Triad traits are however mainly considered as dimensional constructs in taxometric analyses (Beller & Bosse, 2017; Foster & Campbell, 2007; Walters, 2014). In the construct of the Dark Triad, all expressions of these traits are subclinical.

Men show significantly higher scores in all Dark Triad Traits than women, as shown in a meta-analysis by Muris et al. (2017). When controlled for the shared variance among the three traits, the sex differences were only significant for Psychopathy. The authors concluded that all Triad traits are more common in men with the strongest difference in Psychopathy (Muris et al., 2017).

Regarding normal personality constructs, the Dark Triad is constantly negatively correlated with the *Honesty-Humility* (sincerity, fairness, greed avoidance, modesty) factor, as well as the Agreeableness factor of the HEXACO-model (Furnham et al., 2013; Muris et al., 2017).

On a behavioral level, Muris et al. (2017) found every Dark Triad trait to be connected to interpersonal problems like dominance, entitlement, and self-expansion. Additionally, the Dark Triad traits all showed relations to aggressive or antisocial behavior, whereby Psychopathy was the trait with the strongest relation to all investigated negative psychosocial consequences. In another meta-analysis, the Triad traits were related to aggressive behavior, impulsiveness, and sensation-seeking/risk-taking, whereby Narcissism showed the weakest relations (Vize et al., 2016).

A study by Southard et al. (2015) found all Tetrad traits, except for the Narcissism subscale Leadership/Authority, to fall into the fields of the interpersonal circumplex. This represents arrogant, manipulative, cold-hearted, and hostile interpersonal styles (Wiggins et al., 1988). The Dark Triad was also related to short-term mating behavior (Vize et al., 2016). Recently, Tsoukas and March (2018) found Psychopathy and Sadism to be positive predictors for short-term mating behavior and negative predictors for long-term mating behavior, whereas Narcissism turned out to be the only positive predictor for long-term mating behavior. People with high expressions in the dark traits were mainly motivated by social status and finding partners for sex rather than by long term relationships. Negative relations to group affiliation and kin care were especially linked to Machiavellianism, Psychopathy, and Sadism (Jonason & Zeigler-Hill, 2018).

The Dark Triad was also investigated in samples containing people which had already been shown to have criminal tendencies. In a study by Edwards et al. (2017) a sample of non-disordered criminal offenders was investigated regarding a distinction by Miller et al. (2010), proposing that there are “dark” traits (like callousness, interpersonal-affective psychopathic traits, and grandiose Narcissism) and “vulnerable dark” traits (like emotional vulnerability, lifestyle psychopathic traits, vulnerable Narcissism, and borderline traits). It turned out that crimes against others, like assault and murder, are more connected to the actual dark traits, and that crimes that were about property, were more connected to the vulnerable dark traits.

**1.1.6 Dark Tetrad.** The term “Dark Tetrad” was first coined by Chabrol et al. (2009) when they investigated the connection between juvenile delinquency and dark

traits, which consisted of the Dark Triad and Sadism. They claim all four traits to be distinct but overlapping factors due to their consistently positive moderate intercorrelations. Also, they found Sadism to be a predictor of delinquent behavior independent of its overlap with the Dark Triad traits. Therefore, the study suggested to expand the construct to the Dark Tetrad (Chabrol et al., 2009). Other researchers took up the new construct and found supporting evidence for Sadism to be a part of the construct of dark personalities; and some found Sadism to share a stronger relation to Machiavellianism and Psychopathy than to Narcissism (Book et al., 2016; Johnson et al., 2019). Other previous research has shown that the closest related construct to Sadism was probably Psychopathy (Buckels, 2018; Chabrol et al., 2009; Mokros et al., 2011).

In 1.1.4.1. Delimitation of Sadism, the reasons for a possible *exclusion* of Sadism were discussed. Reasons for an *inclusion* are discussed in the following. Sadism, as well as the traits of the Dark Triad, is an aversive personality trait. It fits in the construct and the four-factor structure of the Tetrad has shown to fit well through factor analysis by Plouffe et al. (2019). Paulhus has advocated for the integration of Sadism (Buckels et al., 2013; Paulhus, 2014), and is currently developing a *Short Dark Tetrad* scale with his research group (Buckels et al., 2019). The published literature about the Dark Tetrad is evolving slightly slower than the Dark Triad literature, with 139 hits in SCOPUS (09.03.2020) since its first mentioning in 2009, which still mirrors a large research interest.

The tendency of men scoring higher than women that was found for the Dark Triad was also visible in the Dark Tetrad for all four dark traits (Chabrol et al., 2009; Craker & March, 2016). The negative associations with Honesty-Humility and Agreeableness were also found for the whole Dark Tetrad (Book et al., 2016; Johnson et al., 2019).

The Dark Tetrad is also connected to interpersonal behavior. Regarding delinquency, only Sadism and Psychopathy were predicting delinquent behavior in male juveniles, whereas Machiavellianism and Narcissism had no predictive value in this regard (Chabrol et al., 2009). A student sample also revealed Sadism and Psychopathy as the only predictors of antisocial behavior, independent of sex (Chabrol et al., 2017). In high-school children, a cluster-analysis of four groups, a low trait group, a Sadistic-Machiavellian group, a Psychopathic-Narcissistic group, and a group that was high on all traits, revealed that the high trait group scored highest on antisocial behavior but also

on suicidal thoughts (Chabrol et al., 2015). Also, vandalism for pleasure was predicted by the Dark Tetrad, with Sadism as the strongest predictor (Pfattheicher et al., 2019).

In a study about impression formation by Rogers et al. (2018) people with high Dark Tetrad expressions viewed others less positively and less accurately and were themselves viewed less positively and less accurately by people with low expressions. There were also relations between the Dark Tetrad and the accuracy of the judgement how vulnerable potential crime victims were rated based on their gait. The idea is that past victimization leads to an unconscious change in the gait, which is somehow more asynchronous than the gait of unencumbered people. Ritchie et al. (2019) investigated the perceived vulnerability of potential victims of assault and other crimes in a student sample. They showed videos of eight female students walking down a hallway and let other students rate how vulnerable they perceived the respective person to be. Every one of the eight walkers completed a questionnaire about experiences of victimization over the past five years. The accuracy was assessed through a comparison of the vulnerability ratings of the raters and the presence or absence of past victimization in the walking cues. With higher values in Machiavellianism, Psychopathy, and Sadism, the ratings became more accurate, whereby factor 2 Psychopathy was the best predictor and Narcissism was not related to the accuracy at all. Book et al. (2013) investigated the accuracy of vulnerability ratings in prisoners. They used the same method as Ritchie et al. (2019). Forty-seven prisoners from a maximum-security penitentiary in Canada rated how vulnerable a “target” was to victimization based on videos of walking people. In contrast to the findings of Ritchie et al. (2019), where *factor 2* Psychopathy (antisocial-deviant behavior) was the best predictor for vulnerability rating accuracy, the vulnerability ratings of *prisoners* were more accurate with higher expressions in *factor 1* Psychopathy (interpersonal-affective deficits; Book et al., 2013).

In another study, the Dark Tetrad was able to predict attitudes towards immigrants. People with high expressions of Psychopathy saw a rather realistic threat, while people with high Narcissism expressions saw a symbolic threat in immigrants. The authors claimed cynicism and aggressive humor to be expressions of the Dark Tetrad, whereas negative attitudes toward immigrants would be better described as a correlate of it. Machiavellianism, Narcissism, and Sadism were predictors for cynicism. For aggressive humor the Dark Tetrad as a whole explained the biggest share of variance, with Sadism and Psychopathy as strongest predictors (Međedović & Bulut, 2018).

Lastly, in a study by van Geel et al. (2017), the Dark Tetrad was connected to bullying and cyberbullying. Sadism, Machiavellianism, and Psychopathy turned out to predict bullying, while Narcissism had no predictive value. This was surprising, because earlier research supposed Narcissism to be a good predictor for intense bullying, at least in boys (Reijntjes et al., 2016). Regarding cyberbullying, Sadism was the only dark trait showing a relation (van Geel et al., 2017).

**1.1.7 Dark Core.** Due to the continuously found substantial positive correlations, with coefficients ranging from .35 to .58 (Muris et al., 2017; Vize et al., 2016), the debate about the size of the overlap between the traits brought up ideas of an underlying Dark Core (Bertl et al., 2017; Jones & Figueredo, 2013), whereas others e.g., Paulhus (2014) still consider the dark traits as theoretically and empirically delimitable constructs, but with a common callousness factor.

The study by Book et al. (2015) attributed the strongest explanatory power for the overlap of the dark traits to the Honesty-Humility factor of the HEXACO-model (Lee & Ashton, 2004). Honesty-Humility is so consistently negatively related to all dark traits that some researchers claim that the common element of the Dark Triad is completely represented by opposite low pole of Honesty-Humility (Hodson et al., 2018).

When Jones and Figueredo (2013) found the Dark Core as an underlying construct of the Dark Tetrad, they found manipulateness and callousness to explain the biggest share of variance in the Dark Core. This was supported by Bertl et al. (2017), who also found these two Psychopathy factors to explain the biggest share of variance, and a better model fit for a single Dark Core than for independent constructs. However, in this conceptualization, Sadism did not improve its explanatory value, so the final Dark Core of Bertl et al. (2017) just consisted of the Dark Triad traits.

As mentioned above (1.1.5 Dark Triad), the single dark traits are considered dimensional. However, in a taxometric analysis, in which sex was considered, the Dark Core was still dimensional for women, but taxonomic, that is categorically distinctive, for men. Men who fit into this category are called taxon members (Dark Core cut-off exceeded). All taxon members showed increased expressions in the single dark traits and were mostly younger than members of the complement, who did not exceed the cut-off (Tran et al., 2018).

As can be seen from sections 1.1.1 to 1.1.7, there are pros and cons and different approaches for the categorization of the dark traits. However, generally all traits are

aversive and conceptually, they should be higher in forensic psychiatric patients, due to their accommodation in a psychiatric hospital in combination with committed crimes.

