Dark triads, tetrads, tents, and cores: Why navigate (research) the jungle of dark personality models without a compass (criterion)?

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ABSTRACT

This comprehensive review summarizes and evaluates the present state of the Dark Triad research literature (or more broadly, the dark personality trait literature), and as such serves both a pedagogical purpose, by providing an introduction or primer on the dark personality literature and a scientific purpose by directing future research on key issues that still have not been sufficiently addressed. In this review, we discuss and critique current operational conceptualizations of what it means for a personality trait to be classified as 'dark'. Also discussed is the Dark Core, as well as quantitative issues such as limitations of commonly used statistical treatments, such as multivariate analyses, bifactor modeling, and composite measures, and proposed solutions to some of these issues. Based on a comprehensive and critical appraisal of the literature, future directions are suggested to drive the dark trait field towards a more organized, parsimonious, and productive future.

In this paper, we will review research on the models of personality that stemmed from the introduction of the Dark Triad by Paulhus and Williams (2002). Specifically, we will define the models of dark personalities, review evidence for and against these models, and critically appraise key issues in research that support various configurations of malevolent personality traits, such as the Dark Triad, Dyad, Tetrad, Core, composite, or "Big Tent". Based on the presented evidence, suggestions will be made to direct future research towards a more explicitly specified, organized, and productive field of dark personality traits. The main purposes of the present paper are to thoroughly discuss current issues within the Dark Triad literature and, more importantly, to steer the research literature to achieve a more useful and specific set of criteria to be classified as a 'dark trait'. The current review will also serve as a deep introduction to the dark personality research to researchers, students, practitioners and others who are interested investigating or understanding the field of dark personality traits on a deeper level. Though there is some overlap with previous excellent reviews of the literature on this topic (e.g., Furnham, Richards, & Paulhus, 2013; Miller, Vize, Crowe, & Lynam, 2019), the present review offers a more comprehensive and recent review of empirical data, a more in-depth discussion of critical conceptual issues and controversies (e.g., the

consideration of inconsistencies among self-report, behavioural, and biological evidence regarding the psychopathy-Machiavellianism redundancy debate), and additional recommendations for future research. Moreover, the present review covers issues such as the use of Dark Triad composites, bifactor modeling, and provides a critical overview of the apparent confusion regarding the meaning of the Dark Dyad.

1. The Dark Triad

Though the Dark Triad is a relatively new personality description that was first introduced in 2002 by Paulhus and Williams, the respective traits in this framework (narcissism, Machiavellianism, and psychopathy) had substantial literatures associated with them much earlier. For instance, although narcissism, named after the Greek mythological character, Narcissus, was first introduced by Ellis (1898), the most common modern conceptualization of subclinical narcissism was introduced by Raskin and Hall (1979) with the publication of the Narcissistic Personality Inventory (NPI). Subclinical narcissism is characterized by grandiosity, entitlement, superiority, and dominance (Raskin & Hall, 1979; for a comparison of the subclinical conceptualization of narcissism and clinical conceptualizations, see Miller & Campbell, 2008).

Machiavellianism, on the other hand, was the most recent psychological construct of the Dark Triad to be introduced by Christie and Geis (1970). Machiavellianism, named after the Italian diplomat Niccolò Machiavelli, entails an 'ends justify the means' orientation.[1] Individuals high in this dimension are strategically manipulative, callous, devoid of conventional morality, and have a cynical view of human nature. It is most often measured using the Mach-IV (Christie & Geis, 1970). The third trait, and often referred to as the darkest of the three (e.g., Rauthmann, 2012), is subclinical psychopathy. Psychopathy was introduced in the clinical literature by Cleckley (1941). Since then, psychopathy has frequently been assessed in the subclinical realm of personality (Ray & Ray, 1982). Subclinical psychopathy is characterized by impulsiveness (e.g., Sanecka, 2020), thrill-seeking, and lack of empathy (Hare, 1985) and is most often measured using the Self-Report Psychopathy Scale (SRP; Paulhus, Neumann, & Hare, 2013). Narcissism, Machiavellianism, and psychopathy are intercorrelated and all three of the traits share tendencies towards duplicity, callousness, aggression, and self-aggrandisement (Muris, Merckelbach, Otgaar, & Meijer, 2017; Paulhus & Williams, 2002). Brief scales, which measure all three of the traits, are commonly used in the literature, particularly the Dirty Dozen (DD; Jonason & Webster, 2010) and the Short Dark Triad (SD3; Jones & Paulhus, 2014). Despite their common use and important positive characteristics, they have some substantial limitations that restrict the interpretability of the research. More specifically, despite supporting research that demonstrates the efficiency, adequate information recovery, reliability, convergent validity, and discriminant validity of the DD (e.g., Jonason & McCain, 2012; Jonason & Webster, 2010; Webster & Jonason, 2013), the DD has been heavily criticized in the psychological literature for sacrificing construct coverage for the sake of efficiency (especially variance attributed to antagonism and disinhibition), having conceptually redundant items for each subscale, excess variability in item difficulty, excess overlap in the measurement of psychopathy and Machiavellianism, and failing to reach age and sex invariance (Carter, Campbell, Muncer, & Carter, 2015; Kajonius, Persson, Rosenberg, & Garcia, 2016; Maples, Lamkin, & Miller, 2014; Miller et al., 2012). Although the SD3 has not been as heavily criticized as the DD and research has noted its adequate discriminant validity and strong convergent and criterion validity (Jones & Paulhus, 2014; Maples et al., 2014), critics have pointed out that the SD3 does not differentiate psychopathy from Machiavellianism sufficiently (Persson, Kajonius, & Garcia, 2019; Rogoza & Cieciuch, 2019). When compared, the SD3 demonstrated stronger convergent and incremental validity than the DD, but it is recommended that, when possible, long stand-alone measures are used, rather than brief measures such as the DD or SD3 (Maples et al., 2014).

1.1. Evolutionary theories

Although the three traits have distinct origins, researchers have recently attempted to integrate them within evolutionary theory. For instance, Wilson, Near, and Miller (1996) theorized on the adaptive utility of Machiavellianism and suggest that the Machiavellian tendencies towards social manipulation and strategic flexibility may be adaptive. Since Wilson et al.'s (1996) integrative review, a number of other scholars have used the conceptual framework of evolutionary theory to test hypotheses relevant to the Dark Triad. Specifically, Bereczkei (2018) posited that individuals high in Machiavellianism have

cognitive and social skills that allow to them to effectively exploit others for personal gain. Furthermore, Bereczkei (2018) points to research suggesting that high-Machiavellianism individuals lack advanced theory of mind (Lyons, Caldwell, & Schultz, 2010; Paal & Bereczkei, 2007), emotional intelligence[2] (EI; Austin, Farrelly, Black, & Moore, 2007), and do not score above average on intelligence tests (Michels, Molz, Bermpohl, & g., 2020; O'Boyle, Forsyth, Banks, & Story, 2013; Paulhus & Williams, 2002, but see Kowalski et al., 2018). Further to this point, with a meta-analysis of 70 studies and a total of 76 samples, Blötner, Steinmayer, and Bergold (2021) demonstrated that Machiavellianism is negatively correlated with cognitive empathy (i.e., the tendency to interpet, understand, and infer what others are thinking) and this relationship was attenuated when affective empathy (i.e., the tendency to feel the emotions of others vicariously) was statistically controlled. These are all skills that are arguably necessary to effectively manipulate others. However, Bereczkei (2018) cites neuroscientific and behavioural research that suggest that Machiavellian individuals use evolved heuristics and algorithms that allow for successful manipulation. For instance, Machiavellian individuals are skilled at monitoring others (Czibor & Bereczkei, 2012), inhibiting automatic cooperative impulses (Bereczkei et al., 2015), and reading social situations to retrieve information from interindividual communalities, as opposed to others' mental states (Bereczkei, 2015; Bereczkei & Czibor, 2014), hence making high-Machiavellianism individuals more flexible in their behavioural strategies. Specifically, using a public goods game paradigm, Czibor and Bereczkei (2012) found that individuals high in Machiavellianism adjust their behaviour based on the behaviours of their group mates more effectively than those low in Machiavellianism. They also reported that high-Machiavellianism individuals were more successful at the public goods game than their low-Machiavellianism peers. Machiavellianism has also been found to be associated with high activity in the inferior frontal gyrus (IFG; Bereczkei et al., 2015), which is an area of the brain associated with effort in observing the actions of others (Polosan et al., 2011). Similarly, Bereczkei et al. (2015) used fMRI techniques to examine variation in brain activity of high- and low-Machiavellian individuals in fair and unfair conditions of the Trust Game. High-Machiavellianism individuals profited more than low-Machiavellians by exploiting cooperative partners and punishing unfair partners, whereas low-Machiavellians tended towards reciprocating fair offers with cooperative partners, while also punishing unfair partners. Moreover, the brain imaging results demonstrated that high-Machiavellianism individuals showed more brain activity in the dorsolateral prefrontal cortex (DLPFC) when facing a cooperative partner. Researchers have found that the DLPFC is engaged in decision-making situations in which there is conflict between pursuing self-interest and

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[1] In Machiavelli's (1532/2008) "The Prince", Machiavelli prescribes a morally flexible and manipulative manner of ruling, as exemplified in the following passage "…it is well to seem merciful, faithful, humane, sincere, religious, and also to be so; but you must have the mind so disposed that when it is needful to be otherwise you may be able to change to the opposite qualities…to act against faith, against charity, against humanity, and against religion….to do evil if constrained." (pp. 74)

[2] Recent research has provided a more detailed perspective on the relationship between Machiavellianism and EI. For example, Miao, Humphrey, Qian, and Pollack (2019) investigated the relationship between EI and the Dark Triad with a meta-analysis; they found that Machiavellianism was negatively correlated with both ability and trait emotional intelligence (AEI and TEI, respectively), as was psychopathy, while narcissism was weakly correlated with both AEI and TEI. The negative relationship between psychopathy and AEI and TEI was corroborated by a meta-analysis conducted by Megías, Gómez-Leal, Gutiérrez-Cobo, Cabello, and Fernández-Berrocal (2018), and partially corroborated by Gómez-Leal, Gutiérrez-Cobo, Cabello, Megías, and Fernández-Berrocal's (2018) systematic review, which found that psychopathy was negatively correlated with performance-based AEI measures and inconsistent with results with self-report ability and mixed models of EI. Walker, Double, and Birney (2021), on the other hand, conducted a systematic review investigating relationships of facet-level dark traits and EI. They found that grandiose narcissism was generally positively correlated with AEI and TEI, while vulnerable narcissism, secondary psychopathy, Machiavellianism, were negatively associated with AEI and TEI. The results regarding primary psychopathy were inconsistent and were mainly dependent on the psychopathy measure that was used (Walker et al., 2021).

complying to social norms (Sanfey, Rilling, Aronson, Nystrom, & Cohen, 2003). Therefore, Bereczkei et al. (2015) suggested that high-Machiavellian individuals are more prone to inhibiting cooperative impulses. Moreover, using a Public Goods game paradigm, Bereczkei and Czibor (2014) found that Machiavellianism was positively correlated with overall gains at the end of the game and negatively correlated with overall contributions during the game. Importantly, Machiavellian individuals' contributions were predicted by situational factors (i.e., the number of altruists in the game), whereas low-Machiavellianism individuals' contributions were only predicted by temperament and personality factors, demonstrating that high-Machiavellians are more sensitive to situational cues than their low-Machiavellianism counterparts.[3]

