The relationship between stress, negative (dark) personality traits, and utilitarian moral decisions

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Abstract: Stress affects the cognitive and emotional processes involved in moral decisions, leading to less utilitarian choices. Our study examines whether specific negative (dark) personality traits – narcissism and Machiavellianism – moderate the impact of stress on moral decision-making. Forty undergraduate volunteers were classified into three trait groups («high Machiavellian», «high narcissistic» and «low negative traits»), randomly assigned to two experimental conditions (stress vs. control) and asked to perform a moral decision task. The main results suggest that participants under acute stress made fewer utilitarian decisions when faced with personal moral decisions compared to participants from the control group and that this effect was partially moderated by negative personality traits. We concluded that acute stress may reduce utilitarian decisions in moral dilemmas, but that negative personality traits seem to attenuate the effect of stress on moral decision-making

Keywords: Moral decision; utilitarianism; negative (dark) personality traits; stress.

Relación entre el estrés, los rasgos oscuros de la personalidad y las decisiones morales utilitarias

Resumen: El estrés afecta a los procesos cognitivos y emocionales envueltos en a las decisiones morales, conduciendo a elecciones menos utilitarias. Nuestro estudio examina si determinados rasgos oscuros de la personalidad – el narcisismo y el maquiavelismo – moderan el impacto del estrés en la toma de decisiones morales. Cuarenta voluntarios universitarios fueron agrupados en tres categorías de rasgos («alto maquiavelismo», «alto narcisismo» y «bajos rasgos negativos»), asignados aleatoriamente a dos condiciones (estrés vs. control) y se les pidió que completasen una tarea de decisión moral. Los resultados principales sugieren que los participantes, bajo situaciones de estrés agudo, tomaron menos decisiones morales personales utilitarias en comparación con los participantes del grupo de control y que este efecto estuvo, parcialmente, moderado por los rasgos oscuros de personalidad. Concluimos que el estrés agudo parece reducir la toma de decisiones utilitarias en los dilemas morales, pero los rasgos oscuros de la personalidad pueden atenuar este efecto del estrés.

Palabras clave: Decisión moral; utilitarismo; rasgos oscuros de personalidad; estrés.

Introduction

Moral judgment can be defined as the reasoning required to classify an action as right or wrong (Heiphetz & Young, 2014). One of the methodological approaches most used to study the mental processes involved in moral judgment has been confronting participants with a moral dilemma and asking them to make a decision.

A moral dilemma is a short story where a hypothetical situation requires one to decide between two conflicting courses of action that are both morally controversial

because they imply a moral violation (Christensen et al., 2014). Greene et al. (2004) divided moral dilemmas into *personal dilemmas*, involving an action that causes direct serious physical damage to a person or group, and *impersonal dilemmas*, involving an action that indirectly causes the damage. *Non-moral dilemmas* can also be mentioned as dilemmas referring to alternative actions that do not involve any type of moral violation.

Decisions in moral dilemmas can be taken to maximize the welfare of the greatest number of people involved, even if it implies harming someone (utilitarian decision), or by not agreeing to harm anyone not even to obtain a clear positive welfare for the majority (non-utilitarian response). People usually make utilitarian decisions in non-moral dilemmas; however, when faced with personal or impersonal dilemmas, decisions tend to be non-utilitarian because in such situations the utilitarian decision implies an emotionally aversive and deontologically reprehensible action, hence inducing high emotional conflict and inhibiting the logical resources required to complete a reasoned deliberation (Greene et al., 2008; Zhang et al., 2017).

Since the emotional load of a moral dilemma can markedly influence decisions, some authors have been studying decision-making in stressful situations, to better understand how the emotional charge induced in such situations affects the cognitive decision process (Starcke & Brand, 2012, 2016; Wemm & Wulfert, 2017). Stress occurs whenever the relationship between the person and the environment is assessed as defying or exceeding his/her resources, putting well-being at risk (Lazarus & Folkman, 1984). Under stress, our ability to think rationally about high-conflict dilemmas is reduced (Caviola & Faber, 2014) and this seems to happen because stress inhibits the cognitive control required to detain emotional and automatic responses (Banich et al., 2009), affecting decision-making and probably contributing to less utilitarian decisions (Starcke et al., 2011).

Two studies have investigated this hypothesis. The first one, conducted by Youssef et al. (2012), analyzed the response to non-moral, personal, and impersonal dilemmas after participants had been exposed to a stress-inducing situation (the *Trier Social Stress Test - TSST*; Kirschbaum et al., 1993), where they were expected to give a speech and solve an arithmetic task in front of a panel of psychologists. In the second study, participants were asked to decide on 20 moral dilemmas (both personal and impersonal) after being exposed to a similar stress-inducing situation (Starcke et al., 2012). Overall, results of both studies showed that participants exposed to stress made fewer utilitarian decisions. Youssef et al. (2012) and Starcke et al. (2012) concluded that stress

induces a strong emotional state that inhibits cognitive control and, apparently, promotes prosocial decisions in moral dilemmas.

