Bad Company: Exploring Cooperative Behaviors in Dark Personality Traits

Matheus Paniz Borges[1] , Arthur Guadagnini Bigarella[1] , Sthefanie Costa Espirito Santo[2] , Anna Clara Ribeiro Lessa[1] , Guilherme Freiberger Friedrich[1] , & João Centurion Cabral[1]

1   Social Neuroscience Laboratory, Institute of Human and Information Sciences, Federal University of Rio Grande (FURG), Brazil
2   Postgraduate Program in Health Sciences, Faculty of Medicine, Federal University of Rio Grande (FURG), Brazil

Abstract

Dark personality traits have garnered considerable attention due to their profound social implications. Although it may seem counterintuitive, individuals high in these traits are often required to cooperate, whether in workplaces, team sports, or even in criminal organizations, all of which often operate under mutual benefit rules. However, the relationship between dark personalities and cooperative behavior remains insufficiently studied. This paper examines whether higher levels of dark traits influence cooperative tendencies and contrasts them with competitive orientations. We conducted two studies in distinct contexts. The first involved university students and alumni (n = 1,070), and the replication focused on athletes (n = 253). We used scales to measure the dark triad traits (including separate instruments for Machiavellianism, narcissism, and psychopathy), as well as cooperative and competitive orientations. Additionally, participants' cooperative decision-making was assessed using the Prisoner's Dilemma. Overall, results indicated that the dark triad is linked to heightened competitiveness and diminished cooperativeness, yet each trait exhibited a distinct behavioral profile. Narcissism emerged as the least predictive of low cooperation but the strongest driver of competitive behavior, while psychopathy was the strongest predictor of uncooperativeness, despite showing weaker links to competitiveness. Machiavellianism demonstrated intermediate effects on both social strategies. These findings provide insights into the interplay between dark personalities and social behavior, contributing to a deeper understanding of the adaptive strategies employed by individuals with these traits across different contexts. Furthermore, they shed light on how opportunistic cooperation may serve as a means to mask antisocial intentions.

Over the past few years, there has been growing interest in investigating personality traits associated with antisocial behaviors, particularly narcissism, Machiavellianism, and psychopathy (Muris et al., 2017). Until the early 21st century, these traits were analyzed and measured independently; however, Paulhus and Williams (2002) demonstrated that these personality traits are strongly correlated, despite having distinct characteristics, and coined the term "dark triad of personality" to describe these socially deviant behavioral tendencies. The members of this triad share core characteristics, including a lack of empathy, remorse, and guilt; heightened aggressiveness; manipulative behavior; and emotional coldness (Furnham et al., 2013; Giammarco & Vernon, 2015; Paulhus & Williams, 2002). Another well-documented factor is low scores on agreeableness and honesty-humility (Furnham et al., 2013; Paulhus & Williams, 2002). Moreover, dark traits are strong and consistent predictors of criminal behavior, including involvement in

organized crime groups (Gøtzsche-Astrup et al., 2022; Pechorro et al., 2022; Wright et al., 2017). Despite the increasing interest in the dark side of human nature, the social interaction patterns and social strategies associated with these three personality traits remain not fully understood.

Aversive and antisocial behaviors are central to all components of the dark triad (Paulhus & Williams, 2002) and may potentially lead to criminal tendencies. Therefore, individuals with higher levels of these traits are expected to engage more frequently in conflicts and transgressive acts, disregarding or manipulating the interests and needs of others. However, there are different social strategies to deal with such conflicts, allowing either the appeasement or the escalation of agonistic interactions (Cabral & de Almeida, 2022; Egas et al., 2013; Tomasello et al., 2012). Thus, it is crucial to analyze the triad from the perspective of two seemingly opposite social strategies, which are particularly relevant for explaining both the current escalation of violent acts and urban conflicts around the world (e.g., Berti, 2023; Egas et al., 2013) and our survival as a species: cooperation and competition (Boyd & Richerson, 2009; de Almeida et al., 2015). The first involves prosocial behaviors, whereas the second is characterized by exploitative, individualistic, and selfish tendencies (Jonason et al., 2010). Overall, cooperation can be defined by the actions of individuals or groups that seek mutual benefits (Lindenfors, 2017), contrasting with competition, where an individual strives to outperform others for individual benefit (de Almeida et al., 2015; Puurtinen & Mappes, 2009). Although competitive and cooperative behaviors are commonly seen as opposites — as if they exist on a single continuum where greater competitiveness implies lower cooperation — the relationship between these social orientations is more complex: they can coexist and even complement each other in certain contexts (Lu et al., 2013; Meng et al., 2025). In fact, competitiveness and cooperativeness are not simply opposite poles of a single trait but rather distinct traits that an individual can possess to varying degrees (Lu et al., 2013; Vliert, 1999).

Theoretical Background and Hypotheses

Can Individuals with High Antisocial Tendencies Exhibit Cooperative Behavior?

Growing empirical evidence strongly suggests that cooperative and competitive behaviors are not mutually exclusive; rather, they often occur simultaneously, as observed in organized crime groups. It is intuitively expected that those with high scores on dark traits may often forego cooperative strategies, opting exclusively for competitive tendencies in their social interactions (Jonason et al., 2015). However, it is common for criminal groups — such as criminal syndicates, gangs, drug trafficking cartels, mafias, financial fraud rings, and paramilitary groups, among others — to adopt cooperative orientations (Campana & Varese, 2013; Sanchez & Cruz, 2024). Many criminal associations, whether organized or opportunistic, collaborate internally to be more effective in achieving their objectives and in external competitions (and conflicts); on certain occasions, they even collaborate externally (with rivals) if doing so serves their strategic interests (Campana & Giovannetti, 2025; Sanchez & Cruz, 2024). Within criminal groups, there is a strong motivation for mutual collaboration: members often refer to such groups as "family" and adhere to loyalty codes (e.g., omertà) (Schneider & Schneider, 2024). This internal cooperation is manifested in acts such as sharing the proceeds of criminal activities among accomplices, protecting members from external aggression, and avenging any attacks on a member of the group.