Researchers have also used Life History Theory as a framework for understanding the origins of the Dark Triad. These Dark Triad-Life History theorists have suggested that the Dark Triad traits represent an exploitative and fast life strategy that prioritizes immediate gratification and short-term rewards (Jonason, Li, Webster, & Schmitt, 2009; Jonason, Webster, Schmitt, Li, & Crysel, 2012). Dark Triad-Life History theorists further suggest that the three traits are imperfect indicators of one latent trait which represent a fast life history strategy. In support of this theory, researchers have contended that all three traits have common correlates that are associated with such a strategy. For instance, all three of the Dark Triad traits are associated with empathic deficits (Jonason & Krause, 2013), low prosocial orientations and high agentic orientations (Jonason, Li, & Teicher, 2010), unwillingness to share (Malesza & Kalinowski, 2019), aggression, interpersonal difficulties, antisocial tactics (Jonason, Duineveld, & Middleton, 2015; Muris et al., 2017), low self-control (Jonason & Tost, 2010), and impulsivity (Crysel, Crosier, & Webster, 2013, cf. Malesza, Kalinowski, 2019; Malesza & Ostaszewski, 2016). Similarly, the Dark Triad traits have been implicated in the use of exploitative short-term mating strategies. For example, Jonason et al. (2009) found that all three of the Dark Triad traits are associated with unrestricted sociosexuality, a higher number of sexual partners, and a greater interest in short-term mating. Similarly, research has shown that the Dark Triad traits are associated with narcissistic and aggressive mate retention tactics (Jonason, Li, & Buss, 2010) and mate-poaching (Kardum, Hudek-Knezovic, Schmitt, & Grundler, 2015, cf. Jonason, Koenig, & Tost, 2010). According to the Life History Theory, the fast-life strategy is most often associated with unpredictable ancestral environments with high risk of mortality (McDonald, Donnellan, & Navarrete, 2012). Consistent with this idea is the fact that individuals that reported higher levels of dark traits tended to report having unpredictable childhood environments (Jonason, Icho, & Ireland, 2016), indicating that unpredictable environments are conducive to, and may trigger, these traits and this may also be the case across generations. Moreover, a fast-life strategy entails the production of more offspring with less parental investment, which is consistent with the exploitative short-term mating tactics that are typical of the Dark Triad (i.e., maximizing mating opportunities and minimizing potential investment). Despite evidence for the representation of the Dark Triad as a fast life strategy, a more direct approach at testing this hypothesis has produced a result conflicting with this hypothesis. Jonason, Koenig, et al. (2010) found that of the three Dark Triad traits, only psychopathy consistently correlated with indicators of a fast life strategy. However, a more nuanced investigation that acknowledged the multidimensional nature of psychopathy and narcissism has helped clarify previous mixed results; McDonald et al. (2012) demonstrated that although the

impulsive antisocial aspect of psychopathy is correlated with a fast life strategy, the fearless-dominance element of psychopathy is associated with a slow life strategy. Similarly, only the Entitlement/Exploitativeness factor of narcissism (an antagonistic feature of narcissism; see Ackerman et al., 2011; Rogoza, Kowalski, & Schermer, 2019) was associated with a fast life strategy, while Leadership/Authority and Grandiose Exhibitionism were associated with a slow life strategy and unrelated with life history strategies, respectively. Machiavellianism, on the other hand, was found to be associated with a fast life strategy. Overall, McDonald et al.'s (2012) findings supported the relevance of evolutionary theory, specifically the Life History Theory, to the Dark Triad. However, it is clear that a more nuanced view, rather than a unidimensional perspective of the Dark Triad traits is necessary to obtain useful and consistent findings.

Overall, the evidence for the adaptive role of the dark traits has been mixed. It has been posited that Machiavellianism, in particular, theoretically should have adaptive aspects which allow for enhanced strategic manipulation (Bereczkei, 2018; Christie & Geis, 1970), but research has generally shown that individuals who are high in Machiavellianism do not tend to score higher on such dimensions as intelligence, emotional intelligence, cognitive empathy, and theory of mind (e. g., Austin et al., 2007; Lyons et al., 2010; Paal & Bereczkei, 2007) – dimensions that would hypothetically be advantageous in manipulating others. Other research has shown behavioural and biological evidence of enhanced behavioural flexibility, cooperative impulse inhibition, and reading situational cues (e.g., Bereczkei et al., 2015; Czibor & Bereczkei, 2012). At the current time, the adaptive and long-term focused nature of Machiavellianism remains rather elusive, but research available seems to suggest that high-Machiavellian individuals do not have greater social skills or intelligence, but may be more attuned to situational patterns and they behave accordingly in order to increase personal gain (often to the loss of others).[4] Other research has placed the Dark Triad into a Life History Theory framework (e.g., Jonason et al., 2009) and, overall, research has supported that the Dark Triad are indicators of fast life history strategy as these traits are associated with a wide array of characteristics which are consistent with such a strategy. When the multidimensional nature of the Dark Triad traits is acknowledged, however, the results become less clear, as some aspects of psychopathy and narcissism are either related to a slow life history strategy or are unrelated to life history strategies (e.g., McDonald et al., 2012).

2. The Dark Triad and personality

2.1. Big Five

Like most highly cited topics in personality psychology, the location of the Dark Triad within existing taxonomies of personality has been extensively investigated. The most commonly used taxonomy evaluated in relation to the Dark Triad is the Big Five personality traits. In their seminal work, Paulhus and Williams (2002) demonstrated that narcissism was significantly positively correlated with extraversion and openness and significantly negatively correlated with agreeableness. Machiavellianism, on the other hand, correlated negatively with conscientiousness and agreeableness, while psychopathy was positively correlated with extraversion and openness, and was negatively correlated with agreeableness, conscientiousness, and neuroticism. In a behavioural genetic twin study, Vernon, Villani, Vickers, and Harris

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[3] There are numerous evolutionary perspectives regarding narcissism and psychopathy and an adequate discussion of these theories would require a much longer paper, hence we have only discussed the perspectives that have had the greatest influence on the Dark Triad literature. For a more thorough discussion of evolutionary theories of psychopathy and narcissism, please see Glenn, Kurzban, and Raine (2011) and Holtzman and Donnellan (2015).

[4] Other research that does not explicitly take an evolutionary perspective also tends to be mixed in terms of the inconsistency between theoretical and empirical accounts of Machiavellianism (i.e., if Machiavellianism is long-term strategy focused or short-term gain focused). In a later section (*Putative Redundancy of psychopathy and Machiavellianism*), we summarize the relevant research in great detail and explain the various explanations for such substantial inconsistencies.

(2008) found similar results. However, in their analyses, Machiavellianism was also positively correlated with neuroticism, and psychopathy was only correlated with agreeableness and conscientiousness, both negatively. More importantly, Vernon et al.'s (2008) study provided insight on the heritability of the traits. Specifically, their results indicated that both narcissism and psychopathy have moderate-to-large heritable components, whereas Machiavellianism was only somewhat heritable and had a much stronger shared environment component. Moreover, their results indicated that the correlations between the Dark Triad and Big Five are largely attributable to the same genes. More recently, Muris et al. (2017) meta-analyzed results from 22 research papers, which included 30 samples and a total of 8500 participants. They found that narcissism was significantly positively correlated with extraversion and openness, and negatively correlated with agreeableness. Both Machiavellianism and psychopathy, on the other hand, were negatively correlated with agreeableness and conscientiousness.

2.2. Plasticity and Stability

Alpha and beta meta-traits (Digman, 1997; renamed Stability and Plasticity by Deyoung, Peterson, & Higgins, 2002), which are assumed to be located above the Big Five domains in the personality hierarchy, have also been investigated in the context of the Dark Triad. Jonason, Li, and Czarna (2013) found that all three of the Dark Triad traits were negatively correlated with Stability, whereas none of the Dark Triad traits were significantly associated with Plasticity. One major limitation of this study was the use of the DD measure (Jonason & Webster, 2010) to assess levels of the Dark Triad. As noted earlier, the DD has been heavily criticized in the psychological literature as sacrificing construct coverage for the sake of efficiency (especially variance attributed to antagonism and disinhibition), having conceptually redundant items for each subscale, excess variability in item difficulty, excess overlap in the measurement of psychopathy and Machiavellianism, and failing to reach age and sex invariance (Carter et al., 2015; Kajonius et al., 2016; Maples et al., 2014; Miller et al., 2012). Using the NARC (Back et al., 2013) conceptualization of narcissism, which distinguishes between the antagonistic (rivalry) and grandiose (admiration) faces of narcissism, Rogoza, Żemojtel-Piotrowska, Rogoza, Piotrowski, and Wyszyńska (2016) found that the Admiration aspect of narcissism loaded onto Plasticity (along with extraversion and intellect), whereas Rivalry loaded negatively (along with conscientiousness, agreeableness, and emotional stability). Based on the evidence, Rogoza et al. (2016) concluded that high-narcissism individuals are, in the terminology of meta-trait research, "Unstable Plastics". These results were further corroborated by Rogoza, Żemojtel-Piotrowska, Kwiatkowska, and Kwiatkowska (2018) and Rogoza et al. (2019), which somewhat contradicted Jonason et al.'s (2013) findings. Rogoza et al. (2019) also investigated the Dark Triad in the context of the Circumplex of Personality Metatraits, and found that narcissism was located near Beta+ (high Plasticity), while Machiavellianism and psychopathy were located closest to Alpha- (low Stability).

2.3. Big Five facets

Perhaps more descriptively informative are the lower-order Big Five facets. Using a diverse sample, Kowalski, Vernon, and Schermer (2019) found that narcissism was significantly positively correlated with angry hostility, impulsiveness (neuroticism), gregariousness, assertiveness, activity, excitement seeking, positive emotions (extraversion), fantasy, feelings, actions, ideas, values (openness), and achievement-striving (conscientiousness), and was negatively correlated with self-consciousness, vulnerability (neuroticism), trust, straightforwardness, compliance, modesty, tendermindedness (agreeableness), and dutifulness (conscientiousness). Machiavellianism, on the other hand, was significantly positively correlated with anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability (neuroticism),

excitement-seeking (extraversion), and values (openness), and was negatively correlated with warmth, assertiveness, positive emotions (extraversion), actions (openness), trust, straightforwardness, altruism, compliance, modesty, tendermindedness (agreeableness), competence, order, dutifulness, achievement-striving, self-discipline, and deliberation (conscientiousness). Psychopathy was significantly positively correlated with angry hostility, depression, impulsiveness, vulnerability (neuroticism), excitement-seeking (extraversion), and fantasy (openness), and was negatively correlated with warmth, positive emotions (extraversion), feelings (openness), trust, straightforwardness, altruism, compliance, modesty, tendermindedness (agreeableness), competence, order, dutifulness, achievement-striving, self-discipline, and deliberation (conscientiousness). While these results are informative, they are restricted to a North American sample, limiting generalizability to other parts of the world. Moreover, some of the scales used (i.e., self-consciousness, activity, excitement-seeking, feelings, actions, compliance, tendermindedness, competence, and dutifulness) did not reach the traditional threshold for acceptable reliability (coefficient α ≥ 0.70). Nevertheless, a meta-analysis of 310 samples by O'Boyle, Forsyth, Banks, Story, and White (2015) reported a similar pattern of results to Kowalski et al.'s (2019) findings, although O'Boyle et al. (2015) found that narcissism was negatively correlated with the altruism facet of agreeableness. Moreover, O'Boyle et al. (2015) found that the correlations between narcissism and the positive emotions facet of extraversion, the values facet of openness, and the achievement-striving facet of conscientiousness were only negligible in strength. O'Boyle et al. (2015) did not estimate the relationships between the facets and Machiavellianism, but DeShong, Helle, Lengel, Meyer, and Mullins-Sweatt (2017) and Miller, Hyatt, Maples-Keller, Carter, and Lynam (2017) found similar results to those of Kowalski et al. (2019). However, DeShong et al. (2017) did not find a significant correlation between Machiavellianism and the anxiety facet of neuroticism, the excitement-seeking facet of extraversion, and the actions facet of openness. Moreover, Deshong et al. (2017) found a significant negative correlation with the activity facet of extraversion, whereas Miller et al. (2017) found a nonsignificant correlation between Machiavellianism and the actions facet of openness.

Overall, Miller et al.' (2017) results have shown that the strongest (i. e., r ≥ 0.50) Big Five facet correlates of narcissism were the agreeableness facets of straightforwardness (−0.55) and modesty (−0.67). Moreover, the greatest facet correlates of Machiavellianism were the agreeableness facets of straightforwardness (−0.77), compliance (−0.56), as well as dutifulness (−0.52; facet of conscientiousness). As for psychopathy, Miller et al. (2017) found that the strongest correlates were the agreeableness facets of straightforwardness (−0.76), altruism (−0.56), and compliance (−0.69), and the conscientiousness facets of dutifulness (−0.61) and deliberation (−0.51).

2.4. Honesty-humility

Researchers have also investigated the Dark Triad within the framework of the HEXACO model, which proposes a six-factor structure of personality – a variation of the Big Five personality traits with the addition of honesty-humility (Ashton & Lee, 2007). With a modest sample of 163 participants, Lee and Ashton (2005) found that honesty-humility correlated strongly and negatively with all three of the Dark Triad traits. They also found substantial weak-to-strong negative correlations between all of the Dark Triad traits and all four facets of honesty-humility (i.e., fairness, sincerity, greed avoidance, modesty). Similar results were found in other studies with larger samples, different measures of the Dark Triad, and different cultures (e.g., Aghababaei, Mohammadtabar, & Saffarinia, 2014; Cheng & Egan, 2020; Dinić, Petrović, & Jonason, 2018; Dinić & Wertag, 2018; Djeriouat & Trémolière, 2014; Jonason & McCain, 2012; Lee et al., 2013; Pilch & Górnik-Durose, 2016; Pineda, Piqueras, Galán, & Martínez-Martínez, 2021). Muris et al. (2017) included honesty-humility and its facets in their meta-analysis of

Dark Triad relationships and found similar results to those of Lee and Ashton (2005), although they found the correlation between narcissism and sincerity to be negligible. The importance of honesty-humility should not be understated in the study of socially malevolent personality traits like those represented by the Dark Triad and outcomes associated with the Dark Triad. For example, Lee et al. (2013) found that the HEXACO model and the Dark Triad outperformed the Five-Factor Model in predicting outcomes associated with sex (i.e., short-term mating strategies, sexual quid pro quos), power (i.e., Social Dominance Orientation, desire for power), and money (materialism and conspicuous consumption). There is also strong evidence suggesting that the shared variance among the Dark Triad traits is roughly identical to honesty-humility (see Lee & Ashton, 2014). This issue is discussed below.

