

MORAL DECISION-MAKING IN TROLLEY PROBLEMS AND VARIANTS: HOW DO PARTICIPANTS' PERSPECTIVES, BORDERLINE PERSONALITY TRAITS, AND EMPATHY PREDICT CHOICES?

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KEYWORDS

Moral judgment; moral development; perspective-taking; psychopathology; personality

ABSTRACT

The aim of the present study was to demonstrate and extend the causal effect of participants' perspectives on moral decision-making using trolley problems and variants. Additionally, we investigated whether empathy and borderline (BDL) personality traits predicted participants' choices in these scenarios. We used both a classical trolley problem (a causing harm scenario) and an everyday trolley-like problem (a causing inconvenience scenario). Participants (N = 427, women: 54%) completed BDL traits and empathy questionnaires and, randomly, the two types of trolley problems, presenting both three different perspectives. Our study provided strong evidence that the perspective from which participants were enrolled in the trolley problem caused significant changes in their moral decision-making. Furthermore, we found that affective empathy and BDL traits significantly predicted participants' decisions in the causing inconvenience scenario, while only BDL traits predicted choices in the causing harm scenario. This study was original in providing new experimental materials, causal results, and highlighting the significant influence of BDL traits and affective empathy on moral decision-making. These findings raised fundamental questions, which are further developed in the discussion section.

Introduction

Moral dilemmas have been studied by social psychology, philosophy, and economics for decades, notably because they have several societal implications (e.g., in public health or politics). Recently, they were at the heart of preoccupations during the COVID-19 pandemic, given that many health centers were overwhelmed and had to make unusual ethical choices (e.g., choosing who would benefit from a respirator).

One of the most famous moral dilemmas is the trolley problem. Initially, Foot ([1967](#)) and, a few years later, Thomson ([1976](#)) developed a problem presented as follows: imagine that you are a driver of a runaway tram that can only steer from one track to another. Five workers are standing on one track, and one workman on the other. The only option is to divert a lever to switch the tramway from one track to another, which leads to choosing between killing five people and saving one; or killing one to save the five (Foot, [1967](#)). On the other hand, Thomson's variant (1976) places you on a bridge where an obese workman stands next to you. On this bridge, you see that a runaway tramway will hit and kill the five workers on the track if nothing is done. Hence, you have to choose between pushing to death the obese workman on the track to stop the tramway and save the five; or doing nothing and letting the five get killed.

Greene and collaborators popularized these problems in 2001 with their publication in *Science*. Several studies demonstrated that participants' choices were mainly group-oriented decisions (GOD, also called *utilitarian* choices: choosing to save the five). Indeed, around 90% of people decided to kill the one to save the five in Foot's version. However, this tendency decreased drastically in Thomson's variant (roughly 10% decided to push the obese worker: Hauser et al., [2007](#)).

Greene et al. ([2001](#), [2004](#)) and Greene ([2007](#)) classified Foot and Thomson's versions and developed the Dual-Process Model to understand these drastic decision-making changes. Indeed, Foot's version has been classified as an *impersonal* scenario, and Thomson's variant as a *personal* scenario. They have argued that impersonal moral scenarios involve more cognitive processes and fewer social-emotional responses, leading to higher GOD (i.e., *utilitarian* choices). However, personal scenarios involve the opposite processes (i.e., it elicits higher social-emotional responses and lower cognitive processes), leading to fewer GOD. The authors named this model the *Dual-Process Model* (DPM, Greene et al., [2001](#), [2004](#), [2008](#)).