Certainly, competitive and cooperative behaviors can coexist as independent traits or strategies within an individual, manifesting depending on the context (Lu et al., 2013). An exclusively competitive and exploitative strategy, for example, would likely be socially aversive, maladaptive,

or even detrimental to both the individual and the group as a whole. If dark personality traits are fundamentally competitive, as intuition suggests, how could they be socially advantageous for individuals in the long term? From an evolutionary perspective, human history has depended on an intricate interplay of competition and cooperation, as groups must rely on internal cooperation to compete against one another (Handley & Mathew, 2020). Genetically-influenced behavioral phenotypes, such as certain personality traits (Noblett & Coccaro, 2005; Penke et al., 2007) and social orientations (Cesarini et al., 2008), which facilitate survival and differential reproduction, represent adaptations of populations to physical and/or social environments (Buss, 1995; Jonason et al., 2015). In this regard, the three traits of the dark triad have a relevant genetic component (Schermer & Jones, 2020; Vernon et al., 2008) and can offer considerable ecological and individual advantages (Barbosa & Silva, 2023; Zhu et al., 2024). This suggests that exploitative and socially aversive strategies of individuals with darker personality traits may be adaptive for them in the long term (Barbosa & Silva, 2023). Consequently, these strategies cannot be easily perceived by others, and this masking may, in some cases, occur through the adoption of cooperative behaviors.

Undeniably, dark traits are seen as malevolent manifestations of an agonistic and individualistic orientation (Jonason et al., 2010); an example of this is the fact that Machiavellians and psychopaths perceive their workplace as a competitive environment (Jonason et al., 2015). Indeed, a competitive approach may provide some advantages to these individuals in several contexts. Recent studies have shown that athletes with high dark triad scores have better sports performance, and this is mediated precisely by their competitive orientation (González-Hernández et al., 2020; Vaughan & Madigan, 2020). Moreover, elite athletes have higher dark trait scores than amateur athletes, who, in turn, score higher than non-athletes (Vaughan et al., 2018). Given the selfish and self-centered characteristics prevalent in individuals with darker personalities, they are expected to adopt predominantly competitive strategies over cooperative ones. The three components of the triad concern individualistic and selfish behavioral patterns or means to achieve individual benefits (Deutchman & Sullivan, 2018; Jonason et al., 2010; Jones, 2013). People with higher levels of psychopathy, for example, tend to bet more easily on a game aiming for individual gain with someone else's money (Jones, 2013), even when it likely results in losses for the other person. Furthermore, psychopathic traits predict monetary loss when a negotiation's success depends on the parties' cooperation (Ten Brinke et al., 2015). However, counterintuitively, the tendency to adopt competitive or cooperative strategies may not be as immediate for the other two components of the dark triad.

Machiavellians and narcissists could act cooperatively in certain contexts when this strategy results in a direct benefit. Machiavellians, who are cautious manipulators (Jones, 2013), have a long-term view and do not usually perform acts that may jeopardize their goals (Christie & Geis, 1970), demonstrating reasonable impulse control (Jones & Paulhus, 2011; Malesza, 2020) and sensitivity to their social context (Bereczkei & Czibor, 2014; Deutchman & Sullivan, 2018). In a public goods game study, Machiavellian individuals contributed more when they perceived that there were many altruistic people in the group, and ended up winning the game, as they knew that their cooperation was being observed by others (Bereczkei & Czibor, 2014). In turn, narcissists, characterized by their pervasive sense of grandiosity and constant search for admiration, can be cooperative due to their interest in pleasing others to achieve higher status by being seen favorably and using social comparison and reciprocity tactics (Jonason & Webster, 2012). Despite their inflated sense of self-worth and entitlement (Jones, 2013), narcissists might need others to reinforce their social status (Morf & Rhodewalt, 2001). In Prisoner's Dilemma games — in which

the reciprocal cooperative behavior is more advantageous to both players since one does not betray the other — the narcissistic trait may not be a good predictor of betrayal (Deutchman & Sullivan, 2018; Malesza, 2020).

Going further, a recent study found that Machiavellianism, narcissism, and even psychopathy did not significantly predict defection (non-cooperative decision) in a one-shot Prisoner's Dilemma game; only the overall dark triad score reached a significant level (Lainidi et al., 2022). Of the three components of the dark triad, psychopathy appears to exhibit the least cooperative tendencies, being the trait most strongly associated with impulsivity (Jones & Paulhus, 2011; Myznikov et al., 2024). In the Prisoner's Dilemma, impulsivity is associated with a higher tendency to betray other players (Lainidi et al., 2022; Malesza, 2020), acting in a way that maximizes individual advantages, even to the detriment of others' well-being, as expected in competitive interactions. Nevertheless, even findings on psychopathy remain inconsistent, as several studies have failed to detect a significant relationship between psychopathic trait and impaired cooperative decision-making (e.g., Deutchman & Sullivan, 2018; Lainidi et al., 2022).

The Present Studies and Hypotheses

Cooperative and competitive interactions have shaped both human evolutionary history and present-day social dynamics. Some contexts demand heightened cooperation, while others favor increased competition. In fact, people seek approval, acceptance, and prestige just as much as they pursue power, status, and social control, either through cooperation or competition, possibly balancing and interleaving these strategies of social interaction (Cheng et al., 2013; Maner & Case, 2016). However, an imbalance in these strategies can lead to manipulation, exploitation, and the escalation of conflicts. The presence of individuals with dark traits in professional, sports, and criminal settings has well-documented implications for social groups. Therefore, it is crucial to investigate how dark traits influence cooperative behaviors and to determine whether these traits predict decision-making in social dilemmas. Thus, we hypothesize that:

H1. Although all dark traits are strongly linked to competitive behaviors, Machiavellianism and narcissism will not significantly predict uncooperative tendencies.