2.5. Interpersonal circumplex

Another prominent personality framework that has been investigated in the context of the Dark Triad is the interpersonal circumplex, which includes two higher-order dimensions positioned on two orthogonal axes (i.e., agency and communion; Wiggins, 1979). These axes divide the circumplex into four quadrants: friendly-dominant (high communion-high agency), hostile-dominant (low communion-high agency), hostile-submissive (low communion-low agency), and friendly-submissive (high communion-low agency). Jones and Paulhus (2010) noted that a two-dimensional perspective of the interpersonal circumplex would fail to differentiate between the three dark traits as they would all occupy the same interpersonal space (i.e., high agency-low communion or hostile-dominant). They posited that a more multi-dimensional variation of the interpersonal circumplex would be required to capture the differences between the traits. Specifically, Jones and Paulhus (2010) proposed temporal orientation and identity need as dimensions that would capture the differences between the Dark Triad within the interpersonal space. Jones and Paulhus (2010) further predicted that a third dimension representing temporal orientation on the interpersonal circumplex would successfully separate Machiavellianism from psychopathy and narcissism because Machiavellianism is theoretically associated with a long-term orientation and strategic manipulation, whereas both narcissism and psychopathy are conceptually consistent with a short-term orientation. An identity need (i.e., concrete instrumental goals versus abstract symbolic goals) dimension, on the other hand, would successfully separate narcissism from the other members of the Dark Triad because those high in narcissism tend to pursue abstract goals while maintaining an entitled and superior identity, whereas high-psychopathy and high-Machiavellianism individuals tend to pursue more instrumental goals such as money, sex, and status (Jones & Paulhus, 2010). Using two modest samples, Rauthmann and Kolar (2013) investigated the Dark Triad's location with the interpersonal circumplex further. In their first study, they found that if correlations are used to project the Dark Triad's location in the circumplex, all three traits would be found in the high agency-low communion quadrant, as suggested by Jones and Paulhus (2010). However, if multiple regression coefficients were used to locate the traits within the circumplex, narcissism would be projected into the high agency-high communion quadrant, Machiavellianism would remain in the high agency-low communion quadrant, and psychopathy would be projected onto the margin of high agency-low communion and low agency-low communion. These results provide some evidence for the differentiation of the Dark Triad traits. Unfortunately, it is difficult to interpret these results with confidence due to important limitations including the relatively small sample (184 participants), use of the DD questionnaire, and the inherent limitations in interpreting residualized variables (i.e., the perils of partialing; see Lynam, Hoyle, & Newman, 2006; Sleep, Lynam, Hyatt, & Miller, 2017; Vize, Collison, Miller, & Lynam, 2018). In their second study, based on another modest sample, Rauthmann and Kolar (2013) extended these results by using longer single-construct

measures of the Dark Triad, as well as both self- and peer report data. Interestingly, the analysis of the self-report data demonstrated that narcissism was located in the high agency-high communion quadrant of the circumplex, Machiavellianism was located in the low agency-low communion quadrant, and psychopathy was located in the high agency-low communion quadrant. Peer report Dark Triad traits were projected onto somewhat different locations. Narcissism was still located in the high agency-high communion (albeit much closer to the origin of the circumplex), whereas both Machiavellianism and psychopathy were located in the low agency-low communion quadrant. Southard, Noser, Pollock, Mercer, and Zeigler-Hill (2015) provided a more fine-grained perspective, as they separated the Dark Triad traits into their respective facets and they also separated the interpersonal circumplex into octants (i.e., assured-dominant, gregarious-extraverted, warm-agreeable, unassuming-ingenuous, unassured-submissive, aloof-introverted, cold-hearted, and arrogant-calculating). They found that the Narcissistic Personality Inventory (Raskin & Hall, 1979) facets of Leadership/Authority and Grandiose Exhibitionism were positively correlated with agency and weakly negatively correlated with communion (located in the assured-dominant and arrogant-calculating octants, respectively), whereas Exploitation/Entitlement was uncorrelated with agency and negatively correlated with communion (located in cold-hearted octant). The psychopathy factors of Callous Affect (a facet reflecting primary psychopathy) and Antisocial Lifestyle (a facet reflecting secondary psychopathy) were negatively correlated with both agency and communion (both located in cold-hearted octant), and Erratic Behaviour (a facet reflecting secondary psychopathy) was weakly positively correlated with agency and negatively correlated with communion (located in cold-hearted octant). The psychopathy factor of Interpersonal Manipulation (a facet reflecting primary psychopathy) was uncorrelated with agency and negatively correlated with communion (located in cold-hearted octant). Machiavellianism was negatively correlated with both agency and communion (located in the aloof-introverted octant).

2.6. Reinforcement Sensitivity Theory

The Dark Triad has also been investigated within the framework of Reinforcement Sensitivity Theory (Gray, 1982). Reinforcement Sensitivity Theory describes biological processes which promote sensitivity towards rewards and punishment. Specifically, Gray (1982) posited the existence of three biologically-based systems: the Behavioural Inhibition System (brain regions which regulate arousal in response to punishment and unrewarding stimuli and promoting avoidance behaviour), the Behavioural Activation System (brain regions which regulate arousal in response to rewarding stimuli and promoting approach behaviour), and the Fight/Flight System (which modulates reactions to immediate threat). For instance, Stenason and Vernon (2016) found that all three components of the Dark Triad were positively correlated with Behavioural Activation System (BAS) scores, whereas only psychopathy was significantly negatively correlated with Behavioural Inhibition System (BIS) scores (both narcissism and Machiavellianism were uncorrelated). This study was not without its limitations as it used an undergraduate student sample, a less recent conceptualization of Reinforcement Sensitivity Theory, and the SD3 (Jones & Paulhus, 2014), which does not sufficiently differentiate psychopathy from Machiavellianism (Persson et al., 2019; Rogoza & Cieciuch, 2019). Jonason and Jackson (2016) investigated the relationship between the Dark Triad and Reinforcement Sensitivity Theory as conceptualized by Carver and White (1994; BIS, BAS- reward, BAS-drive, BAS-fun seeking) and Jackson (2008; behavioural inhibition, behavioural activation, fight, flee, freeze). They reported that narcissism was significantly positively correlated with behavioural BIS, BAS-drive, and behavioural inhibition. Machiavellianism, on the other hand, was significantly positively correlated with BAS-drive, and psychopathy was significantly positively correlated with the fight tendency. These results are limited by the use of

the DD measure of the Dark Triad, but in a second study Jonason and Jackson (2016) compared results obtained by the DD and SD3 in relation to Jackson's (2008) measure of Reinforcement Sensitivity Theory. Jonason and Jackson (2016) found that DD narcissism was positively correlated with behavioural inhibition, flight, freeze, and fight, whereas SD3 narcissism was positively correlated with behavioural activation, behavioural inhibition, and fight. DD Machiavellianism was negatively correlated with fight and SD3 Machiavellianism was significantly positively correlated with behavioural inhibition, flight, freeze, and fight. Correlates of psychopathy differed as well among the two short scales: DD psychopathy was negatively correlated with behavioural activation and positively correlated with fight, whereas SD3 psychopathy was significantly negatively correlated with freeze and positively correlated with fight.

Overall, these results showed that despite some similarities in how these scales measure the Dark Triad, there remain substantial measurement differences. Moreover, the two measures used for Reinforcement Sensitivity Theory constructs have also been the object of criticism in the past. Specifically, the Jackson-5 (Jackson, 2008) has been criticized for its limited construct validity, and Carver and White's (1994) measure for its inductively derived factor structure (Corr, 2016). Neria, Vizcaino, and Jones (2016) sought to overcome the issues associated with implementing short measures of the Dark Triad by using the full-length measures of the Dark Triad: the Narcissistic Personality Inventory-13 (NPI-13; Gentile et al., 2013), Mach-IV (Christie & Geis, 1970), and Self-Report Psychopathy Scale (SRP; Paulhus et al., 2013). They found that narcissism was negatively correlated with BIS anxiety and Flight-Fight-Fear System (FFFS), and positively correlated with BAS-drive and BAS-fun. Machiavellianism was weakly negatively correlated with BAS-reward. Psychopathy was negatively correlated with BIS-anxiety, FFFS, and BAS-Reward, and positively correlated with BAS-drive and BAS-fun. More recently, Włodarska, Zyskowska, Terebus, and Rogoza (2019) used meta-analytic methods (18 studies; 8911 participants) to assess the relationship between BIS, BAS, drive, reward-responsiveness, and fun-seeking variables and found that narcissism was weakly negatively correlated with BIS, and weakly positively correlated with fun-seeking. Moreover, narcissism was weakly-to-moderately correlated with BAS and drive and negligibly positively correlated with reward-responsiveness. Psychopathy, on the other hand, was weakly negatively correlated with BIS and weakly positively correlated with BAS and Drive. Moreover, it was moderately correlated with fun-seeking and negligibly negatively correlated with reward-responsiveness (Włodarska et al., 2019). Machiavellianism was negligibly-to-weakly correlated with BAS and drive, negligibly positively correlated with fin, and negligibly negatively correlated with BIS and reward-responsiveness. It must be noted that each of the studies mentioned here use different measures and conceptualizations of Reinforcement Sensitivity Theory, so they are not directly comparable. Still, the combined results provide an idea of the nature of the Dark Triad traits (e.g., long-term orientation of Machiavellianism and uninhibited psychopathy) and the inconsistencies associated with short measures of the Dark Triad.

In this section, we reviewed the extant literature investigating the Dark Triad traits in relation to major frameworks of personality. Specifically, we summarized research which located the Dark Triad in within the models of the Big Five (including higher- and lower-level traits, such as Plasticity and Stability, and facets), Honesty-Humility, the Interpersonal Circumplex, and Reinforcement Sensitivity Theory. Much of the previous research employed short measures of the Dark Triad, which, despite some important advantages (e.g., efficiency, reliability, convergent validity, adequate information recovery, and discriminant validity; Jonason & McCain, 2012; Jonason & Webster, 2010; Webster & Jonason, 2013), has been criticized for inadequate construct coverage, redundancy, having excess variability in item difficulty, overemphasizing the overlap between dark traits, and not having sex and age invariance (Carter et al., 2015; Kajonius et al., 2016; Maples

et al., 2014; Miller et al., 2012; Persson et al., 2019; Rogoza & Cieciuch, 2019). Though these shorter measures are perhaps better suited than long measures when participant fatigue, time, or attentional constraints are matters of great concern, their limitations are known and should be considered when interpreting results. Moreover, a large contingent of research, as first noted by Sleep et al. (2017) and Vize, Collison, et al. (2018), employs multivariate analyses without providing bivariate relationships between variables of interest. Such a strategy forces readers to interpret revisualized variables, which are not comparable to the raw variables, as the variance associated with covariates has been removed (i.e., the perils of partialling; Lynam et al., 2006; Sleep et al., 2017; Vize, Lynam, Miller, & Collison, 2018).

3. What defines a dark trait?

A substantial problem in the dark personality research field is that scholars recommend the inclusion or exclusion of traits within the dark cluster without a priori theoretical criteria for what defines a trait as dark. One such example is the position that narcissism should not be considered a part of the Dark Triad because it has more positive correlates (e.g., greater well-being, hope, optimism, self-efficacy, and resilience; Aghababaei & Błachnio, 2015; Papageorgiou et al., 2019; Papageorgiou, Denovan, & Dagnall, 2019; Papageorgiou et al., 2019; Van Groningen, Grawitch, Lavigne, & Palmer, 2021; Zhu & Geng, 2021[5]) than both psychopathy and Machiavellianism (e.g., Kowalski, Vernon, & Schermer, 2016; Pailing, Boon, & Egan, 2014). Moreover, other researchers have suggested that sadism should be included in the dark cluster (i.e., the Dark Tetrad) because abundant research has indicated that sadism often incrementally predicts external outcomes over other dark traits (e.g., Chabrol, Van Leeuwen, Rodgers, & Séjourné, 2009; Lee, 2019; Reidy, Zeichner, & Seibert, 2011). Both of these examples make implicit assumptions (e.g., sufficient similarity, incremental validity) of what comprise the dark cluster criteria despite a lack of consensus on what constitutes a dark cluster trait.