However, some findings were inconsistent between studies. While Starcke et al. (2012) observed that participants took longer to make moral decisions under stress, Youssef et al. (2012) did not find time differences between experimental conditions. Also, Starcke et al. (2012) reported fewer utilitarian decisions both in personal and impersonal dilemmas, whereas in Youssef and colleagues' study (2012) only personal dilemmas were affected by stress. Besides the potential methodological differences that may explain the observed divergences between studies, individual characteristics should also be considered. Several individual characteristics such as physiological factors, personality traits, life experiences, chronic stress, or psychopathology (Kudielka et al., 2009; Xin et al., 2017) can influence the stress response and moderate its impact on decision-making. Furthermore, other individual characteristics such as difficulties in emotion regulation (Zhang et al., 2017) or the motivation to avoid uncertainty (Kossowska et al., 2016) may amplify the impact of stress on moral decisions. Considering these potential sources of variation may contribute to a greater sensitivity in studies assessing the role of stress in moral judgment.

A recent study (Singer et al., 2017) investigated the effects of acute stress on moral decision-making using more ecologically valid moral dilemmas (not resorting to the extreme sacrificial dilemmas used in previous studies, but to everyday moral conflict situations). Again, results provided evidence that acute stress exposure promotes prosocial decisions (compared to egoistic decisions). However, the authors alert us to the importance of personality traits (namely, agreeableness), which explained a significant fraction of the differences in altruistic decisions between the stress versus non-stress conditions.

The importance of considering individual characteristics when analyzing the psychological processes involved in moral decisions is, thus, gaining empirical support. Of particular interest are the negative personality traits known as the dark triad of personality, namely Machiavellianism, narcissism, and psychopathy. These three negative traits seem to share characteristics like a socially aversive character with behavioral tendencies to self-promotion, callousness, dissimulation, manipulation, and aggression (Paulhus & Williams, 2002). Some studies have revealed that people with strong dark triad traits display empathy deficits and alexithymia symptoms (Bartels & Pizarro, 2011; Jonason & Krause, 2013; Wai & Tiliopoulos, 2012) and, consequently, a diminution of prosocial behaviors

(Baeza Ugarte & Fernández Tapia, 2022; Jonason et al., 2010; Spain et al., 2014). These characteristics anticipate the existence of an inoperative social cognition that might produce atypical moral judgments (Spain et al., 2014). Indeed, Djeriouat and Trémolière (2014) studied the effects of the dark triad on moral judgment and observed a strong association between these traits and utilitarian personal decisions. In another study, dark triad personality traits showed a positive correlation with utilitarian decisions in the personal version of the classic trolley dilemma (Arvan, 2013). Taken together, these studies seem to suggest an association between utilitarian decisions and the presence of negative personality traits. However, research on this topic is still scarce and further evidence is required.

In the present study, we aim to assess how high scores on dark personality traits might affect the way participants respond to moral dilemmas when exposed to a stressful situation. Beyond the tendency for individuals with high levels of dark triad traits to make more utilitarian decisions in moral dilemmas, their callousness-unemotional characteristics will plausibly make them more resistant to the effects of stress on moral judgments (Singer et al., 2017). Furthermore, despite the overlapping qualities associated with dark triad traits, the possibility of examining the effects of each trait separately is particularly relevant due to their unique social characteristics and values (Jonason et al., 2015).

Thus, according to the reviewed literature, we globally expect that (a) participants exposed to stress will make fewer utilitarian decisions than participants in a non-stressful condition, (b) participants with predominant dark personality traits (namely, Machiavellianism and narcissism) will make more utilitarian decisions than participants with low levels of these negative traits, and (c) participants with predominant dark personality traits (namely, Machiavellianism and narcissism) will show similar utilitarian decision rates, whether they are exposed to acute stress or not.

Method

Participants

Seventy-four undergraduate students from a Portuguese University (58 females, 78.4%), aged between 17 and 35 years, volunteered to participate in this study. Participants were excluded when they reported previous neurological or psychiatric conditions in the sociodemographic questionnaire. A self-reported anxiety measure, the *State Anxiety Inventory* (STAI-Y) was also used to exclude participants scoring above the clinical cut-off point in both STAI-Y subscales.

Participants were screened with a measure of dark triad traits (*Short Dark Triad*; SD3) and subsequently classified according to the following procedure: Participants were classified into a specific personality group when they scored above the 70th percentile in the corresponding personality trait and this score was higher than the scores for the other two SD3 traits. Participants who scored below the 30th percentile in all three SD3 traits were allocated to the low dark triad trait group. This kind of extreme-groups approach (based on the «tertile split» of the sample) resulted in three personality groups: a group with high levels of Machiavellianism ($n = 12$; M age $\pm$ $SD = 21.12 \pm 4.58$; 58% female), a group with high levels of narcissism ($n = 10$, M age $\pm$ $SD = 21.71 \pm 4.67$; 40% female) and a group with low levels of dark triad traits ($n = 18$; M age $\pm SD = 20.24 \pm 2.34$; 94% female). It was not possible to select a group with high levels of psychopathy since the score for this dimension was always lower than the scores for the other two; consequently, this dark triad facet was not included in our study. The three groups present a similar age [F (2, 37) < 1, $p = .592$] and level of education [F (2, 37) < 1, $p = .447$], although gender was not balanced across groups [X^2 (2) = 10.2, $p = .006$; female participants were significantly more frequent in the low dark triad trait group]. Discretization is generally not recommended, since the central part of the sample is lost and statistical power is reduced (Preacher et al., 2005). However, this procedure maximizes the dominance of a specific trait within each group and minimizes the confounding effects of different personality traits.