Unlike psychopathy, characterized by impulsivity and a disregard for social consequences, Machiavellians, as strategic manipulators, and narcissists, driven by a need for social validation, may exhibit cooperative behaviors when doing so serves their self-interest. To test this, we conducted two studies examining the predictive role of dark traits in cooperation and competition orientations across distinct populations. Study 1 examined these associations in higher education students and alumni, while Study 2 aimed to replicate the findings in athletes.

Study 1

Method

Participants

This predictive study involved 1,317 students and alumni from public and private Brazilian universities. Participants ranged in age from 18 to 67 years (M = 32.18, SD = 6.82) and included individuals of all genders (females: 67.2%, males: 32.2%, and non-binary: 0.6%). Participants were recruited through random contacts at higher education institutions accredited by the Brazilian

Ministry of Education: first, we accessed the official list of universities authorized to operate in Brazil; next, we randomly selected those to which we would send invitations; we then contacted each selected university's program coordinators individually by email, asking them to forward the invitations to their enrolled and former students; and we repeated this process until we reached the previously determined sample size. Although all 1,317 volunteers initially agreed to participate, 247 did not complete the data collection stage and were subsequently excluded from the analysis, leaving 1,070 participants in the final sample. This final sample size exceeded the minimum required, which was calculated based on a 95% statistical power. This research received approval from the Research Ethics Committee of the Federal University of Rio Grande (approval code 47682121.5.0000.5324).

Procedure

Data collection was conducted virtually using the SoSci Survey software, an online platform specialized in secure, anonymous data collection for scientific research. Participants received detailed information about the study procedures, risks, and benefits before digitally signing an informed consent form. To minimize response bias, participants were given a cover story suggesting the study was broadly about physical health, behavioral patterns, and success strategies. This approach ensured informed consent without revealing the true objectives of the study. Data collection involved self-report instruments and behavioral tasks over two stages in consecutive weeks. In the first stage, participants completed a consent form and accessed psychological assessment materials in the following order: a brief sociodemographic, personal, and health questionnaire; measures of cooperative and competitive tendencies; the dark triad assessment; and a behavioral task assessing cooperative decision-making. Participants were informed at the end of Stage 1 that they would be contacted one week later for Stage 2. In the second stage, an access link was sent directly by email to a random subsample of participants, as previously communicated, exactly 7 days after each participant completed Stage 1, in order to replicate the findings and minimize potential situational influences on the dispositional variables measured. Participants had up to 7 days to complete this stage, and those who did not respond within 48 hours received a reminder email. A total of 543 participants accessed the new link and completed the following instruments: a social desirability scale and specific scales of Machiavellianism (MACH-IV), narcissism (Narcissistic Personality Inventory), and psychopathy (Levenson Self-Report Psychopathy scale). After completing the second stage, a debriefing was conducted to clarify the study's objectives and hypotheses and to answer any additional questions from the participants. The entire data collection process, including both stages, took approximately 45 minutes.

Measures

Personal, Sociodemographic, and Health Information. Participants completed a brief questionnaire designed specifically for this study to gather personal, sociodemographic, and health information. The questionnaire collected data on age, gender, use of medications and hormones, and pre-existing diagnoses of psychiatric and neurological disorders, among other filler questions, which were designed to obscure the true objective of the study and prevent participants from discerning its actual purpose.

Dark Personality. The dark triad personality traits — Machiavellianism, psychopathy, and narcissism — were assessed using the Dark Triad Dirty Dozen scale (DTDD; Jonason & Webster,

2010). This instrument consists of 12 items in a 5-point Likert format, ranging from "Strongly disagree" (1) to "Strongly agree" (5). Recently adapted and validated for the Brazilian context by Gouveia et al. (2016), the DTDD demonstrates high psychometric quality with Cronbach's α values of 0.85 for Machiavellianism, 0.84 for narcissism, and 0.72 for psychopathy. The scale includes four items for each of the dark triad traits.

We also used specific instruments to measure each personality trait independently. To measure Machiavellianism, we used the MACH-IV scale (Christie & Geis, 1970), which contains 20 items in a Likert format, ranging from (1) "Strongly disagree" to (5) "Strongly agree". To assess narcissism, we employed the 16-item version of the Narcissistic Personality Inventory (NPI; Ames et al., 2006), a forced-choice measure where each item presents a pair of statements, and participants choose the one that best describes them. Finally, psychopathy was measured using the 26-item Levenson Self-Report Psychopathy scale (LSRP; Levenson et al., 1995), adapted and validated for the Brazilian culture (Hauck-Filho & Teixeira, 2014). Participants indicated their degree of agreement on a scale from (1) "Strongly disagree" to (4) "Strongly agree". This scale comprises two factors: primary psychopathy (characterized by a lack of empathy and emotional coldness) and secondary psychopathy (characterized by impulsiveness).

Cooperation and Competition. The behavioral tendencies of participants to cooperate and compete were measured using the Cooperative/Competitive Strategy Scale (CCSS) (Simmons et al., 1988). This scale consists of 19 items, with eight items assessing cooperative strategies for achieving success and 11 items assessing competitive strategies. Both subscales demonstrate high test-retest reliability (cooperation: 0.75; competition: 0.84). To estimate the internal consistency of these subscales in our sample, we calculated Cronbach's α coefficient. The cooperation subscale had an α of 0.82, while the competition subscale had an α of 0.79.

Moreover, we examined participants' cooperative decision-making through the Prisoner's Dilemma (Rapoport & Chammah, 1969). The Prisoner's Dilemma is a classic non-zero-sum game, widely studied in game theory as a measure of social cooperation. The game consists of a hypothetical situation presented as follows: two suspects, A and B, are arrested by the police. There is insufficient evidence to convict them, so they are held in separate cells and offered the same deal. If one of them confesses (betrays the partner), while the other remains silent, the one who confesses is set free, while the silent accomplice serves ten years in prison. If both remain silent (cooperate with each other) the police can only convict each suspect to six months in prison. On the other hand, if both confess (betray their partner) they will each spend five years in jail. Each prisoner makes the decision unaware of the other's choice. Faced with this dilemma, after explaining the hypothetical scenario and presenting the matrix of possible outcomes, participants chose the strategy they considered most appropriate (betraying prisoner B to maximize personal gain or cooperating with prisoner B to seek a common benefit), providing a measure of cooperative decision-making.

