MASTERARBEIT | MASTER'S THESIS

Titel | Title

Investigating the Impact of Dark Triad Traits on Neural Empathic Responses to Sexual Objectification

verfasst von | submitted by

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angestrebter akademischer Grad | in partial fulfilment of the requirements for the degree of

Master of Science (MSc)

Wien | Vienna, 2024

Studienkennzahl lt. Studienblatt | Degree programme code as it appears on the student record sheet:	UA 066 840
Studienrichtung lt. Studienblatt | Degree programme as it appears on the student record sheet:	Masterstudium Psychologie
Betreut von | Supervisor:	Assoz. Prof. Giorgia Silani Privatdoz. PhD

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Introduction

The growing awareness and urgency surrounding the issue of sexual violence against women have led to scientific interest in the psychological factors that may contribute to such behavior. A critical aspect of this exploration involves the understanding of socially aversive personality traits, particularly the Dark Triad (narcissism, Machiavellianism, and psychopathy; Paulhus & Williams, 2002). The implications of these traits for interpersonal relationships and societal functioning are profound, as well as their intersections with sexual objectification and empathy (Costello et al., 2019; Jonason & Krause, 2013). Concurrently, sexual objectification is an omnipresent issue, particularly in the digital age (Vendemia & Fox, 2024), which has emerged as a critical area of concern. Sexual objectification, which reduces individuals to mere instruments of sexual pleasure (Nussbaum, 1999), has been shown to diminish empathic responses (Cogoni et al., 2018). This, in turn, may contribute to sexually aggressive attitudes and behaviors (Gervais & Eagan, 2017; Loughnan et al., 2013). Recent studies suggest that individuals exhibiting Dark Triad traits are more likely to engage in objectifying behaviors and exhibit reduced empathy (Bernard et al., 2021; Paulhus & Williams, 2002), which may contribute to the risk of sexual violent attitudes and behaviors (Costa et al., 2024). Given the profound societal impact of sexual violence, it is crucial to investigate how these personality traits influence the relationship between sexual objectification and empathy which, despite growing interest, remains largely unexplored. This study aims to address this gap by investigating the role of Dark Triad traits in shaping neural empathic responses within the context of sexual objectification. The theoretical background of this thesis will elucidate the complex dynamics between these variables through a comprehensive review of existing literature concluding with the definition of the study's hypotheses. Subsequently, the methods including measurements, experimental procedure and data analysis will be explained. After that, the results will be presented and discussed by integrating the findings of this study with those of related recent research and discussing the limitations and implications of this study and its findings.

Sexual Objectification

The omnipresent issue of sexual objectification affects women in a profound way, influencing how they are perceived and causing significant harm to both individuals and society as a whole. Sexual objectification occurs when individuals are reduced to nothing more than bodies, that are valued primarily for their sexual attractiveness and ability to fulfill the sexual needs of others (Bartky, 1990; Fredrickson & Roberts, 1997). According to Nussbaum (1999), this leads to perceiving and treating individuals as tools for one's personal use, considering them as interchangeable, denying their autonomy and subjective experiences, and thus reducing them to passive instruments that are used to satisfy others. Sexual objectification takes various forms and occurs at interpersonal, cultural, and immersive levels. At the interpersonal level, it includes verbal and non-verbal comments about women's bodies or unwanted sexual advances. Cultural manifestations include the exposure to objectified representations of women in the media. Moreover, it is taking place in immersive experiences like modeling and beauty pageants (Szymanski et al., 2021). Thus, sexual objectification of women is a major aspect of how girls and women are socialized and it affects women on a daily basis, with the female body often being seen as an indicator of a woman's identity (Fredrickson & Roberts, 1997; Holland et al., 2017). Research indicates that over 90% of female college students in the United States have experienced at least one instance of unwanted objectifying sexual comments or behavior during one single semester (Szymanski et al., 2021). Women consistently report experiencing more instances of sexual objectification than men, with sexual objectification emerging as a distinct component of their daily encounters with sexism (Swim et al., 1998; Swim et al., 2001). These objectifying experiences of women are associated with several negative psychological consequences, including self-objectification, body surveillance, body shame, internalization of the thin ideal, lowered interoceptive awareness, and eating disorder symptoms (Hill & Fischer, 2008; Kozee & Tylka, 2006; Kozee et al., 2007; Moradi et al., 2005). Empirical evidence collectively indicates that objectification is both directly and indirectly associated with a range of adverse outcomes for women (Moradi & Huang, 2008).

Gender Differences

Despite initial theories as well as recent research focus mainly on women, studies indicate that men also experience sexual objectification (Loughnan et al., 2015). However, debates persist regarding the extent of objectification experienced by men compared to women.

While some research suggests that sexualized men may not face the same level of objectification as women do (Bernard et al., 2012; Gervais et al., 2012), others indicate no difference between male and female gender. For example, Loughnan et al. (2015) measured objectification towards sexualized and non-sexualized men and women. They found that sexualized individuals were objectified to a greater extent than non-sexualized individuals, while both men and women were equally objectified. A growing body of literature has focused on the effects of sexual objectification on men (Cole, Davidson, & Gervais, 2013; Frith & Gleeson, 2004; Moradi & Huang, 2008) and the tendency to objectify men in the media is drastically growing (Johnson, McCreary, & Mills, 2007).

In addition to the question of who is objectified, it is also necessary to take into account gender-specific objectifying behaviors. While there's no definitive link between male gender and objectifying behavior, men who hold hostile and aggressive attitudes towards women are more likely to objectify. Hostile sexism in men was found to negatively correlate with activation in brain regions linked to mental state attribution, specifically the medial prefrontal cortex (mPFC), posterior cingulate cortex (pCC), and temporal poles when pictures of sexualized women were shown (Cikara et al., 2011). Moreover, men with tendencies towards sexual harassment and rape are more likely to objectify women (Rudman & Mescher, 2012). Thus, being male doesn't in itself predict sexual objectification, but it is the presence of hostile attitudes and behaviors towards women that correlate with objectifying beliefs. Objectification is also a prevalent behavior among women. Consequently, a significant predictor for female objectification of others is the tendency to self-objectify and the perception of sexual competition (Moradi & Huang, 2008; Strelan & Hargreaves, 2005). Is not surprising that women who tend to focus on their own sexualized appearance often extend this focus to others. However, it has been suggested that self-objectifying behavior may result from an individual's tendency to view themselves through the perspective of a third party. Therefore, it seems more plausible that other objectification may be a predictor of self-objectification than the other way around (Loughnan & Pacilli, 2014). However, research seems ambiguous whether self-objectification predicts other objectification or vice versa. Taken together, the motives behind the objectification of women vary depending on the gender of the objectifiying person. Men are often motivated by sexual goals, which can be accommodated by hostile attitudes. Women, on the other hand, are more likely to be driven by a desire to create social distance from the target (Vaes et al., 2011).

Consequences of Sexual Objectification

The consequences of sexual objectification for society, and for women in particular, are profound. Research by Loughnan et al. (2010) revealed that sexualized men and women were perceived as less intelligent and less capable of performing everyday tasks, although the effect was larger for women than it was for men. Additionally, findings by Heflick et al. (2011) indicate that sexually objectified individuals were viewed as lacking competence, warmth, and morality. This phenomenon may contribute to a self-fulfilling prophecy (Loughnan & Pacilli, 2014), as evidenced by Gay and Castano’s (2010) study showing that experiencing sexual objectification can impair women's intellectual performance. Furthermore, sexually objectified individuals are perceived as deserving less moral concern. Through the process of dehumanization, their moral relevance decreases significantly when they are objectified accompanied by the perception that their suffering is less severe (Loughnan et al., 2010; Loughnan et al., 2013). Specifically, objectified women are seen as lacking moral standing and as being viewed as dishonest and untrustworthy (Loughnan & Pacilli, 2014). In summary, this means that women who are objectified are perceived to exhibit lower moral standards, and are also considered less deserving of moral treatment from others. This diminished moral standing associated with objectification contributes to an understanding of why men who objectify women are more likely to engage in sexual harassment, assault, or rape (Loughnan & Pacilli, 2014; Rudman & Mescher, 2012), and why this reduced moral concern also encourages harmful behaviors and decreases intervention and support from bystanders (Pacilli et al., 2017).

Therefore, many women are subject to even more extreme manifestations of sexual objectification and become victims of sexual violence, which encompasses a wide range of abusive behaviors, including rape, sexual assault, and sexual harassment (Fredrickson & Roberts, 1997; Gervais & Eagan, 2017). Recent research has demonstrated a correlation between sexual objectification and increased sexual aggression, as well as hostility against women (Loughnan et al., 2013; Pacilli et al., 2017; Rudman & Mescher, 2012; Samji & Vasquez, 2020; Vasquez et al., 2018). Based on estimates provided by the United Nations Organization for Women, approximately one third of women worldwide experience physical and/or sexual violence perpetrated by men at least once in their lifetime (World Health Organization, 2021). In an Austrian sample, almost every third woman is a victim of sexual violence, with one in four women reporting to have experienced rape and three out of four women having experienced sexual harassment (Kapella et al., 2011). Furthermore, there is a gender bias in sexual violent attitudes and behaviors: Although it is also important to recognize that sexual aggression directed towards men does occur, the vast majority of sexual assaults are perpetrated by men against women (Breiding et al., 2014; STATISTIK AUSTRIA, 2021). According to Austrian data, 96.% of women affected by sexual violence have been victimized by one or more male perpetrators (STATISTIK AUSTRIA, 2021). Primarily at the level of attitudes, empirical evidence indicates an association between male gender and the acceptance of sexual violence and rape myths (Costa et al., 2024; Watts et al., 2017). On top of that, sexualized rape victims are often viewed as suffering less after being raped, reflecting a societal tendency to care less about their well-being (Loughnan et al., 2013).

Taken together, sexual objectification profoundly influences people's perceptions by reducing individuals to mere bodies that are only valued for sexual attractiveness, which leads to harmful behaviors. Objectifying experiences result in negative consequences for women including negative psychological outcomes as well as external aspects such as the perception of diminished competence and moral standing. Therefore, sexual objectification perpetuates a harmful power dynamic by degrading women to objects of sexual pleasure or social subordination, which is particularly evident in sexual aggressive attitudes and behaviors of men. The diverse manifestations of sexual objectification underscore its pervasive nature. In order to fully comprehend underlying mechanisms and combat the harmful effects on individuals and society as a whole, it is essential to gain a deeper understanding of this phenomenon. Comprehending the impact of sexual objectification provides a foundation for exploring related psychological factors. It has been proposed that reduced empathy for victims is a critical factor for the perpetration of violence (Baron-Cohen, 2011) and for preventing prosocial behavior (Decety et al., 2016). Thus, examining empathy in the context of sexual objectification is essential for understanding broader implications for society's attitudes and behaviors. Therefore, research regarding empathy and its relationship with sexual objectification will be discussed in the following paragraph.

Empathy

When it comes to successful social interaction, it is necessary to be not only aware of people's obvious behavior, but also of underlying factors such as other's thoughts and feelings, which is commonly understood as empathy. Despite empathy being an established concept, its definition remains ambiguous and lacks consensus among scientists (Cuff et al., 2016). Giving a general definition for empathy is difficult, as there exist multiple and sometimes contradictory ones in the research field (Hall & Schwartz, 2019). However, a common definition of empathy is "natural capacity to share, understand, and respond with care" (Zahavi et al., 2012) to the emotional state and thoughts of others. Empathy is considered to be important for various kinds of social interactions including prosocial and moral behavior as well as inhibiting aggressive behavior (Decety & Knafo-Noam, 2015).

Although empathy is a complex process, research commonly suggests two fundamental components of empathic behavior: cognitive empathy and affective empathy. Cognitive empathy involves the capacity to recognize and comprehend the mental state of another individual, including the understanding of their thoughts, feelings, and emotions. This aspect is closely linked to perspective-taking and Theory of Mind (ToM) or mentalizing (Blair, 2005). On the other hand, affective empathy is defined as the ability to share and resonate with the emotions of others, even in the absence of any direct emotional stimulus affecting oneself. In simpler terms, it refers to the ability to experience the emotions of another person (Eisenberg & Eggum, 2009). It is therefore suggested that the affective facet of empathy operates sensory-driven and automatically, indicating a bottom-up process, whereas the higher-order cognitive aspect operates through a top-down mechanism modulating the autonomic affective response (Claus Lamm et al., 2007). While affective and cognitive empathy systems may function somewhat independently, they likely interact to varying degrees depending on the social situation (Shamay-Tsoory, 2011).

Research indicates that observing and resonating with specific emotions in others, such as fear, disgust, and pain, activates brain regions that reflect these feelings within oneself. Thus, when empathizing with another individual experiencing a specific emotion, the cognitive, perceptual, and affective processes involved in the direct experience of that emotion are activated within oneself, resulting in the recruitment of similar neural networks (Lamm et al., 2011; Decety & Jackson, 2004; Lamm et al., 2016; Zaki et al., 2016). This means we don't just understand others' emotions, we also experience them ourselves to some degree. This capability is based on the idea of shared representations (Heberlein & Atkinson, 2009). The shared representation theory, as proposed by Sommerville and Decety (2006), suggests that the neural mechanisms for the first-hand emotional experience and recognizing the emotions of others largely overlap. The model is supported by various research, which has demonstrated that neural networks recruited in the experience of one’s own emotions are also active during empathic processes (Singer et al., 2004; Wicker et al., 2003) Consequently, both theoretical frameworks and empirical data indicate we use our own emotional representations to mimic and empathetically share the emotions of others.

In the following, further details on the neural structures and mechanisms which are associated with empathy will be discussed. Specific attention will be given to the empathy for pain paradigm since it is crucial for the study's framework.

Neural Basis of Empathy

The field of social neuroscience typically examines two main forms of empathy: empathy for physical pain and empathy for social pain (such as social exclusion). In the context of sexual objectification and the potential for sexual aggression and therefore physical harm that may result, there is a possible physical pain component. Additionally, empathy for physical pain is important for inhibiting aggressive behaviors. Individuals that have a reduced capacity to empathize with the physical pain of others are more likely to commit or tolerate aggressive actions (Decety et al., 2009). Since sexual objectification can lead to increased likelihood of sexual aggression (Rudman & Mescher, 2012), it is critical to understand how empathy for physical pain is affected by objectification. Consequently, this form of empathy will be the focus of the present study. Recent neuroimaging studies have revealed and agreed on reliable brain activation patterns involved in the processing of empathy.