**1.1.8 Schizophrenia.** So far, the Dark Triad was mainly investigated in healthy populations, which is partly due to the self-rating character of the Dark Triad measurements. However, those with the highest expressions in the dark traits should not be subclinical, but clinical populations. Together with the aversive character of the traits, the investigation of a clinical and forensic sample is especially interesting. There is a disorder that often occurs in clinical forensic settings: the schizophrenic disorder, which will be briefly described below.

Translated from Greek, schizophrenia means “splitting of the mind”. Nowadays it is considered to be a disintegration of mental subfunctions with a profound disturbance of the reference to reality. There is type 1 schizophrenia, which is characterized by positive symptoms like thinking disorders, delusions, and hallucinations; and Type 2 schizophrenia, which is more chronic and tends to be characterized by negative symptoms like inhibition of thinking, slowing down of thinking, loss of interests, social withdrawal, impoverishment of affect, language regression, and loss of drive (Häßler, 2015).

Schizophrenia is classified in both diagnostic classification systems ICD-10 and DSM-5 (American Psychiatric Association, 2013; World Health Organization, 2004) and has several sub-forms, inter alia the paranoid form, which is the only relevant form for the current study (see 2.2 Participants). Paranoid schizophrenia is also the most frequent form. It is often characterized by disordered perception, hallucination, and delusion (Gonther, 2017).

When the loss of reality becomes extreme, the person enters a so-called “psychotic state“. Psychosis is a widely used, but a rarely understood term. A psychosis is a temporary state of changed perception and behavior which sprawls to a strangely changed thinking, wishing, feeling, and acting. The perception filter seems to be deactivated, and everything their sensory organs receive is perceived to be equally important. In such a mental state, picking information out of a room or a conversation and focusing on specific things becomes exhausting and sometimes impossible. This leads to fear, social withdrawal, and, if another person seems responsible for all this change, aggression. People often dive even deeper into their delusional constructs that have often been created long time before the psychosis, until they incorporate everything that happens into their constructs of thought. If a crime is committed in such

a state, the offender is often considered as limited or not criminally liable. Antipsychotic medication helps to recover and often eases the regain of control through inhibition of several stimuli, facilitating the renewed filtering of important information.

### **1.2 Relevance of this research**

Forensic psychiatric patients are already highly exposed to prejudices due to their mental disorder. These are even worse in cases where the patient also committed crimes. The common perception of forensic psychiatric patients is influenced by negative connotations through books, movies, and series that present a picture of psychopathic serial killers. This leads to an automatic attribution of this perception to forensic psychiatry. The investigation of forensic psychiatric patients regarding the Dark Tetrad is a chance to show whether this assumption is justified. In case that relevant differences are shown, there is the chance to open a new sub-field in Dark Tetrad research to examine the reasons for these differences. In case that no relevant differences are shown, prejudices might be reduced, and one would see, that there are no big differences between forensic psychiatric patients and the general population in terms of Dark Tetrad traits.

The Dark Tetrad has been investigated in several clinical (Olsson et al., 2016; Smeijers et al., 2018) and forensic (Edens et al., 2000; Hare, 1991; Woodworth & Porter, 2002) samples, but the current study was the first to investigate the whole Tetrad in a clinical and forensic setting at the same time. The existence of such a sample in the dark personality discourse may contribute to a wider knowledge in dark personalities, inspire researchers to extend their investigations in direction of psychiatric patients, and may even lower obstacles for similar studies.

### **1.3 Hypothesis**

Due to the possibility of pertinent disorders (e.g., narcissistic personality disorder, antisocial personality disorder) in the group of forensic psychiatric patients, and due to the fact that they have obviously already demonstrated the malevolent side of human behavior, this group is expected to score higher in the dark traits than a general population sample. Because of the consistent relation of delinquency and Psychopathy (Chabrol et al., 2009; Hare, 1991; Paulhus & Williams, 2002), the forensic psychiatric patients are expected to score higher in Psychopathy than the a general population sample. This second hypothesis was not pre-registered.

## 1.4 Preregistration

In the spirit of open science practices, this study was pre-registered in the open science framework osf.io in September 2019 (<https://osf.io/z7sa5>). A pre-registration separates hypothesis-testing and hypothesis-generating research. It increases transparency and facilitates reproducibility by determining the planned methodology and hypotheses. This study was pre-registered prior to data collection. All analyses were made according to the pre-registered plan. All Information that is based on analyses and has not been mentioned in the pre-registration is marked in a clear visible way through an own paragraph. Any deviation from the pre-registration will be marked and justified accordingly.

## 2 Method

### 2.1 Study design

The study compared two parallelized groups that were merged to test-twins (see below) regarding the four dark traits of the Dark Tetrad. The treatment group consisted of forensic psychiatric patients, i.e. people who have been in a psychotic or mentally exceptional state during a criminal offence, which to its extent justifies at least a reduction in their criminal liability and who have therefore been placed in a psychiatric ward. In Germany, this is usually done by court judgement including a psychiatric or psychological expert report. The control group consisted of participants from the general population. The means of each dark trait, as well as the composite scores of Dark Triad and Tetrad were compared between the two groups.

Participants were parallelized for sex, age with a range of  $\pm$  five years, and the closest possible distance between the highest completed education level to create test-twins. The different groups were compared in Microsoft Excel and manually sorted to obtain the maximum possible fit. The criteria were applied hierarchically with sex to fit perfectly, age to stay within the range of  $\pm$  five years, and at the same time keeping the distance between education levels at a minimum. After parallelization, the mean age of the treatment group ( $M = 37.9$ ,  $SD = 12.6$ ) and control group ( $M = 38.3$ ,  $SD = 14.5$ ) differed with a small effect size. This difference was nonsignificant,  $t(34) = -.768$ ,  $p = .437$ ,  $d = -0.1$ . The education levels were coded as: compulsory school – 1, apprenticeship – 2, high school degree – 3, and university degree – 4. For parallelization, the highest distance between two test-twins was 2 steps. A Wilcoxon-test (because education levels are rank-data) still revealed a higher education level in the

control group ( $Mdn = 3.00$ ,  $R = 3$ ) than in the treatment group ( $Mdn = 2.00$ ,  $R = 4$ ;  $U = -3.727$ ,  $p < .001$ ,  $d = -0.87$ ). Cohen's  $d$  was calculated with parametric methods.

There were 36 participants recruited for the treatment group and 39 for the control group. One participant of the treatment group was excluded due to a questionnaire completion degree lower than 80 percent. The remaining 35 participants from the treatment group were parallelized with the 39 participants of the control group, so the four control-participants with the lowest fit were excluded. The final sample were 35 test twins. Thirty-three twin pairs were men and two were women.

## 2.2 Participants

The clinical sample was recruited in the forensic wards of the Center for Psychiatry South-Württemberg (ZfP Südwestfalen) in Weissenau in the region of Ravensburg in Germany. The sample size in the clinical sample was  $N = 36$ . Thirty-two patients had primary diagnoses of a paranoid schizophrenia, with the ICD-10-code F20.0, as noted in their patient record. Three patients had a pedophile disorder F65.4 and one had a schizoaffective disorder F25.0 (ICD-10; World Health Organization, 2004). Notably, there is a quite large subgroup in the clinical sample: Out of 36 patients, there were 32 with paranoid schizophrenia and 30 of them were men, so this subgroup is a rather homogeneous sample.

The main share of the control sample was recruited in a soccer club in Blitzenreute in the region of Ravensburg in Germany. Due to assumed relatively low educational levels in the clinical sample, control participants with non-academic educational backgrounds were recruited. In total the control group consisted of  $N = 39$  participants while the first 32 consisted of participants from the soccer teams and the last seven were recruited individually in order to create the best fit according to the pre-registration.

The stopping rule used for data collection differs from the pre-registration. In the pre-registration it was planned to recruit 100 test persons for the control group and select the best fitting participants for parallelization. Due to a lack of economy of the original approach, the mass-recruitment was limited to the soccer teams and the remaining seven participants were recruited from the researcher's circle of acquaintances.

**2.2.1 Ethics Vote.** The study has been approved by the Ethic commission of the University of Ulm in South Germany (number 66/19). The vote is valid since May 2019

and no data has been collected before this date. See the appendix for further information about the vote.

## 2.3 Measures

**2.3.1 Sociodemographic data.** On the first page of the questionnaire, age, sex, and highest completed level of education were enquired. Participants were asked to report their level of education e.g., compulsory school, apprenticeship, high school, or university degree due to subsequent categorization (see 2.1 Study design). It is worth noting that high school is divided into different levels in Germany as well as in Austria. The herein mentioned high school degree refers to the highest possible level of education (Matura, Abitur, or comparable equivalent degrees), besides a university degree.

### 2.3.2 Narcissistic Personality Inventory NPI-15 by Schütz et al. (2004).

Narcissism was assessed with the German short-version of the Narcissistic Personality Inventory, the NPI-15 by Schütz et al. (2004). The original NPI by Raskin and Hall (1979) had 40 Items and was used by Paulhus and Williams (2002) in the original study. There is an English short version, the NPI-16 by Ames et al. (2006), that was developed at the same time as the NPI-15 and according to the authors it has a good predictive validity. The NPI-15 is considered to have a better internal consistency due to a more specific focus on the authority dimension of Narcissism. The NPI-16 on the other hand is supposed to have a broader focus on more different components of Narcissism (Ames et al., 2006). The NPI and its short forms are the most popular tools for the measurement of Narcissism partly due to its frequent use in referring literature. Nearly every investigation that includes the Dark Triad or the Dark Tetrad uses the NPI, at least for comparison with other measurements. The 15 questions consist of two alternative sentences that are supposed to represent different sides of the same dimension. Answers are given in a forced choice format ranging from plus three in one direction to plus three in the other direction; e.g., item 15: “I am much like everybody else.” vs. “I am an extraordinary person.” (English wordings derived from Ames et al., 2006).