Social Desirability Bias. Social desirability is the tendency some participants have to present themselves in a favorable light by responding to behavioral surveys in a socially approved and acceptable manner (Krumpal, 2013). Social desirability bias can be considered a type of response bias and can compromise the quality of research reports, especially when measuring overt attitudes and socially undesirable personality traits. To control for this limitation and confounding factor, we employed the short version of the Marlowe-Crowne Social Desirability Scale (MCSD; Crowne & Marlowe, 1960), which consists of 20 items. This instrument was adapted to the Brazilian context by Ribas and colleagues (2004) and demonstrated appropriate psychometric properties.

Data analysis

First, we tested the assumptions of normality and homoscedasticity using the Shapiro–Wilk and Levene's tests, respectively, alongside evaluations of kurtosis, skewness, and graphical residual analyses. No violations of these assumptions were found. Next, we conducted separate simple linear regressions to examine whether dark personality traits — operationalized via the dark triad composite score (DTDD) and its Machiavellianism, psychopathy, and narcissism subscales, as well as through specific trait measures (i.e., Mach-IV, NPI, and LSRP) — predicted participants' levels of cooperation and competition (both measured using the CCSS). Because cooperative decision-making (as measured by the Prisoner's Dilemma task) was coded as a binary outcome (i.e., non-cooperative choice or cooperative choice), we employed logistic regression models to determine whether dark triad traits and each specific trait measure predicted the likelihood of cooperative decision-making. Subsequently, models were replicated while controlling for social desirability (MCSD), which was included as a covariate to evaluate whether any observed relationships might be confounded by self-presentation biases. All tests were two-tailed, and the significance level was set at $\alpha = 0.05$.

Results

Table 1 presents the descriptive statistics for the study's main measures. First, we tested whether the dark triad and its subcomponents (i.e., DTDD subscales) predict competitive and cooperative behavior tendencies, as well as cooperative decision-making in the Prisoner's Dilemma. Then, we performed the same hypothesis testing, but this time using specific and more extensive measures of Machiavellianism, narcissism, primary psychopathy, secondary psychopathy, and overall psychopathy to confirm the results. After testing the models, all analyses were repeated, controlling for social desirability bias.

Table 1 Descriptive Statistics (Study 1)

|	M	SD
Age	32.18	6.82
Competition (CCSS)	35.44	7.07
Cooperation (CCSS)	32.91	4.87
Cooperative Decision-Making	19.89%	
Dark Triad (DTDD)	22.93	6.93
Machiavellianism (DTDD)	6.06	2.58
Psychopathy (DTDD)	6.50	2.69
Narcissism (DTDD)	10.37	3.81
Machiavellianism (MACH-IV)	52.86	8.56
Narcissism (NPI)	3.24	2.63
Primary Psychopathy (LSRP)	25.78	5.96
Secondary Psychopathy (LSRP)	21.56	4.48
Overall Psychopathy (LSRP)	47.34	8.49
Social Desirability-Bias (MCSD)	6.80	2.52

Note. Descriptive statistics of the main variables of Study 1 (n = 1070), including mean (M) and standard deviation (SD), or percentage (%).

Cooperation. The dark triad composite (i.e., DTDD overall scale) negatively predicted the level of cooperation among participants ($\beta = -0.22$; $F(1, 1068) = 56.07$; $p = $ 1e-13), as shown in **Figure 1**. The results for cooperation also indicated significant models for all DTDD subscales: higher levels of Machiavellianism ($\beta = -0.20$; $F(1, 1068) = 43.61$; $p = $ 6e-11), psychopathy ($\beta = -0.28$; $F(1, 1068) = 90.87$; $p = $ 9e-21), which had the most significant effect size, and narcissism ($\beta = -0.07$; $F(1, 1068) = 5.87$; $p = 0.016$), which had the smallest effect size, although it had reached the significance level, predicted lower cooperation. When using specific scales for each personality trait, the pattern of results persisted (see Figure 1); however, Machiavellianism appeared to be more strongly associated with a lack of cooperation ($\beta = -0.41$; $F(1, 541) = 109.66$; $p = $ 1e-23), followed by overall psychopathy ($\beta = -0.37$; $F(1, 541) = 86.90$; $p = $ 2e-19), primary psychopathy ($\beta = -0.34$; $F(1, 541) = 69.13$; $p = $ 7e-16), secondary psychopathy ($\beta = -0.26$; $F(1, 541) = 38.47$; $p = $ 1e-9), and narcissism ($\beta = -0.14$; $F(1, 541) = 11.32$; $p = 0.001$). When controlling for social desirability, almost all tested models confirmed the significant results mentioned above, except for narcissism from the DTDD scale ($p = 0.646$).

Competition. Levels of competitiveness were significantly predicted by the dark triad composite ($\beta = 0.29$; $F(1, 1068) = 94.86$; $p = $ 1e-21). In contrast to the results for cooperation measures, narcissism was the strongest predictor of competitive behavior ($\beta = 0.36$; $F(1, 1068) = 161.53$; $p = $ 1e-34), followed by Machiavellianism ($\beta = 0.16$; $F(1, 1068) = 29.23$; $p = $ 7e-8) and psychopathy ($\beta = 0.07$; $F(1, 1068) = 4.61$; $p = 0.032$) (see Figure 1). For the specific scales, the models showed that primary psychopathy predicts higher levels of competition ($\beta = 0.30$; $F(1, 541) = 51.77$; $p = $ 2e-12), followed by narcissism ($\beta = 0.29$; $F(1, 541) = 50.46$; $p = $ 3e-12), overall psychopathy ($\beta = 0.18$; $F(1, 541) = 17.32$; $p = $ 3e-5), and Machiavellianism ($\beta = 0.12$; $F(1, 541) = 7.73$; $p = 0.006$). Secondary psychopathy did not reach significance ($\beta = -0.06$; $F(1, 541) = 1.89$; $p = 0.169$). After controlling for social desirability, all the models remained significant, except for psychopathy measured by the DTDD scale ($p = 0.200$).