One potential reason for this issue is that within Paulhus and Williams's (2002) seminal paper, which introduced the Dark Triad traits as a cluster, there was no explicit mention of why these traits belong in the triad. Paulhus and Williams (2002) did, however, posit that "the personalities composing this 'Dark Triad' share a number of features. To varying degrees, all three entail a socially malevolent character with behavior tendencies toward self-promotion, emotional coldness, duplicity, and aggressiveness" (p. 557). Though this statement could be interpreted as only a description of the dark traits that comprise the Dark Triad, it could also plausibly be received as an early operational empirical criterion for conclusion in a dark category, as it is consistent with an intuitive notion of a what a malevolent personality disposition ought to look like. Moreover, one of the purposes of Paulhus and Williams's (2002) investigation was to provide evidence for the differentiation of narcissism, Machiavellianism, and psychopathy. Although differentiation of these traits was not explicitly mentioned by Paulhus and Williams (2002) as a criterion for traits to fit into the dark cluster, the result of allowing for absolute redundancy (i.e., completely identical dimensions) is an unuseful taxonomy of dark personality traits. For this reason, perhaps, some researchers have adopted this as an implicit criterion for inclusion in the dark cluster. To summarize, if one implemented Paulhus and Williams's (2002) descriptions of the Dark Triad as explicit criteria for traits to be included in the dark cluster, the traits would have to share tendencies towards deliberate social malevolence and would have to differ from the other traits.

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[5] It should be noted that Aghababaei and Błachnio (2015), Papageorgiou, Benini, et al. (2019), Van Groningen et al. (2021), and Zhu and Geng (2021) do not question narcissism's place in the Dark Triad, but rather point to relatively positive correlates of the narcissism compared to psychopathy and Machiavellianism.

Other criteria have also been suggested in the extant literature. For instance, a lack of empathy (i.e., callousness) has been posited as the defining feature of a dark trait (Furnham et al., 2013; Paulhus, 2014). At first glance, this seems like a feasible criterion, however, there are serious issues with this criterion, at least on its own, if a dark trait is conceptualized as one that predicts deliberate malevolence. Firstly, it is plausible that high empathy may motivate the deliberate infliction of suffering because of its inherently emotional nature, which favours the fate of certain individuals over others, who we may have a more difficult time identifying with (Bloom, 2016; Breithaupt, 2018). For example, in a three-party scenario where one person is observing a conflict between two other parties, empathy may cause the observer to take the side of one party at the expense (and possible harm) of the other (Breithaupt, 2012, 2018), potentially demonizing the opposing side, regardless of the actual virtues of either side. An example of this is politically or ideologically motivated violence, where individuals may choose the side of who they perceive as the oppressed and perpetrate acts of violence against the perceived oppressor (regardless of if these labels are true or not, or whether an issue is, in reality, more nuanced than a conflict between oppressed vs oppressor). This is to say that even empathy, a trait that is often perceived as uniformly prosocial or positive, can motivate malevolence. Also, the evidence linking empathy and aggression, perhaps the most salient form of antisocial behaviour, has been inconsistent and surprisingly modest, according to meta-analytic estimates (Vachon, Lynam, & Johnson, 2014). Hence, callousness (or a lack of empathy), on its own, is insufficient to characterize the 'darkness' of a trait. Jones and Figueredo (2013) added to this suggestion: they posited that "one must be simultaneously dishonest and lack concern for others, to be truly and intentionally harmful" (p. 522). Put another way, deliberate malevolence is the defining feature of the 'darkness' of a trait. This notion of deliberate malevolence can be approximated by a combination of callousness and interpersonal manipulation. This definition appears to be consistent with the essence of a dark personality, as each of these core features independently may not be sufficient to cause deliberate harm. For example, one may be deceitful with good intention, and therefore interpersonal manipulation on its own is not sufficient as a defining feature of dark personality traits. As mentioned before, low empathy on its own is also not a sufficient criterion. Moreover, Jones and Figueredo (2013) stated that callousness and interpersonal manipulation appear to describe the shared core of the Dark Triad, which also allows for the addition of traits as long as they are not redundant with the traits included. Some research has suggested that the combination of interpersonal manipulation and callousness are similar, if not nearly identical to the honesty-humility factor of the HEXACO model (e.g., Gaughan, Miller, & Lynam, 2012; Lee et al., 2013; Lee & Ashton, 2005; Lee & Ashton, 2014; Visser, Ashton, & Pozzebon, 2012), and this is demonstrated by moderate, strong, and even stronger correlations between honesty-humility and interpersonal manipulation, callousness, and primary psychopathy, respectively. Further, honesty-humility and callousness and interpersonal manipulation (primary psychopathy) have both been convincingly put-forward as interpretations of the shared core of dark traits (e.g., Dinić, Wertag, Tomašević, & Sokolovska, 2020; Jones & Figueredo, 2013; Lee & Ashton, 2005; Lee et al., 2013; Marcus, Preszler, & Zeigler-Hill, 2018; more thoroughly discussed later in this paper). Moreover, regardless of empirical relationships, the essences of low honesty-humility and callousness and interpersonal manipulation both seem to approximate deliberate malevolence. Thus, either honesty-humility or the combination of callousness and interpersonal manipulation could be used to test candidate dark traits.

More recently, Marcus and Zeigler-Hill (2015) have suggested a broader definition of what constitutes a dark personality (i.e., the Big Tent of dark personality traits). These authors argue that dark traits need not be overtly antagonistic. Rather, Marcus and Zeigler-Hill (2015) posited that the categorization of variables into the Dark Tent should be predicated on the probable outcomes linked to the endorsement of these variables. In their own words, "traits qualify as dark if they are regularly

associated with problematic outcomes across a variety of situations even when they are only present at modest levels" (Marcus & Zeigler-Hill, 2015, p. 435). It is our view that Marcus and Zeigler-Hill's (2015) definition is overly broad to the point of being virtually boundless. One may argue that almost any personality trait can be categorized in Marcus and Zeigler-Hill's (2015) 'Dark Tent,' as consequences that are perceived as problematic need not be inherently antisocial. Following this line of logic traits such as neuroticism may can be characterized as dark traits given the trait's negative mental health consequences across a variety of contexts (e.g., Hansell et al., 2012; Muris, Roelofs, Rassin, Franken, & Mayer, 2005), even if these outcomes are maladaptive for the self and not antisocial in nature. Even empathy would fit in to the Dark Tent, as some researchers have described as a risky strength because it can lead to empathic personal distress, excessive guilt, anxiety, and internalizing problems (Gambin & Sharp, 2018; Tone & Tully, 2014), as well as the negative affective consequences when empathizing with a target's pain or problems (see Ferguson, 2016 for review of the costs of empathy). The number of contexts in which the trait should result in negative or maladaptive outcomes is also unspecified by Marcus and Zeigler-Hill (2015), resulting in overly broad and ambiguous categorizations that, if taken to the extreme, can include almost any trait, as certain levels of any trait can be problematic in certain contexts. Even traits that are largely adaptive can lead to acute negative outcomes in certain contexts where the level of a specific trait are not well-suited to the needs of the particular situations.

Based on this evidence, the dark trait definition introduced by Jones and Figueredo (2013) appears to be the better fit. That is, a dark trait should be identified by a core of deliberate malevolence (i.e., callousness and interpersonal manipulation or honesty-humility). Additionally, as noted by Watts, Waldman, Lilienfeld, Smith, and Poore (2017), dark traits should not be redundant with each other and must incrementally predict antisocial outcomes. This notion, however, brings quantitative issues to the forefront of debate. For instance, Furnham et al. (2013) recommended the use of multiple regression and partial correlations as the analytical tool to investigate differences between these constructs. For example, if Machiavellianism could uniquely predict an antisocial outcome above and beyond the effect of narcissism and psychopathy, this would be considered evidence that Machiavellianism is distinct enough from the other traits to be considered part of the Dark Triad. Other researchers have convincingly criticized this approach (i.e., Lynam et al., 2006; Miller et al., 2019; Sleep et al., 2017; Vize, Collison, et al., 2018) based on the 'perils of partialing' and point out that using multivariate approaches to remove shared variance for substantially overlapping dimensions will result in analyses of residualized variables that no longer represent the original (i.e., non-residualized) constructs. In other words, narcissism without its substantial shared variance with the other traits is no longer narcissism and should not be conflated as such. Miller et al. (2019) note that this is especially problematic in the case of suppression effects where relationships with peripheral traits appear or become stronger once the shared core of the Dark Triad is removed. Moreover, relationships among residualized Dark Triad traits and external correlates seem to be less reliable than with raw scores and external correlates (Sleep et al., 2017). It should be noted that these authors do not suggest discarding multivariate statistical analyses altogether, but only to use and interpret them carefully and in tandem with bivariate correlations (Miller et al., 2019). Moreover, they suggest that to demonstrate differential relationships between the Dark Triad and external variables, direct tests are needed such as tests of differences of dependant variables to ascertain that the bivariate correlations among dark traits and external correlates differ significantly.

3.1. Applying these criteria to the Dark Triad

Assuming that these criteria (i.e., a core of callousness and interpersonal manipulation or honest-humility, and non-redundancy) are valid, an important question addresses whether narcissism,

Machiavellianism, and psychopathy fit into these criteria. With regards to callousness and interpersonal manipulation, research evidence consistently demonstrates that all three of the Dark Triad traits fit these criteria. For instance, Jones and Figueredo (2013) found that both manipulation and callousness explained all the non-within-scale relationships among the facets of the Dark Triad traits, and that the combination of callousness and interpersonal manipulation accounted for the overlap among the Dark Triad. Marcus et al. (2018), on the other hand, used network analyses to draw similar conclusions. These authors found that the psychopathy facets of interpersonal manipulation and callousness, held the most central position in a network including Dark Triad facets, spitefulness, and aggression. Also using a series network analyses, Dinić, Bulut Allred, Petrović, and Wertag (2020) confirmed that callousness and interpersonal manipulation were central to the Dark Tetrad (i.e., narcissism, Machiavellianism, psychopathy, and sadism), regardless if brief or long measures of the Dark Triad were used.

The results are remarkably similar if one uses the honesty-humility conceptualization of this criterion. For example, Watts et al. (2017) found that every facet and trait of the Dark Triad (multiple measures were used for each trait) was significantly negatively correlated with honesty-humility, ranging in strength from $r = -0.19$ to -0.67. In the same vein, evidence has shown moderate-to-strong negative correlations between the Dark Triad traits and honesty-humility (e.g., Ashton, Lee, & Son, 2000; Lee et al., 2013; Lee & Ashton, 2005; Muris et al., 2017; Pailing et al., 2014). Hodson et al. (2018) has also demonstrated that there is nearly complete overlap between the shared variance of the Dark Triad and honesty-humility, with a latent correlation of $r = -0.95$. Based on the available evidence, each of the Dark Triad traits fit the interpersonal manipulation-callousness/honesty-humility criteria. The non-redundancy criterion, however, is more complicated.

3.2. Putative redundancy of psychopathy and machiavellianism[6]

Perhaps the most common debate within the Dark Triad literature is the putative redundancy of psychopathy and Machiavellianism. In fact, this debate long predates Paulhus and Williams's (2002) seminal Dark Triad paper (e.g., Skinner, 1988; Smith, 1978; Smith & Griffith, 1978). These early concerns were laid in more detail by McHoskey, Worzel, and Szyarto (1998), who posited that psychopathy and Machiavellianism were redundant. McHoskey et al. (1998) stated that the same dimension has been studied concurrently by clinical and social/personality psychologists, creating two different labels and literatures for the same variable.

3.2.1. Self-report evidence

In terms of research based on self-report methodologies, the evidence favours the position that psychopathy and Machiavellianism is redundant. Meta-analytic evidence has demonstrated virtually indistinguishable personality profiles and considerable overlap of psychopathy and measures of Machiavellianism (O'Boyle et al., 2015; Vize, Lynam, et al., 2018). Based on this evidence, O'Boyle et al. (2015) concluded that psychopathy largely encompasses Machiavellianism. Other research has attempted to distinguish these two traits based on theoretically chosen constructs; that is, constructs that differentiate theoretical accounts of Machiavellianism with theoretical accounts of psychopathy (e.g., impulsiveness, self-control, etc.; Crysel et al., 2013; Muris et al., 2017; Petrides, Vernon, Schermer, & Veselka, 2011), though this has often led to mixed evidence and often also favours the redundancy argument. Additionally, research has employed alternate data analytic strategies and coming to the same conclusion. For instance, Rogoza and Ciecich (2018) used Goldberg's (2006) Bass-Ackwards technique and found evidence which indicated the notion that psychopathy subsumes

Machiavellianism. Similar conclusions were made by Glenn and Sellbom (2015) who failed to estimate a latent Dark Triad using CFA, as more than 100% of the variance was attributed to psychopathy. Moreover, using multiple criterion variables, Glenn and Sellbom (2015) found that a latent Dark Triad trait and a residualized Dark Triad trait generally do not provide incremental explanatory power beyond the effect of psychopathy.