Ackerman et al. (2011) suggested to form three subscales, namely Leadership/Authority (LA), Grandiose Exhibitionism (GE), and Entitlement/Exploitativeness (EE). Notably EE consists of just one item, which is possibly not sufficiently meaningful. Therefore, a two-factor solution like proposed by Spangenberg et al. (2013) with the factors Leadership Ability/Personality (LA/P) and Grandiosity (G) was used. These factors differ in several points from the three-factor

solution of Ackerman et al. (2011). Spangenberg et al. (2013) used item 7, which Ackerman et al. (2011) counted to the factor EE, for their LA/P factor. Item 13 and 15, which belong to LA in Ackerman et al.'s (2011) approach, are now used for the G scale (Spangenberg et al., 2013). Spangenberg et al. (2013) allocate the items 4 and 8, that do not have an allocation in Ackerman et al.'s (2011) approach, in their G scale. Items 2 and 10 from Ackerman et al.'s (2011) GE scale are used in Spangenberg's LA/P score. The last item from GE, item 3, was used for LA/P in Spangenberg et al.'s (2013) approach. Basically, the whole GE subscale was absorbed by Spangenberg's LA/P scale and his G subscale is a completely new factor. It is important to note that different researchers speaking of Grandiosity regarding Narcissism can mean completely different constructs. While in Ackerman et al.'s (2011) approach Grandiose Exhibitionism is mainly understood as putting oneself in the center of attention, Spangenberg et al. (2013) understand Grandiosity more as a feeling of being extraordinary and successful. In the present study, Grandiosity is understood according to Spangenberg et al. (2013), since their subscales were used. It must be noted that Ackerman et al. (2011) used the long version of the NPI and the reported item allocations were subsequently converted into the short version. In the present study, the internal consistencies of the total score were .74 and .81. for the treatment and control group. Internal consistencies for the subscales were .71 and .80 for Leadership Ability/Personality and .39 and .49 for Grandiosity.

**2.3.3 Machiavellianism Scale Mach-IV by Christie & Geis (1970).** For the formation process of the Machiavellianism scale, 71 items were created through behavior descriptions from the books by Niccolò Machiavelli. In the next step, 60 of these items were chosen to form a preliminary scale. Then, the 10 best fitting items for high expressions, and the 10 best fitting items for low expressions of Machiavellianism were selected for the Mach-IV scale. The construct validity of the Mach scale has been demonstrated repeatedly and in different research settings (Wrightsman, 1991). Cronbach's alpha ranged between .70 and .76 (Fehr et al., 1992).

Nevertheless, the original Mach-IV was used due to its high popularity, along with its good comparability. The answers are given on a 6-point scale ranging from strongly disagree to strongly agree. The original subscales by Christie and Geis (1970) Manipulative Tactics (MT), Cynical Worldview (CW), and Pragmatic Morality (PM) were used, as well as the German translation created by Bertl et al. (2017). In the present study, the internal consistencies for the total score were .51 and .57 for the

treatment and control group. Internal consistencies for the subscales were .53 and .56 for Manipulative Tactics, .39 and .27 for Cynical Worldview, and -.16 and -.21 for Pragmatic Morality.

Negative values are a violation of the requirements for a reliable measurement. The subscale Pragmatic Morality has already been criticized by different researchers, mostly because it just consists of two items that partly show poor psychometric properties (Fehr et al., 1992; Monaghan et al., 2016). Still it was used for the confirmatory analysis. For the exploratory analysis, the approach of Monaghan et al. (2016) was used. Monaghan et al. (2016) removed item 19 because of poor item discrimination and assigned item 9, which had an acceptable item discrimination for the “Tactics” subscale, to the Tactics subscale. The new subscale Tactics corresponds to Manipulative Tactics MT in the original concept. This results in a two-factor solution with just “Views” (which corresponds to Cynical Worldview CW) and Tactics. This structure has already been used successfully in the past (e.g., Bertl et al., 2017). Internal consistencies for the new Tactics subscale were .55 and .46 for treatment and control group.

**2.3.4 Self-report Psychopathy SRP-III by Paulhus et al. (2016).** The SRP is based on the Psychopathy Checklist Revised (PCL-R; Hare, 1991), which was considered as “gold standard” for the measurement of forensic Psychopathy in the past decades (Furnham et al., 2013). The SRP passed several revisions including the original SRP-I (Hare, 1985), the SRP-II (Hare et al., 1989), the SRP-III-E (Williams et al., 2007), and the SRP-III (Paulhus et al., 2016). The most recent version is the SRP-4 (Paulhus et al., 2016). Due to continuous maintenance of the self-report questionnaire along with a consistent name, various translations in different languages and different approaches on explaining the factor structure, the literature on the different forms of the SRP is quite evasive. In the current study, a translated German (Bertl et al., 2017) 31-item version of the SRP-III (Paulhus et al., 2016), with a structure of four underlying factors was used: Antisocial behavior (AB), Impulsive Thrill- Seeking (TS), Interpersonal Manipulation (IM), and Cold Affect (CA) by Williams et al. (2003). The general four-factor structure stays similar: the manipulation, the affective, the lifestyle, and the antisocial component are found throughout the various versions, with varying terminology and slightly different items in the subscales which, however, are largely negligible. The interpersonal component is sometimes named interpersonal manipulation, or just manipulation, the affective component is sometimes named cold

affect, callous affect, or callousness, the lifestyle component is sometimes named erratic lifestyle or impulsive thrill-seeking, and sometimes there is a “behavior“ added in the naming of the antisocial component. Answers are given on a five-point scale ranging from 1: strongly disagree to 5: strongly agree. In the present study, the internal consistencies for the total score were .77 and .88 for the treatment group and the control group. Internal consistencies for the subscales were .41 and .62 for Interpersonal Manipulation, .65 and .77 for Impulsive Thrill-Seeking, -.56 and -.17 for Cold Affect, and .68 and .80 for Antisocial Behavior.

As described in 2.3.3, negative reliability values are a requirement violation. Therefore, the subscale Cold Affect CA was investigated on an item level. An exploratory factor analysis showed different answer-vectors for the treatment and the control group. Item 4, which is reversed and should therefore show a negative contribution to the factor of the subscale, showed a positive contribution in the treatment group and did not benchmark (factor loading  $>.30$ ) in the control group. Item 7, which is supposed to contribute positively, showed a negative contribution in the treatment group and a positive one in the control group. Item 11, which is also reversed, showed a positive contribution to the factor in the control group. Therefore, the subscale is not appropriate for the investigated samples and the subscale was excluded from the exploratory analysis. The respective internal consistencies of the new Psychopathy score were .78 and .88 for treatment and control group.

**2.3.5 Short Sadistic Impulse Scale SSIS by O’Meara et al. (2011).** The SSIS is a short screening instrument for the measurement of sadistic impulses. It was developed by examining the 10 best fitting items of the 49-item *Sadistic Attitudes and Behaviors Scale SABS* (Davies & Hand, 2003). O’Meara et al. (2011) postulated their screening as one-dimensional, due to a principal components analysis that showed just one meaningful factor, the so-called “hurting-factor“. The Sadism definition used includes humiliation of others, longstanding patterns of cruel or demeaning behavior, and the infliction of physical, sexual, or psychological pain in order to gain power and dominance over others for pleasure and enjoyment (O’Meara et al., 2011).

The SSIS is widely used (Bertl et al., 2017; Buckels et al., 2013; Buckels et al., 2019; Craker & March, 2016; Foulkes, 2019; Tran et al., 2018) and is considered a reliable tool with a good incremental validity for the prediction of positive attitudes towards dangerous social groups (Dinić et al., 2020). Answers are given on a six-point

scale, ranging from 1: strongly disagree to 6: strongly agree. In the present study, the internal consistencies for the treatment group and control group were .68 and .78.

**2.3.6 Crime data.** The crime descriptions given by the responsible person in the ward were slightly amended to merge them into the following common categories of the German criminal code “Strafgesetzbuch (StGB)”: crimes against life (§§211 – 222, StGB), crimes against physical integrity (§§223 – 231, StGB), robberies and extortion (§§249 – 256, StGB), crimes against sexual self-determination, in particular sexual crimes against minors (§§176 – 182, StGB), and crimes dangerous to the public, in particular arson (§ 306, StGB). The amendments did not change the meaning of any crime description. If there was a double conviction, just the more severe one was used. Attempted crimes were counted as completed ones for the purpose of this study. Dangerous physical injury was treated the same way as ordinary physical injury. One test person was not assignable to any of the above groups because the respective patient only had a conviction for the damage of property.

A weighting of the offences was not carried out because of unclear conviction circumstances. Some patients were convicted for attempted murder, but the actual crime was more or less harmless, while others who were convicted for seemingly more harmless crimes would in fact be dangerous to the public if released. This is sometimes due to specifics in the progression of events arising from the patients’ exceptional psychological state. For example, if someone burns down a house, the indictment is multiple attempted murder. But if the person made sure that everyone is outside their homes and the fire cannot spread to other houses, the actual crime was damage to property. Sometimes this is due to the patient’s psyche itself. For example, if a person is considered dangerous to the public, but did not commit severe crimes sufficient for a conviction, the indictment is maybe theft or threat, but the respective person needs to be kept imprisoned for the protection of the public due to his/her impulsive antisocial behavior. This is a well-known categorization problem in forensic psychiatric hospitals. Statements made based on weighted crime scores would therefore lack validity. Hence the categories are nominally scaled and for descriptive consideration only.

## **2.4 Procedure**

The clinical sample (treatment group) was recruited in the Center for Psychiatry South-Württemberg (ZfP Südwürttemberg) in Weissenau near Ravensburg in South Germany. As previously agreed with the chief physician of the forensic psychiatric department Dr. Udo Frank, participation was offered to all seven forensic wards. Two

wards were excluded due to doubts of the responsible ward managers about the ability of their patients to fill out questionnaires, due to active psychotic states or low intelligence levels. Three of the participating wards were open (patients can leave at any time for a certain time frame, depending on their security level) and two were closed (the ward door is just opening with a key card and exits need to be agreed by the leading therapist).