Cooperative Decision-Making. All models using the DTDD measures as predictors again confirmed our hypotheses, significantly predicting participants' individualistic (non-cooperative) decision-making: dark triad composite (OR = 0.96; Wald $\chi^2 = 12.98$; $p = $ 3e-4), Machiavellianism (OR = 0.93; $\chi^2 = 7.01$; $p = 0.008$), psychopathy (OR = 0.91; $\chi^2 = 12.93$; $p = $ 3e-4), and narcissism (OR = 0.96; $\chi^2 = 4.94$; $p = 0.026$). When we used the specific scales, only narcissism (OR = 0.93; $\chi^2 = 3.38$; $p = 0.066$) did not reach significance; the models for Machiavellianism (OR = 0.96; $\chi^2 = 8.87$; $p = 0.003$), primary psychopathy (OR = 0.95; $\chi^2 = 9.95$; $p = 0.002$), secondary psychopathy (OR = 0.95; $\chi^2 = 4.22$; $p = 0.040$), and overall psychopathy (OR = 0.96; $\chi^2 = 10.84$; $p = 0.001$) were significant predictors for non-cooperative decision-making. For this binary measure of cooperative decision-making, four out of the nine tested models remained significant after controlling for social desirability. The models that did not reach significance after this covariate control were dark triad composite ($p = 0.108$), Machiavellianism ($p = 0.113$), and narcissism ($p = 0.202$) from the DTDD, as well as narcissism ($p = 0.088$) and secondary psychopathy ($p = 0.096$) measured by their respective specific scales.

Figure 1 Predictive Relationships Between Dark Triad Traits and Social Behaviors
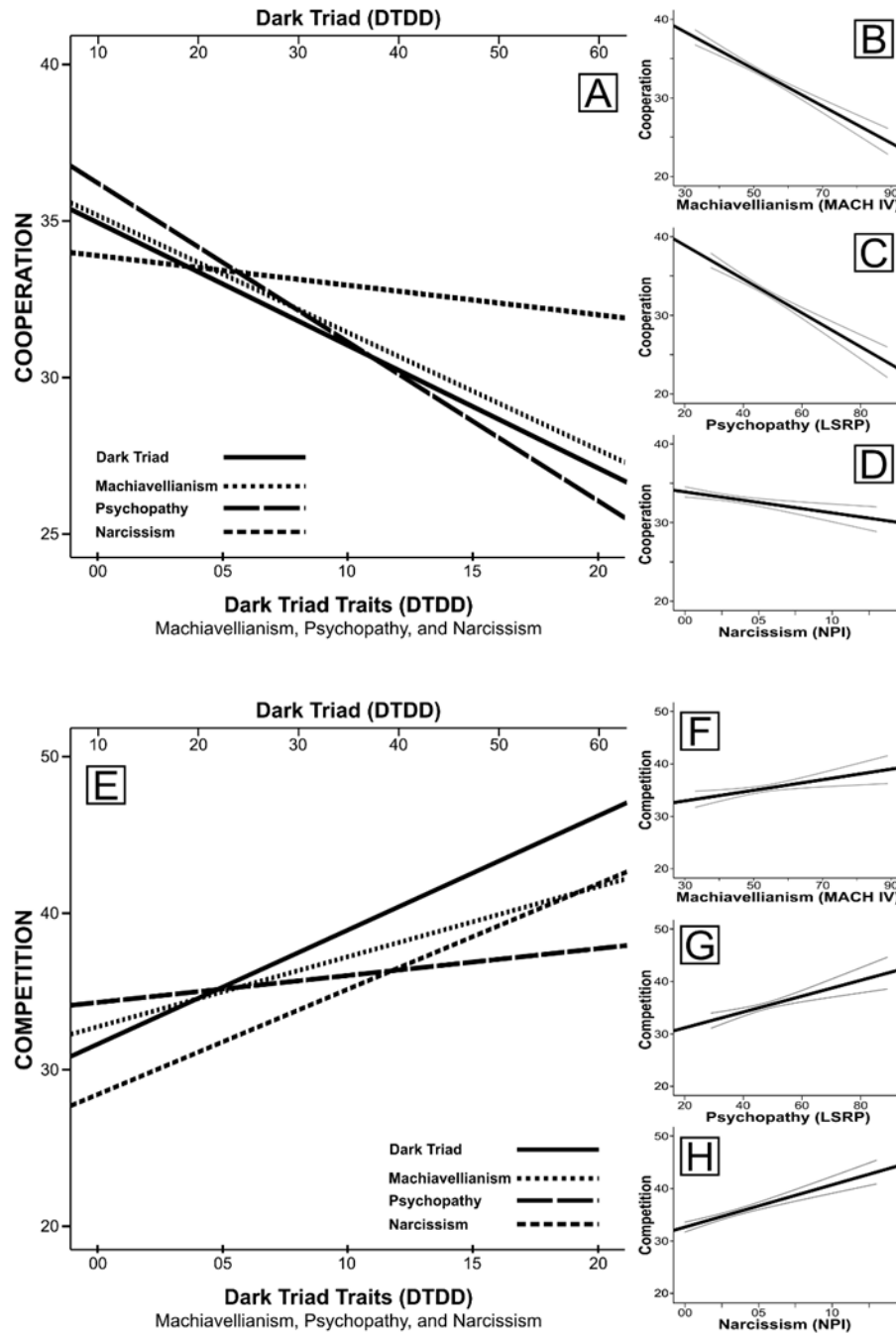
Note. Regression coefficients are shown for the Dark Triad traits — Machiavellianism, psychopathy, and narcissism — as measured by the DTDD and specific scales. Panel A displays the relationship between the DTDD composite score and cooperative behavior, while Panel E shows the relationship with competitive behavior. Panels B, C, and D illustrate the predictive effects of Machiavellianism, psychopathy, and narcissism, respectively, on cooperation. Panels F, G, and H demonstrate these traits' effects on competitiveness.