Participants from these three groups ($n = 40$) were invited to the second phase of the study and were randomly allocated to two experimental conditions (simple randomization with Research Randomizer; Urbaniak & Plous, 2013), the stress-inducing group (SG) and the control group (CG). Each group comprised six participants high in Machiavellianism, five high in narcissism, and nine from the low negative traits group.

Instruments and tasks

Sociodemographic questionnaire. A sociodemographic data questionnaire was specifically designed for the present study to obtain information regarding participants' gender, age, education level, as well as clinical information regarding possible significant physical and/or mental illness.

Short Dark Triad (SD3; Jones & Paulhus, 2014; Portuguese version: Pechorro et al., 2019). The SD3 is a 27-item measure of the dark triad traits of personality. This scale assesses the dimensions of Machiavellianism,

narcissism, and psychopathy with nine items each. Participants indicate their agreement on a 5-point rating scale (from 1 = «strongly disagree» to 5 = «strongly agree») with statements reflective of narcissism (e.g., «People see me as a natural leader»), Machiavellianism (e.g., «It's not wise to tell your secrets»), and psychopathy (e.g., «People who mess with me always regret it»). High scores indicate high levels of dark triad traits. The SD3 Portuguese version used in this study obtained excellent reliability indexes for the three subscales (Cronbach's alpha: from .82 to .89; Pechorro et al., 2019).

State Anxiety Inventory (STAI-Y; Spielberger et al., 1977; Portuguese version: Silva, 2003). The STAI-Y is a 20-item scale that distinguishes between state anxiety (a temporary anxiety condition experienced in specific situations) and trait anxiety (a general tendency to perceive situations as threatening). Participants indicate on a 4-point scale from 1 («not at all») to 4 («a lot») the response expressing the way they feel or think in certain contexts. The STAI-Y Portuguese version shows excellent reliability for both subscales (Cronbach's alpha for state anxiety: .88, Cronbach's alpha for trait anxiety: .90; Silva, 2003). In our study, state anxiety (STAI-Y1) was used to evaluate the efficacy of the stress-inducing procedure, while trait anxiety (STAI-Y2) was included as a covariate in data analysis.

Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; Portuguese version: Galinha & Pais-Ribeiro, 2005). The PANAS is a self-report questionnaire that consists of two 10-item scales that measure positive (e.g., «interested», «excited») and negative affect (e.g., «distressed», «guilty»). Each item is rated on a 5-point scale from 1 («slightly or not at all») to 5 («extremely»). The PANAS Portuguese version shows excellent reliability for both scales (Cronbach's alpha for positive affect: .86, Cronbach's alpha for negative affect: .89; Galinha & Pais-Ribeiro, 2005).

Interpersonal Reactivity Index (IRI; Davis, 1980; Portuguese version: Limpo et al., 2013). The IRI is a self-report 24-item scale that assesses empathy according to four dimensions: perspective taking, fantasy, emphatic concern, and personal distress. Participants had to indicate how well each sentence describes them on a 5-item scale ranging from 0 («does not describe me well») to 4 («describes me very well»). The IRI Portuguese version subscales show satisfactory reliability indexes (Cronbach's alpha: from .74 to .83; Limpo et al., 2013).

Adaptation of the Trier Social Stress Test (TSST; Kirschbaum et al., 1993). A cover story was used to induce stress in participants allocated to the stress condition (SG). The method was the same as the one used in a previous study (Starcke et al., 2012), and led to both subjective and endocrine stress responses for at least 30 minutes after cessation. Each SG participant was informed that he/she would have to deliver a short speech in front of two psychology experts about the topic «How do I evaluate my cognitive abilities?». No consequences were indicated as a result of the speech. Before the speech, participants had to complete an intelligence test (an altered Raven's matrices test, with fake items which were impossible to be solved) supposedly to confirm their cognitive abilities. After the instructions, the participants were given two minutes to prepare their speech, while a camera was set up to make them believe they would be recorded during their performance. The topic of cognitive abilities was chosen because it was assumed to elicit stress in students. At the end of the experiment, the participants were informed that they did not have to make the speech about their cognitive abilities.

Moral decision task. This task comprised 20 moral dilemmas (twelve personal and eight impersonal), previously translated from the original dilemmas by Greene et al. (2004) and adapted to European Portuguese by Martins and Reis (2007). The decision task followed the procedures used in Koenigs and colleagues' study (2007). The text describing the scenario of each dilemma was displayed on a computer monitor and participants could read it at their own pace; then, they needed to press the space bar to advance to the next screen where a question about a hypothetical action related to the dilemma was asked; participants had a maximum of 25 seconds to read this dilemmatic question and to decide between a utilitarian decision («yes») and a non-utilitarian decision («no»), pressing a pre-determined button on the keyboard. *Presentation* (version 7.0; Neurobehavioral Systems; http://nbs.neurobs.com) was used to deliver the stimuli and to record the responses and response times. The dilemma presentation order was randomized for each participant.