Critics of Classical Trolley Problems and Solutions

Bauman et al. ([2014](#)) raised several limits on trolley problems. They reported that participants tend to be amused rather than concerned and described trolley problems as neither immersive nor realistic, too far from daily-life activities. Indeed, killing someone is fortunately far from daily-life activities (Nasello et al., [2021](#)), and several authors have attempted to overcome these trolley problems' limits. For instance, Navarrete et al. ([2012](#)) proposed a virtual reality study of the trolley problem, immersing participants in a virtual environment. More recently, several authors proposed to overcome Bauman et al.'s limits (2014) by using some everyday trolley-like problems that are more realistic and plausible

(Lotto et al., [2014](#); Nasello et al., [2021](#); Pletti et al., [2017](#); Takamatsu, [2019](#); Vyas et al., [2017](#)). These ecologically valid variants showed more generalizable findings, which is of substantial interest when studying psychopathological populations. Therefore, to display choice differences in both scenario types, this study used an everyday trolley-like problem and a classical variant based on Thomson's scenario (i.e., the transplant dilemma). Bruers and Braeckman ([2014](#)) considered Thomson's scenario and the transplant dilemma similar.

Participant's Perspective on Trolley Problems and Variants : A Broader Understanding?

An important element in trolley problems and variants has been depicted in a recent study. This study demonstrated a causal effect of participants' perspectives on everyday trolley-like problems (Nasello et al., [2021](#)). The authors created two versions of a similar trolley-like problem and invited participants to be alternatively two different protagonists of these scenarios. In one perspective, the participant was asked to be a driver of a university tramway who had to decide whether to stop or not to board one tardy student. This scenario is comparable to impersonal scenarios from classic trolley problems (they called it "*a no-direct impact scenario*" because the participant's decision will not impact him/her directly). In the other one, the participant was a tardy student (they called it "*a direct impact scenario*" because the participant's decision will impact him/her directly: attending or not the lecture). As expected, the authors showed a higher ratio of GOD in the driver's perspective (75-25), and this proportion decreased when the participant was the tardy student (50-50).

In the present study, we targeted a missing element by inviting the participant to enroll a protagonist in a third perspective: the one among the five. Hence, we aimed to replicate Nasello et al.'s experimental design ([2021](#)) and test whether an additional perspective (i.e., Perspective C, see [Figure 1](#)) would impact moral decision-making to deepen the results previously obtained.

The Role of Emotional Processes and Empathy in Trolley Problems and Variants

Based on the DPM (Greene et al., [2001](#)), several authors focused on the role of emotional processes. For instance, Choe and Min ([2011](#)) showed that anger, disgust, and empathy significantly predict utilitarian judgments. Anger increased GOD levels, while empathy and disgust decreased these levels. Empathy is "an innate ability to perceive and be sensitive to the emotional states of others, coupled with a motivation to care for their well-being" (Smith et al., [2017](#), p. 2) and is usually composed of two domains: affective and cognitive empathy. The former describes the ability to feel what others feel, and the latter refers to the capacity to comprehend others' perspectives and put oneself in someone's shoes. Several authors found that (1) a lack of affective empathy characterized psychopathic traits (Burghart & Mier, [2022](#)) and (2) that this affective empathy depletion predicted GOD significantly in

trolley problems (Decety & Cowell, 2014; Gleichgerrcht & Young, 2013; Greene et al., 2004; Patil & Silani, 2014; Takamatsu, 2018). While these findings are important, we have no experimental results on contrasted psychopathology (i.e., clinical populations presenting higher affective empathy scores).