Matching the shared representations account mentioned above, research on functional neuroimaging has demonstrated that similar psychophysiological responses and brain activation patterns occur when individuals experience emotions on their own and empathize with others' emotional experiences. For instance, a meta-analysis of Lamm et al. (2011) identified the core brain areas which are associated with empathy for pain. When individuals experience empathy, specific regions of the brain, such as the bilateral anterior insula (AI), the anterior medial cingulate cortex (aMCC) and the posterior anterior cingulate cortex (pACC) tend to show increased activity. They also found that, besides empathy-related activation, the AI and aMCC are associated with the affective-motivational component of nociception and therefore show an overlap of empathy related activation with activation elicited by painful stimulation of the self. This intersection between brain regions activated during empathy for pain and actual nociception suggests shared neural mechanisms for processing both empathic responses and the first-hand experience of pain. Within the same study, Lamm et al (2011) also showed that different experimental paradigms result in different coactivations. Picture-based paradigms involve body parts in painful situations (e. g. a hand being poked by a needle). These paradigms activate areas related to action understanding, such as inferior parietal cortex and ventral premotor areas, and somatosensory processing. In cue-based paradigms, as for example utilized in a study of Singer et al. (2004), subjects were positioned in the MRI scanner while a target individual, who was a loved one, was seated closely to them. The use of visual cues of different colors signaled to the participants whether the stimulation would be applied to the loved one or to the participant themselves, and whether it would be a painful stimulation or not. These paradigms engage regions associated with mental state representation of self and other, like the precuneus, ventral medial prefrontal cortex (vmPFC), superior temporal cortex, and temporo-parietal junction (TPJ; Lamm et al., 2011). Singer et al. (2004) found that bilateral AI, rostral ACC, brainstem, and cerebellum were activated both when subjects experienced pain themselves and also when they observed a loved one experiencing pain through visual cues. Importantly, in this study, AI and ACC activation correlated with self-reported empathy scores. Consistent with that finding, additional studies have shown that when it comes to empathy for pain, regions simultaneously associated with first-hand experience of pain, indicating parts of the pain matrix, such as the ACC and insula are activated (Decety et al., 2010; Shamay-Tsoory, 2011). In contrast to that, regions such as the posterior insula, secondary somatosensory cortex, and sensorimotor cortex showed specific activation only during the first-hand experience of pain (Singer et al., 2004). Matching this, the meta-analysis of Lamm et al. (2011) discovered that only picture-based paradigms were accompanied by significant somatosensory processing. They suggest that the specific operationalization of inducing empathy with visual cues showing painfully stimulated body parts is responsible for somatosensory responses. These responses reflect unspecific co-activation induced by the presentation of these body parts being touched and not a specific resonating with the other's somatosensory and nociceptive state. These findings indicate that empathizing involves activation of neural regions associated with the affective dimension of pain, but not the sensory-discriminative components of the pain-matrix (Singer et al., 2004).

Also Fan et al. (2011) aimed to investigate the existence of a core neural network involved in empathy by conducting a fMRI-based meta-analysis. This study highlights two forms of empathy: affective-perceptual and cognitive-evaluative empathy. According to the authors, affective-perceptual empathy involves an automatic empathic response evoked through observation, while cognitive-evaluative empathy is influenced by attending to the feelings of the target through explicit imagination or evaluation. The main clusters of activation included the dorsal ACC, aMCC, supplementary motor area (SMA) and bilateral AI, independent of task and stimulus type. While both affective-perceptual and cognitive-evaluative empathy activated the left AI, they emphasize the activation of the right AI extending to right inferior frontal gyrus (IFG), right dorsomedial thalamus (DMT) and midbrain only for affective-perceptual empathy, while the dorsal aMCC, orbitofrontal cortex and left DMT indicates cognitive-evaluative empathy. This result suggests different activation patterns between these two forms of empathic responses.

These findings partially align with those of Kogler et al. (2020), who also conducted a meta-analysis to investigate the neural underpinnings of cognitive and affective empathy across various emotional and painful scenarios. For cognitive empathy, the anterior dorsal medial prefrontal gyrus (dmPFG) and the supramarginal gyrus (SMG) were consistently recruited. Conversely, affective empathy showed activation patterns in the posterior dmPFG, which is associated with evaluation of the emotional state of the self during empathic processing, and the IFG, which is associated with emotional perspective taking (Schulte-Rüther et al., 2007). Convergent brain activation across both types of empathy was observed in the left dmPFG, left IFG, left AI and bilateral precuneus. Particularly, empathy for pain recruited brain regions including the AI, anterior dmPFG, and SMG. This shared neural network again suggests shared neural mechanisms underlying these empathic experiences, which aligns with the shared representations approach.

Furthermore, the debate between bottom-up and top-down processes in empathy models is central to neuroscientific investigations (Singer & Lamm, 2009). In line with the concept of shared representations, which seem to be activated unconsciously, the neuroscientific research mentioned above shows, that empathy for pain is, at some level, an automatic, bottom-up process (Shamay-Tsoory, 2011). Speaking for the existence of a top-down process of empathy, recent neuroimaging research highlights the influence of contextual and interpersonal factors on the strength of empathic responses (Zaki, 2014). For instance, Singer et al. (2006) found gender and perceived fairness to have an influence on neural empathy for pain responses. When men observed an unfair individual undergoing a painful stimulus, they had reduced empathic responses in the fronto-insular and anterior cingulate cortices, while having increased activation in reward-related areas, which was also associated with an self-reported desire for revenge. Additionally, studies show that observing pain in people of other races can reduce neural empathic responses in the ACC (Xu et al., 2009). These findings suggest that personal attitudes can shape empathic reactions and certain top-down mechanisms may influence the automatic empathic system, possibly involving higher-order cognitive processes and their interplay with emotional empathy. Another crucial top-down mechanism that influences empathic responses and is related to the physical appearance of an individual, is sexual objectification. Therefore, the following paragraph will discuss the importance of the impact of sexual objectification on empathy.

Empathy and Sexual Objectification

Recent research on empathy and sexual objectification has provided valuable insights into how situational factors like physical appearance influence empathic responses towards others which further supports the idea of top-down mechanisms involved. Empathy and moral concern have been found to be diminished towards sexually objectified individuals, which can be attributed to the tendency to ignore their mental states and to evaluate them only on the basis of their physical appearance (Cogoni et al., 2018; Cogoni et al., 2021; Cogoni et al. 2023; Loughnan et al., 2010; Loughnan et al., 2013). These findings are particularly relevant to the present research, as they show a negative link between sexual objectification and empathy.

Examining this research in greater detail, neuroscientific evidence from Cogoni et al. (2018) revealed decreased activity in brain areas associated with empathic responding towards sexually objectified women. In particular, this study examined how sexual objectification influences both behavioral and neural responses to social pain. They used a modified cyberball task (Williams et al., 2000) featuring videos of objectified and personalized women. The objectified and personalized targets differed in the sexualization of their outfits so that women dressed in a more revealing manner were expected evoke higher sexual objectification from the observer. Results showed reduced self-reported emotional ratings towards objectified compared to personalized women. Interestingly, while negative emotions were similar across conditions during observing social exclusion, positive emotions were less intense for objectified women. This suggests diminished empathy in the sense of positive emotions directed at sexually objectified women. On a neural level, reduced activation in areas associated with the affective component of pain (AI, SMA, aMCC) and the mentalizing network (middle frontal gyrus) was observed when empathizing with objectified women's exclusion compared to exclusion of personalized women. This indicates a modulatory effect of sexual objectification on neural empathic responses. It also suggests that outfit and physical appearance can considerably affect empathy. In line with these findings, Cogoni et al. (2021) conducted another study examining how sexual objectification influences empathic responses towards humans and human-like objects. They examined the difference in self-other emotional assessments across two distinct paradigms: again, social pain, i. e. social exclusion, and additionally physical pain, i. e. unpleasant stimulation. Results in both experimental paradigms showed that interacting with sexually objectified women led to reduced shared emotional experiences compared to non-sexualized women. This suggests that sexual objectification diminishes empathic responses in social interactions as well as painful situations. These findings on empathy for pain align with and are further supported by recent research of Cogoni et al. (2023) who investigated electrophysiological responses. In this study, participants viewed images of sexualized and non-sexualized women in both painful and non-painful scenarios. Again, sexual objectification was manipulated by the outfits of the female confederates. Their results showed that sexualized women were perceived as experiencing less pain compared to non-sexualized women. Moreover, the perception of others' physical pain was notably reduced for sexualized women across both event-related potentials and brain oscillation. The results of this study indicate that sexual objectification may interfere with neuro-behavioral processes associated with empathy for pain. Furthermore, Loughnan et al. (2013) examined the impact of sexual objectification on perceptions of sexual assault. Participants rated mental attributes and moral concern of sexualized and non-sexualized women before being told she was a victim of acquaintance rape. The study revealed that sexualized women were perceived as lacking mental states and moral concern and were consequently held more responsible for the rape. Despite there were no differences in overt measures of perceived suffering, participants demonstrated a tendency to deny the suffering of victims through a reduction in their moral concern for objectified victims. This suggests serious consequences of objectification on victim perceptions and victim blaming.

Given that empathy has a negative association with sexual violence risk factors (Hudson-Flege et al., 2020), diminished empathy may contribute to a higher risk of antisocial or violent behaviors as well as reduced helping behaviors towards sexually objectified individuals (Loughnan et al., 2013; Pacilli et al., 2017; Rudman & Mescher, 2012; Samji & Vasquez, 2020; Vasquez et al., 2018). Taken together, these findings highlight the serious consequences of sexual objectification on empathic attitudes and behaviors as well as on victim perceptions, suggesting that empathy is crucial for understanding the harmful relationship between sexual objectification and violence (Gervais & Eagan, 2017). Additionally, certain personality traits not only significantly predict antisocial attitudes and behaviors but also negatively impact empathy (Furnham et al., 2013; Paulhus & Williams, 2002; Singer & Lamm, 2009). Therefore, the literature on socially aversive characteristics, specifically the Dark Triad traits (Paulhus & Williams, 2002), will be reviewed in detail in the following section.

Dark Triad

The concept “Dark Triad” is composed of three distinct, but interconnected traits: Machiavellianism, narcissism, and psychopathy (Paulhus & Williams, 2002). It represents a constellation of offensive, yet subclinical, non-pathological personality traits, which are often associated with transgressive and norm-violating behaviors (Muris et al., 2017; Paulhus & Williams, 2002). The use of the word "dark" as a synonym for "bad" is considered as subtly racist (Watts-Jones, 2004). Despite acknowledging that, the term "Dark Triad" is used in this thesis, as it refers to the relation of the findings of this study to relevant prior research. In the future, research should utilize terms that do not have racist roots when naming concepts (Gluck et al., 2020).

Beginning with Machiavellianism, this trait is conceptualized by Christie & Geis (1970) and is rooted in duplicity, cynicism, lack of moral values, emotional coldness, and manipulation of others for personal gain. Individuals high in Machiavellianism tend to conceal their own weaknesses while spotting and taking advantage of others'. This trait, which is influenced by Niccoló Machiavelli's (1469-1527) political strategies, also involves strategic planning, coalition formation, reputation building, and calculated actions. It is distinguished from the impulsive nature of psychopathy by this strategic and calculated long-term approach (Jones & Paulhus, 2014; Wai & Tiliopoulos, 2012).

Individuals with psychopathic traits can be primarily characterized by deficits in affect and self-control, in particular, callousness and impulsivity. They use manipulative and charming tactics, along with harmful patterns of dysfunctional interpersonal behavior, for their own gain, regardless of the cost to others (Hare, 1999; Jones & Paulhus, 2014; Wai & Tiliopoulos, 2012). Psychopathy is typified by high impulsivity and a disregard for one's reputation (Hare, 1999; Hare & Neumann, 2008). This manifests in short-term behaviors, such as lying for immediate gains, even at the expense of their long-term interests (Jones & Paulhus, 2014) as well as violent behaviors, driven by a lack of empathy and remorse (Jonason & Krause, 2013; Wai & Tiliopoulos, 2012; Williams & Paulhus, 2004).

Lastly, Narcissism is defined by seeking gratification from vanity or egotistic admiration of one's own attributes (Muris et al., 2017). Narcissism was defined based on the characteristics of clinical narcissistic personality disorder, under the assumption that similar psychopathological traits can be observed to a lesser extent in the non-clinical population (Miller & Campbell, 2008). Recent literature defines narcissism as the combination of excessively high self-esteem, feelings of grandiosity, a very high craving for admiration, and feelings of superiority (Paulhus & Williams, 2002). Narcissistic behavior can be described as a conflict between an exaggerated identity and an underlying insecurity that reflects a grandiose yet fragile self-concept (Jones & Paulhus, 2014; Morf & Rhodewalt, 2001). Individuals with narcissistic tendencies are often driven by a constant need for external validation of their own worth, disregarding the concerns of others, who they perceive as inferior (Morf & Rhodewalt, 2001).

Research indicates a significant overlap among the Dark Triad traits (Muris et al., 2017; Paulhus & Williams, 2002). While narcissism appears to be relatively unique from the other two traits, Machiavellianism and psychopathy exhibit a stronger relationship (Muris et al., 2017; Vize et al., 2018). One possible reason for this might be that narcissism, despite its malevolent qualities, also has a vulnerable side of masked insecurity (Morf & Rhodewalt, 2001).

Gender differences in Dark Triad traits indicate that men tend to exhibit higher levels of narcissism, psychopathy, and Machiavellianism compared to women, with psychopathy being the strongest male-linked trait (Muris et al., 2017; Paulhus & Williams, 2002). One potential explanation for this phenomenon may be that these behaviors align with traditional conceptualizations of the male gender role (e. g. impulsive and dominant behavior), whereas they are in contrast to traditional conceptualizations of the female gender role (e. g. compassionate behavior; Jonason & Davis, 2018). Also, research shows that transgressive behaviors associated with these traits are more prevalent among men (Muris et al., 2017).