On every ward there is a *forum* once or twice a week. This forum is a get-together where all patients, nurses, therapists, and doctors of the ward sit together and discuss formal, interpersonal, and social issues. Also, new patients or staff members introduce themselves; and patients who will soon be leaving say goodbye. The patients can address problems with other patients or staff members, learn to formulate their anger, and to verbally stand up for themselves. They can also address concerns about their daily life on the ward and apply for different activities.

First, the questionnaire and a quick overview of the study was presented to the team (nurses, therapists, doctors, social workers, etc.) and questions were clarified. Then the project was introduced and advertised to the patients during the forum, including name, purpose, aim, and planned duration of the survey. Patients who accepted to take part were asked to raise their hand and give their name. All names were recorded by the recording clerk of the forum. The participating patients were told that the surveys will follow subsequently to the forum. In a short time between the end of the forum and the surveys, participation requirements were checked with the team. Specifically, it was checked whether each volunteering patient was stable enough not to be burdened by the questions. If the responsible person judged someone to be in a bad condition, the specific patient was addressed separately and told that their participation is impossible due to medical or therapeutic reasons. This only happened twice. All remaining volunteers could participate directly.

Following this, the patients who were considered to fulfill the requirements were called together. In the smaller circle of participants resulting from this selection more detailed information was given. This included explanations of the Dark Tetrad traits, brief information about statistical comparison, and the expected results. The patients were informed that all inquired data will be treated confidentially, so no one except for the onsite researcher, who is also the author of this study, will ever read their filled-in questionnaire and that their data will be anonymized. To still ensure the possibility for data insight and deletion, the participants filled in a unique code that was solely

creatable by the respective participant and at the same time is not retraceable. It consisted of the first and the last letter of the first name of their mother, their father, the first and last letter of their favorite animal, and the month of birth of their mother. So if a participant wanted to have insight into his/her data or wanted it to be deleted, he/she could contact the research team (contact information was provided on the patient information sheet) and recreate the individual code so the individual data set could be found in the complete anonymized total data set. The participants were further informed about their right of cancellation, their right of insight into their data and the procedure to collect the hospitalization data. The participants were told that this includes the date of hospitalization, the offence for which they were accommodated, and their diagnosis. The participants were informed that their name on the informed consent will be shown to a responsible person of the ward, who would then write the date, crime, and diagnoses on the sealed envelope that would contain their filled-out questionnaire. They were assured that the respective member of staff would just know *that* the patient had participated and that they had the permission to release the hospitalization data. They were told that from this moment on their data would be anonymous, because the informed consent sheets would then be separated from the envelopes. After this information, the informed consent and the patient information sheet were distributed. Lastly the participants were told that they could cancel their participation at any time without any disadvantage.

After signing the informed consent and if there were no more questions, the participants filled in the four subscales (one for each dark trait). If any difficulties or questions appeared in the meanwhile, the onsite researcher and author of this study assisted the regarding participant(s). No one but the author administered the questionnaires. The surveys took place at a comfortable place for the participant(s). This was either an unused room provided by the ward (e.g., the celebration hall), a common room, or the private room of the participant. In the case of group surveys, no private rooms were used. For each participant, a pen, a chair, and a place at a table were available. After finishing the questionnaire, the participants were recommended to re-read the patient information carefully and were reminded that they have the right of insight and deletion of the data at any time. The participants were thanked, and their answer sheets were stored in an envelope which was subsequently sealed. The informed consent was placed in the right order with the envelopes for the inquiry of the

hospitalization data. The participants were reminded that this only serves the purpose of the inquiry of hospitalization data.

Next, the name of the participant on the informed consent sheet as well as the sealed envelope was shown to the responsible person in the ward. They then wrote the date of hospitalization, the offence, and all relevant diagnoses on the envelope. This always took place in an office where no one else could hear or see the information. From there on, the informed consent was kept separate from the envelope and there was no way to unite them again. This procedure ensures full anonymity.

The control sample was mainly recruited in the soccer club in Blitzenreute near Ravensburg in Germany. Participation was requested in advance from two different teams of the soccer club: the active (ages 20-30) and the seniors' team (ages 30-50). Both teams confirmed their participation after training. The active team was recruited on Tuesday the 24.09.2019 and the seniors on Wednesday the 25.09.2019. In total, 32 people participated in these two days. After the players finished their training, the study was introduced and the informed consent sheets and participant information sheets were distributed. Any questions were clarified and the anonymity procedure with the envelopes was explained. After the questionnaires were completed, the participants were thanked and provided with a beverage as reward.

The remaining participants of the control sample were contacted directly, and an individual meeting with each participant was arranged. The informed consent and participant information sheets were distributed. Explanations of the procedure and of anonymity were similar to the soccer teams. All information about the right of insight and deletion of their data, as well as the possibility of cancellation without any disadvantages was also given to all control participants.

## **2.5 Statistical Analysis**

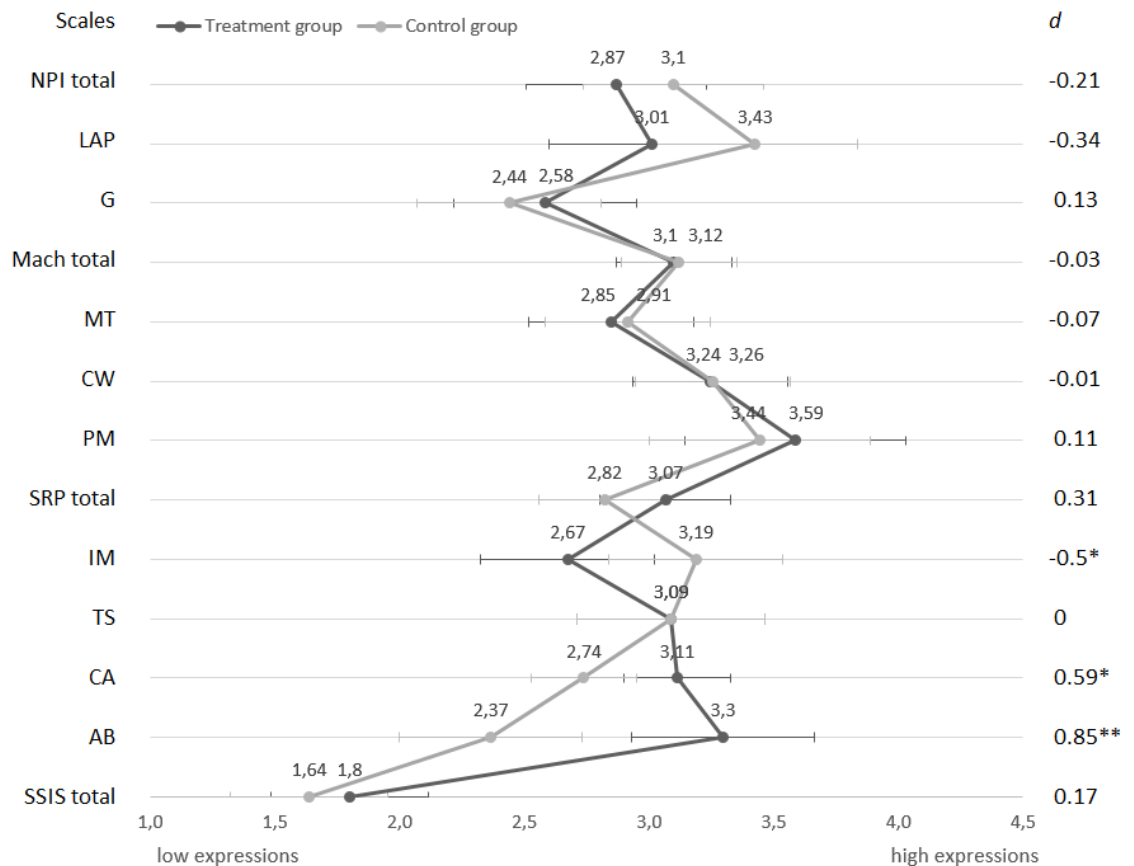
The data was entered into the SPSS (statistics software) Datasheet. Parallelization was done manually in Microsoft Excel. Therefore, all data was handled as dependent data. Datasets that included less than 80 percent of valid data (filled out items) were excluded. Missing data that did not reach the 80 percent cut-off per dataset were imputed with the respective variable means. To check for deviations from the normal distribution, the cut-offs for skewness  $< 2$  and kurtosis  $< 7$  by West et al. (1995) were used. An interval scaling of the subscale and total scores was assumed. The logistic regression announced in the pre-registration was not carried out for power reasons (sample size too low). Due to different numbers of response alternatives in the

different measurements, all scales were standardized to range from 1 to 6. Because Narcissism answers ranged from 0 to 5, all scores were increased by 1. Because Psychopathy answers ranged from 1 to 5, all scores were divided by 5 and multiplied by 6. Due to the mentioned concerns about the statistical power, all results are reported and interpreted using effect sizes according to the well-established classification of Cohen (1988).

### 3 Results

For the mean comparison in the scores of the dark traits, *t*-tests for dependent data were conducted. For relations between the dark traits, Pearson correlations were conducted. For requirement tests, difference scores between the two groups were calculated for all subscales. All skewness values were  $<2$  and all kurtosis values were  $<7$ . Outliers were screened with the criterion of not being more than three interquartile ranges (IQR) away from the median. There were no such outliers in the data, so all requirements for *t*-tests and Pearson correlations were fulfilled.