Study 2

In this second study, we sought to replicate the findings of Study 1 in a different context by using a sample of athletes, who are routinely engaged in both cooperation and competition. This population was chosen because team sports inherently demand both social strategies: while cooperation is necessary for team success, competition drives individual and collective performance. Examining whether dark personality traits predict cooperative and competitive strategies in individuals accustomed to these behaviors offers a unique opportunity to evaluate whether the associations found in Study 1 hold in a setting where cooperation and competition coexist in a structured, goal-oriented environment. Based on this rationale, we investigated whether the predictive patterns observed in the general population would also emerge among athletes.

Method

Participants and Procedure

A total of 284 participants, aged 18 to 53 years, who self-identified as amateur (96%) or professional (4%) athletes from various team sports, took part in this study. Of the initial sample, 31 did not complete data collection and were excluded, resulting in a final sample of 253 participants (age: M = 32.03, SD = 6.94; gender: 43.1% female, 56.1% male, and 0.8% other genders). Participants were recruited through sports associations and teams located in Rio Grande do Sul, Brazil. A comprehensive list of these associations and teams was compiled using publicly available information, such as official websites, social media, or institutional records; emails were then sent to the respective directors or institutional contacts, requesting them to disseminate the study invitation among their members. The invitation included a brief description of the study design, the inclusion criteria (age $\geq$ 18 years, active participation in organized sports), and a link to an online data collection platform, following the procedures detailed in Study 1. Indeed, this study largely replicated the first stage of Study 1 but omitted the Prisoner's Dilemma task. Therefore, after accessing the online platform, participants were presented with detailed study information, including potential risks and benefits, but without objectives and hypotheses, which were disclosed only upon completion of data collection, and provided electronic informed consent before proceeding to the instruments. The same measures from the first stage of the previous study were employed, namely a sociodemographic and health questionnaire, dark triad scale (DTDD), and the cooperative and competitive tendencies scales (CCSS). Data were collected remotely using a secure system that ensured confidentiality and anonymity, as described in Study 1.

Data Analysis

Following the same procedures as in Study 1, we tested the assumptions of normality and homoscedasticity. Since all variables in this study were quantitative and met the assumptions for parametric analysis, we conducted linear regressions to examine whether dark triad traits (DTDD) predicted cooperative and competitive tendencies (CCSS). All statistical tests were two-tailed, with the significance level set at α = 0.05.

Results

Descriptive statistics are reported in **Table 2**. Here we tested whether the dark triad and its components predict competitive and cooperative behavioral tendencies in athletes.

Table 2 Descriptive Statistics (Study 2)

	M	SD
Age	32.03	6.93
Cooperation (CCSS)	32.79	4.47
Competition (CCSS)	36.60	7.50
Dark Triad (DTDD)	23.44	7.32
Machiavellianism (DTDD)	6.08	2.60
Psychopathy (DTDD)	7.11	2.62
Narcissism (DTDD)	10.25	4.08

Note. Descriptive statistics of the main variables of Study 2 (n = 253), including mean (M) and standard deviation (SD).

Figure 2 Predictive Relationships Between Dark Triad Traits and Athletes' Levels of Cooperation and Competition
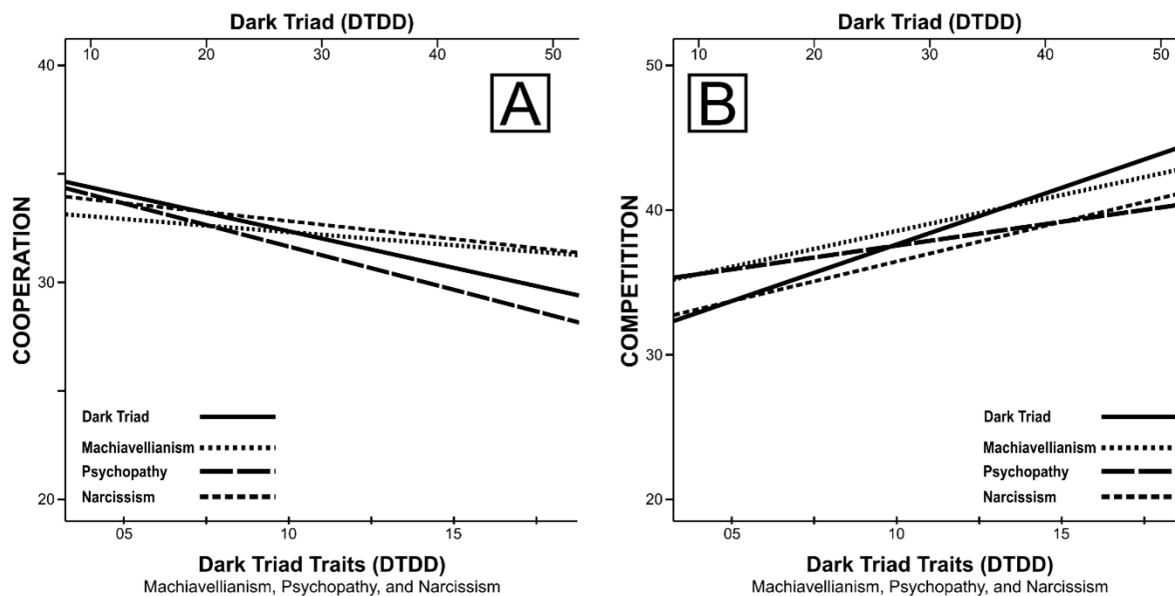
Note. Regression coefficients for the Dark Triad composite score, as well as for Machiavellianism, psychopathy, and narcissism measured by the DTDD, were used to predict cooperative behaviors (Panel A) and competitive behaviors (Panel B).