The relations between Dark Triad traits and other personality factors reveal consistent patterns. Regarding the Big Five Personality traits (McCrae & Costa, 1989), all three Dark Triad traits show significant negative associations with agreeableness. Narcissism, however, exhibits a positive association with extraversion and openness. Psychopathy is negatively linked to conscientiousness, which aligns with its impulsive and uncontrolled nature (Muris et al., 2017; Paulhus & Williams, 2002). Commonly, narcissism, Machiavellianism, and psychopathy are associated with low levels of positive attributes such as truthfulness, honesty, fairness, sincerity, and faithfulness. Additionally, all Dark Triad traits maintain negative associations with the HEXACO personality factor honesty-humility (Muris et al., 2017). People with low scores on the honesty-humility scale tend to engage in manipulation to obtain desired outcomes, are more likely to disregard rules for personal gain, are motivated by material gain, and exhibit a strong sense of self-importance (Lee & Ashton, 2004). Overall, these findings suggest that members of the Dark Triad share a common core of disagreeableness and various other anti-social personality traits in non-clinical samples.

Additionally, the malevolent nature of Dark Triad traits is indicated by their predominantly negative psychosocial correlates. According to a meta-analysis of Muris et al. (2017), all three Dark Triad traits are associated with higher levels of adverse psychosocial outcomes, such as aggression and delinquency, interpersonal difficulties (e. g. dominance), sex-related issues (e. g. infidelity and sexual harassment), and anti-social tactics. Furthermore, Machiavellianism and psychopathy where also related to erratic behavior, emotional deficits (e. g. low levels of empathy and ToM), poor well-being, and morality problems. However, even after controlling for shared variance among the traits, psychopathy shows the strongest associations, which indicates its dominant role in predicting negative psychosocial outcomes. Taken together, Machiavellianism and especially psychopathy demonstrate a stronger relationship with adverse psychosocial consequences compared to narcissism, aligning with the perception that they represent more extreme and harmful traits within the Dark Triad (Rauthmann & Kolar, 2012).

In conclusion, the Dark Triad traits represent overlapping but still distinct constructs, with each trait predicting different personality attributes and psychosocial outcomes based on its unique characteristics and motivational goals. Understanding the Dark Triad traits and their interplay is essential for comprehending a spectrum of transgressive behaviors and their implications for constructs such as empathy and interpersonal relationships, which will be discussed extensively within the next paragraph.

Dark Triad and Empathy

The relationship between the Dark Triad and empathy has been subject of various studies. Some have indicated that all three Dark Triad traits are correlated with reduced overall levels of empathy (Jonason & Krause, 2013; Paulhus & Williams, 2002). Conversely, other research investigated its impact on empathy dividing it into cognitive and affective components. The findings revealed that the Dark Triad traits exhibit deficits primarily in affective empathy while showing relatively little impairment in cognitive empathy (Wai & Tiliopoulos, 2012). Additionally, Kajonius & Björkman (2020) demonstrated that individuals scoring high in Dark Triad traits show a normal capacity for empathy, in the sense of a cognitive ability to read objective emotions in faces. Nevertheless, they exhibit a diminished disposition to empathize, which can be defined as trait-based empathy by describing tendencies to empathize with others. However, some studies focus solely on individual Dark Triad traits, analyzing them separately from each other. Although for some of the traits research is relatively scarce, the existing literature will be discussed in the following.

When examining Machiavellianism and its relationship with empathy, research also revealed a trade-off between cognitive and affective empathy. However, the exact opposite pattern of this trade-off was found compared to the above mentioned results of studies that analyzed all three Dark Triad traits together. That is, individuals high in Machiavellianism showed relatively lower capabilities in ToM processing, which is part of cognitive empathy, but relatively greater automatic emotional resonance, which relates to affective empathy (Bagozzi et al., 2013). In particular, on a neural level, increased activation in the pars opercularis and insula regions was observed, which have been shown to be critical for perceiving others' emotions and emotion sharing. That means that individuals high in Machiavellianism are more likely to resonate with the emotions of others in comparison to individuals with lower scores. Whereas decreased activation in areas typically associated with ToM processing was found, such as the mPFC, TPJ and precuneus (Bagozzi et al., 2013). This pattern was also found in meta-analytic evidence, where Machiavellianism was first inversely correlated with all aspects of empathy, ranging from weak to moderate correlations. However, when the researchers controlled for affective empathy, the relationship between Machiavellianism and cognitive empathy weakened significantly (Blötner et al., 2021).

The most extensively researched Dark Triad trait in terms of its association with empathy is psychopathy. Studies have consistently demonstrated a robust correlation between psychopathy and generally low levels of empathy (Jonason & Krause, 2013; Jonason & Kroll, 2015; Wai & Tiliopoulos, 2012). Specifically, psychopathy is linked to a lack of dispositional empathy, particularly concerning the recognition and processing of distress and negative emotions in others, which relates to the affective aspect of empathy (van Dongen, 2020). Consistent with these findings, there is evidence of an fMRI study that investigated psychopathy traits with an empathy for pain paradigm (Decety et al., 2013). Images displaying bodily harm were presented to the participants while they had to imagine that either they were harmed or another person. In the imaging-other perspective, individuals with psychopathic traits showed a lower activity in the anterior AI and an atypical connectivity pattern of the AI with the PCC, OFC and vmPFC as well as of the amygdala with the OFC, vmPFC and dlPFC. This finding also speaks for deficits in affective processing. Furthermore, AI activation was negatively associated with interpersonal and affective aspects of psychopathy. This finding aligns with empirical evidence, that suggests little to no impairment in cognitive empathy in psychopathic individuals, but low capability of affective empathy (Rogers & Robinson, 2016).

Regarding the relationship between narcissism and empathic responses, as per DSM-V (Diagnostic and Statistical Manual of Mental Disorders, 5th edition;, American Psychiatric Association, 2000), a lack of empathy is considered one of the primary symptoms associated with Narcissistic Personality Disorder. However, research is especially highlighting impairments in affective empathy (rather than cognitive empathy) in narcissistic individuals through numerous studies on clinical samples (Ritter et al., 2011; Ronningstam, 2010), but also on non-clinical samples (Jonason & Krause, 2013). In line with these findings, a meta-analysis by Urbonaviciute & Hepper (2020) investigated the relationship between grandiose and vulnerable narcissism and affective and cognitive empathy, revealing significant negative associations between narcissism and both self-reported affective and cognitive empathy. When measured behaviorally, grandiose narcissism showed negative associations with affective empathy, but not cognitive empathy. Furthermore, on a neural level, among individuals with narcissistic traits, research has revealed altered brain activations during empathic processes, particularly in the right AI, which is involved in affective empathy (Fan et al., 2011; Fan et al., 2010). Nevertheless, also contrasting findings have emerged, indicating even higher empathy levels in narcissistic individuals (Jonason & Kroll, 2015).

Taken together, the relationship between the Dark Triad traits and empathy is complex, with varying patterns observed across different traits. However, there seems to be the tendency that affective but not cognitive empathy is diminished in Dark Triad traits (Rogers & Robinson, 2016; Urbonaviciute & Hepper, 2020; Wai & Tiliopoulos, 2012), especially among individuals with psychopathic and narcissistic traits. However, when Machiavellianism is investigated on its own, it shows an interchanged trade-off between the ability of cognitive and affective empathy compared to the evidence looking at all three traits commonly. Overall, the Dark Triad traits are linked to lower levels of empathy and altered brain activations during empathic processes, particularly in the insula region.

Dark Triad and Sexual Objectification

Exploring the relationship between the Dark Triad traits and sexual objectification, existing literature is limited. However, recent research has revealed positive associations between the two concepts. A study by Costello et al. (2019) investigated the personality correlates of intimate sexual objectification attitudes and behaviors. They discovered a strong correlation between sexual objectification and dark personality traits like meanness, low affective empathy, narcissism, sadism, disinhibition, coldheartedness and boldness. Since, in addition to narcissism, these are mainly attributes of psychopathy, this evidence suggests that objectifying attitudes and behaviors are especially common among narcissistic and psychopathic individuals. In addition, Bernard et al. (2021) used the body inversion effect to investigate objectification. The body inversion effect refers to the phenomenon that recognizing an inverted body is more difficult than recognizing an inverted faces. This highlights the holistic processing of bodies, rather than as collections of individual parts. However, they revealed that objectifying behavior, a lack of self-control, greater degrees of sexism, and higher levels of dark triad traits were linked to a lower body inversion effect indicating a reduced difference in recognizing upright versus inverted bodies. This suggests that these correlates are linked to the perception of women as objects as their bodies are being processed more like objects rather than a whole integrated unit. Additionally, it was found that individuals with high levels of narcissism are more likely to objectify others (Lachowicz-Tabaczek et al., 2021). However, in this case objectification was studied in a non-sexual way and therefore was defined as using others as a tool for fulfilling one's own goals and interests. The relationship between sexual objectification and psychopathy can be further explained by their shared characteristics, such as using others as tools for one's own gratification and disregarding others' autonomy and boundaries (Costello et al., 2019; Langton, 2009).

When it comes to more extreme types of sexual aggression, research suggests a link between the characteristics of the Dark Triad and the tolerance of sexual violence (Costa et al., 2024) as well as blaming victims of sexual aggression (Brewer et al., 2021). Psychopathy, for example, is strongly linked to sexual harassment and violence (Patrick, 2018). Furthermore, narcissism and psychopathy are both positively associated with sexual aggression (Mouilso & Calhoun, 2012; Patrick, 2018). Moreover, all three Dark Triad traits as well as related personality constructs such as low honesty-humility and low empathy are associated with the tendency to commit sexual harassment (Lee, 2003; Stillman et al., 2009; Zeigler-Hill et al., 2016). Additionally, Sanchez-Ruiz et al. (2021) investigated the relationship between Dark Triad traits and the acceptance of rape myths, which are prejudicial false beliefs that justify sexual aggression, blame the victim, and downplay the severity of the crime (e. g., the belief that a woman is responsible for being assaulted due to her provocative cloths). Their findings indicate that Dark Triad traits are positively correlated with rape myth acceptance. Moreover, they found that the association of psychopathy and Machiavellianism with rape myth acceptance is influenced by sexism and masculine honor beliefs. In line with these findings, a negative relationship has been observed between Dark Triad traits and feminist attitudes. Interestingly, this effect is particularly pronounced in men, where sexist ideology significantly predicts Dark Triad scores (Douglass et al., 2023; Gluck et al., 2020). Sexism, in turn, serves also as an important correlate of sexual objectification towards women (Bernard et al., 2021). Moreover, psychopathy has been linked to sexist and violent attitudes towards women, with dehumanization being one major correlate of sexual aggression attitudes (Bevens & Loughnan, 2019; Methot-Jones et al., 2019).

In conclusion, the findings suggest that individuals high in Dark Triad traits, especially psychopathy, are more likely to exhibit objectifying attitudes and behaviors towards others, particularly women. This objectification is linked to a range of negative outcomes, including tolerance of sexual violence, victim blaming, and acceptance of rape myths.

Research Question and Hypotheses

Taken together, the existing literature on Dark Triad traits and sexual violence attitudes and behaviors is substantial, with numerous studies shedding light on this relationship (Brewer et al., 2021; Costa et al., 2024; Methot-Jones et al., 2019; Mouilso & Calhoun, 2012; Patrick, 2018; Sanchez-Ruiz et al., 2021). Additionally, the fundamental cause of sexual objectification, which makes people see others as objects without taking into account their emotional experiences, may be a lack of empathy or emotional resonance with others' feelings, which is common in individuals with Dark Triad personality traits (Costello et al., 2019; Langton, 2009). Despite the importance of the negative consequences of sexual objectification and socially aversive personality traits, a noticeable research gap remains concerning the triangular relationship between empathy, the Dark Triad and sexual objectification. Particularly, there is a lack of fMRI investigations on sexual objectification encompassing an empathy for pain paradigm and especially of those taking into account sexual objectification of men. However, to my best knowledge, there is no existing neuroscientific research utilizing empathy for pain paradigms in order to examine sexual objectification and its relationship with the Dark Triad.

To address these gaps, the aim of this study is to investigate the impact of Dark Triad traits on empathy for pain, focusing on sexually objectified and non-objectified men and women. By exploring these dimensions on a neural level, I seek to contribute valuable insights into the dynamics between Dark Triad traits, empathy for pain, and sexual objectification. This will advance the understanding of the complex interplay between dark personality traits and objectifying behaviors based on empathic brain responses. The main idea of this study is that individuals with high Dark Triad traits tend to prioritize their own needs and objectives, feel entitled, take advantage of others, and also exhibit lower empathy levels, which may make them more likely to (sexually) objectify other people. Therefore, the primary objective of this study is to use a social neuroscience approach to determine whether individuals with higher Dark Triad scores exhibit reduced empathic neural responses towards sexually objectified individuals. To investigate this research question, three hypotheses are postulated:

Hypothesis 1: There will be reduced neural activation in empathy-related brain regions (e. g. AI and ACC) in individuals with higher Dark Triad scores compared to individuals with lower Dark Triad scores, indicating diminished empathic processing in higher scoring individuals.

Hypothesis 2: Among individuals with higher Dark Triad-scores, there will be a greater difference in empathy-related brain activation between sexually objectified and non-objectified targets compared to individuals with lower Dark Triad scores. Participants with higher Dark Triad scores will exhibit an even more pronounced reduction in empathy related brain activation for sexually objectified targets as compared to those with lower scores, indicating heightened sensitivity to sexual objectification.

Hypothesis 3: Moreover, for individuals with higher Dark Triad scores the gender of the sexually objectified targets will have a stronger influence on empathic responses compared to individuals with lower Dark Triad scores. I expect the activation of empathy related brain areas to be more reduced towards female confederates in comparison to male confederates, revealing a greater reactivity to gender-related aspects of the objectification process in individuals high in Dark Triad characteristics.