Semi-structured interview. A semi-structured interview was specifically designed for this study and conducted at the end of the experiment with the participants from the SG to understand what they had felt and thought, as well as the emotions they had experienced during the stress induction procedure. Participants had to respond to two open questions («How did you feel when asked to give a speech about your cognitive abilities in front of two psychology experts?»; «What did you think when asked to give a speech about your cognitive abilities in front of two psychology experts?») and to express the intensity of their emotions (fifteen emotional labels were used: six basic emotions – «happiness», «sadness», «fear», «anger,» «disgust, «surprise» – and ten social

emotions such as «shame», «uselessness», «contempt», «guilt», «empathy») on a 4-point rating scale ranging from 1 («nothing») to 4 («extremely»). Answers to the open questions were categorized according to the underlying theme, while ratings were used to identify the emotions felt with more intensity.

Procedure

The present study received the previous ethical approval of the Faculty of Human and Social Sciences Scientific Committee from the Universidade do Algarve, where the study took place.

In the first stage, the SD3 was applied collectively to a large group of undergraduates, to select participants with high and low levels of dark personality traits. Students that matched the inclusion criteria were subsequently contacted to participate in the laboratory procedure ($n = 40$). Data were collected in individual sessions with an average duration of 50 minutes. After giving their informed consent, participants sat comfortably while the heart rate monitor was positioned. Heart rate (beats per minute, bpm) was continuously recorded via a heart rate monitor (Crivit model), consisting of a chest belt positioned below the chest muscles at the beginning of the session, and a wristwatch that received the readings. Participants were asked to complete the sociodemographic questionnaire as well as the three psychometric scales (STAI-Y, PANAS, IRI) while their heart rate was monitored (for 15 minutes). Finally, participants from the SG were submitted to the stress-inducing procedure (based on Starcke et al., 2012), while participants in the CG were involved in a non-stressful task (they were asked to think about one day of their last vacations that was pleasant).

Immediately after the stress-inducing procedure, heart rate measurement was again recorded, while the moral decision task was administered to all participants (approximately 15 minutes). Finally, all participants completed the STAI-Y for the second time. Then, SG participants were informed of an error in the intelligence test to justify why they would not be delivering the planned speech anymore and the semi-structured interview was carried out with them. The debriefing occurred afterwards, and each participant received a certificate for collaborating in the study.

Statistical analysis

Factorial mixed ANOVAs were used to test the effects of the experimental manipulation, personality groups, and type of dilemma on moral decisions. The dependent variable was the percentage of utilitarian decisions (expressed by the «yes» answers given to the moral dilemmas) and the time participants spent to take such decisions. Considering our small groups, data were transformed to ensure a better approximation to the requirements of the parametric ANOVA. Thus, a logit transformation for proportions was used for stabilizing variance across the data range (Warton & Hui, 2011) before parametric tests were run; back-converted mean percentages were used to report descriptive results, as well as the mean and the standard deviation in the original scale. Reaction time data were log-transformed considering their positively skewed distribution. Whenever significant effects were obtained in ANOVA, post-hoc tests were run: the Tukey HSD procedure was used for post-hoc comparisons after significant main effects, while independent samples t tests were used for comparisons between groups when interactions were significant (LSD procedure); Cohen's d was also computed to express the magnitude of the differences. Analyses were replicated considering the level of empathy (IRI), trait anxiety (STAI-Y2) and the affective state (PANAS) as covariates. The significance level used was $\alpha = .05$. All statistical analyses were carried out with SPSS, version 24.0 (IBM Corp., 2016).

Results

Stress induction: manipulation check

To analyze if the stress-inducing procedure had been successful, a mixed ANOVA was run considering *moment* (before and after the stress-inducing procedure) as the within-subjects factor and *group* (stress vs. control) as the between-subjects factor. The heart rate and the self-reported measure of state anxiety were used as dependent variables. Concerning heart rate, a significant interaction of large magnitude was observed between moment and group [$F (1, 38) = 75.51$, $MSE = 64.62$, $p < .001$, *partial-η^2* $= .67$]: heart rate was similar for both groups before the induction of stress ($M \pm SD$: CG $= 87.30$ bpm ± 11.08; SG $= 85.70 \pm 12.98$; Cohen's $d = -0.13$; $t (38) = -0.42$, $p = .677$) but heart rate levels were clearly higher for the stress group ($M \pm SD$: 104.65 ± 23.08) compared to the control group ($M \pm SD$: 74.95 ± 8.77; Cohen's $d = 1.70$; $t (38) = 5.38$, $p < .001$) by the end of the stress-inducing procedure.

Regarding the self-reported measure of state anxiety (STAI-Y1), participants of both groups revealed similar scores before ($M \pm SD$: CG $= 33.75 \pm 8.88$; SG $= 36.40 \pm 9.05$) and after the stress-inducing procedure ($M \pm SD$: CG $= 33.40 \pm 9.19$; SG $= 38.95 \pm 11.04$), resulting

in a non-significant interaction between moment and stress condition [F (1, 38) < 1, MSE = 44.23, p = .336, partial-η^2 = .02].