Descriptive statistics and Cohen *ds* for differences for the full sample are provided in Figure 1. In most scales, there were no large differences. According to Cohen's (1988) classification of effect sizes  $|d| = 0.2$  is a small effect,  $|d| = 0.5$  is an effect of moderate size, and  $|d| = 0.8$  is a large effect. In Narcissism, the control group scored higher than the treatment group. The effect size of the difference in the Narcissism total score was small and in the subscale Leadership Ability/Personality small to moderate. In Grandiosity, the treatment group scored higher than the control group with a small effect size. In Machiavellianism, all differences were negligibly small. In the Psychopathy total score, the treatment group scored higher than the control group with a small to moderate effect. In the subscale Interpersonal Manipulation, the control group had higher scores than the treatment group with a moderate effect size. The means in the subscale Impulsive Thrill-Seeking of the SRP were equal and therefore the effect size is zero. In Cold Affect there was a moderate effect, with the treatment group showing higher scores than the control group. In Antisocial Behavior there was the only large effect, also with higher scores in the treatment group than in the control group. In Sadism, the treatment group also scored higher than the control group with a small effect. Statistically significant differences are marked with asterisks. Differences without asterisks were nominally nonsignificant. The differences in the sum scores of the Dark Triad and the Dark Tetrad were small effects,  $t(34) = 0.575$ ,  $p = .569$ ,  $d = 0.10$  and  $t(34) = 0.744$ ,  $p = .462$ ,  $d = 0.13$ , and were nominally nonsignificant. The



**Figure 1.** Means and their 95% confidence intervals of the dark traits and their subscales in the two groups, alongside effect sizes. Full sample.  $N = 70$ .  $N = 35$  in treatment and control group respectively.  $d$  = Cohen  $d$ ; NPI = Narcissistic Personality Inventory (NPI-15); LAP = Leadership Ability/Personality; G = Grandiosity; Mach = Machiavellianism Scale (Mach-IV); MT = Manipulative Tactics; CW = Cynical Worldview; PM = Pragmatic Morality; SRP = Self-Report Psychopathy (SRP-III); IM = Interpersonal Manipulation; TS = Impulsive Thrill-Seeking; CA = Cold Affect; AB = Antisocial Behavior; SSIS = Short Sadistic Impulse Scale. \*  $p < .05$ , \*\*  $p < .001$ .

preregistered hypothesis about the differences in the dark traits between the treatment and control group was just partly supported. However effect sizes suggest non-trivial differences between the groups. The following results are exploratory, and therefore hypothesis generating.

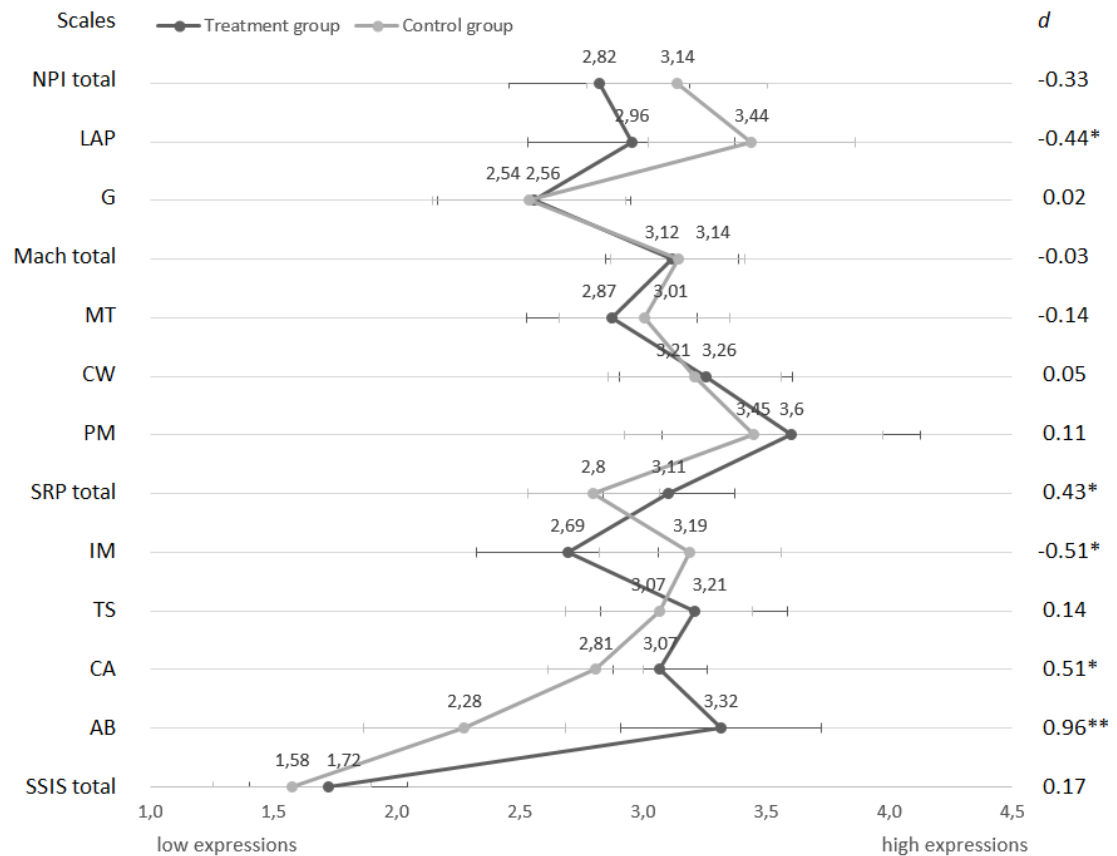
According to Cohen's (1988) classification of effect sizes, a correlation coefficient of  $r < .01$  is trivial,  $r > .1$  is a small effect,  $r > .03$  is a moderate effect, and  $r > .5$  is a large effect. In the treatment group, Machiavellianism and Psychopathy were moderately correlated with  $r(33) = .366$ ,  $p = .031$ . In the control group Machiavellianism showed a large correlation with Sadism, with  $r(33) = .536$ ,  $p = .001$ , while there was no meaningful relationship  $r(33) = .058$ ,  $p = .739$  in the treatment

group. The moderate correlation between Machiavellianism and Psychopathy was also found in the control group,  $r(33) = .312, p = .068$ , but it was nominally nonsignificant. The correlation of Sadism and Psychopathy was moderate to large in both groups with  $r(33) = .417, p = .013$  in the treatment group, and  $r(33) = .476, p = .004$  in the control group. The correlation between Psychopathy and Narcissism was moderate in the treatment group,  $r(33) = .316, p = .065$ , and small in the control group,  $r(33) = .273, p = .113$ , and nominally nonsignificant. Machiavellianism and Narcissism showed a very small correlation in the treatment group,  $r(33) = .087, p = .620$  and a small negative correlation in the control group,  $r(33) = -.160, p = .358$ , which were both nominally nonsignificant. The correlation of Narcissism and Sadism was small in the treatment group,  $r(33) = .139, p = .426$ , and very small negative in the control group,  $r(33) = -.046, p = .791$ , and as well nominally nonsignificant.

### 3.1 Subgroup men with schizophrenia

As mentioned above, the largest homogeneous subgroup in the treatment group consisted of men with a primary diagnosis of paranoid schizophrenia F20.0. Out of the final sample of 35 test-pairs, 31 had paranoid schizophrenia as the main diagnosis and 2 of them were women. The subsample therefore consists of 29 pairs. Descriptive statistics and Cohen  $d$ s for differences for this subgroup are presented in figure 2. The effects of the NPI total score and the LA/P subscale were larger than in the main analysis. The effect in the Grandiosity subscale was smaller than in the main analysis. The effects in Machiavellianism were similar, except for IM, which was larger than in the main analysis. The effects in Psychopathy were generally larger than in the main analysis, except for CA, where the effect size was slightly lower. Differences in the sum-scores of the Dark Triad and Dark Tetrad were larger than in the main analysis,  $t(28) = 0.638, p = .529, d = 0.12$  and  $t(28) = 0.765, p = .451, d = 0.14$ . Nonetheless, all interpretations about the size of effects stayed the same (e.g., moderate to large effect was still moderate to large).

Numerical correlation coefficients tended to be of similar size in the homogeneous sample and in the full sample. Exceptions were two correlations in the treatment group: the correlation of Narcissism and Psychopathy, that was moderate in the full sample,  $r(33) = .316, p = .065$ , and small in the homogeneous sample,  $r(28) = .197, p = .305$  and the correlation between Sadism and Psychopathy, that was moderate in the full sample,  $r(33) = .417, p = .013$ , and large in the homogeneous sample,  $r(28) = .558, p = .002$ . In the control group there were no such exceptions.



**Figure 2.** Means and their 95% confidence intervals of the dark traits and their subscales in the two groups, alongside effect sizes. Subgroup men with schizophrenia.  $N = 58$ .  $N = 29$  in treatment and control group respectively.  $d$  = Cohen  $d$ ; NPI = Narcissistic Personality Inventory (NPI-15); LAP = Leadership Ability/Personality; G = Grandiosity; Mach = Machiavellianism Scale (Mach-IV); MT = Manipulative Tactics; CW = Cynical Worldview; PM = Pragmatic Morality; SRP = Self-Report Psychopathy (SRP-III); IM = Interpersonal Manipulation; TS = Impulsive Thrill-Seeking; CA = Cold Affect; AB = Antisocial Behavior; SSIS = Short Sadistic Impulse Scale. \*  $p < .05$ , \*\*  $p < .001$ .