Method

Participants

This thesis is part of a larger project which was still in process at the time of the present data analysis. By the time of this analysis, 80 healthy participants voluntarily took part in the study in exchange for a monetary reward of 30 Euro. The participants were recruited via the Vienna CogSciHub study participation system, as well as via social media. Throughout the recruitment phase it was made sure to have a balanced representation of male and female participants. Upon interest, an online questionnaire was sent out to check for exclusion and inclusion criteria. We only included heterosexual male and female individuals between the age of 18 and 35 in order to minimize variability within the sample. Also, it was essential for the participants to be proficient in German, as the entire study was conducted in German. In addition, there were standard inclusion criteria for MRI experiments. Therefore, we excluded participants with any contraindications for MRI scanning, such as head surgery, non-removable metallic objects in the body, active implants, surgical implants, hearing aids, claustrophobia, permanent make-up, certain tattoos or pregnancy. Individuals with psychiatric diagnoses or psychopharmaceutic therapy were also excluded from the study. Moreover, psychology students were excluded because of the experimental design, which involved deception, psychology students were more likely to see through. Data from 18 participants had to be removed from analyses due to technical problems during the execution or recording of the experiment of two subjects as well as missing responses to the Dark Triad questionnaire of 16 subjects. Therefore, the final sample included 62 participants (N = 32 female, N = 30 male), with ages ranging from 18 to 35 (*M* = 23.81, *SD* = 3.85). All subjects were blind to the experiment. All participants gave written informed consent before participating in the study, which was approved by the Ethics Committee of the University of Vienna. The participants were recruited and tested between October 2022 and January 2024.

Material and Measurements

Dark Triad Measure

Once participants were considered to meet the inclusion criteria, they were provided with a link to the validated German version of the Short Dark Triad (SD3; Jones & Paulhus, 2014; validated German adaptation by Malesza et al., 2019), which was to be completed online before the date of the actual experimental session. The SD3 is a self-report questionnaire comprising 27 items, with 9 items corresponding to each of the three Dark Triad traits. The items are rated on a 5-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). Sample items are: “Many group activities tend to be dull without me” (Narcissism), “It's not wise to tell your secrets” (Machiavellianism), and “I'll say anything to get what I want” (Psychopathy). According to analyses by (Malesza et al., 2019) the German adaptation of the SD3 has a robust factor structure and acceptable psychometric properties.

Manipulation of Sexual Objectification

The experiment involved the participation of two confederates in each session, both either male or female. The confederates were models, who were instructed to portray themselves as real participants. That means that they did not actually take part in the experiment, but they represented the operationalization of the two experimental conditions (objectified vs. non-objectified). One model represented the sexually objectified condition and the other the non-objectified condition for every experimental session. For the female targets, the outfit in the objectified condition consisted of a short, figure-hugging, revealing black dress, heeled shoes and heavy make-up. Whereas in the non-objectified condition, the female models’ outfit consisted of loose beige trousers, flat shoes, a black shirt and a beige cardigan, with most of their skin covered (Figure 1). For the male targets, the objectified outfit consisted of a tight, black tank top, skinny jeans and cowboy boots. The non-objectified male model wore a baseball shirt, loose chino trousers and sneakers. It was ensured that the models did not differ in any way apart from this (e. g. didn't have any visual tattoos). The outfits were controlled for luminance so that the colours of the body parts remained relatively consistent between the objectified and the non-objectified model. Also, in order to make sure the efficacy of the manipulation, the outfits have been piloted prior to this study. The findings revealed that objectified targets were rated with increased sexiness, decreased intelligence and were being perceived as less agentic (Gray et al., 2011). The confederates showed up half an hour before the start of the experimental session to prepare. They were introduced to the subjects before the start of the experiment. For more flexible scheduling of the session dates, several models were recruited. In total there were three male models and four female models. They were all equally assigned to the objectified and non-objectified condition. The models were always attending the sessions in pairs of the same gender, one objectified, one non-objectified.

Figure 1.

Examples for the Manipulation of Sexual Objectification.

Note. Non-objectified (left) and objectified (right) outfits of female (top) and male (bottom) confederates. Images were shown without a black bar on the face during the actual experiment.

Experimental procedure

Before the day of the scanning session, the participants received an e-mail with the details of the session, such as meeting point, participant information and consent form. The fMRI experiment took place at the Dental Clinic of the Medical University of Vienna using a 3 Tesla Siemens MAGNETOM Skyra scanner equipped with a 32-channel head coil. At each session, there was one participant and two confederates of the same sex, either both male or both female, attending. After preparing their outfits according to the conditions in advance of the arrival of the participant, the confederates went to their target locations, one at the entrance area of the clinic, one outside of the front door, to make the scene more natural. At every point of the study, it was essential and caution was taken, that the confederates were perceived by the subject as also being participants of the study. After being picked up by the experimenter, the participant and the confederates were brought to the preparation room in the clinic. The preparation room, where the models got ready before, was in the meantime arranged for the experiment. The models' personal belongings were removed, and two computers and a pain stimulator were set up to make it look like the experiment was taking place in this room. In the preparation room, the instructions for the experimental procedure were given to the participant and the confederates and the consent form was filled out by all three. It was explained to them that three subjects were recruited to participate in a joint task, as the study aims to investigate pain perception in oneself and others. The participants were not informed of the true purpose of the study in advance because the topic is highly influenced by social desirability. It was made clear that only the participant would perform the experiment in the fMRI scanner. This was explained by pretending that only the participant got specifically recruited as a participant who will be scanned, while the confederates would remain in the preparation room and perform the tasks there on the computer.

Then all three were asked by the experimenter to come to the scanning room, in front of which portraits of the participant were taken. The participant was told that these would serve as cues during the experimental tasks. Full body and upper body photos of the subject were taken, with the upper body photos showing the simulation of different levels of pain (they were told to stage one neutral and one painful facial expression), as well as pretending to take the same photos of the confederates in order to maintain the cover story. It was said that these pictures would be presented during the task as stimuli. Actually, to make sure that the facial expressions represent an appropriate response to the given shocks in terms of intensity, the confederates' photos were taken beforehand and reviewed for the intensity of the painful expression displayed (Figure 2). Also, the pictures of the participant were never used in the empathy for pain task, they had only been taken for the maintenance of the cover story.

Figure 2.

Examples of the Stimulus Pictures used in the Empathy for Pain Task.

Note. The stimulus pictures show a female (top) and a male (bottom) non-objectified (A, D) and objectified (B, C) confederate in the low pain (left) and in the high pain (right) condition. During the actual experiment, confederate images were shown without a black bar.

After that, the confederates were asked to return to the previous room to attend the experiment there (in fact the models were then free to leave). Meanwhile, the subject was instructed by another experimenter for the tasks, which they had to perform in the fMRI scanner, including instructions for the eye tracker, the empathy for pain task, the pain for gain task, and the morphing task (for this thesis, only the fMRI data of the empathy for pain task will be analyzed). Additionally, the subject filled out the MR safety questionnaire before entering the scanning room. After entering, the MR safety was clarified by a trained and certified researcher (qualified user) based on the MR safety questionnaire just completed. After that, since the tasks included receiving electrical stimulation, a weak electric shock was demonstrated shortly to the participant.

Then, the subject was guided to the fMRI scanner, where the fMRI compatible electric shock device was attached to the back of their hand by the qualified user. The shocks were only given in the self condition. Before the actual scanning session began, a pain calibration was done to find proper values and individual voltage levels of low and high intensity electrical shocks. Therefore, at first weak electric shocks were given, which were progressively getting stronger. The subject was supposed to rate the intensity of the shocks on a pain scale ranging from zero to eight. A pain rating of eight was the pain limit and once indicated as such, the shocks were not again delivered at that respective voltage level within the experiment. Thus, each participant rated their individual maximum level of tolerable pain (Rütgen et al., 2015).

The participant was then located in the scanner by the qualified user and the actual experiment began, including the empathy for pain task, the pain for gain task and the morphing task, in this chronological order. The participant performed the tasks in the fMRI scanner with the belief that the confederates were in the preparation room and participated simultaneously on the computer. Via an fMRI-compatible eye tracker, eye movements of participants were recorded throughout all tasks (the eye tracking data was not used or analyzed within this thesis). Before every task, the eye tracker was calibrated. Also, there were again exact instructions given for each task and training trials were performed for the specific tasks. Through an MRI-compatible button box, the participant could confirm instructions or give ratings during the tasks. For the maintenance of the joint task cover story, the participant was instructed to wait a brief period after confirming the instructions until all other participants had done the same. The experiment consisted of 60 trails of the empathy task, 40 trials of the pain for gain task and 40 trials of the morphing task. The duration of the scan depended on the functionality of the eye tracking and fMRI technology. When everything was functioning properly, the scan took approximately 90 minutes. After the participant got out of the scanner, they were offered something to drink and sweets. Lastly, they had to fill out a few questionnaires (which are not part of this study and therefore won't be described in further detail) as well as the document for the expense allowance. After the study, the participant was asked what they thought, what the study was about and were then fully informed about the true objective of the study. The subject was then formally dismissed.

Empathy for Pain Task

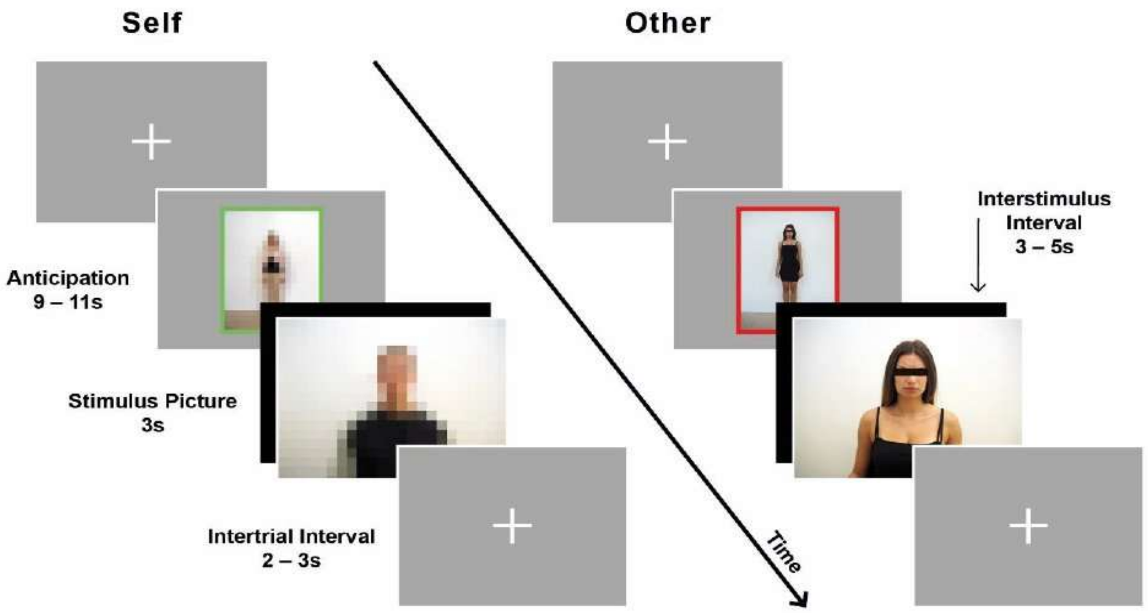
The construct of empathy was assessed through an empathy for pain task (Figure 3). This task is a modified version of the empathy for pain paradigm initially proposed by Singer et al. (2006) and later adopted by Hein et al. (2010). While lying in the fMRI scanner, participants received either high or low intensity electric shocks (high pain vs. low pain) administered through electrodes on the back of their hands. These short-lasting shocks (500ms) were delivered via an fMRI-compatible electric shock device, namely the Digitimer DS5 Isolated Bipolar Constant Current Stimulator (Digitimer Ltd, Clinical & Biomedical Research Instruments). Each participant performed the tasks with two confederates (either both female or male), who differed in their level of sexual objectification (one objectified, one non-objectified). The participants were informed and led to believe that the confederates also received painful shocks, although the confederates did not actually experience the shocks.

At the beginning of each trial, a fixation cross was displayed. This was followed by an anticipation screen, in which the condition was indicated through a picture displaying the person receiving the shock and its intensity (pain level). The picture was either a neutral full body image of the sexually objectified confederate (other objectified condition) or the non-objectified confederate (other non-objectified condition), or a pixelated photo suggesting a full body image (self condition). The picture was framed in either green or red, indicating whether the following shock would be weak (green, low pain condition) or strong (red, high pain condition). After that, a black screen appeared, followed by an upper body stimulus picture of the person indicated in the anticipation phase. Simultaneously, as indicated before, participants either viewed an upper body picture of the target which was assumed to be undergoing the stimulation (other condition) or viewed a pixelated upper body picture and experienced the shock themselves (self condition). In the other low pain condition, the target's facial expression was neutral. In the other high pain condition, their facial expressions clearly indicated that they felt pain (Figure 2). In the self-condition, a pixelated picture of a person was shown again. Then the next trial started.

The trials were conducted in a pseudorandomized order regarding the conditions. After one-third of the trials, the participants were asked one or two brief questions to rate their empathic response. Through an MRI-compatible button box, the participant could answer these questions before the start of the next trial. The purpose of the questions was to get extra behavioral data, which will not be covered within this thesis. There were two runs of the task, each consisting of five trials for each condition (self, other-objectified, other non-objectified), resulting in a total of 30 trials per run. During the entire task, brain responses were measured to assess neural reactions to assess neural reactions to the stimuli.

Figure 3.

Empathy for Pain Task.



Note. In the other condition (right), participants observed confederates receiving shocks, with conditions indicated by the target's level of sexual objectification (objectified vs. non-objectified) and shock intensity (low pain: green frame, high pain: red frame). An anticipation screen displayed the target and shock intensity, followed by a stimulus picture showing the target's reaction (neutral expression for low pain; painful expression for high pain). In the self-condition (left), participants were shown pixelated images and shock intensity (low pain: green frame, high pain: red frame) in the anticipation phase and they received the shock at the beginning of the stimulus picture, which was a pixelated upper body image. Trials were pseudorandomized, with one-third followed by another interstimulus interval (3-5s) and a rating (6-12s). During the actual experiment, target images were shown without a black bar.

Data Analysis

Dark Triad Data Analysis

The data for the Dark Triad traits was collected via an online version of the SD3 (Malesza et al., 2019). The items were categorized according to the three traits (narcissism, psychopathy, and Machiavellianism). Scores for the individual traits were computed by reversing the scoring of certain items and subsequently averaging all subscale items. An overall Dark Triad score was then derived by averaging the scores of all subscales.