The information collected during the semi-structured interview showed that most of the SG participants felt anxious/nervous (78.6%) for being asked to deliver an unexpected speech; half of the participants reported having thought about the speech structure and 35.7% devaluated their cognitive abilities after having done the fake intelligence test. The emotions felt with high intensity were «surprise» (73.5%), «anxiety» (71.4%), and «shame» (56.1%).

Effect of stress, Machiavellian, and narcissistic traits in utilitarian decisions

Regarding the analysis of moral decisions, a mixed ANOVA was conducted considering *dilemma type* (personal vs. impersonal dilemmas) as the within-subjects factor and *group* (stress vs. control) and *personality* (high Machiavellian vs. high narcissistic vs. low negative traits) as the between-subjects factors; the dependent variable was the logit of the percentage of utilitarian decisions made (see Table 1).

A significant effect of high magnitude was observed for the dilemma type [F (1, 34) = 34.01, MSE = 1.10, $p \leq$ .001, partial-η^2 = .50], with participants having clearly made more utilitarian decisions for impersonal (back-transformed M: 52.8%; original $M \pm SD$: 49.3% ± 17.50) than for personal dilemmas (back-transformed M: 21.4%; original $M \pm SD$: 25.1% ± 18.85; Cohen's d = 1.33).

A significant large effect was also found for the group manipulation [F (1, 34) = 9.74, MSE = 0.97, p = .004, partial-η^2 = .22], revealing that the stress group made fewer utilitarian decisions (back-transformed M: 27.3%; original $M \pm SD$ = 33.9% ± 12.35) than the control group

(back-transformed M: 43.3%; original $M \pm SD$: 43.2% ± 12.54). There was no interaction between *group* and *dilemma type* [F (1, 34) < 1, p = .566], suggesting that the effect of stress on utilitarian decisions was similar for personal and impersonal dilemmas.

Another significant large effect was observed for *personality* [F (2, 34) = 5.80, MSE = 1.04, p = .007, partial-η^2 = .25]. Post-hoc Tukey HSD comparisons suggested that this effect resulted from the fact that participants with low dark triad traits showed a lower percentage of utilitarian decisions (back-transformed M: 27.0%; original $M \pm SD$: 30.4% ± 9.46) when compared to participants with high Machiavellianism (back-transformed M: 39.2%; original $M \pm SD$: 43.3% ± 15.28; HSD p = .012) or with high narcissism (back-transformed M: 41.4%; original $M \pm SD$: 41.9% ± 10.91; HSD p = .039).

However, such differences between personality groups seemed to be affected by stress and dilemma type; indeed, the three-way interaction (group ´ dilemma type ´ personality) is large, although only marginally significant [F (2, 34) = 2.63, MSE = 1.10, p = .085, partial-η^2 = .14].

To explore this interaction, separate analyses for each type of dilemma were carried out. Thus, when confronted with personal dilemmas (see Figure 1), participants from the lower dark trait group exposed to stress clearly made less utilitarian decisions than participants from the lower dark trait group not exposed to stress ($M \pm SD$: CG = 26.5% ± 11.65; SG = 11.1% ± 11.79; Cohen's d = 1.31; t (16) = 3.09, p = .007); however, this difference could not be found for either participants with high levels of Machiavellianism ($M \pm SD$: CG = 35.4% ± 26.81; SG = 26.3% ± 20.7; Cohen's d = 0.37; t (10) = 1.16, p = .275) or participants with high narcissism ($M \pm SD$: CG = 28.6% ± 15.98; SG = 30.0% ± 24.01; Cohen's d = -0.07; t (8) = -0.11, p = .994).

Table 1. Effects of dilemma type (personal vs. impersonal dilemmas), group (stress vs. control), and personality traits (high Machiavellianism vs. high narcissism vs. low dark triad traits) on utilitarian decisions

	F	df	MSE	p	partial-η^2
Dilemma	34.00	1,34	1.10	< .001***	.500
Group	9.67	1,34	0.97	.004**	.221
Personality	5.77	2,34	0.97	.007**	.253
Group ´ dilemma	0.02	1,34	1.10	.889	.001
Group ´ personality	0.68	2,34	0.97	.514	.038
Dilemma ´ personality	0.02	2,34	1.10	.985	.001
Group ´ dilemma ´ personality	2.65	2,34	1.10	.085º	.135

Note. º p < .1; ** p < .01; *** p < .001; MSE: Mean squared error.

For impersonal dilemmas (see Figure 2), the effect of stress seems not to have affected the proportion of utilitarian decisions, either in the low dark triad trait group ($M \pm SD$: CG = 40.7% ± 11.60; SG = 43.4% ± 10.34; Cohen's d = -0.25; t (16) = -0.56, p = .584), the high Machiavellianism group ($M \pm SD$: CG = 67.9% ± 20.98; SG = 43.8% ± 17.23; Cohen's d = 1.26; t (10) = 1.92, p = .084) or the high narcissism group ($M \pm SD$: CG = 60.0% ± 24.04; SG = 48.9% ± 7.10; Cohen's d = 0.62; t (8) = -0.01, p = .994).