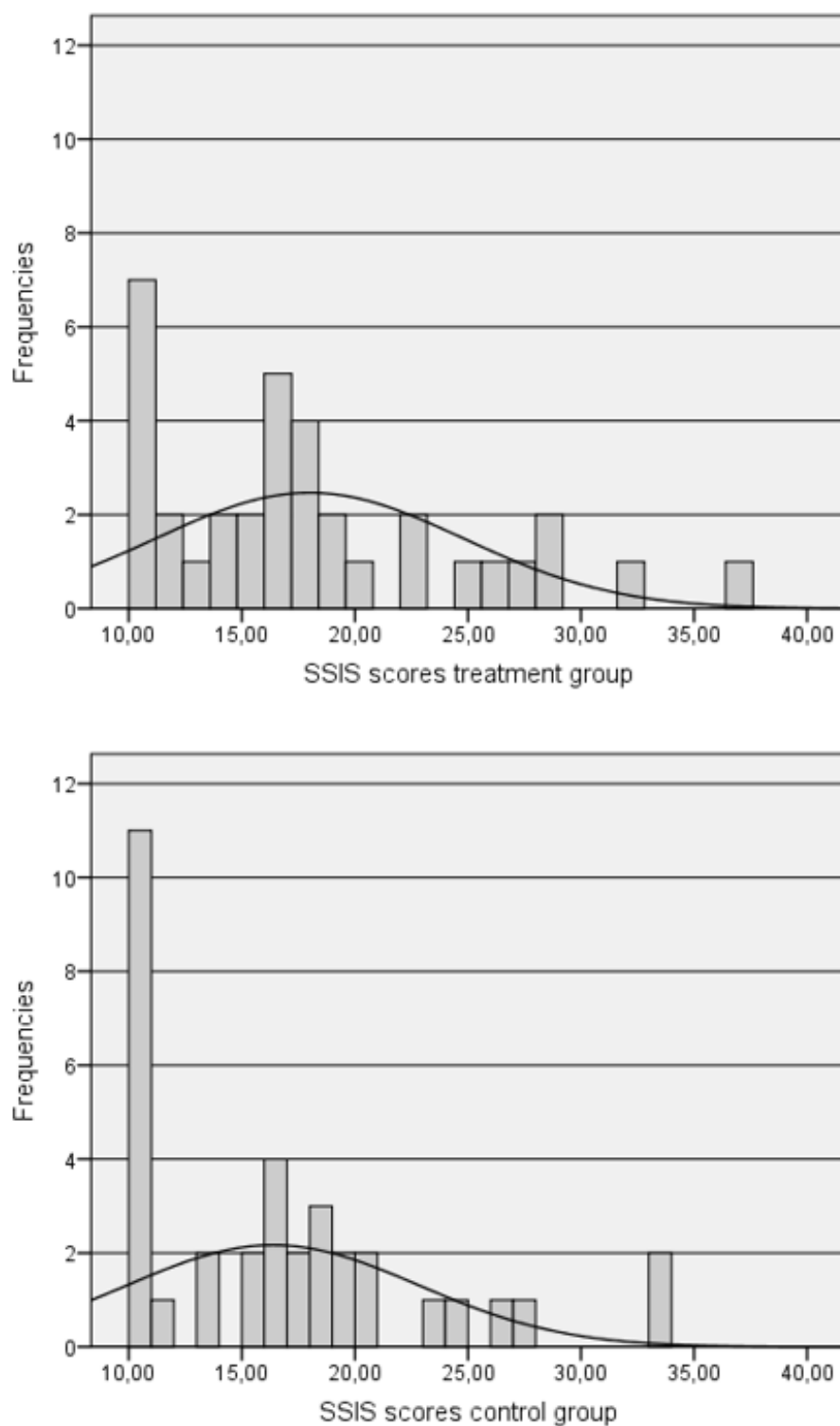
### 3.2 Sadism

Sadism scores in the treatment group were slightly higher than in the control group (figures 1 and 2). The treatment group scored higher in nearly every item. The frequencies of the different Sadism scores are presented in figure 3. The lowest possible score is 10 and the highest is 60.

### 3.3 Subgroups crimes

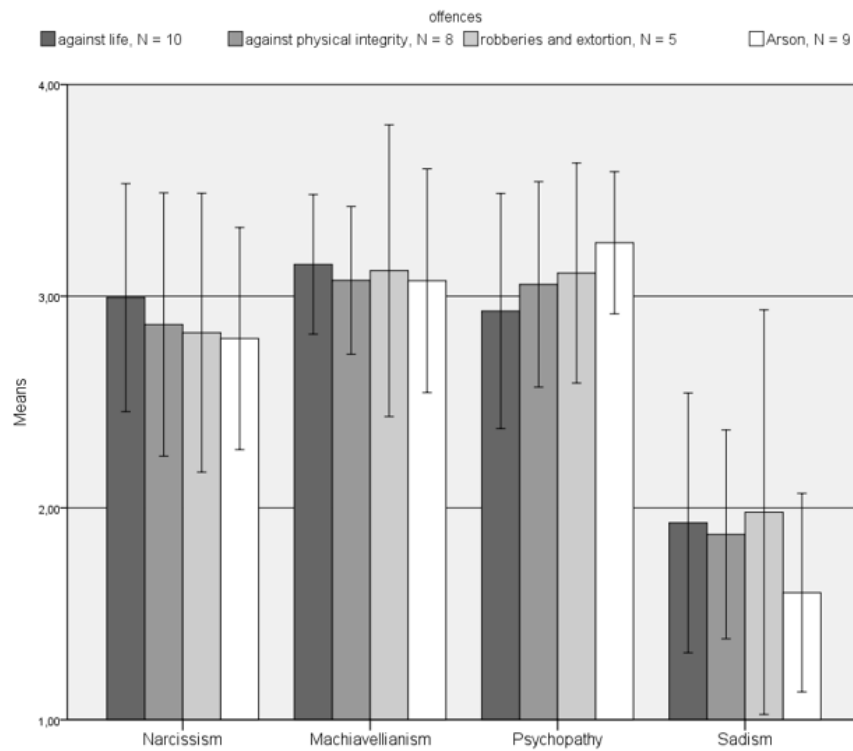
The different means of the dark traits scored by the different subgroups are presented in figure 4. All following results are solely descriptive. In Narcissism and Machiavellianism, offenders who committed crimes against life scored highest. In Psychopathy, arsonists scored highest. In Sadism, offenders who committed robberies

and extortion scored highest. In Machiavellianism, the means of robberies and extortion were nearly as high as of crimes against life, and in Sadism arsonists scored slightly lower than the other offenders. Figure 5 shows every single dark trait with its subscales

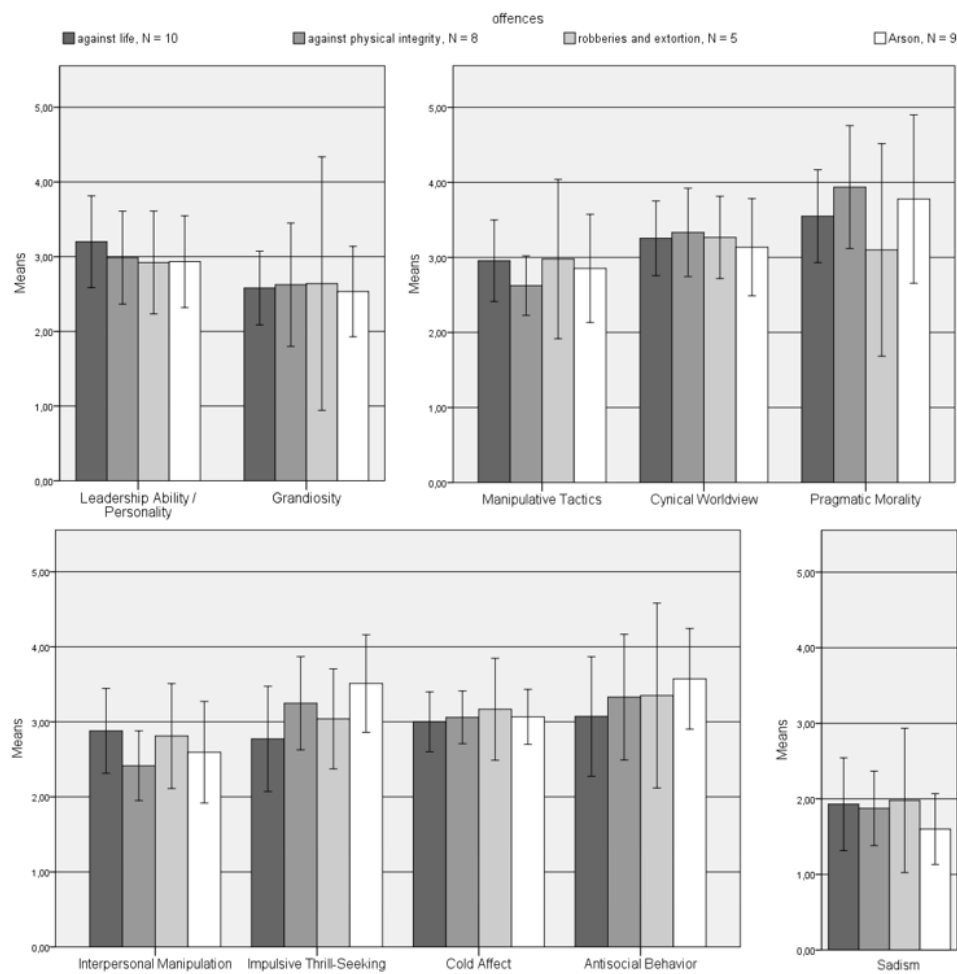


**Figure 3.** Frequencies of the scores in the Short Sadistic Impulse Scale (SSIS) presented separately for the different groups.

decomposed into crime categories. A statistical comparison of the different means ( $t$ -test) revealed a large effect of  $t(17) = -1.745$ ,  $p =$



**Figure 4.** Means of crime groups compared over the different dark traits with 95% confidence intervals.



**Figure 5.** Means of crime groups compared over the different subscales of the dark traits with 95% confidence intervals.

.099,  $d = -0.80$  in Impulsive Thrill-Seeking among arsonists and offenders against life, which was only nominally nonsignificant.

### 3.4 Subscales with suboptimal psychometric properties

The exploratory analysis of the group differences without the subscales with suboptimal psychometric properties described in 2.3.3 and 2.3.4 showed slightly lower or identical effect sizes with the new subscales in the respective scores. These scores, which depended on PM and CA, were the Machiavellianism total score, the new Tactics subscale, and the total score in Psychopathy. The Machiavellianism total score difference remained at  $d = -0.03$ , the Tactics score difference decreased from  $d = -0.07$  to  $d = -0.03$ , and the Psychopathy total score went down from  $d = 0.31$  to  $d = 0.25$ .

### 3.5 Further analyses

The duration of stay in the psychiatric institution was not significantly associated with any other relevant variable. Pre and post-data would clearly be necessary for the interpretation of the duration of stay. To be accommodated on an open ward was strongly negatively correlated with Dark Triad and Dark Tetrad scores,  $r(33) = -.449$ ,  $p = .007$  and  $r(33) = -.426$ ,  $p = .011$ . Only Machiavellianism and Narcissism showed larger effects,  $r(33) = -.390$ ,  $p = .021$  and  $r(33) = -.492$ ,  $p = .003$ . Psychopathy showed a small to moderate negative relation, and the relation with Sadism was small  $r(33) = -.201$ ,  $p = .247$  and  $r(33) = -.085$ ,  $p = .627$ .