FMRI Data Analysis

The fMRI data analysis was completely performed using Statistical Parametric Mapping (SPM12, 2014) implemented in MATLAB (Version 2023b, 2023).

Preprocessing

Preprocessing involved several critical steps to prepare the functional images for analysis. Motion correction was performed using spatial realignment to the mean functional image to correct for subject movement during the scan. This was followed by slice timing correction to adjust for the different acquisition times of each slice within a volume (Sladky et al., 2011). Next, the realigned functional images were coregistered to the anatomical image to ensure accurate spatial alignment. The anatomical image underwent tissue segmentation, dividing it into grey matter, white matter, and cerebrospinal fluid. The segmented images were then used for normalization, transforming the functional images into the standard MNI space (Montreal Neurological Institute; Evans et al., 1994). Finally, the normalized images were smoothed using an 8mm Gaussian kernel to enhance the signal-to-noise ratio.

Following the preprocessing of the data, the general linear model (GLM; Kiebel & Holmes, 2007) was used to determine first level statistical maps for each subject and to evaluate these maps in a second level random effects group analysis, with the target contrast being the one that detects empathy for pain.

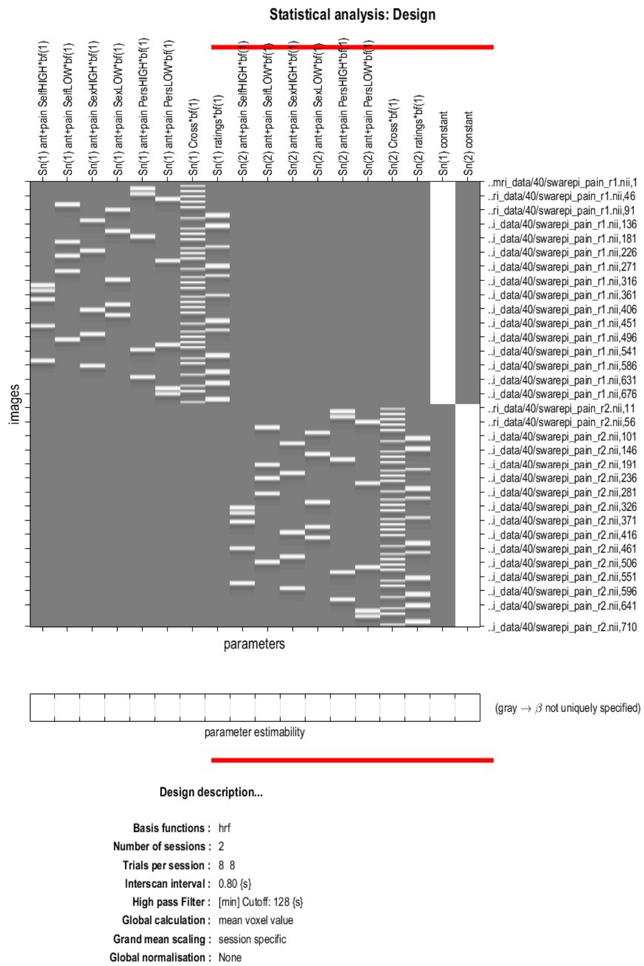
First Level Analysis

The first level analysis was performed separately for each participant, as it is an essential step to identify activity patterns associated with the specific experimental conditions. Within this analysis, a design matrix for the experimental paradigm of this study was set up (Figure 4). Therefore, a total of eight first level regressors were used, which consisted of two regressors capturing the pain level (high pain, low pain) for each condition (self, other sexualized, other personalized). Additionally, the ratings and the intertrial intervals (fix crosses) were represented as regressors.

Second Level Analysis

Figure 4.

Design Matrix of the First Level Analysis.



Note. The design matrix illustrates six regressors for each run, representing conditions (self, other personalized, other sexualized), pain levels (high pain, low pain), intertrial intervals, and ratings.

For the second level analysis, contrasts were conducted to investigate the hypotheses regarding differences in brain activation between experimental conditions. The differences in empathy for pain (other condition) were analysed by contrasting high pain vs. low pain for each condition (other objectified vs. other non-objectified).

For hypothesis one, to examine empathic activity during the presentation of painful (high pain intensity) compared to non-painful situations (low pain intensity), combining data for sexually objectified and non-objectified conditions, the contrast high pain (other objectified + other non-objectified) > low pain (other objectified + other non-objectified) was used. For hypothesis two and three, the contrast other objectified (high pain > low pain) vs. other non-objectified (high pain > low pain) was conducted to investigate the differences in neural responses between objectified and non-objectified individuals. For the first and the second hypothesis, the corresponding contrasts were used within a multiple regression framework with the Dark Triad scores of each participant added as covariates. A whole brain analysis with a threshold of $p < .005$ uncorrected and an extent threshold of 10 voxels was performed for each of the three Dark Triad traits while controlling for the two other traits as well as for all three traits combined. For the third hypothesis, a two-sample t-test was performed for group comparison between sessions with female confederates and sessions with male confederates. Also here, the Dark Triad scores of each participant were added as covariates and a whole brain analysis with a threshold of $p < .005$ uncorrected and an extent threshold of 10 voxels was performed for each of the three Dark Triad traits while controlling for the two other traits as well as for all three traits combined.

MRIcroGL (Rorden & Brett, 2000) was used for anatomical and cytoarchitectonic interpretation and visualization of the activation data.

Results

Influence of Dark Triad on Empathy

According to hypothesis one, individuals with higher Dark Triad scores were expected to show reduced neural activity in areas associated with empathy during the empathy for pain task. Therefore, whole-brain multiple regression analyses using the contrast high pain vs. low pain was performed with the Dark Triad scores as covariates.

For higher narcissism scores, results show a significantly lower activation in the following regions: right posterior insula, which belongs to the somatosensory component of pain (Craig, 2003b) and right cerebral white matter ($p < .005$, uncorrected, Table 1 and Figure 5).

Table 1

Multiple Regression Analysis for the Dark Triad Trait Narcissism: High Pain > Low Pain

	Anatomical region	Cluster K	*p* (uncorr)	T	Z-score	x, y, z [mm]
R	Posterior insula	22	0.002	3.04	2.92	40 -16 -2
R	Cerebral white matter	14	0.002	2.92	2.84	2 0 24

Note. Whole-brain analysis with a peak-level threshold of $p < 0.005$ (uncorrected) and an extent threshold of 10 voxels with x, y, z indicating MNI coordinates.

For higher Machiavellianism scores, results indicate reduced brain activation in the following areas: a) areas belonging to the mentalizing network (Lamm et al., 2011; Mar, 2011): bilateral precuneus, right superior temporal gyrus; b) other areas: left lingual gyrus, left calcarine sulcus, left cuneus, left middle occipital gyrus, bilateral superior occipital gyrus, bilateral paracentral lobule, right postcentral gyrus ($p < .005$, uncorrected; Table 2 and Figure 5).

Table 2

Multiple Regression Analysis for the Dark Triad Trait Machiavellianism: High Pain > Low Pain

	Anatomical region	Cluster K	*p* (uncorr)	T	Z-score	x, y, z [mm]
L	Lingual gyrus	814	0.000	4.94	4.49	-28 -62 -4
L	Calcarine sulcus		0.000	3.80	3.57	-24 -62 4
L	Lingual gyrus		0.000	3.77	3.55	-20 -44 0
L	Middle occipital gyrus	410	0.000	3.65	3.44	-46 -72 6
L	Middle occipital gyrus		0.001	3.38	3.21	-38 -80 8
L	Cuneus	610	0.000	3.49	3.31	-10 -84 18
L	Superior occipital gyrus		0.001	3.23	3.09	-16 -80 30
R	Superior occipital gyrus	141	0.001	3.37	3.20	24 -80 24
L	Paracentral lobule	28	0.001	3.25	3.10	-12 -32 78
L	Precuneus		0.002	3.03	2.91	-12 -44 74
L	Paracentral lobule	37	0.001	3.35	3.19	-12 -32 78

R	Prenuceus	62	0.001	3.22	3.07	22 -42 -6
R	Paracentral lobule	140	0.001	3.14	3.01	6 -28 58
R	Postcentral gyrus		0.004	2.76	2.66	12 -38 62
R	Postcentral gyrus	24	0.002	3.09	2.96	22 -34 76
R	Superior temporal gyrus	42	0.002	2.96	2.84	58 -20 -2
R	Superior temporal gyrus		0.004	2.79	2.69	66 -12 -2

Note. Whole brain analysis with a peak-level threshold of $p < 0.005$ (uncorrected) and an extent threshold of 10 voxels.

Results regarding psychopathy show reduced activation for higher scores in the left middle orbitofrontal gyrus, which is linked to cognitive empathy (Fan et al., 2011; p < .005, uncorrected; Table 3 and Figure 5)

Table 3

Multiple Regression Analysis for the Dark Triad Trait Psychopathy: High Pain vs. Low Pain

	Anatomical region	Cluster K	*p* (uncorr)	T	Z-score	x, y, z [mm]
L	Middle orbitofrontal gyrus	35	0.001	3.11	2.98	-38 48 -4

Note. Whole brain analysis with a peak-level threshold of $p < 0.005$ (uncorrected) and an extent threshold of 10 voxels.

The analysis of the data regarding overall Dark Triad scores revealed significantly reduced activation for higher scores in the following brain areas: a) areas belonging to the mentalizing network (Fan et al., 2011; Mar, 2011): right inferior frontal gyrus (triangular part, opercular part, orbital part), left middle orbitofrontal gyrus; b) areas belonging to the somatosensory component of pain (Price, 2000): right rolandic operculum; c) other areas: right superior temporal gyrus, left postcentral gyrus (p < .005, uncorrected; Table 4 and Figure 5).

Table 4

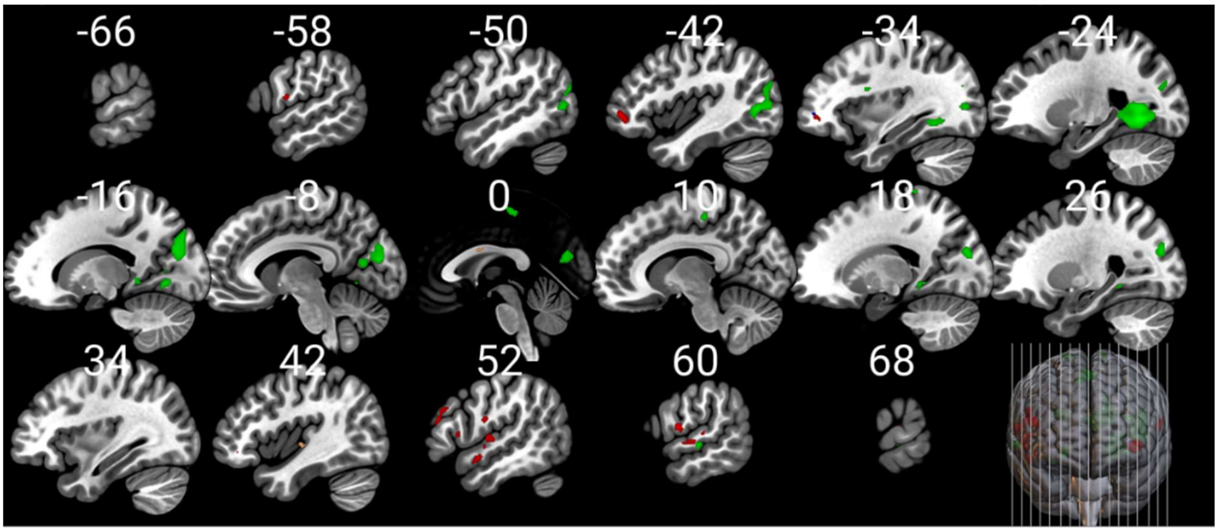
Multiple Regression Analysis for all Dark Triad Traits Combined

	Anatomical region	Cluster K	*p* (uncorr)	T	Z-score	x, y, z [mm]
L	Middle temporal gyrus	125	0.000	4.15	3.88	-64 -4 18
R	Superior temporal gyrus	570	0.000	4.02	3.77	56 -4 -4
R	Rolandic operculum		0.000	3.88	3.65	62 -2 14
R	Superior temporal gyrus		0.000	3.85	3.63	60 -16 2
R	Inferior frontal gyrus, triangular part	81	0.000	3.46	3.29	50 40 18
R	Rolandic operculum		0.003	2.91	2.80	62 -2 14
L	Postcentral gyrus	92	0.001	3.14	3.01	-64 -4 18
R	Superior temporal gyrus		0.002	2.98	2.87	52 2 -12
R	Superior temporal gyrus	37	0.002	3.03	2.91	62 -22 8
R	Inferior frontal gyrus, opercular part	45	0.002	3.03	2.91	52 18 8
R	Inferior frontal gyrus, orbital part		0.003	2.81	2.71	46 40 -10
L	Middle orbitofrontal gyrus	36	0.002	2.98	2.87	-42 48 -4
R	Inferior frontal gyrus, triangular part	12	0.003	2.84	2.74	54 28 28

Note. Whole brain analysis with a peak-level threshold of $p < 0.005$ (uncorrected) and an extent threshold of 10 voxels.

Figure 5.

Neural Activation Associated with Narcissism, Machiavellianism, Psychopathy and overall Dark Triad Scores During the Empathy for Pain Task



Note. Brain activation map showing regions associated with narcissism (brown), Machiavellianism (green), psychopathy (blue), and overall Dark Triad (red) scores during the empathy for pain task (contrast: high pain (objectified + non-objectified) > low pain (objectified + non-objectified)). The map is thresholded at a peak level of $p < 0.005$ (uncorrected) with an extent threshold of 10 voxels. Activation is displayed on a standard MNI anatomical template using MRIcroGL (Roden, 2000). The x-coordinates are indicated above the respective slices.

Influence of Dark Triad on the Effect of Sexual Objectification on Empathy

Within hypothesis two, we aimed to investigate the influence of Dark Triad scores on the association between neural empathic responses and sexualization of the confederate. To test this hypothesis, whole-brain multiple regression analyses using the contrast non-objectified vs. objectified was performed with the Dark Triad scores as covariates.