Cooperation. Confirming the results of Study 1 and our hypothesis, the dark triad composite (β = -0.19; $F(1, 251)$ = 9.68; p = 0.002) significantly predicted low cooperativeness in our sample of athletes (**Figure 2**). These findings were also confirmed by the psychopathic dimension (β = -0.23; $F(1, 251)$ = 14.47; p = 1e-4), which had the largest effect size, and narcissism (β = -0.15; $F(1, 251)$ = 5.85; p = 0.016), which had the smallest significant effect size. However,

Machiavellianism was not significant (β = -0.07; $F(1, 251)$ = 1.24; p = 0.266).

   Competition. Once again, the dark triad composite (β = 0.27; $F(1, 251)$ = 19.38; p = 1e-5) was positively associated with athletes' competitiveness (see Figure 2). Narcissism (β = 0.30; $F(1, 251)$ = 24.29; p = 2e-6) showed the largest effect size, followed by Machiavellianism (β = 0.17; $F(1, 251)$ = 7.62; p = 0.006). Psychopathy (β = 0.12; $F(1, 251)$ = 3.38; p = 0.067) was also associated with competitive behavior in Study 2, but the model did not reach significance.

Discussion

   In two studies, we tested whether dark personality traits predict cooperative and competitive behavioral tendencies in both higher education students/alumni and athletes. The results partially supported our hypotheses, indicating that the dark triad is generally characterized by lower cooperation and higher competitiveness. However, our study went further, demonstrating that specific dark traits differ in the extent to which they employ these social strategies. In brief, the narcissistic trait consistently showed a negligible or non-significant association with cooperative orientation, suggesting that higher levels of this trait do not determine uncooperative behaviors. On the other hand, more narcissistic individuals had the highest competitiveness scores in both studies. Conversely, as expected, the psychopathic trait stood out as the strongest predictor of an uncooperative orientation: among dark traits, individuals with high levels of psychopathy are generally the least likely to engage in cooperative behaviors. Surprisingly, however, psychopathy emerged as the weakest predictor of competitive orientation among the dark triad traits. Machiavellianism, meanwhile, demonstrated more inconsistent and/or intermediate relationships compared to the other two traits, in terms of both cooperation and competition. These results were mostly consistent across the conducted studies, even after controlling for social desirability bias in Study 1, indicating the replicability of our current findings.

Narcissism: Extremely Competitive but Opportunistically Cooperative

   Regarding narcissism, the measures of this trait had the smallest effect sizes within the triad, indicating a lower aversion to cooperativeness compared to psychopathy and Machiavellianism. This pattern reinforces the idea that individuals with high narcissism may adopt cooperative strategies to achieve higher social status, reputation, and admiration from others (Jonason & Webster, 2012; Morf & Rhodewalt, 2001). In contrast, this trait was most strongly related to competitive social strategies, corroborating that narcissists enjoy competing and actively seek individual recognition in competitive environments (Luchner et al., 2011). This agonistic narcissistic strategy suggests that these individuals may use cooperativeness to self-promote (i.e., increase their social status) and competitiveness to derogate others (i.e., decrease their social status) (Grapsas et al., 2020; Lainidi et al., 2022). This aligns with the dual-strategies theory for gaining social hierarchy (Maner & Case, 2016; McClanahan et al., 2022); according to this evolutionary model, leadership and social status can be achieved both through dominance, using power and coercion, and through prestige, which involves seeking admiration and appreciation for individual characteristics (Cabral et al., 2023; Cheng et al., 2013). Even though individuals with high levels of narcissism might lean towards dominance and "toxic" competitiveness, they may intentionally suppress these tendencies to maintain their prestige and the admiration of their followers (Cheng et al., 2010; Jonason & Webster, 2012). Therefore, narcissists can be adept at masking their true intentions, excelling at living competitively while appearing cooperative.

Psychopathy: The Least Cooperative

Psychopaths are highly unlikely to exhibit cooperation as a dispositional tendency. Consistent with expectations, the psychopathic trait showed the highest associations with a lack of cooperation, while it demonstrated the smallest effect sizes concerning competition within the dark triad. Indeed, individuals with high psychopathy, marked by disregard for others' well-being, exploitation, and lack of empathy (Jones & Paulhus, 2011), have recently been found to exhibit lower cooperation in the prisoner's dilemma (Malesza, 2020). Moreover, when we analyzed the two factors of psychopathy separately, the primary psychopathy subscale was significantly linked to competition, being the most robust predictor among all specific scales for each trait. The secondary psychopathy subscale of the LSRP, on the other hand, had a small or even negative (although not significant) effect on competition, highlighting the importance of analyzing these factors separately. This suggests that individuals with high scores for secondary psychopathy tend to have lower competitiveness compared to the other dark traits, possibly because this personality trait tends to experience intense emotional arousal and distress (Lyons, 2019; McHoskey et al., 1998), which can make competitive contexts aversive.

In sum, our results indicate that, although both psychopathy factors are associated with poor cooperation, only primary psychopathy predicted individuals' competitiveness. People with higher levels of primary psychopathy, characterized by callousness and manipulative behaviors, may be more competent in deliberate antisocial and exploitative tendencies, which confer social advantages, at least compared to secondary psychopathy, distinguished by poor impulse control and a lack of manipulative skills (Gao et al., 2021; Lyons, 2015, 2019). Therefore, the more substantial effect of decreased cooperativeness and increased competitiveness predicted by primary psychopathy aligns with its lack of empathy and behavior aimed at seeking personal gain without considering the costs to others, which is characteristic of this dimension of psychopathy (de Almeida et al., 2015; Gao et al., 2021; Tamura et al., 2016).