Despite the aforementioned evidence, the self-report literature is not entirely consistent in assessing this issue, and there is evidence demonstrating differential relationships between Machiavellianism and psychopathy with external outcome variables. For example, in a study of the relationship between the Dark Triad and coping preferences, Birkás, Gács, and Csathó (2016) found that despite a similar overall coping preference profile, high-Machiavellianism individuals make efforts to control their emotional reactions in times of stress, whereas there was no indication that high-psychopathy individuals do the same. Similarly, high-psychopathy individuals showed a preference for confrontive coping strategies indicating low stress-tolerance that could lead to offensive behaviour, whereas Machiavellian individuals showed no preference for such coping strategies. In the realm of moral and social normativity, Kay and Saucier (2020) concluded that high-psychopathy individuals are less attuned to moral norms and social, while Machiavellian individuals did not share these deficits. This conclusion was based of two studies in which relationships between these Dark Triad traits and measures of social and moral normativity were assessed; study 1 only supported this conclusion when multivariate regression was used with the dark traits (measured by the DD) as predictors of social and moral normativity, but bivariate correlations did not support this conclusion, demonstrating similar patterns of relationships with the normativity variables. Study 2, in which the SD3 was used, was more in-line with the conclusions made, as both bivariate correlations and multivariate regressions indicated nonsignificant relationships between Machiavellianism and normativity variables. Similarly, in an organizational context, Jonason, Slomski, and Partyka (2012) found that while Machiavellianism and psychopathy (but not narcissism; dark traits were measured by DD) predicted the use of hard manipulation tactics, Machiavellianism and narcissism (but not psychopathy) predicted the use of soft manipulation tactics. Again, this set of results was obtained using multivariate regression, but when bivariate correlations are examined, the differences are more ambiguous with all three dark traits correlating with both types of tactics. Also in the realm of organizational research, Szabó, Czibor, Restás, and Bereczkei (2018) found that Machiavellianism and psychopathy (as measured by the SD3) showed differential relationships with organizational citizenship behaviour and in-role behaviour. Specifically, they found that Machiavellianism was significantly but very weakly correlated (i.e., $r = 0.15$ and -0.13, respectively) with organizational citizenship behaviour towards an individual and towards their organization, and was unrelated to in-role behaviour, while psychopathy showed weak-to-moderate (i.e., ranging from $r = -0.34$ to -0.43) negative relationships with these variables. In a subsequent study, Szabó, Simon, Czibor, Restás, and Bereczkei (2021) found similar results regarding organizational citizenship behaviour (though in this study the target of the behaviour, individual or organization, was not separately measured). They also found differential relationships with Machiavellianism and counterproductive work behaviour and psychopathy and counterproductive work behaviour.[7] Jonason, Baughman, Carter, and Parker (2015) also observed differential relationships between psychopathy and Machiavellianism and mental and physical health outcomes. Specifically, they found that while psychopathy was negatively correlated with social skills, Machiavellianism was negligibly positively correlated with social skills. Moreover,

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[6] The putative redundancy of psychopathy and sadism is discussed in a later section.

[7] It should be noted that though relationships differed somewhat, no significance tests for differences in correlations were conducted, hence it is difficult to compare these values with any certainty that they statistically differed.

psychopathy was shown to be associated with risk-taking and unhealthy behaviours (i.e., smoking, drinking alcohol, dangerous sex, drug use, and seatbelt wearing), and no relationship was found between these outcomes and Machiavellianism. As well, Kiire, Matsumoto, and Yoshida (2020) found that psychopathy and Machiavellianism can be differentiated by their impulsivity profiles; specifically, they found that psychopathy is significantly positively correlated with lack of premeditation, while Machiavellianism is significantly positively correlated with lack premeditation, and psychopathy was nonsignficantly positively correlated with lack of perseverance, while Machiavellianism was significantly negatively correlated with lack of perseverance. In the same vein, Malesza (2020) found that psychopathy was moderately-to-strongly correlated with self-report impulsivity, while there was no significant correlation between Machiavellianism between and impulsivity. Moreover, Heym et al. (2019) found distinct relational aggression and empathic profiles among the Dark Triad, with psychopathy showing global empathic deficits and was related to all types of relational aggression, whereas Machiavellianism was associated with only specific forms of empathic deficits and forms of relational aggression.

Overall, the bulk of the self-report evidence supports the position that psychopathy and Machiavellianism are redundant. There are, however, issues with this conclusion. First, as demonstrated by Miller et al. (2019), the majority of these studies do not assess the significance of the differences between correlations, making informed interpretations of the results difficult. Kowalski et al. (2019) attempted to address this issue by comparing the correlations between Machiavellianism and psychopathy and found that these traits differed significantly ($p < .01$) in their relationships with 13 of the 30 Big Five facets. These results suggest that despite substantial overlap, these traits can be seen as distinct dimensions. Still, it would be premature to assume any position based solely on the evidence described. Future research should indeed assess the significance of the differences between correlations. The discussion of this controversy is further complicated by substantial evidence that the most commonly used measures of Machiavellianism are not actually measuring Machiavellianism. Perhaps the clearest demonstration of this was shown by Miller et al. (2017), who found that Machiavellian empirical Big Five profiles (including domain and facets) yielded conflicting results from expert-rated Machiavellian profiles based on theory (e.g., empirical profiles showed low conscientiousness facets, while expert-derived profiles showed high conscientiousness facets). This result was further substantiated by Persson's (2019) work based using the Bass-Ackwards approach (Goldberg, 2006). Specifically, Persson (2019) concluded that current measures of Machiavellianism better reflect psychopathy and narcissism than the construct they are supposed to measure. This led Collison, Vize, Miller, and Lynam (2018) to the creation of a new measure of Machiavellianism based on expert ratings of facets of the Five-Factor Model, known as the Five Factor Machiavellianism Inventory (FFMI). An advantage of the FFMI is that it is theoretically driven and overlaps less with existing psychopathy measures than previous measures of Machiavellianism. One cause for concern, however, is that the framework used for the development of this measure – the Five-Factor Model – assumes that the neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness fully explain personality. Though in some contexts this may be true, there is abundant evidence suggesting that in terms of antisocial personality traits, the HEXACO model of personality has substantially greater explanatory power (Ashton, Lee, & de Vries, 2014; Ashton et al., 2000; Lee & Ashton, 2005; Lee et al., 2013; Paulhus & Klaiber, 2020; see Hong, Koh, & Paunonen, 2012 for an alternative view). Indeed, as mentioned previously in this review, substantial evidence suggests that the shared variance of the Dark Triad is equal to low honesty-humility (Hodson et al., 2018; Lee et al., 2013), which may have led to the weaker correlations between the FFMI and psychopathy than previous measures of Machiavellianism (Collison et al., 2018). In a sense, the goal of reducing the measurement similarities between Machiavellianism and psychopathy came at the cost of eliminating a substantial amount of

the meaningful variance that defines the 'darkness' of a trait. Still, future research is needed to evaluate the psychometric utility of this measure, while the existing psychometric literature on this measure has generally supported its validity (e.g., Collison, South, Vize, Miller, & Lynam, 2021; Kückelhaus & Blickle, 2021; Kückelhaus, Blickle, Kranefeld, Körnig, & Genau, 2020). In the same vein, Paulhus, Buckels, Trapnell, and Jones (2020) have developed an improvement of the SD3 (called the SD4) to, among other reasons (e.g., they also included an assessment of sadism to the measure), reduce the excessive overlap between the measures of psychopathy and Machiavellianism. So far, this measure has successfully distinguished between psychopathy and Machiavellianism and has shown solid psychometric properties (Blötner, Ziegler, Wehner, Back, & Grosz, 2021; Neumann, Jones, & Paulhus, 2021; Paulhus et al., 2020) and criticisms regarding the possible loss of content coverage due to overlap reduction have yet to be seen in published research. Thus, at this very early stage, the SD4 seems like a promising short measure of the Dark Tetrad, but more research is needed to thoroughly test this measure. Grosz, Harms, Dufner, Kraft, and Wetzel (2020) have also developed new scales (M7 and P7, measuring Machiavellianism and psychopathy, respectively) by selecting items from the Mach-IV, SD3, and the SRP-III, with the intent of mitigating the excessive overlap of psychopathy and Machiavellianism; this scale is very recent and has not been widely used yet, but Grosz et al. (2020) report acceptable to good psychometric properties in terms of unidimensionality, precision, convergent and discriminant validity, measurement invariance across languages and gender, as well as temporal stability.

3.2.2. Behavioural evidence

The redundancy debate literature is far more complicated than what the self-report literature would suggest. The behavioural and biological literatures, overall, provide conclusions that conflict with the redundancy position and go against the criticisms of current measures of Machiavellianism. In a study of the Dark Triad traits in the context of romantic relationships, Jones and Weiser (2014) found that both psychopathy and Machiavellianism predicted relationship infidelity, but only psychopathic infidelity led to relationship ending, while Machiavellian infidelity did not lead to break up. These results suggest that individuals who high in Machiavellianism are better at avoiding consequences, possibly as a consequence of manipulation of their partners, or being more selective of lower-risk opportunities to cheat. Similarly, Jones, Padilla, Curtis, and Kiekintveld (2021) found that in a hypothetical game scenario relating to cyber-attacks, Machiavellianism strongly predicted stealthy attacks, while narcissism and psychopathy predicted aggressive and short-term attacks (e.g., brute force attacks) and this pattern was largely replicated in a realistic lab-based simulation. Likewise, Jones (2014) found that high psychopathy individuals persisted in gambling with other people's money even when there was a high risk of punishment, however, high-Machiavellianism individuals did not. More recently, Jones and Paulhus (2017) found that psychopathy and Machiavellianism were similarly associated with cheating on a coin-flipping game, but only individuals who scored highly in psychopathy cheated when there was a high risk of getting caught; high-Machiavellianism individuals only cheated in high-risk conditions when they were ego-depleted, demonstrating the strategic and manipulative nature of theoretical descriptions of Machiavellianism. For example, Malesza, Kalinowski (2019) found that psychopathy was associated with the behavioural impulsivity measures of delay discounting and social discounting, as opposed to Machiavellianism which predicted only social discounting, indicting that individuals that score highly on Machiavellianism are unwilling to share with others, but do not have a preference for immediate rewards. On the other hand, high-psychopathy individuals tend towards non-sharing and immediate rewards. In a separate study involving impulsivity, Malesza & Kalinowski (2021) employed an ecological momentary assessment approach. Participants filled out measures of the Dark Triad traits and measures of impulsivity (both self-report and behaviour on a delay discounting task),

and then were prompted periodically over a length of time to report four types of impulsive behaviour since their last prompt (i.e., talking without thinking, overspending, impatience, impulsive decisions). Malesza & Kalinowski (2021) found that psychopathy was positively correlated with all measures of impulsivity and reported impulsive behaviour, whereas Machiavellianism was uncorrelated with all impulsivity measures and behaviours. Additionally, Curtis et al. (2021) found that individuals that are high in Machiavellianism outperform those that are high in psychopathy and narcissism in a strategic resource control game and that the poor performance of those high in psychopathy was, in part, due to their negligence of costs. In an investigation of Machiavellianism and prosocial behaviour, Bereczkei, Birkas, and Kerekes (2010) found that while prosocial personality traits were associated with providing more costly charity service irrespective of anonymous or public conditions, Machiavellian charity contributions were strongly dependent on situational factors (i.e., a greater charity contribution when in public condition). Bereczkei et al. (2010) explain these results in terms of strategic reputation-gaining when the charity contribution was public, while there would be no such personal advantage in anonymous circumstances. In general, these results indicate that Machiavellianism may be more flexible and situation-dependent than psychopathy (Jones & Mueller, 2021) and this notion is consistent with the theoretical account of Machiavellianism and would give some insight into why self-report research comparing relationships with general dispositions has given largely null results when comparing psychopathy and Machiavellianism. However, the authors did not assess psychopathy, and therefore the results do not allow for direct comparison of the traits. Further research has shown that high-psychopathy individuals made riskier decisions when exposed to stressful situations, while the decision-making of high-Machiavellianism individuals was unaffected, indicating greater self-control as suggested by theoretical accounts of Machiavellianism (Carre & Jones, 2016). Rauthmann, Kappes, and Lanzinger (2014) found further evidence for the distinction between psychopathy and Machiavellianism with a naturalistic field study in which 59 men were observed romantically approaching 1395 women, on the street, to investigate the notion of whether dark personalities profit from cloudy or dark weather. Rauthmann et al. (2014) found that only men that were high in Machiavellianism (and not narcissism or psychopathy) solicited more positive responses from women in darker weather, as a consequence of increase self-assuredness in darker surroundings. Other research has indicated differences in amount of effort used in deception (Baughman, Jonason, Lyons, & Vernon, 2014) and flexibility in negative mate retention tactics (Jones & De Roos, 2017). Still, it must be noted that most of these findings are liable to the same faults of the self-report evidence (i.e., perils of partialing and lacking significance testing of differences in bivariate correlations). It is also important to note that behavioural research does have limitations, such as smaller samples compared to self-report research, as well as relatively low reliability (Enkavi et al., 2019).