Results revealed no significant differences in brain activations for narcissism, psychopathy, or the combined Dark Triad traits. For Machiavellianism as a covariate, results indicated that individuals with higher Machiavellianism scores exhibited decreased neural activation in the left middle occipital gyrus ($p < .005$, uncorrected; Table 5 and Figure 6).

Table 5

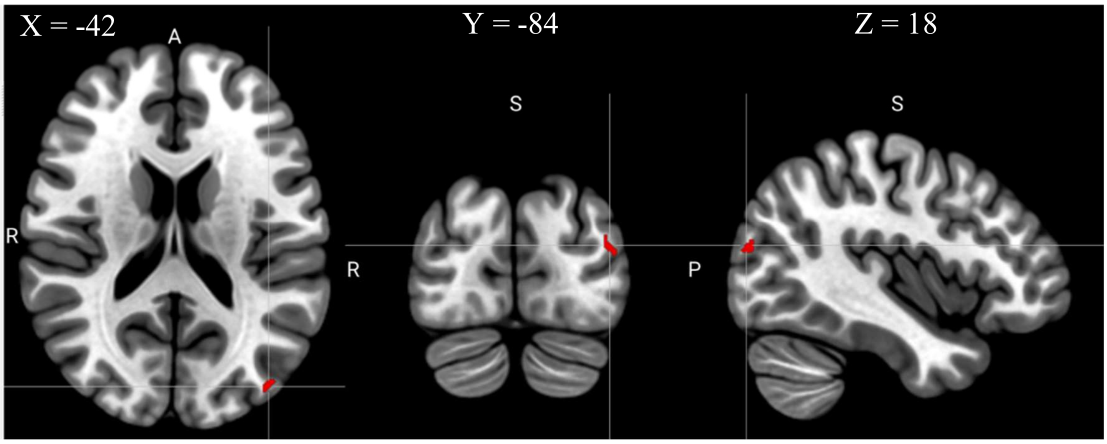
Multiple Regression with Dark Triad Traits: Machiavellianism

	Anatomical region	Cluster K	*p* (uncorr)	T	Z-score	x, y, z [mm]
L	Middle occipital gyrus	18	0.001	3.22	3.08	-42 -84 18

Note. Whole brain analysis with a peak-level threshold of $p < 0.005$ (uncorrected) and an extent threshold of 10 voxels.

Figure 6.

Neural Activation Associated with Machiavellianism Scores Across Objectification Conditions



Note. Brain activation map showing the region associated with Machiavellianism scores during the empathy for pain task (contrast: objectified (high pain > low pain) vs. non-objectified (high pain > low pain)). The map is thresholded at a peak level of $p < 0.005$ (uncorrected) with an extent threshold of 10 voxels. Activation is displayed on a standard MNI anatomical template using MRIcroGL (Roden, 2000). The coordinates are indicated above the respective slices.

Influence of Dark Triad on the Effect of Gender and Sexual Objectification on Empathy

For hypothesis three, a group comparison was performed to assess, whether there is a difference in empathy related brain activation between observing female and male confederates in pain, and whether this difference is moderated by the participants' Dark Triad scores. A whole-brain two-sample t-test analyses was conducted with the Dark Triad traits as covariates.

However, for narcissism and Machiavellianism, there were no significant findings. The examination of psychopathy in relation to gender-specific empathic responses revealed significant neural correlates. Individuals with higher psychopathy scores exhibited decreased activation in the following areas: a) areas belonging to the mentalizing network (Mar, 2011): bilateral superior medial frontal cortex, right middle frontal gyrus, right supplementary motor area; b) areas underpinning action understanding (Lamm et al., 2011): right inferior parietal lobule, c) other areas: right superior frontal gyrus, right middle temporal gyrus, left precentral gyrus, bilateral postcentral gyrus ($p < .005$, uncorrected; Table 6 and Figure 7).

Table 6

Two-sample t-Test with Dark Triad Trait Psychopathy

	Anatomical region	Cluster K	*p* (uncorr)	T	Z-score	x, y, z [mm]
R	Superior temporal gyrus	70	0.000	3.71	3.49	66 -18 -4
R	Cerebral white matter	396	0.000	3.68	3.46	60 -60 28
R	Middle temporal gyrus		0.000	3.62	3.41	46 -60 22
R	Cerebral white matter		0.000	3.65	3.44	26 -60 22
R	Cerebral white matter		0.003	2.81	2.70	36 -52 14
R	Superior medial frontal gyrus		0.001	3.43	3.25	10 70 18
R	Middle frontal gyrus	292	0.001	3.47	3.28	26 60 22
R	Superior frontal gyrus	41	0.001	3.15	3.00	14 38 58
L	Superior medial frontal gyrus	76	0.002	3.10	2.96	-12 60 28
L	Cerebral white matter	5	0.002	3.03	2.90	-6 -12 24
L	Cerebral white matter	18	0.002	3.24	3.08	-10 -32 20
L	Superior medial frontal gyrus	87	0.002	3.16	3.02	-12 60 28
R	Supplementary motor area	116	0.002	3.01	2.88	4 -18 54
R	Supplementary motor area		0.002	2.95	2.83	0 -20 66
L	Precentral gyrus	21	0.002	2.99	2.86	-18 -18 76

R	Superior medial frontal gyrus	42	0.002	2.97	2.85	6 56 14
L	Postcentral gyrus	52	0.003	2.91	2.79	-32 -30 64
R	Postcentral gyrus	70	0.002	2.94	2.82	30 -28 64
L	Postcentral gyrus	68	0.003	2.90	2.79	-32 -32 64
L	Postcentral gyrus		0.003	2.88	2.76	-30 -32 56

Note. Whole brain analysis with a peak-level threshold of $p < 0.005$ (uncorrected) and an extent threshold of 10 voxels.

For the overall Dark Triad score, results indicated reduced activation in the bilateral angular gyrus, which is part of the mentalizing network (Mar, 2011; $p < .005$, uncorrected, Table 7 and Figure 6).

Table 7

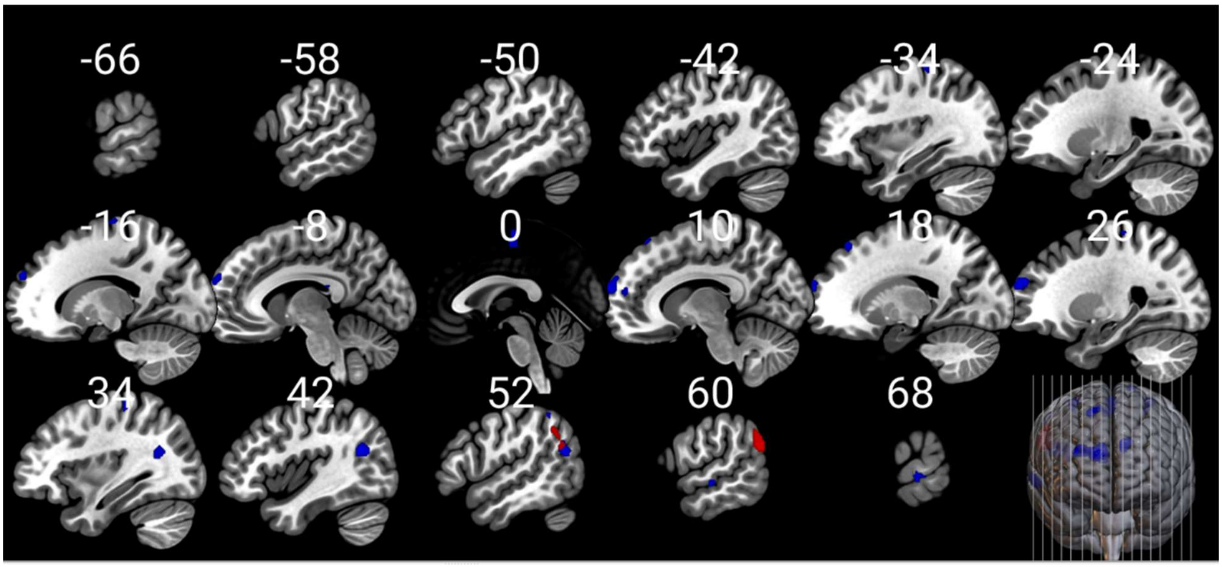
Two-sample t-Test with all Dark Triad Traits Combined

	Anatomical region	Cluster K	*p* (uncorr)	T	Z-score	x, y, z [mm]
R	Angular gyrus	56	0.001	3.26	3.11	58 -58 38
L	Angular gyrus	44	0.001	3.12	2.99	-46 -68 46

Note. Whole brain analysis with a peak-level threshold of $p < 0.005$ (uncorrected) and an extent threshold of 10 voxels.

Figure 7.

Brain Activation Patterns Associated with Psychopathy and Overall Dark Triad Scores Across Gender-Specific Objectification Conditions



Note. Brain activation map illustrating regions associated with psychopathy scores (blue) and overall Dark Triad scores (red) during the empathy for pain task (contrast: objectified (high pain > low pain) vs. non-objectified (high pain > low pain)), focusing on gender-specific objectification conditions. The map is thresholded at a peak level of $p < 0.005$ (uncorrected) with an extent threshold of 10 voxels. Activation is displayed on a standard MNI anatomical template using MRIcroGL (Roden, 2000). The x-coordinates are indicated above the respective slices.

Discussion

The purpose of this study was to examine the influence of socially aversive personality traits on the relationship between sexual objectification and empathy for physical pain from a social neuroscience perspective. To this aim, an empathy for pain task displaying pictures of sexually objectified and non-objectified confederates undergoing painful electric stimulation was utilized. In line with previous findings and hypothesis one, it was found that several empathy related brain areas were significantly less activated in individuals high in Dark Triad traits in the empathy for pain task. Importantly, results showed reduced activation in areas of the mentalizing network, including the precuneus and superior temporal gyrus, associated with Machiavellianism, the middle orbitofrontal gyrus (OFG) associated with psychopathy, as well as the IFG (pars triangularis, pars opercularis, and pars orbitalis), and middle OFG associated with higher overall Dark Triad scores. Hypothesis two proposed a stronger effect of sexual objectification on empathy in individuals high in Dark Triad traits. For this hypothesis no empathy related brain activation was significantly altered in any of the tested socially aversive traits. Hypothesis three examined the effect of Dark Triad scores on empathic neural activation in relation to the gender of the sexually objectified confederates, indicating reduced empathy responses towards objectified female confederates associated with higher Dark Triad scores. Results indicated a lower activation in empathy related brain regions like the superior medial frontal cortex, middle frontal gyrus, and SMA for psychopathy as well as the angular gyrus for overall Dark Triad scores. Therefore, results indicate that hypotheses one and three may be partially confirmed. Hypothesis two, however, could not be confirmed. In the subsequent section of this thesis, the results will be interpreted in greater detail and categorized in relation to existing research.

Interpretation of Findings

Dark Triad's Association with Reduced Empathy

Hypothesis one investigated whether Dark Triad traits have a negative impact on empathic activation. A whole brain contrast was calculated to identify areas where neural activity was increased in the high pain condition compared to the low pain condition. Using a multiple regression approach with the Dark Triad traits as covariates, the individual contributions of narcissism, Machiavellianism, and psychopathy as well as their combined effect on empathic neural responses, were analyzed. It was expected that higher Dark Triad scores would predict reduced activation in brain areas linked to empathic processing.

Narcissism

Results regarding narcissism show a lower activation in the posterior insula for individuals with higher narcissism scores. The posterior insula plays a crucial role in somatosensory and motor integration as well as interoceptive awareness, which involves the perception of bodily states, including the sensory aspects of pain (Craig, 2003a; Singer et al., 2004). This aligns with findings of Novembre et al. (2015) who observed that empathy for social ostracism activates brain regions involved in the somatosensory-discriminative component of pain, including the posterior insula. Additionally, a meta-analysis found, that the posterior insula was activated in empathic processes when using empathy for pain paradigms (Jauniaux et al., 2019). However, this finding contradicts evidence from studies that distinguish between the functional networks involved in empathy processing and pain processing (Fallon et al., 2020; Lamm et al., 2011; Lamm & Singer, 2010; Singer et al., 2004). These studies indicate that the posterior insula is activated only during the first-hand experience of pain, but not during empathy for pain. This differentiation is supported by findings indicating that both posterior and anterior insula parts are engaged during self-experienced pain, whereas empathy primarily recruits the anterior parts of the insula. This suggests a distinction in the insula's function: the posterior region is involved in encoding nociceptive information, whereas the anterior region contributes to the metal representation of affective states related to oneself and others (Lamm & Singer, 2010). Additionally, the results of the present thesis indicated decreased activation in cerebral white matter for individuals with higher narcissistic traits. The findings indicate that individuals with higher narcissistic traits exhibited reduced activity in the posterior insula and cerebral white matter when observing others in pain.

Machiavellianism

Several neural correlates were identified as exhibiting reduced activation in individuals with high Machiavellianism scores in the empathy for pain task, including areas within the mentalizing network such as the left precuneus and the right superior temporal gyrus (Lamm et al., 2011; Mar, 2011). The precuneus plays a crucial role in both affective and cognitive empathy and is involved in processes like perspective-taking and ToM (Kogler et al., 2020). Also, Mar (2011) highlighted that ToM processes are located in the precuneus, extending into the pCC. Furthermore, Cavanna and Trimble (2006) reviewed the functional correlates of the precuneus, associating it with visuo-spatial imagery, episodic memory retrieval, self-processing operations, the modulation of conscious processes, and ToM. The present study indicates a negative relationship between precuneus activation and Machiavellianism within empathy for pain scenarios, suggesting that the representation of others' intentions and mental states seems to be impaired in individuals high in Machiavellianism. This finding is consistent with the results of Bagozzi et al. (2013), which showed a negative correlation between Machiavellianism and activation in the mPFC, TPJ, and precuneus. This suggests that individuals with higher levels of Machiavellianism have more difficulty with ToM skills and perspective taking, and therefore engaging in cognitive empathy, compared to non-Machiavellians.