Machiavellianism: Strategic and Opportunistic Adaptation

In turn, our results showed that Machiavellianism is positively associated with competition and negatively associated with cooperation, at least among university students and alumni. Nevertheless, in the second study, Machiavellianism did not predict cooperative behavior among athletes, who often need to cooperate to succeed. This aligns with the highly individualistic and manipulative characteristics of Machiavellian people (Deutchman & Sullivan, 2018; Jones, 2013); however, it also supports the idea that the Machiavellian strategy encompasses both cooperative and competitive approaches, but only when strictly necessary (e.g., in team sports and criminal groups), allowing these individuals to adapt their behavior opportunistically, using cooperation when it is personally advantageous (Wilson et al., 1996). Even with a highly competitive and low cooperative tendency, having both seemingly opposite orientations when pertinent fosters manipulation, flexibility and sensitivity to social context, which are core characteristics of these individuals (Bereczkei & Czibor, 2014; Lyons, 2019). It is commonly thought that antisociality and prosociality, as well as competitiveness and cooperativeness, are mutually exclusive strategies (Hawley, 2014b); however, in the case of Machiavellians, this does not always hold true, as they can exhibit both tendencies, indicating that these individuals are especially skilled at changing their behavior depending on social context (Hawley, 2003, 2014a).

Robustness of Findings and Their Evolutionary Foundations

In general, our results were quite consistent, even varying the tools used to record the variables or the population investigated. Indeed, cooperative decision-making via the Prisoner's Dilemma corroborated the pattern of results we found when using the CCSS cooperation scores as the response variable. Psychopathy was the main predictor of betrayal (i.e., non-cooperative decision), regardless of the personality scale used. Machiavellianism was also a good predictor of betrayal on both scales. Narcissism, in turn, was a predictor with a negligible effect size on the DTDD and was not a significant predictor on the NPI scale. Additionally, these findings are largely in line with previous studies that have used the social dilemma along with dark traits (Deutchman & Sullivan, 2018; Lainidi et al., 2022; Malesza, 2020). Our pattern of results was maintained even when controlling for social desirability bias. Furthermore, these findings did not depend on the population evaluated. We identified the same pattern of results in both students/alumni and athletes, even though the latter group, drawn from a wide variety of sports, has a more favorable social context for expressing competitive and cooperative behavioral tendencies compared to the general population. Although the sample size of Study 2 was smaller and, therefore, had less statistical power, our replication confirms that the dark triad personality traits are related to cooperation and competition in different populations.

From an ecological perspective, life history theory offers a valuable framework for understanding the social strategies associated with different dark personalities. Originating from evolutionary ecology, this theory describes differences in individuals' resource allocation for growth, survival, and reproductive purposes (see Figueredo et al., 2006; Jonason et al., 2010). Some researchers argue that individuals within a species can vary along the slow-fast continuum, applying this concept to human behaviors (Ene et al., 2022). Those who invest more resources in survival and offspring development are described as having a slow life strategy, whereas those who aim for short-term reproductive gains have a fast life strategy (Ene et al., 2022; Jonason et al., 2010). The slow strategy may involve prosocial and cooperative behaviors, which can be advantageous in the long term, whereas the fast strategy prioritizes more immediate competitive behaviors (Han & Chen, 2020). In this sense, the dark triad has been associated with a fast life strategy (Jonason et al., 2010).

Our findings align with this evolutionary ecological model, given that the dark triad, in general, predicted participants' lack of cooperation — or opportunistically strategic cooperation — and high competitiveness, signaling that individuals with high scores on these personality traits seek immediate personal benefits. Psychopathy is the trait most associated with a fast life strategy (Jonason et al., 2010) and was also the trait most associated with a lack of cooperation in the present study. In fact, men with elevated psychopathic traits, influenced by early stressful conditions, have more offspring than men who are lower in these traits, which is compatible with a faster strategy (Brazil & Volk, 2023; Ene et al., 2022). Such exploitative and socially aversive behaviors associated with darker traits may confer adaptive advantages (i.e., provide reproductive benefits) over the long term (Barbosa & Silva, 2023). Consequently, these individuals need to employ strategies that obscure their true dispositional tendencies, enabling them to mask their competitive or exploitative motives through selective cooperation. This calculated masking helps them avoid detection and potential retaliation, as their opportunistic cooperation makes their underlying agonistic and antisocial intentions less perceptible to others (Deutchman & Sullivan, 2018; Jonason et al., 2015).

Although all methodological precautions were taken in the design of the present study, it is not free from limitations. A large part of the instruments were self-report measures, which requires caution regarding response bias for socially undesirable variables. However, the findings were confirmed by controlling for social desirability bias; additionally, to further minimize this possibility, we used complementary psychological assessment tools to avoid reliance on the specifics of certain instruments. Despite obtaining broad and diverse samples, the absence of direct behavioral measures may limit full access to all nuances of cooperative and competitive orientations in everyday situations, suggesting the need for future studies that include direct behavioral observations in natural environments. Although a social dilemma was used, it did not consist of an interaction between different participants but rather a decision-making process from a given situation. It is also important to see how short-term and long-term interactions influence the behavior of these individuals. To minimize the role of situational factors, we aimed for replication of the results in a distinct sample, strengthening the robustness of the findings and their generalization to different contexts.

Conclusion

In summary, our findings indicate that the dark personalities significantly predict both cooperative and competitive behavioral tendencies, albeit differently for each trait. Narcissism and Machiavellianism may occasionally engage in strategic cooperation, employing cooperative behaviors selectively to achieve personal goals, whereas psychopathy consistently predicts low cooperation and high competitiveness, aligning clearly with a fast life-history strategy. In criminal contexts, for example, rivals may temporarily set aside their conflicts to form instrumental alliances; however, our findings suggest that these alliances are always overshadowed by the threat of imminent betrayal, reflecting their true dispositional tendencies. Going further, recognizing the specific impacts of dark traits can aid in developing policies and practices designed to mitigate their negative effects in environments such as workplaces and team sports, where manipulative behaviors, extreme competitiveness, and low cooperativeness can compromise team cohesion and ethical standards. By fostering environments that encourage cooperative over competitive strategies, organizations, educational programs, and public policies may reduce the social influence of dark traits and promote healthier and more productive interactions. In contrast, cultures that excessively encourage competitiveness, especially from an early age, may exacerbate and perpetuate these dark traits in today's times.

Author Note

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