Concerning reaction times (only decision times for utilitarian answers were analyzed; see Table 2), the effect of the stress manipulation was non-significant [F (1, 29) = 2.53, MSE = 0.17, p = .127, $partial\text{-}\eta^2$ = .08]. A significant effect of *dilemma type* was observed [F (1, 29) = 4.32, MSE = 0.10, p = .046, $partial\text{-}\eta^2$ = .13]: independently of *group* or *personality*, participants needed more time to make a utilitarian decision when facing personal dilemmas (back-transformed M: 5710ms; original $M \pm SD$: 6199.11ms ± 2750.34) compared to impersonal dilemmas (back-transformed M: 4628ms; original $M \pm SD$: 4955.15ms ± 1715.72 ; Cohen's d = 0.54). A marginally significant effect of *personality* was also detected [F (2, 29) = 2.67, MSE = 0.17, p =.090, $partial\text{-}\eta^2$ = .15], resulting from longer decision times for the high Machiavellianism group (back-transformed M: 6063ms; original $M \pm SD$: 6430.81ms ± 2137.42) compared to the high narcissism (back-transformed M: 4492ms; original $M \pm SD$: 4637.53ms ± 1254.41) and the low dark triad traits (back-transformed M: 5432ms; original $M \pm SD$: 5574.58ms ± 1526.25) groups. However, this pattern of response seems to depend somehow on stress [marginally significant interaction effect between *group* and *personality*: F (2, 29) = 2.64, MSE = 0.17, p = .093, $partial\text{-}\eta^2$ = .15, since the high Machiavellianism group differed from the other groups only in the non-stressful condition.
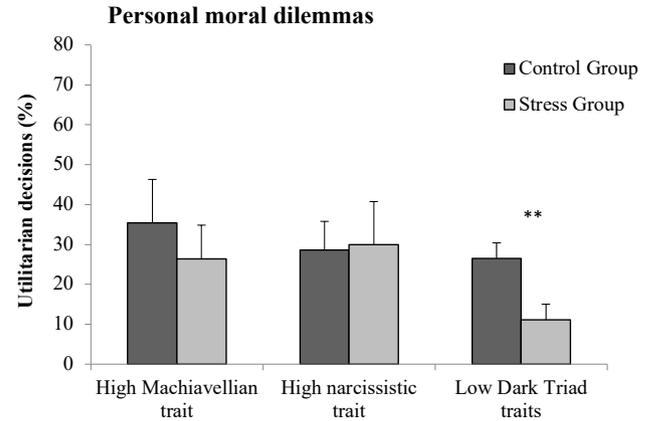

Figure 1. Percentage of utilitarian decisions in personal moral dilemmas by group (stress vs. control) and personality trait (mean ± standard error of the mean). Differences between groups: ** p < .01.
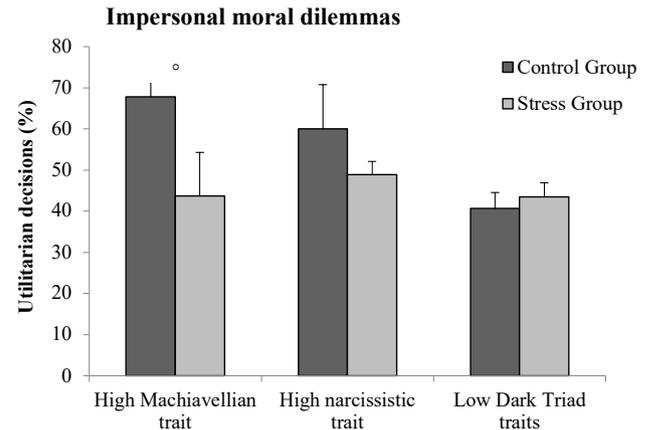

Figure 2. Percentage of utilitarian decisions in impersonal moral dilemmas by group (stress vs. control) and personality trait (mean ± standard error of the mean). Differences between groups: º p < .1.

Table 2. Effects of dilemma type (personal vs. impersonal dilemmas), group (stress vs. control), and personality traits (high Machiavellianism vs. high narcissism vs. low dark triad traits) on reaction times for utilitarian decisions

	F	df	MSE	p	$partial\text{-}\eta^2$
Dilemma	4.34	1, 29	0.10	.046*	.130
Group	2.47	1, 29	0.17	.127	.078
Personality	2.62	2, 29	0.17	.090º	.153
Group ´ dilemma	0.95	1, 29	0.10	.339	.032
Group ´ personality	2.58	2, 29	0.17	.093º	.151
Dilemma ´ personality	1.18	2, 29	0.10	.321	.075
Group ´ dilemma ´ personality	0.36	2, 29	0.10	.698	.024

Note. º p < .1; * p < .05; MSE: Mean squared error.

Repeating the analyses of the percentages of utilitarian decisions but including covariates did not markedly influence the effects described above. Indeed, the three-way interaction remained marginally significant after entering positive affect (PANAS) [$F(2, 33) = 2.60$, $MSE = 1.13$, $p = .088$, $partial\text{-}\eta^2 = .14$] or trait anxiety (STAI-Y2) [$F(2, 33) = 2.62$, $MSE = 1.14$, $p = .092$, $partial\text{-}\eta^2 = .14$] as covariates. The three-way interaction became even significant when negative affect (PANAS) was included as a covariate [$F(1, 33) = 3.31$, $MSE = 1.15$, $p = .048$, $partial\text{-}\eta^2 = .17$]. Although empathy levels (IRI) attenuated this three-way interaction [$F(1, 33) = 2.37$, $MSE = 1.02$, $p = .115$, $partial\text{-}\eta^2 = .12$], the pattern of results remained similar.