3.2.3. Biological evidence

This research is supplemented with biological evidence suggesting that existing measures of Machiavellianism are true to the theoretical underpinnings of the construct. Spitzer, Fischbacher, Hernberger, Grön, and Fehr (2007) used fMRI to study the neural circuitry involved in social norm compliance. They reported that Machiavellianism was correlated with increases in norm compliance when the threat of social punishment was present, as well as activity in the lateral orbitofrontal cortex and right insula – brain regions involved in evaluation of punishing stimuli and the representation of emotional states. Although this study did not assess psychopathy's relationship with activity in these brain regions, previous research has demonstrated that criminal psychopaths exhibit no activations in these brain areas in a fear conditioning paradigm in which pain is associated with conditioned stimuli, whereas healthy participants showed significant activity in these areas (Birbaumer et al., 2005; Veit et al., 2002). It must be noted, however,

that conclusions drawn based on the redundancy controversy should be made with caution as it is possible that subclinical psychopaths differ in their activation from criminal psychopaths, and that the tasks in the latter-mentioned studies differed from the Spitzer et al. (2007) study. Machiavellianism has also been associated with activation in the thalamus and anterior cingulate cortex, as well as the dorsal anterior insula/inferior frontal gyrus brain regions during a social dilemma task (Bereczkei, Deak, Papp, Perlaki, & Orsi, 2013). These brain regions are related to abstract reasoning about social situations, mental flexibility, reward processing, high risk assessment, and anticipation of beneficial decisions. Some researchers have also suggested that the middle frontal gyrus plays a part in manipulation and high-level planning (Cairo, Liddle, Woodward, & Ngan, 2004; Delgado, Nystrom, Fissell, Noll, & Fiez, 2000; Liu et al., 2012; Miedl, Fehr, Meyer, & Hermann, 2010; Reverberi, Shallice, D'agostini, Skrap, & Bonatti, 2009; Vidal, Mills, Pang, & Taylor, 2012). Consistent with the research previously summarized associations between the DLPFC and Machiavellianism, Cohen-Zimerman, Chau, Krueger, Gordon, and Grafman (2017) found that brain damage to the left DLPFC predicted increases in Machiavellianism and Machiavellian views, even after controlling for intelligence, emotional intelligence, empathy, psychopathology, and linguistic abilities. These results suggest a causal role of the left DLPFC in regulating Machiavellian views. The biological research summarized here and in Bereczkei's (2018) review suggest that commonly used measures of Machiavellianism do indeed correspond well to the intended construct. There is also some evidence suggesting that Machiavellianism differs from psychopathy, but because none of this research investigated subclinical psychopathy or directly compared brain activity between Machiavellianism and psychopathy scores, conclusions based on this evidence cannot be drawn with confidence. Future biological investigations on this topic should measure both subclinical psychopathy and Machiavellianism and directly compare activity in the brain. Another limitation of these biological investigations is that they use small samples and therefore present with concerns regarding power. However, once the issues with these studies are properly rectified, the results of this research could be critical to the understanding of the redundancy debate. More specifically, well-powered research directly comparing the neurological underpinnings of psychopathy and Machiavellianism can definitively put the redundancy criticism to rest by demonstrating that the differences between the traits are not just historical or theoretical, but also rooted in biological processes (e.g., Eysenck, 1992).

3.2.4. Suggestions for future redundancy research

Despite the considerable amount of high-quality literature on the topic and some exceptionally clever methods of addressing the controversy, this debate remains unsolved. What is promising, however, is that researchers are developing innovative ways to explain discrepancies within the literature. Kowalski et al. (2019), for instance, presented a case for using narrow bandwidth measures and compared their correlations with psychopathy and Machiavellianism using significance testing for differences in dependent correlations. The authors claimed that this research provides a more high-resolution perspective that broad bandwidth measures are unable to provide. Moreover, previous research has demonstrated that in many circumstances, narrow bandwidth measures often outperform broad bandwidth measures in predicting intended criteria (i.e., Ashton, Jackson, Paunonen, Helmes, & Rothstein, 1995; Ashton, Paunonen, & Lee, 2014; Christiansen & Robie, 2011; Mcabee, Oswald, & Connelly, 2014; Paunonen & Ashton, 2001, 2013). It is argued that aggregating narrow bandwidth facets into a broad bandwidth trait can suppress the specific non-error variance associated with each trait, therefore producing a lower-resolution image of the differences between Machiavellianism and psychopathy (Kowalski et al., 2019). Szabó and Jones (2019), on the other hand, suggest that the mixed results pertaining to the redundancy debate may be partially explained by gender differences. That is, the Dark Triad traits may manifest differently in men and women, and when these differences are

not accounted for, inconsistent results emerge. Specifically, they found that Machiavellianism in men was positively correlated with planning, but in women Machiavellianism was negatively correlated with planning (a trait central to the theoretical account of Machiavellianism). McHoskey's (2001) research also indicated that high-Machiavellianism women and men differ significantly across an array of sexual attitude variables. Czibor et al. (2017) also found evidence to support this notion, as they found that high-Machiavellianism men were more likely to endorse an opportunistic world view, whereas high-Machiavellianism women were more likely to report anxious personality characteristics. Similarly, Visser, Pozzebon, Bogaert, and Ashton (2010) found that psychopathy in men was associated with high self-rated attractiveness, low appearance anxiety, and low body shame, while psychopathy in women was associated with low self-esteem and high body shame. Thus, future research should take into account gender differences in Dark Triad trait manifestations.

We argue that specified criteria and theoretically-derived biological investigations may be crucial to critically examine the alleged redundancy of psychopathy and Machiavellianism. Future investigations should be mindful of the perils of partialing and should consider both bivariate correlations and tests of significant differences in correlations to assess the differences between the Dark Triad traits. Based on conflicting evidence regarding redundancy, it is difficult to draw conclusions regarding the recommended criteria for dark trait inclusion. Though biological evidence tends to support the theoretical account of Machiavellianism using traditional Machiavellianism measures, it is still unclear whether psychopathy differs in in its biological profile. Moreover, to resolve this debate, future personality research should incorporate narrow bandwidth measures and account for potential gender differences to improve our understanding of possible differences or overlap.

4. The Dark Core

Another contentious issue in the Dark Triad literature concerns the core of the Dark Triad. In other words, researchers are debating the answer to the question: What does the shared variance of the Dark Triad represent? In the present review, we previously discussed research suggesting that callousness and interpersonal manipulativeness, or alternatively honesty-humility represent the shared core of the Dark Triad. The first to propose that callousness and interpersonal manipulation (i.e., facets of psychopathy) are at the heart of the Dark Triad were Jones and Figueredo (2013). They found that callousness and interpersonal manipulation accounted for the preponderance of the overlap between facet scores of narcissism, Machiavellianism, and psychopathy across multiple samples. Similar findings emerged in a second study in which Social Dominance Orientation (SDO) was added as a variable, indicating that SDO also shares the same core as the Dark Triad traits (Jones & Figueredo, 2013). Using a network approach, Marcus et al. (2018) observed that both callousness and interpersonal manipulation were central to the network of dark traits (psychopathy, Machiavellianism, narcissism, spitefulness, aggressiveness). They stated that eliminating callousness and interpersonal manipulation from the networks would produce less densely connected nodes representing the dark traits; thus, it may be concluded that these dimensions bind the dark traits together. Corroborating these findings, Dinić, Bulut Allred, et al. (2020) conceptually replicated these findings reporting that callousness and interpersonal manipulation were central to the network of the Dark Tetrad traits.

Another approach to explain what the shared variance of the dark traits represent is to interpret it in terms of more general traits from established personality models such as HEXACO and FFM. Lee and Ashton (2005) presented early evidence suggesting the shared core of the Dark Triad is at least partly explained by honesty-humility. They found that all three of the Dark Triad traits were significantly and strongly negatively correlated with honesty-humility. Further

investigations by Lee et al. (2013) showed that the common variance of the Dark Triad was highly saturated with honesty-humility across two samples and two different Dark Triad measures, including the SD3 and DD. Relatedly, Hodson et al. (2018) identified a virtually perfect negative correlation (-0.95) between the latent honesty-humility and the latent dark core. More evidence supporting honesty-humility as a candidate for the core of the Dark Triad was found by Book, Visser, and Volk (2015) who employed canonical correlation analyses to assess competing hypotheses regarding the dark core. Based on their results, Book et al. (2015) concluded that the HEXACO model (particularly honesty-humility) best explained the overlapping variance of the Dark Triad compared to the Big Five traits, fast life history strategy, primary psychopathy, callousness, or the HEXACO model with the addition of callousness, and the HEXACO model with the addition of fast life history strategy. Honesty-humility was also the most parsimonious candidate to accommodate the Dark Triad overlap. In a sequel study, Book et al. (2016) added sadism to the Dark Triad traits (i.e., the Dark Tetrad) and again, the HEXACO model (particularly honesty-humility) outperformed the other models (i.e., the Big Five, callousness, fast life history strategy, and primary psychopathy) in accounting for empirical overlap. It should be noted, however, that the FFM trait of agreeableness is not orthogonal to HEXACO honesty-humility. Indeed, research has shown that both psychopathy and narcissism are strongly related to FFM agreeableness, largely due to the facets of modesty and straightforwardness (Miller, Gaughan, Maples, & Price, 2011) – traits that are conceptually and empirically related to HEXACO honesty-humility (Lee & Ashton, 2014).

Earlier attempts at explaining the dark core concluded that agreeableness accounted for shared variance between the traits. In a factor analytic study with a modest sample, Jakobwitz and Egan (2006) found that the Dark Triad traits loaded onto one factor, which correlated negatively with agreeableness. Using similar methodology and a larger sample size, Stead and Fekken (2014) obtained similar results. More recently, Dinić, Wertag, Sokolovska, and Tomašević (2021) analyzed the shared variance among dark traits and found that PID-5 (Kreuger, Derringer, Markon, Watson, & Skodol, 2012) antagonism[8] was the best single candidate (compared to primary psychopathy, narcissistic rivalry, honesty-humility, aggressiveness, selfishness, emotional intelligence, and emotionality) for the dark core and the combination of callousness, deceitfulness, and grandiosity (facets of antagonism) accounted for 92% of the common variance among dark traits. Moreover, Dinić et al. (2021) found that primary psychopathy, followed by callousness (facet of antagonism) were the most central elements in the network of traits (which included primary and secondary psychopathy, narcissism, the 12 sub-traits of the D factor, facets of antagonism, facets selfishness, Machiavellianism, narcissistic rivalry and admiration, facets of aggressiveness, the Light Triad, and honesty-humility). Considering callousness is also an aspect of primary psychopathy, these results demonstrate the key role of callousness (and antagonism and primary psychopathy, more broadly) in the network of dark traits. As well, Vize, Miller, and Lynam (2020) used the Bass-Ackwards approach, structural equation modeling, and nomological network analysis found evidence suggesting that the dark core was not distinct from low agreeableness and found a latent correlation between the dark core and agreeableness of $r = -0.90$ and almost perfect profile dissimilarity.

Taking the dark core research a step further, Moshagen, Hilbig, and Zettler (2018) used a bifactor model approach and included a wide array of traits that are viewed as socially aversive (i.e., egoism, Machiavellianism, moral disengagement, narcissism, psychological entitlement, psychopathy, sadism, self-interest, and spitefulness). They found a common factor that they labelled the 'D factor of personality' which was

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[8] Though PID-5 antagonism is not equivalent to low agreeableness, research has suggested that it can be seen as a maladaptive variant of (low) agreeableness (Kreuger & Markon, 2014).

replicated in multiple studies. In a second study, they found that this general D factor predicted selfish choices in the dictator game, as well as cheating in a coin-flip game. In a subsequent study, they also found that the D factor predicts various criteria incrementally over the effect of honesty-humility, providing some evidence that although honesty-humility is a good proxy of the core of dark personality features, it is not a perfect candidate. Further research has supported the validity of the D factor across age and genders (Hartung, Bader, Moshagen, & Wilhelm, 2021) and research has also supported the relative temporal stability of the D factor (though there is a slight downward trajectory over time), as well as its role in predicting change in dark traits (Zettler, Moshagen, & Hilbig, 2020). Likewise, using bifactor exploratory structural equation modeling, McLarnon and Tarraf (2021) found that the correlation between honesty-humility and the general dark factor extracted from the SD3 was approximately equal (or slightly weaker) to the correlation between honesty-humility and the specific Machiavellianism factor, providing evidence against the notion that the dark core represents the reverse of honesty-humility. Another candidate for the core of the Dark Triad is a fast life strategy (e.g., Jonason, Slomski, et al., 2012; Volmer, Koch, & Wolff, 2019). Volmer et al. (2019) reported that the shared variance of the Dark Triad is related to low life satisfaction, which does not necessarily correspond to honesty-humility, and instead more closely follows the life history interpretation.