## 4 Discussion

The current study was the first study to investigate the Dark Tetrad in a forensic psychiatric sample. It was expected that forensic psychiatric inpatients score higher in the dark traits, because dark traits that become pathologic most likely lead to a placement in a forensic psychiatric ward when a crime has been committed. It turned out that forensic psychiatric inpatients show some interesting differences to the general population regarding the Dark Tetrad traits. The Hypothesis was still only partly supported, because differences were not found in all subscales.

The Leadership Ability/Personality subscale of Narcissism was more distinctive in the control group. When Vater et al. (2013) compared NPI scores of a clinical sample and a healthy control group, the clinical sample scored as low as the control group, most likely because their Narcissism answers were suppressed by a low self-esteem. They concluded that the NPI was no valid indicator for pathological Narcissism (Vater et al., 2013). Therefore, one possible reason for such low values in the treatment group could be due to the fact that this is a clinical sample, which should have shown higher scores

in Narcissism, but did not because of suppression effects. Another possible reason could be the socially undesirable character of leadership in a forensic psychiatric ward. People in forensic psychiatric wards are not supposed to behave like leaders, but to be humble and agreeable, to care and think about their illness, take their medication, and to try not to cause trouble. It could be imagined that the observed scores mirror a normal level in the control group and a slightly inhibited answering behavior in the treatment group, which would both correspond to the socially desirable answer patterns. It is also worth mentioning that the difference was stronger in the subgroup than in the full sample. This could indicate that men with schizophrenia show less Leadership Ability/Personality scores, or that the social desirability that led to this response pattern is more important to this subgroup. Differences in the Grandiosity subscale of Narcissism were small in the full sample and even smaller in the subgroup. Apparently, there are no, or just very small differences in this subscale. The same is applicable to Machiavellianism and all its subscales.

The fact, that no observable differences were found in Machiavellianism is surprising at first glance, after all the groups differed somehow regarding the other dark traits. Kavish et al. (2019) tried to predict antisocial behavior, in particular the number of arrests in a forensic sample, inter alia with Mach-IV scores. In their regression model, in the first step Psychopathy predicted the number of arrests. When they added Machiavellianism in the second step, although the total score of the Mach-IV was a marginally significant predictor, the model itself turned nonsignificant. Kavish et al. (2019) concluded that Machiavellianism is not useful for the understanding of antisocial behavior. So if the main difference between the groups is antisocial behavior, which is a legitimate assumption based on the current data (figure 1), this finding is in line with the literature. Possibly Machiavellianism is just not the trait that distinguishes between the general population and forensic psychiatric patients.

Differences in the Psychopathy total score also were small to moderate in the full sample and moderate in the subgroup. In a study by Debowska et al. (2017) a forensic sample ( $N = 730$ ) was compared with a student sample ( $N = 2506$ ) regarding the four subscales of Psychopathy. In Debowska et al.'s (2017) study, the forensic sample scored significantly higher than the student sample in *all* subscales. In the current study, the treatment group scored lower in the Interpersonal Manipulation subscale, so the results point in the opposite direction than the results of Debowska et al. (2017). The Impulsive Thrill-Seeking subscale shows similar mean values in the full

sample and in the subgroup slightly higher scores in the treatment group. This is partly in line with the previous literature (Debowska et al., 2017). In Cold Affect and Antisocial Behavior, the treatment group scored higher as the control group, which is fully in line with the results of Debowska et al. (2017). Still the studies are not fully comparable, because the forensic sample in Debowska et al.'s (2017) study were not forensic psychiatric patients, but maximum-security prison inmates from the UK and the USA.

In the current study, the difference in Interpersonal Manipulation seemed to be connected to one single item. The treatment group scored low on item 15, "I regret almost nothing I did" and the control group scored high. Obviously, people who commit crimes, especially during a state of psychosis, often regret them afterwards. The mean difference in this subscale was mainly driven by this item.

The difference in Cold Affect is possibly due to the mental disorders themselves. One of the main symptoms of paranoid schizophrenia is a flattened affect, so this could lead to an answer pattern related to the psychopathic Cold Affect (World Health Organization, 2004). Another possibility is side effects of neuroleptics, which were taken periodically by all patients in the treatment group. After all, every anti-psychotic substance interferes with the dopaminergic system and partly inhibits signal forwarding through dopamine receptors, which also influences the affect regulation. The subscale showed a negative reliability and was therefore investigated on an item level. An exploratory factor analysis showed that this subscale was not appropriate for the investigated samples. The interpretative value is therefore very limited. Because the Psychopathy total score did not change much (still a small to moderate effect) when CA was excluded ( $d_{\text{included}} = 0.31$ ,  $d_{\text{excluded}} = 0.25$ ), the results of this subscale were excluded from the general interpretation.

The questionnaire for Antisocial Behavior subscale consisted of questions about criminal activity. Due to the evident criminal history of the patients in the treatment group, the higher value of Antisocial Behavior within this group is obvious. Item 25, "I have been arrested before" even applied to the whole treatment group, whereas it was normally distributed in the control group. Nonetheless, it is important to consider the scale construction of Psychopathy and therefore also of Antisocial Behavior. It is evident that Psychopathy is connected to crime (e.g., Harris et al., 1991; Woodworth & Porter, 2002), but the direction of this connection is not clear and one should be careful with a causal conclusion. It could be that psychopaths commit more crimes because of

their high expression in Psychopathy. At the same time, because committed crimes are part of Psychopathy questionnaires, they could simply be called more psychopathic because they committed crimes. Still, committing a lot of crimes is socially deviant, and in cases where the crimes harm other people, also antisocial.

The small effect in the Sadism score, with higher values in the treatment group, was identical in the main analysis and the subgroup analysis. Regarding Sadism, it is interesting how the answers are distributed, due to its elusiveness and due to the tendency for null answers in the general population. Usually, people do not like to admit that they have sadistic tendencies (Buckels et al., 2013), and this is logically reflected in self-report questionnaires. This in turn leads to a strongly right-skewed distribution of answers in Sadism scores (figure 3). One Item shows an interesting answer pattern. Item 8, “I wouldn’t intentionally hurt anyone.”, which is the only reversed item after 7 non-reversed ones, is easily overseen by the tested person. The observed answer pattern shows that people generally tend to cross at the left (lowest Sadism) side of the scale, and this does not change at item 8. A possible reason could be that at this point of the questionnaire, test persons are not reading carefully anymore but just answering whatever they think is the answer that indicates the lowest Sadism level. This indicates that the item is possibly just discriminating between careful and careless readers. The distribution in the control group shows a strong tendency towards a score of 10. A score of 10 points is the lowest possible Sadism score. Because item 8 is so easily overlooked (and the scale is ranging from 1 to 6), the score of 15 is in some cases also a zero response. The treatment group distribution shows less null-answers and a finer gradation in the rest of the scores than the control group, so it can be assumed that the treatment group answered slightly more honestly than the control group, possibly due to a less categorical refusal of the statements. A real existing difference in the traits would also be possible.

In Sadism, there was one outlier in the treatment group that showed high scores. The respective case-id was connected to a sadistic disorder in the dataset, so large Sadism values were unsurprising. Interestingly, there were two outliers in the control group that scored in similar magnitude. This could be due to unserious answers of the respective control-participants, or the trait is nearly equally distributed in both populations.

Most of the observed intercorrelations showed the expected direction. Because the correlations of the Dark Triad traits were almost consistently positive and of

moderate to large size (except of the correlation between Narcissism and Machiavellianism), the results speak rather for an underlying Dark Core, than for “distinct but overlapping” traits. The observed moderate relation of Psychopathy and Machiavellianism was consistent with the literature (Furnham et al., 2013; Muris et al., 2017). The large correlation between Psychopathy and Sadism, with  $r$ s ranging from .417 to .558, that was observable across all conditions was also in line with the literature:  $r = .35$  (Chabrol et al., 2009),  $r = .44$  (Craker & March, 2016), and  $r = .61$  (Pajevic et al., 2018). The correlation of Machiavellianism and Sadism in the control group ( $r = .536$ ) was larger than in previous research, where it was moderate to large, with  $r = .37$  (Pajevic et al., 2018). This correlation was completely absent in the treatment group. A Fisher  $r$  to  $z$ -transformation showed that the correlations differ significantly. A possible reason could be a Machiavellian obfuscation effect: possibly, Machiavellians with a clinically relevant expression of their trait would hide their sadistic tendencies to stay unobtrusive, especially when they are accommodated in a forensic psychiatric ward, whereas Machiavellians with subclinical expressions, in freedom, may not see a reason to do so. The correlation of Narcissism and Psychopathy, that was moderate in both groups, had been small in previous research (Pajevic et al., 2018).

The differences in the crime categories presented in figure 4 show that apparently the type of crime had no substantial effect on the mean values of the dark trait scores. Still, the crime categories do show *tendencies* according to the different types of delinquency. Figure 5 shows the differences in the subscales. Most of the confidence intervals (CIs) are overlapping, like in the global comparison (figure 4). One difference was salient between offenders against life and arsonists in Impulsive Thrill-Seeking. Lighting something on fire can be imagined to be quite thrilling. In a study of Dadds & Fraser (2006), fire-setting was inter alia associated with a thrill-seeking temperament. On the other hand, crimes against life differ in their thrill character because of the premature addition of manslaughter and murder into the category, which are possibly different in their thrill-character.

The exploratory analysis without the problematic subscales showed slightly lower or equal effect sizes in the group comparison of the respective scales. This strengthens the accuracy of the results.

#### **4.1 Limitations**

The current study was the first study assessing Dark Tetrad Trait self-reports in a forensic-psychiatric sample. The sample was drawn from one hospital in one location, so generalization to other forensic psychiatric patients in other institutions is limited by the probability of differing compositions of diagnoses, and offences in other wards. The control group was drawn from the same region as the treatment group, which provides a good comparability for these groups.