Discussion

Our main objective was to observe the effects of a stressful condition on moral decisions and to assess the possible moderating role of negative personality traits in such a process.

The experimental procedure used to induce stress in half of the sample had the expected effects. In general, participants exposed to stress revealed a higher heart rate than participants from the control condition and reported feeling anxiety during the task. Although not statistically significant, self-reported levels of state anxiety (STAI-Y1) showed a similar effect: Before manipulation, STAI-Y1 levels were similar between groups (Cohen's $d = 0.30$) but differences between groups increased after stress induction (Cohen's $d = 0.50$), with participants from the stress group reporting higher levels of anxiety.

Participants in the stress group made fewer utilitarian decisions than participants in the control group, confirming that stress appears to affect moral judgment. These results are consistent with previous studies (Singer et al., 2017; Starcke et al., 2012; Youssef et al., 2012), suggesting that stress predisposes individuals to give more emotional, automatic, non-utilitarian responses in high-conflict moral dilemmas, supporting the notion that emotions play an important role in moral decisions (Greene et al., 2004). When individuals are exposed to a stressful situation, the strong emotional charge hinders rational thinking about moral dilemmas, activating a higher emotional involvement in the choices proposed and turning individuals more prone to prosocial decisions (Caviola & Faber, 2014).

In our study, stress had a similar effect across personal and impersonal dilemmas (the *group* by *dilemma type* interaction was not significant), a result in line with Starcke and colleagues' (2012), but opposing Youssef and colleagues' (2012) findings, where only decisions in the more demanding personal dilemmas were affected by stress. This divergence might result from the different stress induction procedures used. While in Starcke et al. (2012) and the present study participants completed the moral decision task before presumably delivering a speech, in Youssef et al. (2012) the decision task was completed after participants had already delivered the speech, being their decisions possibly less driven by stress and anxiety. Overall, these results suggest that, although the emotional conflict activated by impersonal dilemmas may be lighter, the cognitive resources required to make utilitarian decisions under stress seem to be sufficiently compromised even in such a situation (Starcke et al., 2012).

Regarding reaction times, participants spend more time making utilitarian decisions in personal dilemmas than in impersonal dilemmas. According to Greene et al. (2004), participants need more time to make a utilitarian decision in personal dilemmas than in impersonal due to the possible urgency to overcome the negative emotional conflict elicited by this kind of dilemma. Nevertheless, in our study, the stress manipulation did not seem to modify the time required for decision-making. Based on previous studies (Starcke et al., 2012), it was expected that, under stress, individuals would consume more time in their moral decision-making, since stress would inhibit the cognitive control mechanism necessary to override the higher conflict imposed by moral dilemmas. However, reaction times should be interpreted cautiously as a direct proxy for the use of either intuitive/automatic or reflective/controlled processes in social decisions (Evans et al., 2015). Thus, further studies are needed to better understand in which ways the emotional load brought about by stressful situations contributes to changing the time course of moral decision-making.

One central aspect addressed in our study was the effect of specific dark personality traits on moral decisions. Following our expectations, participants with high levels of Machiavellianism and narcissism showed a higher percentage of utilitarian decisions than participants with lower dark personality traits (approximately, a 10 % difference), suggesting that such traits provide some degree of emotional callousness when facing moral dilemmas. These results are in line with previous studies, which pointed out that individuals from the dark triad present an atypical utilitarian pattern of moral decision-making (Arvan, 2013; Djeriouat & Trémolière, 2014).

The specific dark triad empathic difficulties (Jonason & Krause, 2013) may explain the preference for utilitarian strategies when individuals high in Machiavellianism or narcissism face moral dilemmas.

Some studies have concluded that individuals with dark triad traits might display higher cognitive empathy abilities compared to affective empathy competencies (Pilch, 2020; Wai & Tiliopoulos, 2012). This means that individuals high in these negative personality traits may possess an empathic profile that allows them to read and evaluate others' emotions and then use this sensitive information to manipulate and explore people and get what they want from them, while a diminished affective empathy might lead them to ignore possible damages inflicted in the process. If these considerations are true, a more rational empathy may impel individuals high in dark triad traits to disregard the emotional aspect of the situation and deliver a utilitarian decision. Therefore, the emotional processing of Machiavellians and narcissists can conduce them to be less permeable to automatic emotional responses in moral dilemmas, unlike people with lower levels of dark traits.