This body of the Dark Triad literature continues to grow and new insights have been incoming. For example, recently Schermer and Jones (2020) extracted a dark core variable and found that it was best explained by genetic and unique environmental factors (after age and sex effects were controlled). These results are preliminary and are difficult to interpret in terms of heritability of the dark core, but they do encourage further dark core research from a behaviour genetic perspective that may provide more insight on the nature of the core.

4.1. The bifactor model approach

A growing number of scientific articles aim to separate the shared variance and trait-specific variance using bifactor modeling (e.g., Czarna, Jonason, Dufner, & Kossowska, 2016; Gamache, Savard, & Maheux-Caron, 2018; Jonason & Luévano, 2013; Maneiro, López-Romero, Gómez-Fraguela, Cutrín, & Romero, 2019; Mclarnon & Tarraf, 2017; Moshagen et al., 2018; Savard, Simard, & Jonason, 2017; Volmer et al., 2019). A bifactor structural model identifies a general factor representing common variance among a number of scale items, as well as specific factors which represent the common variance of items that are orthogonal to the general factor (Reise, 2012). Under the assumption that the Dark Triad is a cluster of overlapping but distinct personality traits, a bifactor model with three specific factors should provide a good fit to the data. Despite the bifactor model's newfound popularity, there are number of limitations and misuses of the measure that are seldom noted. First, the general factor is often difficult to interpret (Reise, 2012). In the case of the dark core, researchers have been making significant progress in this area. Related to the issue of interpretability, bifactor models are not necessarily free from the perils of partialing, as residualized specific factors are no longer the raw score constructs that they represent (Vize, Collison, et al., 2018). Moreover, some have noted that improved model fit and strong correlations across measures do not necessarily guarantee that a bifactor structure exists (Bonifay, Lane, & Reise, 2017). Another notable limitation is that the bifactor model is too restricted to provide an accurate reflection of population item-response data (Reise, 2012). For instance, it is unlikely that that data will naturally output one common factor and additional orthogonal specific factors with zero loadings. Furthermore, when compared to other types of models (e.g., correlated factor models), bifactor models are often erroneously favoured based on common fit indices (Greene et al., 2019). Murray and Johnson (2013) have shown that fit indices are biased towards bifactor models regardless of how the true population model is structured. Part of this problem may be related to over-fitting (Bonifay

et al., 2017). Some research has indicated that bifactor models typically fit any data well, even implausible data (Bonifay & Cai, 2017), and that these models accommodate nonsense response patterns (Reise, Kim, Mansolf, & Widaman, 2016). Therefore, Murray and Johnson (2013) and Bonifay et al. (2017) state that decisions on choosing a model should not be based on best fit. This is not to say that bifactor modeling is not a useful tool to study dark personality traits; they can be useful, but must be interpreted correctly, and should be implemented with awareness and acknowledgement of the limitations of bifactor modeling.

4.2. Implementing a Dark Triad composite

Another popular method of researching the Dark Triad is using a Dark Triad composite. The Dark Triad composite involves treating the Dark Triad as a unidimensional scale and aggregating scores of each Dark Triad measure together to produce one Dark Triad total score. For example, Jonason et al. (2009) conducted a mediation analysis on the relationship between sex and short-term mating behaviour using the Dark Triad composite score as a partial mediator. As predicted, Jonason et al. (2009) found that the Dark Triad composite score partially mediated the relationship between sex and short-term mating behaviour. To justify their use of the composite measure, they argued that narcissism, Machiavellianism, and psychopathy are substantially correlated with one another and yielded a one factor solution labelled exploitive social style when entered into both an exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). However, there are inherent problems with this argument. Other than subjecting the same sample to both EFA and CFA arguably being a questionable practice (Henson & Roberts, 2006; Worthington & Whittaker, 2006), the intercorrelations among the Dark Triad in their sample ranged from weak to moderate (i.e., $r = 0.20$ to 0.39), suggesting that the traits are more distinct than they are similar. Furthermore, the one-factor solution obtained in the CFA accounted for only 53.09% of the total variance, indicating that approximately 47% of the variance was still unaccounted for in this solution. Lastly, the latent factor obtained from the data is not equivalent to a composite measure obtained by the data, as the former is composed of the shared variance of the three dark traits, while the latter is a combination of the shared variance and a mix of the traits' unique variance. Still, the practice of using a composite measure of the Dark Triad is quite common and the composite score has been found to have been associated with variables including short-term mating behaviour (Jonason et al., 2009), mate poaching, mate retention tactics (Jonason, Koenig, et al., 2010), relationship quality, life history strategies (Jonason et al., 2013), schadenfreude (Porter, Bhanwer, Woodworth, & Black, 2014), the Big Five domains and facets, meta-traits, (Jonason et al., 2013) and well-being (Aghababaei & Błachnio, 2015). The common use of this method has spurned significant criticism from other researchers. For instance, Glenn and Sellbom (2015) argued that aggregating the Dark Triad measures into a composite score fails to represent the important distinctions of the traits and therefore is theoretically problematic and presents limited usefulness. Moreover, they suggest that aggregating the Dark Triad into a composite essentially creates a measure of psychopathy that overemphasizes grandiose narcissism. Moreover, Jones and Figueredo (2013) presented a similar case and pointed out that the unique pieces of the Dark Triad traits are sometimes inconsistent or orthogonal to the other dark traits, and thus, combining to form a single score would not make sense. By contrast, using Mokken analyses, Carter et al. (2015) determined that the DD scale can be seen as a unitary construct in non-student populations, but not student populations. Moreover, they point out that some of the items do not function well for the Dark Triad composite measure across a number of different demographics (i.e., DD is non-invariant across age or sex).

5. Alternative models

Besides the Dark Triad, researchers have suggested the use of a number of additional dark trait models based on the introduction of the Dark Triad by Paulhus and Williams (2002). The two most notable are the Dark Dyad and the Dark Tetrad. In this section, we will discuss the two models and issues relevant to these models. Then, based on the criteria discussed earlier on, we provide additional suggestions for dark traits based on available evidence.

5.1. Dark Dyad

A number of authors have advocated for a 'Dark Dyad' configuration of dark traits. Using structural equation modeling, Egan, Chan, and Shorter (2014) found that a latent variable composed of psychopathy and Machiavellianism variance provided a better fit to the data than a latent variable with loadings from all three Dark Triad traits. The authors suggested that the Dark Triad may be better conceptualized as the Dark Dyad (with Machiavellianism and psychopathy), with narcissism as a separate but correlated construct. A limitation of this study, however, is the use of the DD and SD3 measures of the Dark Triad, which have been criticized for overemphasizing the overlap between Machiavellianism and psychopathy (e.g., Persson et al., 2019; Rogoza & Cieciuch, 2019). Similarly, using the SD3, Pailing et al. (2014) found that Machiavellianism and psychopathy loaded onto a single factor with low honesty-humility and low agreeableness (labelled antisociality), whereas narcissism loaded onto a separate factor including extraversion, indicating evidence for a Dark Dyad. Garcia, Adrianson, Archer, and Rosenberg (2015) came to a similar conclusion using the DD when they found that narcissism, but not Machiavellianism or psychopathy, was associated with positive emotions (albeit weakly) and Machiavellian and psychopathy were associated with negative emotions (as was narcissism). In the same vein, Garcia and Rosenberg (2016) found that Machiavellianism and psychopathy exhibit similar light character profiles and narcissism showed a distinct profile from the other two traits, suggesting the existence of a Dark Dyad. In a different study, the authors assessed the conditional relationships between the Dark Triad (e.g., the relationship between Machiavellianism and agreeableness in individuals who scored low on psychopathy and narcissism) and the Big Five (Garcia & González Moraga, 2017). Their results suggested that agreeableness was at the core of psychopathy, as well Machiavellianism when certain conditions were met, but not at all in narcissism (Garcia & González Moraga, 2017). Based on this evidence, the Garcia and González Moraga (2017) suggested that a Dark Dyad might be an appropriate structure of dark traits. On the other hand, in an investigation of the structure of the Dark Tetrad, Dinić, Bulut Allred, et al. (2020) found that CFA models in which psychopathy and Machiavellianism were combined did had slightly worse fit than models where psychopathy and Machiavellianism were separate. As in the aforementioned studies, only the short measures of the Dark Triad were used (SD3) by Garcia and Rosenberg (2016) and Garcia and González Moraga (2017). Using standard long measures of the Dark Triad, Kowalski et al. (2016) also suggested the existence of a Dark Dyad based on the correlations between the Dark Triad traits and the General Factor of Personality (GFP) – a metatrait theorized by some to be a prosocial dimension made of the common variance of the Big Five. Kowalski et al. (2016) found that both Machiavellianism and psychopathy were (almost identically) negatively correlated with the GFP, while narcissism was not, suggesting that narcissism was not as dark as the other two traits, hence leading to the suggestion that narcissism should be excluded from the Dark Triad. In similar style, Kowalski, Vernon, and Schermer (2017) proposed the existence of the Dark Dyad based on the greater similarity in vocational interest profiles between Machiavellianism and psychopathy than these two traits and narcissism. Papageorgiou, Denovan, et al. (2019), Papageorgiou, Gianniou, et al. (2019), and on the other hand, questioned narcissism's place in the Dark Triad as it predicts mental toughness and better psychosocial

and educational outcomes. Rogoza and Ciecich (2018), on the other hand, used both long and short measures of the Dark Triad and employed the Bass-Ackwards approach. They found that at the scale level, Machiavellianism and psychopathy were virtually indistinguishable and can be seen as one construct.

One limitation of many of these studies is a lack a of theoretical rationale that justifies creation of a Dark Dyad. In addition, they rely mostly on the argument that Machiavellianism and psychopathy are more similar to each other than they are to narcissism or relatedly, narcissism is 'lighter' than the others. Of course, similarity is related to one of the criteria recommended in this review (i.e., non-redundancy). However, only one of the papers (i.e., Rogoza & Ciecich, 2018) which discuss the Dark Dyad made a case for the redundancy of Machiavellianism and psychopathy. Moreover, there is some confusion in the literature regarding what the Dark Dyad constitutes. Some researchers describe the Dark Dyad as the latent variable representing Machiavellianism-psychopathy (e.g., Egan et al., 2014), whereas other researchers describe them as two separate traits of Machiavellianism and psychopathy (Kowalski et al., 2016). Others have suggested that the dyad comprises a trait relating to the self (i.e., narcissism) and a trait relating to others (i.e., Machiavellianism and psychopathy; Garcia & Rosenberg, 2016). Finally, a dyad consisting of narcissism and an amalgamation trait of Machiavellianism and psychopathy has been suggested (e.g., Garcia & González Moraga, 2017). Other research has made a differentiation between different aspects of narcissism and has suggested that the antagonistic aspect of narcissism (narcissistic rivalry) is more similar to Machiavellian and psychopathy (Dinić et al., 2021; Rogoza et al., 2019); this does not seem to be the case when using a model of narcissism that does not distinguish between antagonistic and grandiose aspects (e.g., Dinić, Bulut Allred, et al., 2020). Future Dark Dyad research should clarify and differentiate between the different models that have been labelled the Dark Dyad. Perhaps more importantly, future research should use a theoretical rationale for reducing the Dark Triad to a Dark Dyad, such as the criteria proposed earlier on in this review.

5.2. Dark Tetrad

Many researchers have advocated for the inclusion of subclinical sadism (also known as everyday sadism) into the dark cluster (i.e., the Dark Tetrad of personality). Everyday sadism is defined a tendency towards humiliating and hurting others for the purpose pleasure or asserting dominance (O'Meara, Davies, & Hammond, 2011). In terms of the Big Five, Kowalski, Di Pierro, Plouffe, Rogoza, and Saklofske (2020) found that everyday sadism is correlated negatively with agreeableness and conscientiousness and showed null or negligible correlations with the other Big Five traits. Moreover, in their meta-analysis, Kowalski et al. (2020) found that sadism was significantly positively correlated with the Dark Triad traits with correlations ranging from $r = 0.27$ to 0.58. Moreover, sadism has been associated with antisocial behaviours such as internet trolling (Buckels, Trapnell, Andjelovic, & Paulhus, 2018; Buckels, Trapnell, & Paulhus, 2014), aggression (Duan, Yang, Zhang, Zhou, & Yin, 2021), preferences for violent video games (Gonzalez & Greitemeyer, 2018), schadenfreude towards mourners (Lee, 2019), antisocial Tinder (dating application) use (Duncan & March, 2019), bullying (van Geel, Goemans, Toprak, & Vedder, 2017), sexual aggression (Russell, Doan, & King, 2017; Russell & King, 2016), vandalism (Pfattheicher, Keller, & Knezevic, 2019), unprovoked aggression (Buckels, Jones, & Paulhus, 2013; Reidy et al., 2011), cyberstalking (Smoker & March, 2017), religious radicalization (Chabrol, Bronchain, Morgades Bamba, & Raynal, 2019) and juvenile delinquency (Chabrol et al., 2009). Recent research has also suggested that sadistic tendencies could be induced in individuals that are already high in sadism, suggesting a malleable component, however more research is needed to substantiate this claim (Pfattheicher & Schindler, 2015; Themelidis & Davies, 2021).