In addition, other regions exhibiting reduced activation in higher Machiavellianism include the left lingual gyrus, left calcarine sulcus, left cuneus, left middle occipital gyrus and bilateral superior occipital gyrus, which are known to be involved in visual processing (Lamm et al., 2011; Rehman & Al Khalili, 2023), as well as the bilateral paracentral lobule and right postcentral gyrus (SI), which are associated primarily with somatosensory processing (Konstantopoulos & Giakoumettis, 2023). According to Lamm et al. (2011), cue-based empathy for pain paradigms typically activate visual processing areas whereas picture-based paradigms tend to engage somatosensory processing regions. As the empathy for pain task that was used in the present study did not conform strictly to either a traditional cue-based or picture-based paradigm, since neither there was a real person present nor did participants look at a direct image of the painful stimulus itself, but rather observed a picture showing facial expressions of individuals in pain, the paradigm might be considered as a mixture of both cue- and picture-based tasks. This mixed approach aligns with Lamm et al.'s (2011) findings, as it resulted in reduced activations in both occipital and postcentral regions. Taken together, these findings suggest a diminished reactivity in neural networks associated with empathy for pain in individuals with higher levels of Machiavellianism.

Additionally, the postcentral gyrus is identified as part of a core network of empathy in a meta-analysis by Timmers et al. (2018). This study highlighted several core regions involved in empathy, including the bilateral AI, IFG, mid-cingulate cortex, SMA, postcentral gyrus, inferior parietal lobe, thalamus, amygdala, and brainstem. Empathy for pain, compared to observing non-painful negative affective states, recruits additional brain regions involved in pain experience and motor response preparation, such as the precentral and postcentral gyrus (Morrison et al., 2007). These findings somewhat contrast with those of Lamm et al. (2011) and Singer (2004), who found that only experiencing first-hand pain, but not observing pain in others, was associated with sensory-discriminative processing of pain, including the somatosensory cortex (SI, postcentral gyrus). However, the observed diminished activation of the postcentral gyrus in higher Machiavellianism could therefore suggest a reduced capacity for the sensory-discriminative processing of pain when empathizing with others.

Psychopathy

Individuals with higher scores in psychopathy exhibited reduced activation in the left middle OFG. The medial OFC plays a crucial role in representing valence and affective information (Lamm et al., 2011), and also has been highlighted playing a role in affective empathy (Cox et al., 2012; Leigh et al., 2013). Investigating this region's association with psychopathy, Decety et al. (2013) noted a decreased pattern of connectivity, specifically involving the amygdala in conjunction with the OFC and ventromedial PFC. These findings align with studies indicating reduced affective empathy in individuals high in psychopathy (van Dongen, 2020). However, they challenge findings of a meta-analytical study that found the OFC to be activated within perspective-taking, thus cognitive empathy, but not within affective perceptual empathy (Fan et al., 2011). Overall, the reduced activation in the middle OFC among those with higher psychopathy scores points to a diminished capacity for empathic responses. This neural activation pattern aligns with the characteristic deficits in empathy observed in psychopathy and highlights the importance of the OFC in empathic processes.

Overall Dark Triad Score

For a higher overall Dark Triad score, the present findings indicate reduced activity in the right IFG (triangular, opercular part, and orbital part), as well as in the left middle OFC. As mentioned in the paragraph before, the OFC appears to be involved in several empathy related processes. Also, the IFG emerges as a critical neural substrate associated with empathy (Timmers et al., 2018). For instance, Mar (2011) underscores the involvement of the IFG in cognitive empathy tasks, where individuals engage in mental state representation and perspective-taking, highlighting its role within the mentalizing network. In line with these findings, additional research linked IFG activation to cognitive empathy and emphasized its role in interpreting social signals and comprehending others' emotional states (Hooker et al., 2010). Despite these results highlighting its link to cognitive empathy, evidence emerged also suggesting an important role of the IFG in automatic empathic responses as well as emotion recognition and emotional contagion, which would rather be coding for affective empathy (Fan et al., 2011; Shamay-Tsoory, 2011). Therefore, both previous research and evidence of the present study indicate decreased empathy related activation of the IFG in individuals with higher Dark Triad traits, suggesting reduced empathic processing. However, conversely, Bagozzi et al. (2013) found increased activation in the pars opercularis of the IFG among Machiavellians implying that individuals with high Machiavellian tendencies exhibit even increased empathic responsiveness compared to those without such tendencies. While evidence is somewhat conflicting, the IFG still seems to play an important role in empathy-related processes, and the decreased activation patterns in individuals with higher Dark Triad traits may suggest alterations in empathic and mentalizing responsiveness.

Additionally, the right superior temporal gyrus (STG) showed decreased activation in higher overall Dark Triad traits, which was also found to be activated in mentalizing processes (Lamm et al., 2011; Mar, 2011). Besides these empathy related activations, the relationship of empathy for pain with Dark Triad traits was characterized by a reduced activity in regions related to the sensory-discriminative component of pain, including the Rolandic operculum (Price, 2000).

Thus, hypothesis one was partially supported. Specifically, no brain region typically associated with empathy showed reduced activation in relation to narcissism. However, decreased activation was observed in the precuneus for Machiavellianism, in the middle OFG for psychopathy, and in the middle OFC, IFG and STG for the overall Dark Triad score. These regions are consistently shown to be involved in empathic processes, particularly in cognitive empathy. Therefore, hypothesis one was confirmed for Machiavellianism, psychopathy, and the overall Dark Triad score, but not for narcissism.

Lack of Dark Triad Moderation in the Relationship between Sexual Objectification and Empathy

Hypothesis two investigated whether Dark Triad traits moderate the effect of sexual objectification on empathic activation. To investigate this, a whole brain contrast was calculated to identify areas where neural activity was decreased in the sexually objectified condition compared to the non-objectified condition. Using a multiple regression approach with the Dark Triad traits as covariates, it was expected that higher Dark Triad scores would be associated with a greater difference between empathic responses towards sexually objectified vs. non-objectified confederates, resulting in reduced empathy related neural activation, indicating heightened sensitivity for sexual objectification. However, the findings did not show any significant differences in empathic brain activation associated with narcissism, psychopathy, or the combined traits of the Dark Triad. When Machiavellianism was considered as a covariate, individuals with higher scores exhibited reduced neural activation in the left middle occipital gyrus. Since the occipital lobe is predominantly engaged in visual processing tasks (Rehman & Al Khalili, 2023), it does not align with regions typically associated with empathy-related activation. Therefore, Hypothesis two could not be supported.

Dark Triad's Association with Reduced Empathy for Objectified Women

Hypothesis 3 proposed that empathy-related brain activation would be reduced in observing objectified vs. non-objectified female vs. male confederates in pain, and that this difference would be moderated by the participants' Dark Triad scores. It was expected that higher Dark Triad traits would be associated with a higher influence of gender of objectified vs. non-objectified confederates. Only for psychopathy and the overall Dark Triad score, but not for narcissism and Machiavellianism as covariates, significantly reduced activation patterns could be found.

Psychopathy

Specifically, higher psychopathy scores were linked to a stronger reduction of activation in the right SMA when observing female objectified confederates in pain compared to male and non-objectified confederates. The SMA is robustly found to be a part of the core brain regions of empathy (Timmers et al., 2018). For instance, a previous meta-analysis by Fan et al. (2011) identified the SMA's involvement in both tasks involving automatic empathic responses elicited by observation as well as in the conscious consideration and evaluation of other's emotions. The authors also stated that the SMA, as traditionally being associated with motor control, plays a key role in the motor-motivational component of empathy (Fan et al., 2011; Prince, 2000). These findings also align with characteristic deficits in psychopathy in empathic processing (Jonason & Krause, 2013; Jonason & Kroll, 2015; Wai & Tiliopoulos, 2012). Additionally, it was found that while viewing images showing bodily injuries and adopting an imagine-other perspective, individuals scoring higher on psychopathy showed a reduced signal change in several empathy related brain regions, including the SMA (Decety et al., 2013). Taken together, the reduced activation of the SMA linked to psychopathy might reflect a diminished motivational drive to engage in empathic responses or to translate empathic feelings into actions when witnessing the pain of objectified female individuals.

In addition to the SMA, areas associated with the mentalizing network, such as the bilateral superior medial frontal cortex (SMFC) and the right middle frontal gyrus (MFG; Lamm, 2011; Mar, 2011), exhibited reduced activation patterns associated with psychopathy scores. The SMFC, as a part of the superior frontal gyrus (SFG), is involved in the mental state representation of self and others, as it was found to be active during story-based ToM (Mar, 2011). The right middle frontal gyrus (MFG) also demonstrated reduced activity. As part of the mentalizing network, the MFG is involved in understanding others' mental states and emotions and was found to be consistently activated in non-story-based ToM studies (Amodio & Frith, 2006; Mar, 2011). In a recent study investigating the impact of sexual objectification on empathy for social exclusion, empathy for personalized women vs. objectified women showed stronger activations in regions associated with mentalizing network regions such as the MFG, which suggests a modulatory role of objectification on the neural markers of empathy (Cogoni et al., 2018). Additionally, the right superior frontal gyrus (SFG) and right middle temporal gyrus (MTG), showed reduced activity in psychopathic individuals. Previous meta-analytic findings suggest anterior temporal regions, including the middle temporal gyrus and superior frontal gyrus, to take part in the mentalizing network (Mar, 2011) as well as in empathy for pain (Jauniaux et al., 2019). Therefore, reduced activity in the mentioned areas (SMA, SMFC, MFC, SFG, and MTG) in individuals with high psychopathic traits partially aligns with previous research on the impact of psychopathy on empathy, indicating a lower overall capacity for empathy (Jonason & Krause, 2013; Jonason & Kroll, 2015; Wai & Tiliopoulos, 2012). However, it also contradicts other findings that suggest minimal impairment in cognitive empathy in psychopathic individuals, while highlighting a low capability for affective empathy (Decety et al., 2013; Robinson and Rogers, 2015). More in line with findings of diminished affective empathy in psychopathic individuals, the present study found significant signal reduction in the bilateral precentral gyrus. Although the precentral gyrus (primary motor cortex, MI) is typically linked to motor control, a study by Hooker et al. (2010) examined the correlation between self-reported cognitive and affective empathy and specific brain regions. This study identified the precentral gyrus as a key area involved in affective empathy processing. Additionally, the present study's results also show reduced activation in areas underpinning action understanding (right inferior parietal lobule) in higher psychopathy scores (Lamm et al., 2011). Also, there was reduced activation of the bilateral postcentral gyrus (SI), which, as mentioned before, besides its somatosensory role, was found to be active in empathy for pain as well as in the experience of pain (Timmers et al., 2018).

Taken together, the findings suggest that the greater the reduction in empathy for female objectified confederates in comparison to male and non-objectified confederates, the lower the activity in these empathy related regions (SMA, SMFC, MFG, SFG, MTG, SI, and MI) for higher scores of psychopathy. This may indicate a diminished capacity in psychopathic individuals for both affective autonomic and cognitive empathy, particularly in relation to the sexual objectification of women.

Overall Dark Triad traits

For the overall Dark Triad score, results indicated reduced activation in the bilateral angular gyrus, which is part of the mentalizing network (Mar, 2011). This suggests that individuals with higher Dark Triad traits might exhibit a diminished capacity for engaging in mentalizing, associated especially with sexual objectification of the female gender.

Overall, the findings support hypothesis three to some extent, by demonstrating that the difference in empathy-related brain activation between observing female vs. male objectified vs. non-objectified confederates is moderated by psychopathy and the overall Dark Triad, but not by narcissism or Machiavellianism. Specifically, higher psychopathy and overall Dark Triad scores are associated with reduced activation in key mentalizing and ToM-related regions, indicating mainly impaired cognitive empathic responses, when observing sexually objectified women in pain. This highlights the modulatory effect of gender, objectification and socially aversive personality traits on empathic responses. The gender-specific aspect of this finding suggests that individuals higher in psychopathy and overall Dark Triad scores might vary in exhibiting empathic responses based on the gender of the observed objectified individual, potentially due to hostile attitudes towards (sexualized) women (Douglass et al., 2023; Gluck et al., 2020).

Despite the importance of the identified significant brain regions, it is noteworthy that other crucial regions implicated in empathy did not show the expected activation patterns. These regions will be discussed within the following paragraph.

Lack of Expected Activation in Empathy-Related Brain Regions

Several brain regions have been identified as consistently playing a key role in empathy. However, in the present study, these regions were not found to be significantly activated. For instance, the AI has been consistently highlighted as a core region in the empathy network, with numerous studies identifying its involvement in both affective and cognitive empathy processes (Fan et al., 2011; Kogler et al., 2020; Lamm et al., 2011; Singer, 2004). It is particularly active in empathy for pain paradigms, where it has been shown to be active in both self- and other-pain conditions, underscoring its role in the affective motivational component of pain, which aligns with the shared representations approach (Kogler et al., 2020; Lamm et al., 2011). Despite its widely acknowledged importance for empathic responses, this study did not observe any significant alterations in AI activation related to sexual objectification and the Dark Triad traits.

Additionally, the mPFC and TPJ were also not part of the significant findings in the present study, despite their well-documented role in empathy. In terms of cognitive empathy, these two brain regions are crucial for self-reflection and autobiographical memory, which are necessary for cognitive empathy (Mar, 2011; Shamay-Tsoory, 2011) and therefore also have been identified as part of the core mentalizing network (Mar, 2011). Lamm et al. (2011) further specified that the dorsomedial PFC is activated in empathy paradigms involving painful images, and the ventromedial PFC is crucial for mental state representation. Contrary to these findings, Fan et al. (2011) did not observe significant mPFC or TPJ activation in their meta-analysis.

Moreover, regions within the cingulate cortex were not found to be significantly altered in the findings of the present thesis, despite previous studies indicating this region's importance in the context of empathy. Particularly, the ACC and the aMCC are consistently highlighted as being core components of the empathy network (Fan et al., 2011; Lamm et al., 2011). Notably, the dorsal aMCC was found to be particularly involved in attending to others' feelings through imagination or evaluation and therefore ToM tasks (Fan et al., 2011). Previous research also highlights the activation of the ACC and aMCC during both empathic responses and first-hand pain experiences, aligning with the shared representations approach (Lamm et al., 2011; Price, 2000; Singer et al. 2004). However, Kogler et al. (2020) did not find significant activation of the ACC or MCC in their meta-analysis, indicating some variability in findings.