The preference for utilitarian decision-making may also arise from the diminished concerns for morality that have sometimes been attributed to people high in dark triad traits. Cima et al. (2010) suggested that psychopaths may have a normal understanding of right and wrong but are insufficiently motivated to act in ways that coincide with the moral conceptions expected by society. Other studies have reported an association between dark personality traits and reduced individualizing moral foundations (that is, little concern for the protection of an individual's rights; Jonason et al., 2015; Karandikar et al., 2019), moral flexibility (namely in Machiavellians, who reveal a willingness to adhere to various moral virtues, depending on their personal agenda; Jonason et al., 2015) and moral disengagement (easily disengaging from their personal moral standards; Egan et al., 2015). Unfortunately, our empirical study was not designed to elucidate these (and other) alternative explanations. Clearly, further studies are needed to explore this issue. However, the specific pattern of response to moral dilemmas under stress shown by individuals high in Machiavellian and narcissistic traits may partially clarify the processes involved in moral decisions.

Personality differences did not seem to directly affect the impact of stress on utilitarian decisions, leading to the rejection of our moderation hypothesis: Inducing stress seems to reduce utilitarian decisions, and this effect is grossly the same across the three personality groups (the *group* by *personality* interaction was not significant). However, a more detailed analysis indicated that this may depend on the dilemma type (the three-way interaction was marginally significant).

When facing personal dilemmas, individuals high in Machiavellian and narcissistic traits reacted similarly in the stressful and non-stressful conditions (small differences between conditions, Cohen's $d < .4$), compared to individuals with low levels of these negative traits, who tended to make fewer utilitarian decisions in personal moral dilemmas when submitted to stress than in the non-stressful control condition (Cohen's $d = 1.31$). Indeed, the participants of all three personality groups showed an average percentage of utilitarian responses between 25% and 35% in the control condition; however, while the participants from the Machiavellian and narcissistic groups maintained the same level of utilitarian responses under stress, the participants that scored lower in dark triad traits significantly reduced their utilitarian decisions (average: ~ 11%). This result suggests that participants with higher levels of negative traits will not differ significantly in their utilitarian decisions in personal dilemmas, whether they are exposed to stress or not. However, this effect was observed only for the more emotionally demanding moral dilemmas. When facing impersonal dilemmas, the effect of the stress manipulation on utilitarian decisions did not reveal to be significant in any of the three personality groups (although a marginally significant decrease in the rate of utilitarian decisions was observed for the participants high in Machiavellianism submitted to stress; see Figure 2).

Overall, our results imply that a stressful situation reveals how different personality traits affect the way individuals manage their emotions when making moral decisions, at least in personal moral dilemmas.

The resistance to the stress effect shown by participants with high levels of Machiavellianism or narcissism might be due to a routine pattern of disregarding prosocial altruistic behaviors in their everyday life that emerged in the stressful situation due to the pressure to make a fast decision (Djeriouat & Trémolière, 2014). However, as some researchers have noted, it seems implausible that egotistic individuals aim to maximize overall well-being in a utilitarian sense in traditional sacrificial dilemmas, such as those used in the present study (Kahane et al., 2015), unless the utilitarian decision brings a direct self-benefit.

To conclude, this research makes two main theoretical contributions. First, it adds new evidence that supports the relationship between stress and moral judgment, confirming the importance of the dilemma type (personal vs. impersonal dilemmas) in this process. Second, it contributes to a better clarification of the role of certain negative personality traits (specifically, narcissism and Machiavellianism) in the adoption of a personal utilitarian course of action, even in extreme sacrificial dilemmas such as those used in this study.

Understanding individuals with high levels of dark personality traits has practical implications in many fields of study, from philosophy to criminal profiling.

While our results seem to be pertinent in the ongoing discussion about the role of dark personality traits in moral judgment and decision-making, the present study has several limitations that hamper more clear-cut conclusions. First, the small and unbalanced number of participants in the personality groups forces us to interpret null results with caution, due to the lack of statistical power. Gender distribution was not equivalent between personality groups. Considering that men show a stronger preference for utilitarian decisions than women (Armstrong et al., 2019; Friesdorf et al., 2015), the results for the group with lower dark triad traits (constituted almost exclusively by female participants) should be interpreted cautiously. Small sample sizes hindered the use of statistical analyses to control for such effects. Although participants in each personality group had higher scores in one specific dark triad trait than in the remaining traits, it was not possible to avoid some degree of overlap between dark triad facets due to the moderate-to-high correlations among them (Pechorro et al., 2018). It was not possible to select a group associated exclusively with psychopathy, which constitutes a clear limitation of the breadth of our conclusions. Although the psychopathic trait has been empirically explored more intensively than the other dark personality traits (for a meta-analysis, see Marshall et al., 2018), some studies, using similar instruments, found an underrepresentation of the psychopathy construct in the triad (e.g., Copez Lonzoy et al., 2020). The sample consisted exclusively of undergraduate students who might respond more rationally to moral dilemmas, considering that they may have higher cognitive access to the dilemmas than other population groups (Starcke et al., 2012). Considering the data collection procedures, the self-reported measures could be influenced by social desirability, especially when negative personality traits were assessed or when dilemmatic decisions had to be taken. Finally, the use of a moral dilemma experimental paradigm imposes the utilitarian vs. deontological dichotomy and is maybe too simple to assess the cognitive and emotional processes underlying moral decisions. Future research should benefit from larger and more homogenous personality groups as well as from implicit assessment procedures as an alternative to the self-report measures used to assess dark traits and moral decisions.

Conflicts of interest

The authors declare no conflicts of interest.

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