In comparison to previous studies that investigated the Dark Tetrad in normal samples, the sample size is quite low. Still, this was the first matched-pairs study with forensic psychiatric patients and the general population. Drawing a sample in forensic psychiatric hospitals is relatively difficult, due to a multitude of restrictions. The sample size of 35 matched pairs limits the statistical power for complex methods. However, interpretation of effect sizes instead of nominal null hypothesis significance testing allowed an examination of meaningful differences.

#### **4.2 Implications for future research**

For future research it should also be considered whether the investigated patients showed short-term criminal behavior in short-term psychotic states, or if there are personality disorders that can relate to the Dark Tetrad. According to the DSM-5 (American Psychiatric Association, 2013), a psychosis is an Axis 1 (clinical disorders) attribute, but speaking of the investigation of dark personalities, disorders on Axis 2 (personality) could be an interesting factor.

If the low Narcissism answers of the treatment group were based on suppression effects, it would be helpful to assess self-esteem. For the investigation of the possible manipulation of Sadism scores by people with high Machiavellianism expressions, the use of measurements that are harder to fake would be practical. This could be a mixture of self-reports and interviews. At last, especially in clinical settings it would be interesting to include the concept of vulnerable dark traits.

#### **4.3 Conclusion**

Based on the results described above, it can be concluded that forensic psychiatric patients, and particularly people with schizophrenia who committed crimes in a psychotic state, differ from the general population mainly in the subscales of Psychopathy. In the Narcissism subscale Leadership Ability/Personality and the Psychopathy subscale Interpersonal Manipulation, they scored lower than the general population. In contrast, they scored higher in the Psychopathy subscales Cold Affect

and Antisocial Behavior. They also scored higher in Sadism; however the effect was small. Most of the intercorrelations between the dark traits were positive, as expected.

The strong relationship between Machiavellianism and Sadism, which was confirmed for the general population, was negligibly small in forensic psychiatric patients. It can be concluded that the groups differed in Narcissism, Psychopathy, and Sadism, but not in Machiavellianism. Especially in the Antisocial Behavior subscale of Psychopathy the forensic psychiatric patients scored noticeably higher than the control group. In the other subscales, the patterns were less consistent.

These first results of such a special sample suggest that the Dark Tetrad scores of forensic psychiatric patients are tentatively higher than in the general population, especially in Antisocial Behavior. However, these differences were not as consistent and not as strong as previously expected. Therefore, the author hopes that the results of the current study may help to destigmatize the respective patients and lower prejudices towards people on forensic psychiatric wards.

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## **Appendix**

Appendix A: Ethics vote

Appendix B: German Abstract

## Appendix A

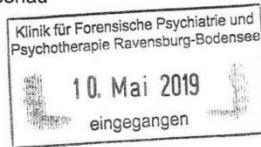


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Durchwahl  
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Datum  
08.05.2019

n/an BSc Jonas Traub, Pulverturmstraße 15 / 32-33, A-1090 Wien

#### Antrag Nr. 66/19 – Die dunkle Tetrade im forensisch psychiatrischen Setting

Sehr geehrter Herr Dr. Frank,

am 11.03.2019 wurde Ihr o.g. Antrag mündlich verhandelt. Nach Eingang der gewünschten Ergänzungen und Korrekturen am 23.04.2019 wurde über Ihren Antrag in der Sitzung der Ethikkommission der Universität Ulm am 06.05.2019 erneut beraten. Nunmehr sind alle Voraussetzungen erfüllt.

Es bestehen keine ethisch begründbaren Bedenken gegen die Durchführung des Projekts.

**Damit wird die Bewertung durch die Ethikkommission der Universität Ulm mit einer zustimmenden Stellungnahme abgeschlossen.**

Wir bitten jedoch folgende Hinweise zu beachten und umzusetzen:

Es wird um Vorlage einer Probandeninformation für die Kontrollgruppen (aus Sportvereinen, Narrenzunft, Tanzclubs, etc.) gebeten.

Wir bitten um Übersendung sowohl als Original als auch in elektronischer Form.

Entsprechend der ausschließlich beratenden Funktion der Ethikkommission betrifft diese Bewertung nur die *berufsethische und berufsrechtliche Beurteilung* der Konzeption, der geplanten Methoden, der Durchführung und Überwachung des betreffenden Projekts sowie der beabsichtigten Patientenaufklärung.

**Die ärztliche und juristische Verantwortung verbleibt uneingeschränkt beim Projektleiter und den daran Mitwirkenden.**

- Wir weisen darauf hin, dass mit der Studie, d.h., mit der Rekrutierung der Patienten/Probanden erst ab Datum dieses Votums begonnen werden darf.
- Bitte teilen Sie uns jede Änderung in der Konzeption des Projekts mit. Es muss dann geklärt werden, ob die Beurteilung der Ethikkommission noch Bestand hat.
- Über alle schwerwiegenden oder unerwarteten unerwünschten Ereignisse, die während der Untersuchung auftreten und die Sicherheit der Studienteilnehmer oder die Durchführung des Projekts beeinträchtigen könnten, muss der Vorsitzende der Ethikkommission unverzüglich unterrichtet werden.

Mitglieder der Kommission: Frau Prof. Dr. M. Dudeck (stellv. Vorsitz), Prof. Dr. P. Gierschik, J. Glembeck, Prof. Dr. H. Gündel, Frau Prof. Dr. C. Herbert, Prof. Dr. J. Högel, Prof. Dr. Ch. Lenk, Prof. Dr. L. H. Meyer, Frau R. Rau, Prof. Dr. D. Rothenbacher, Prof. Dr. Ch. Scholz, Prof. Dr. H. Schrezenmeier, Frau K. Stascheit, Prof. Dr. F. Steger (Vorsitz), Prof. Dr. S. Stilgenbauer

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- Die Ethikkommission der Universität Ulm geht davon aus, dass nicht-ärztliche Mitarbeiter speziell auf Verschwiegenheit verpflichtet werden.
- Wir gehen davon aus, dass sämtliche studienbedingten Mehrkosten nicht den Kassen in Rechnung gestellt und bei der Rekrutierung von Studienteilnehmern keine dienstlichen oder andere Abhängigkeitsverhältnisse ausgenutzt werden.
- Datenschutzrechtliche Aspekte von Forschungsvorhaben werden durch die Ethikkommission grundsätzlich nur kursorisch geprüft. Dieses Votum ersetzt mithin nicht die Konsultation des zuständigen Datenschutzbeauftragten.

Für die Durchführung der Studie wünschen wir Ihnen viel Erfolg und bitten an dieser Stelle um Übersendung des Abschlussberichts bzw. der entsprechenden Publikation zu gegebener Zeit.

Für die Ethikkommission der Universität Ulm



Prof. Dr. Florian Steger  
(Vorsitzender der Ethikkommission)

## Appendix B

Die Dunkle Tetrade der Persönlichkeit besteht aus Machiavellismus, Narzissmus, Psychopathie und Sadismus. Forensisch psychiatrische PatientInnen sind in unserer Gesellschaft einigen Vorurteilen ausgesetzt und die Eigenschaften der Dunklen Tetrade werden ihnen leicht voreilig zugeschrieben. Das Ziel dieser Studie war es zu untersuchen, in wie weit sich forensisch psychiatrische PatientInnen hinsichtlich der Eigenschaften der Dunklen Tetrade von der Allgemeinbevölkerung unterscheiden. Die vorliegende Studie war die erste, in der die Dunkle Tetrade in einem klinisch-forensischen Setting untersucht wurde. Es wurde eine Stichprobe von  $N = 35$  forensisch psychiatrischen PatientInnen mit einer Kontrollstichprobe von  $N = 35$  TeilnehmerInnen aus der Allgemeinbevölkerung hinsichtlich des Alters, des Geschlechts und des Ausbildungsgrades parallelisiert. Die Ergebnisse aus vier Selbsteinschätzungsfragebögen wurden verglichen, wobei ein Fragebogen für jede der Dunklen Triade Eigenschaften vorgegeben wurde. Die Ergebnisse zeigten Gruppenunterschiede mit moderaten Effektstärken in den Psychopathie-Subskalen Interpersonelle Manipulation (Interpersonal Manipulation) und Gefühlskälte (Cold Affect), sowie einen großen Effekt in Antisozialem Verhalten (Antisocial Behavior). Die Kontrollgruppe zeigte höhere Werte in Interpersoneller Manipulation und die Vergleichsgruppe in Gefühlskälte und Antisozialem Verhalten. Ein kleiner bis mittlerer Effekt zeigte sich in der Narzissmus-Subskala Führungspersönlichkeit/-begabung (Leadership Ability/Personality), in der die Kontrollgruppe höhere Werte zeigte als die Vergleichsgruppe. Die meisten Personen in der Vergleichsgruppe waren Männer mit Schizophrenie (29 von 35). Auf diese homogene Gruppe beschränkt, waren alle kleinen oder klein bis mittleren Effekte größer als in der Gesamtstichprobe, mit Ausnahme von der Subskala Gefühlskälte, in der die Effektstärke etwas kleiner wurde. Die Gesamtscores der Dunklen Triade und der Dunklen Tetrade unterschieden sich mit kleinen Effektstärken zwischen  $d = 0,10$  und  $0,14$ , die statistisch nicht signifikant waren. Eine explorative Analyse über die verschiedenen Arten von Delikten ergab, dass BrandstifterInnen in der Psychopathie-Subskala Impulsivität und Nervenkitzel (Impulsive Thrill-Seeking) höhere Werte zeigten als Personen, die Straftaten gegen das Leben begangen hatten. Im Allgemeinen deuten die Ergebnisse darauf hin, dass sich forensisch psychiatrische PatientInnen in Narzissmus, Psychopathie und Sadismus von der Allgemeinbevölkerung unterscheiden, jedoch nicht in Machiavellismus. Diese Unterschiede waren weniger stark und weniger konsistent als angenommen.