In studies examining the relationship between empathy and sexual objectification, the AI and ACC were found to exhibit reduced activation during social exclusion tasks when empathizing with sexually objectified women in comparison to personalized women (Cogoni et al., 2018). This indicates that sexual objectification has a negative impact on empathy for social pain and highlights the sensitivity of empathy to social contexts and the physical appearance of the target. However, these findings contrast with these of the present study, as no similar pattern was observed that would indicate reduced empathic activation in the AI or ACC associated with sexual objectification.

Additionally, studies focusing on the Dark Triad traits and its relation to empathy have also highlighted decreased activation in several brain regions. For instance, individuals higher in Machiavellianism show decreased activation in the mPFC, TPJ, and precuneus when listening to stories with ToM content (Bagozzi et al., 2013). In psychopathy, decreased activation in the AI and dorsal ACC has been reported when imagining others' pain (Decety et al., 2013). For narcissism, reduced activity in the right AI and right dorsolateral PFC has been noted (Fan et al., 2011). These neural activation patterns were also not reflected within the results of the present thesis.

In light of these previous findings, it is surprising that this study did not detect any reduced activations in regions such as the AI, ACC, aMCC, mPFC, or TPJ regarding the impact of Dark Triad traits and sexual objectification on empathy. The absence of significant findings in these regions in the present study could be attributed to various factors.

In contrast to the proposed hypotheses and results of previous studies presented in this thesis, Bagozzi et al. (2013) observed increased bilateral insula activation in individuals with high Machiavellianism, suggesting that Machiavellians may even have an advantage over non-Machiavellians in emotionally resonating with others. However, it's important to note that Bagozzi et al. (2013) did not differentiate between the anterior and posterior parts of the insula. Considering this evidence, one explanation for the absence of findings regarding especially decreased AI activation in this thesis could be attributed to the specific focus on detecting decreased brain activation related to Dark Triad traits, rather than also exploring potential increases in activation, such as those observed by Bagozzi et al. (2013). This focus may have limited the range of detected neural differences, as the complexity of Dark Triad traits and their interaction with empathy processes likely involve more nuanced neural mechanisms that were not captured in the present analysis.

Furthermore, it is possible that the differences between high and low Dark Triad scores were not pronounced enough in the present study to find more significant findings. Unlike other studies (Decety et al., 2013; Fan et al., 2011), the present study did not artificially categorize questionnaire scores into high, medium, and low groups, but treated them as a metric variable. This categorization done by other studies may have amplified the observed differences in brain activations in Dark Triad traits. Also, it's important to note that Dark Triad traits may manifest differently across various populations. For instance, individuals in clinical or forensic settings (as in Decety et al., 2013) may exhibit more extreme expressions of these traits compared to a general, subclinical population, such as that included in the present study. This possible discrepancy in trait expression across different samples may highlight the importance of considering sample characteristics when investigating neural activation patterns related to Dark Triad traits.

Additionally, there were some notable limitations within this study that could also explain the absence of significant findings in the mentioned brain areas. These will be discussed within the next paragraph.

Limitations, Strengths and Implications for Future Research

This study has several limitations that should be acknowledged. Firstly, the found effects were reported with a weak statistical threshold of $p < 0.005$ uncorrected, indicating an unquantified control of family-wise error, which might inflate the risk of Type-I-errors (Poldrack et al., 2008). Future research should employ more stringent statistical corrections to ensure the robustness of findings and minimize the likelihood of false positives. The measurement of Dark Triad traits, although utilizing a validated version of the SD3, can be criticized for its broad construct measurement, as it may have limitations in differentiating between the traits that it aims to measure (Persson et al., 2019). Additionally, the reliance on self-report questionnaires for assessing socially aversive personality traits can introduce biases such as social desirability bias or inaccuracies in self-assessment (Paulhus & Vazire, 2010). The complexity of the study procedure is also a limitation, as it cannot be ruled out that errors or discrepancies occurred during the different sessions, so that the circumstances were not always exactly the same for all participants. Numerous individuals, including confederates and experimenters, were involved in the execution of the study, and the varying constellations of people involved in different sessions might have introduced discrepancies (despite the use of a consistent script). Moreover, the involvement of four different female and three different male confederates in portraying objectified and non-objectified conditions could have introduced additional variability and noise into the data. Moreover, the homogeneity of the sample, which was restricted to heterosexual male and female individuals aged 18-35, limits the generalizability of the findings to other age groups, sexual orientations, and gender identities. These heteronormative restrictions are a broader issue in psychological research, which must be addressed to avoid discrimination against gender identities and sexual orientations. This is crucial for achieving a more inclusive and representative understanding of psychological phenomena. Future research should include a more diverse sample in terms of age, gender, sexual orientation, and cultural background to enhance the generalizability and robustness of findings. These sample restrictions, which are often implemented to reduce variability, ultimately exclude entire population groups from psychological research. This highlights the need for methodological advancements to facilitate the inclusion of diverse populations in research while maintaining data accuracy (Williams & Fredrick, 2015). Additionally, the findings are restricted to the Austrian, German-speaking population, limiting the applicability to non-German-speaking populations. Therefore, there is a necessitating for future studies to investigate the generalizability of the results in other countries or cultures. Other potential confounding variables include the participants' prior experiences with pain, empathy, and objectification. These variables were not controlled for, and they could influence the observed neural activations and empathy responses. For instance, Dvir and Nagar (2022) explored how situational factors, including experiencing sexual objectification, influence women’s blame attribution in cases of sexual harassment. Their experimental findings revealed that women, who were sexually objectified themselves, tended to show greater empathy towards victims of sexual harassment, which resulted in reduced victim blaming. These findings underscore the impact of the similarity of the perceiver’s and the victim’s situation and personal experiences on empathy and blame perception. This should be taken into account in future studies. Lastly, the laboratory fMRI environment may be another limitation. The ecological validity of the study may be compromised by the artificial environment of the fMRI scanner and the utilization of electric shocks, as these factors may not accurately reflect the empathic responses that would be observed in real-life situations. Additionally, it is likely that the subjects experienced physical and psychological stress, including the painful stimulation through electric shocks and being in an fMRI scanner for a longer period of time. Also, some sessions were held late in the evening, which, combined with lying in the fMRI scanner in a dark environment, may have caused subjects to become tired during the exhibition of the experimental tasks. These limitations could have affected the participants' neural and empathic responses.

Despite these limitations, the study also has several notable strengths. The manipulation of sexual objectification in this study was conducted in a naturalistic manner, using present confederates in each scanning session. Participants interacted with the confederates in a realistic setting, believing that they were also fellow subjects. This approach seems more ecologically valid compared to studies using abstract stimuli, such as Cogoni et al. (2023), who used pictures of models in underwear for the sexualized conditions and manipulated pain conditions with images of a q-tip or syringe. The present study also included both male and female sexually objectified and personalized targets, unlike previous studies such as Cogoni et al. (2018), which only investigated the effect of sexual objectification on women. The controlled experimental design, with the use of confederates and controlled outfits, ensured systematic and consistent manipulation of sexual objectification, reducing potential confounding variables. The manipulation was piloted prior to the study, confirming the effectiveness of the experimental conditions and improving the validity of the manipulation. Additionally, the balanced representation of male and female participants enhances the generalizability of the findings across these two genders. Future research should continue to include balanced gender representations and consider gender-specific effects on empathy and Dark Triad traits, analyzing data separately for males and females to gain more nuanced insights into gender related empathy differences associated with sexual objectification. Given also the potential for gender-specific effects on empathy and Dark Triad traits, future research should also investigate the differences in empathy and objectification across various gender combinations of targets and participants to determine whether gender dynamics influence the neural and behavioral responses to sexual objectification and empathy for pain. This could lead to a deeper understanding of gender specific mechanisms of sexual objectification based on empathy.

Conclusion

The present thesis aimed to expand the understanding of the influence of sexual objectification on empathy by integrating the investigation of socially aversive personality traits. Previous research has demonstrated that empathic responses, both at the behavioral and neural level, are diminished towards sexually objectified targets. However, the potential moderating effect of Dark Triad personality traits on this phenomenon has not been previously addressed. This study is the first to utilize fMRI in combination with an empathy for pain paradigm to explore these interactions. This study’s findings revealed reduced responses in key empathy-related regions, primarily those associated with cognitive empathy, in subjects scoring high in Machiavellianism, psychopathy and the combined Dark Triad, when observing others in pain. This indicates that individuals scoring higher on these traits may exhibit diminished empathic responses to the suffering of others, highlighting the complex interplay between personality traits and empathic processes. However, when including the effect of sexual objectification on empathy related activation, no influence of any of the tested socially aversive traits could be found. This indicates that neural empathic responses towards sexually objectified vs. non-objectified targets are not significantly associated with Dark Triad traits. Thus, individuals high in these traits do not appear to sexually objectify more, at least when considering its interplay with empathy, than individuals with lower scores. But, when examining empathy-related brain activation in response to observing objectified female confederates in pain, compared to male and non-objectified confederates, significant reductions were observed in empathy-related brain activation in individuals high in psychopathy and combined Dark Triad traits. The gender-specific aspect of this finding suggests that individuals higher in psychopathy and overall Dark Triad might modulate empathic responses depending on the gender of the observed sexually objectified individual. This finding might be potentially due to hostile attitudes towards (sexualized) women and highlights the negative effects of sexualization especially for female individuals. Notably, no impairments in empathy related activation were associated with narcissism. This suggests that empathy might be less impaired in narcissism than in Machiavellianism and psychopathy, also in the context of gender-specific aspects of sexual objectification. Overall, this study contributes to the growing body of literature on the neural underpinnings of empathy in relation to socially aversive personality traits, providing valuable insights into the complex nature of empathy and its modulation by such personality characteristics. The differential impacts of the Dark Triad components on empathy underscore the need for a more nuanced understanding and addressing the implications of each trait on social interactions and behaviors, such as sexual objectification of women and its consequences. Future research should continue to explore these dynamics with more diverse samples and consider analyzing additional variables such as gender differences in subjects. These efforts will further elucidate the complex relationship between personality traits, empathic processes and sexual objectification, and may potentially inform interventions aimed at improving empathy in individuals with high levels of socially aversive traits, which may contribute to reduce the exposure of especially women to sexual violence.

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Appendix

Abstract (English)

Recent research indicated significant effects of sexual objectification on empathy demonstrating that sexual objectification reduces empathic responses, both behaviorally and neurally. Concurrently, the influence of socially aversive personality traits on the relationship between sexual objectification and empathy was highlighted. The aim of this study was to investigate the effects of sexual objectification on empathy and the impact of Dark Triad traits (narcissism, Machiavellianism, and psychopathy). Therefore, an empathy for pain paradigm was used, while measuring neural empathic responses towards objectified and non-objectified confederates, which was manipulated through their physical appearance. The Dark Triad was measured with the Short Dark Triad questionnaire. 62 participants were tested. Results revealed that participants with higher Machiavellianism, psychopathy, and overall Dark Triad scores showed decreased neural empathic activation compared to individuals with lower scores. Dark Triad traits did not moderate the effect of sexual objectification on neural empathic responses. However, when comparing the effects of sexual objectification between male and female confederates, participants higher in psychopathy and overall Dark Triad exhibited reduced empathic brain activation for objectified women. These findings contribute to previous research confirming the negative impact of Dark Triad traits on empathy and highlighting the gender specific aspect of even more reduced empathy towards female objectified targets. This underscores the importance of addressing sexualization of women and its harmful consequences within our society, particularly among individuals with socially aversive personality traits.

Keywords: empathy, sexual objectification, Dark Triad, fMRI, gender differences

Abstract (Deutsch)

Aktuelle Forschung hat gezeigt, dass sexuelle Objektifizierung einen signifikanten Einfluss auf Empathieempfinden hat. Dieser Effekt zeigt sich auf Verhaltensebene und in neuronalen Korrelaten. Gleichzeitig wurde der Einfluss sozial aversiver Persönlichkeitsmerkmale auf die Beziehung zwischen sexueller Objektivierung und Empathie verdeutlicht. Die vorliegende Studie hatte zum Ziel, die Auswirkungen sexueller Objektivierung auf Empathie sowie den Einfluss der Persönlichkeitsmerkmale der Dunklen Triade (Narzissmus, Machiavellismus und Psychopathie) zu untersuchen. Es wurde ein Empathie-für-Schmerz-Paradigma verwendet. Dabei wurden neurale empathische Reaktionen gegenüber sexuell

objektifizierten und nicht objektifizierten Konföderierten gemessen, wobei die sexuelle Objektifizierung durch deren Erscheinungsbild manipuliert wurde. Die Dunkle Triade wurde mit dem Short Dark Triad gemessen. Insgesamt wurden 62 Teilnehmende getestet. Die Ergebnisse zeigten, dass Teilnehmende mit höheren Werten in Machiavellismus, Psychopathie und höheren Gesamtwerten der Dunklen Triade eine geringere neuronale empathische Aktivierung aufwiesen. Die Dunkle Triade moderierte die Auswirkungen sexueller Objektifizierung auf neuronale empathischen Reaktionen nicht. Wenn aber Auswirkungen sexueller Objektifizierung zwischen männlichen und weiblichen Konföderierten verglichen wurden, konnte festgestellt werden, dass Teilnehmende mit höheren Werten in Psychopathie und der gesamten Dunklen Triade eine geringere empathische Gehirnaktivierung für sexuell objektifizierte Frauen aufwiesen. Diese Ergebnisse fügen sich in den Kontext früherer Forschungsarbeiten ein, die den negativen Einfluss von Merkmalen der Dunklen Triade auf Empathieempfinden bestätigen und den geschlechtsspezifischen Aspekt einer noch geringeren empathischen Reaktion gegenüber weiblichen sexuell objektifizierten Personen hervorheben. Dies verdeutlicht die Relevanz der Implementierung von Maßnahmen zur Bekämpfung der Sexualisierung von Frauen und der damit einhergehenden negativen Konsequenzen in unserer Gesellschaft, insbesondere bei Personen mit sozial aversiven Persönlichkeitsmerkmalen.

Schlagwörter: Empathie, Sexuelle Objektifizierung, Dunkle Triade, fMRI, Geschlechtsunterschiede