A vital question proposed in the research literature is: does everyday sadism belong in the Dark Tetrad? A number of studies have attempted to answer this question and most of these studies have relied on correlations with the Dark Triad and incremental validity over the Dark Triad traits in predicting external outcomes. This has led some to conclude that sadism is redundant with psychopathy. On one hand, sadism is strongly correlated with psychopathy (Kowalski et al., 2020), has almost identical patterns of correlations with empathy and trolling as psychopathy (Sest & March, 2017), and does not predict a number of outcomes beyond the effect of the Dark Triad, including moral decision-making (Karandikar, Kapoor, Fernandes, & Jonason, 2019) and perceiving victim vulnerability based on gait cues (Ritchie, Blais, & Forth, 2019). Moreover, sadism only negligibly predicted the seven deadly sins and moral foundations beyond the effect of the Dark Triad (Jonason, Zeigler-Hill, & Okan, 2017). Coming to the same conclusion, Bertl, Pietschnig, Tran, Stieger, and Voracek (2017) found that the Dark Triad is better seen as a latent dark core and adding sadism into the equation does not improve the construct's explanatory value.

On the other hand, there are also an abundant number of studies that support the position of everyday sadism within the Dark Tetrad. For instance, Pajevic, Vuksavljevic-Gvozden, Stevanovic, and Neumann (2018) found that sadism predicted performance on an emotion recognition task beyond the effect of the Dark Triad traits. Additionally, Min, Pavisic, Howald, Highhouse, and Zickar (2019) found that sadism incrementally predicted interpersonal deviance, instigated incivility, and cyberbullying frequency, beyond the effect of the Dark Triad; moreover, they found that relative weight analyses as the most important predictor of workplace mistreatment among the Dark Tetrad traits. In the same vein, Rogers, Le, Buckels, Kim, and Biesanz (2018) found that sadism independently predicted aspects of interpersonal perception beyond the effect of the Dark Triad. To the same point, using multiple measures of sadism, Dinić, Bulut Allred, et al. (2020) found that sadism predicted attitudes towards dangerous groups beyond the effect of the Dark Triad, sex, and age. In another study, Johnson, Plouffe, and Saklofske (2019) entered measures of narcissism, Machiavellianism, psychopathy, and sadism into an exploratory factor analysis and found, despite some overlap between sadism and psychopathy, six interpretable factors emerged, representing narcissism, Machiavellianism, psychopathy, physical sadism, verbal sadism, and vicarious sadism. Međedović (2017) found that sadism also incrementally predicts positive emotional responses to violent stimuli over the effect of psychopathy. Some studies have also suggested that sadism and the Dark Triad traits have distinct patterns of associations with agency and communion (Southard et al., 2015). Despite findings supporting sadism's addition to form a Dark Tetrad, these studies do not make a case for sadism belonging within the dark cluster based on the aforementioned criteria (i.e., incremental prediction of antisocial outcomes beyond the effect of the Dark Triad and the presence of callousness and interpersonal manipulation/honesty-humility). To satisfy the incremental criterion, everyday sadism has been found to incrementally predict vandalism (Pfattheicher et al., 2019), internet trolling (Buckels et al., 2018), cyberstalking (Smoker & March, 2017), traditional bullying and cyberbullying (van Geel et al., 2017) beyond the effect of the Dark Triad. Moreover, in a behavioural study, Buckels et al. (2013) found that only sadism was significantly correlated with a willingness to work for the opportunity to hurt an innocent person. Still, despite the strong empirical basis for the non-redundancy and for the incremental validity of sadism, the literature overwhelmingly relies on multiple regression and is subject to the perils of partialing (as discussed in an earlier section), just like the literature examining the putative redundancy of Machiavellianism. To our knowledge, there is no research so far that tests for significant differences in correlations between psychopathy and sadism and external variables, as suggested by Miller et al. (2019).

As for the callousness and interpersonal manipulation/honesty-humility criterion, a plethora of evidence unanimously demonstrates that sadism meets this criterion. Research has consistently shown that everyday sadism is negatively correlated with honesty-humility (Book et al., 2016; Johnson et al., 2019; Međedović & Petrović, 2015; Pineda et al., 2021; Plouffe, Saklofske, & Smith, 2017; Plouffe, Smith, & Saklofske, 2019). Unsurprisingly, research has also consistently indicated substantial positive correlations between everyday sadism and callousness and interpersonal manipulation (Book et al., 2016; Međedović, 2017; Međedović & Petrović, 2015). Therefore, though there is still room for improvement in terms of sadism research (i.e., to mitigate the perils of partialing), there is evidence for the utility of sadism's addition into the Dark Triad to form a tetrad.

5.3. Potential inclusions into the dark cluster

The expansion of the Dark Tetrad will likely not end with the inclusion of sadism (e.g., Marcus & Zeigler-Hill, 2015). Marcus and Zeigler-Hill (2015) for instance, suggested the inclusion of several possible additions to the dark cluster, such as spitefulness, greed, dependency, and perfectionism. In addition, others have suggested social dominance orientation (Jones & Figueredo, 2013) and status-driven risk taking (Visser, Pozzebon, & Reina-Tamayo, 2014). Further, Watts et al. (2017) suggested potential inclusions that may be considered dark if Marcus and Zeigler-Hill's (2015) Dark Tent criteria were to be accepted; Watts et al. (2017) posited that vulnerable narcissism, borderline personality, oppositionality, jealousy, hubristic pride, paranoia, workaholism, schadenfreude, irritability, and Type A personality may fit into the Dark Tent. So far, the respective literatures associated with these traits have not sufficiently examined the dimensions in relation to the criterions described in this paper, thus it is still unclear if these traits should be considered dark.

6. Conclusions

The literature investigating dark personality dimensions is extensive, however the key questions that are currently being debated are often answered with empirical reasoning with little or no theoretical basis. One salient example of this is the virtually endless proposals of candidate dark traits based on non-existent or non-consensual criteria, which can introduce new jangle fallacies into a literature that is already struggling to solve the putative Machiavellianism-psychopathy jangle fallacy. Moreover, such a willy-nilly atheoretical approach may overexpand the dark cluster until the label is no longer meaningful. In this comprehensive overview of the literature, we have presented the current state of the dark personality literature, including its origins, evolutionary theories, and position in personality taxonomies. Moreover, we have discussed issues pertaining to atheoretical conclusions drawn regarding the structure of the Dark Triad, problems and support for previously proposed dark traits criteria, and proposed explicit criteria that should be adopted for dark personality trait research. Issues such as 'the perils of partialing' and the alleged redundancy of the Dark Triad traits have also been discussed. In the present review, we have described issues associated with the dark core, bifactor models, composite measures of dark personality traits. Finally, alternate models and issues associated with these models have also been described (i.e., Dark Dyad, Dark Tetrad).

In this paper, we argued for the need of criteria for consideration as a dark trait. Previous investigations have attempted to manufacture arguments for traits' conceptualizations as 'dark' without legitimate or consensual theoretical justification (mostly as a result of the absence of theoretical rationalizations). Others have attempted to solve this issue by proposing various criteria for inclusion. For example, Furnham et al. (2013) proposed callousness as the main criterion that defines the Dark Triad. Jones and Figueredo (2013) built on this by proposing the presence of callousness and interpersonal manipulation as the defining features of dark traits, akin to deliberate malevolence. There is also considerable research suggesting that the combination of callousness and interpersonal manipulation is identical to low honesty-humility (e.

g., Lee & Ashton, 2014). Marcus and Zeigler-Hill (2015) proposed an alternative criterion inconsistent with the malevolent essence of the previously suggested criteria, as well as the seminal work on the Dark Triad (e.g., Paulhus & Williams, 2002). Marcus and Zeigler-Hill (2015) introduced the 'Big Tent' of dark personality traits which emphasizes problematic outcomes for the self and others as criteria. In this review, we echo the positions of Jones and Figueredo (2013) and Lee et al., (2014), who contended that the combination of callousness and interpersonal manipulation (otherwise conceptualized as low honesty-humility) is a necessary component for classification as a dark trait. Moreover, incremental utility and non-redundancy should be considered as necessary criteria for inclusion into the dark cluster of personality. Relatedly, researchers should be mindful of the 'perils of partialing' (as laid out by Lynam et al., 2006; Miller et al., 2019; Sleep et al., 2017; Vize, Lynam, et al., 2018) when using a multivariate approach, and should include an inspection of bivariate correlations, as well as significance testing of significant differences in dependent correlations, when investigating the redundancy of traits.

Furthermore, based on our criteria, the question of redundancy of Machiavellianism and psychopathy is a complicated issue. The bulk of self-report evidence suggests that Machiavellianism, as currently measured, is the same as psychopathy, indicating that Machiavellianism measures lack construct validity. The problem with this conclusion is that the bulk of the behavioural and biological evidence lead us to a different conclusion – that measures of Machiavellianism are adequate at assessing construct that they are intended to measure. Such conflicting accounts leave Dark Triad researchers who are interested in the redundancy debate in a particularly fascinating, but uncomfortable position.

Recent work has exhibited potential to clarify these inconsistent findings. First, Kowalski et al. (2020) suggested employing narrow bandwidth external measures to correlate with Machiavellianism and psychopathy, including significant testing for differences in correlations. This method would simplify and clarify subtle similarities and differences between the two overlapping traits. Another promising avenue has been presented by Szabó and Jones (2019) who presented a case for examining gender differences in the manifestation of these traits, as they may contribute to drastic inconsistencies in dark traits' relationships with external criteria. Moreover, biological investigations including both measures of Machiavellianism and psychopathy may also be used to examine the differences and similarities between these dimensions at a more proximal level.

Based on the reviewed evidence, it is evident that the most suitable representation of the core of the Dark Triad is honesty-humility. At the very least, it is apparent that the dark core is strongly related to honesty-humility (according to some accounts, at $r = -0.95$; Hodson et al., 2018) and is at least an excellent proxy measure for what the core represents. At the same time, bifactor models are frequently implemented in the dark personality literature to simultaneously examine the shared core and the unique variance. Despite the appeal of bifactor models, they have a number of serious limitations to consider both prior to data analysis and while interpreting results. Another common practice is to produce composite measures of the Dark Triad, which, based on the conflicting theoretical differences between the traits (Machiavellian strategic planning vs. psychopathic low self-control and impulsiveness), are inappropriate.

Other models derived from the Dark Triad have also been suggested, including the Dark Dyad and Dark Tetrad. The Dark Dyad literature is largely inconsistent in terms of Dark Dyad definitions. The empirical Dark Dyad literature is also overwhelmingly based on short measures of the Dark Triad, which overemphasize overlapping trait characteristics. Moreover, much of the research that explicitly suggest the existence of the Dark Dyad rely on atheoretical criteria (e.g., Machiavellianism and psychopathy are more similar to each other than they are to narcissism). Future research that aims to investigate the existence of the Dark Dyad should use theoretical rationale (as the one currently proposed) and

should clarify the meaning of the Dark Dyad to avoid potential jingle fallacies. The Dark Tetrad literature, on the other hand, provides a strong case for including sadism into the category of dark traits, though this contention is not without controversy. Based on the reviewed evidence and the criteria proposed in this paper, sadism is a natural and appropriate step forward. Still, this research could be improved by adopting bivariate correlations and significant difference testing of these correlations to differentiate sadism from other traits (e.g., psychopathy) without risking the perils of partialing. Other potential additions to the dark trait category have also been briefly mentioned in this paper, but currently, there is not enough evidence to suggest that any of these traits warrant inclusion into a dark cluster.

The present review has provided a broad perspective of pertinent issues within the Dark Triad literature. Overall, in order for the field to resolve these issues, consensual criteria for inclusion as a dark trait is required, as is an awareness of the issues pertaining to their quantitative analyses. The aim of this paper was to provide a snapshot of and introduction to the current literature and to provide a path to a more parsimonious and rigorous science of dark traits.

Declaration of competing interest

None.

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