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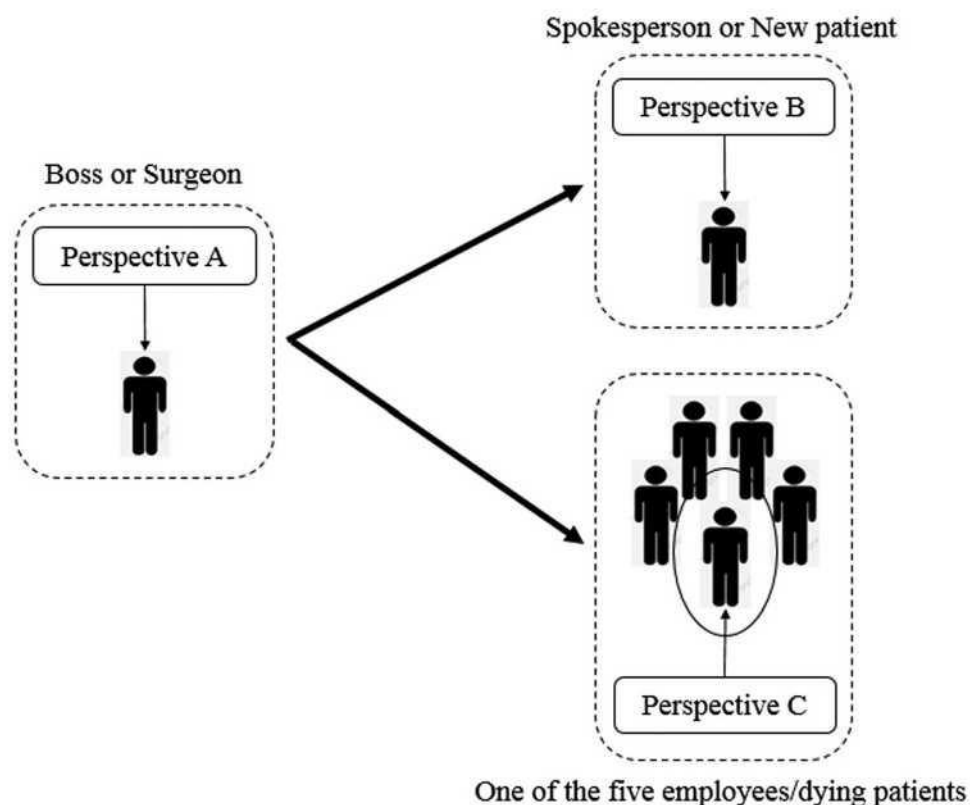


Figure 1. Decision-maker’s perspectives on trolley problems and variants.

Note. This figure depicts the three perspectives enrolled by the participant (i.e., the decision-maker) for the causing harm and inconvenience scenarios.

The Opposite Side of the Affective Empathy Continuum

Compared to psychopathic traits, borderline personality traits are characterized by salient divergences in affective empathy and emotional functioning. Furthermore, a pervasive pattern of instability of affects, interpersonal relationships, self-image, and marked impulsivity characterizes borderline (BDL) personality disorders. This personality disorder is a severe and persistent psychiatric disorder with a lifetime prevalence estimated to be between 1 and 3% in the general population (Leichsenring et al., [2011](#)).

Therefore, despite some shared symptoms (e.g., marked impulsivity), psychopathy and BDL personality disorders are fundamentally different in their emotional semiology: while psychopathy is characterized by emotional callousness (Hare, [1996](#); Hare & Neumann, [2009](#)) and emotional hypo-responsiveness compared to BDL (Herpertz et al., [2001](#)), BDL personality disorders are instead marked by heightened emotional reactivity (Crowell et al., [2009](#)). Several authors considered that affective and emotional intensity and lability are central symptoms of BDL (Richetin et al., [2017](#); Southward & Cheavens, [2018](#)), regardless of age (Peckham et al., [2020](#)). Furthermore, in comparison with healthy control populations, a recent systematic review showed that BDL presents higher affective empathy levels and a deficiency in perspective-taking (Salgado et al., [2020](#)), while another review (Burghart & Mier, [2022](#)) showed that psychopaths display a lack of emotional/affective empathy (as sustained by several findings: Blair, [2005](#); Hare, [1993](#); Robinson & Rogers, [2015](#); Sandoval et al., [2000](#); Van Dongen, [2020](#)) and a deficiency in perspective-taking as well.

Therefore, based on the differences between psychopathic and borderline personality traits and their impact on emotional functioning in moral decision-making, our study aims to investigate whether subclinical borderline personality traits predict a reversed pattern of moral decision-making in trolley problems and variants, as opposed to the effect of psychopathic traits. The underlying concept is that emotional processes significantly influence moral judgments, as stated by Greene et al. ([2001](#)). Hence, affective empathy—an emotional process that amplifies or attenuates the emotional experience of the protagonists in moral dilemmas—or psychopathological personality traits characterized by higher or lower affective empathy levels should influence moral decision-making.

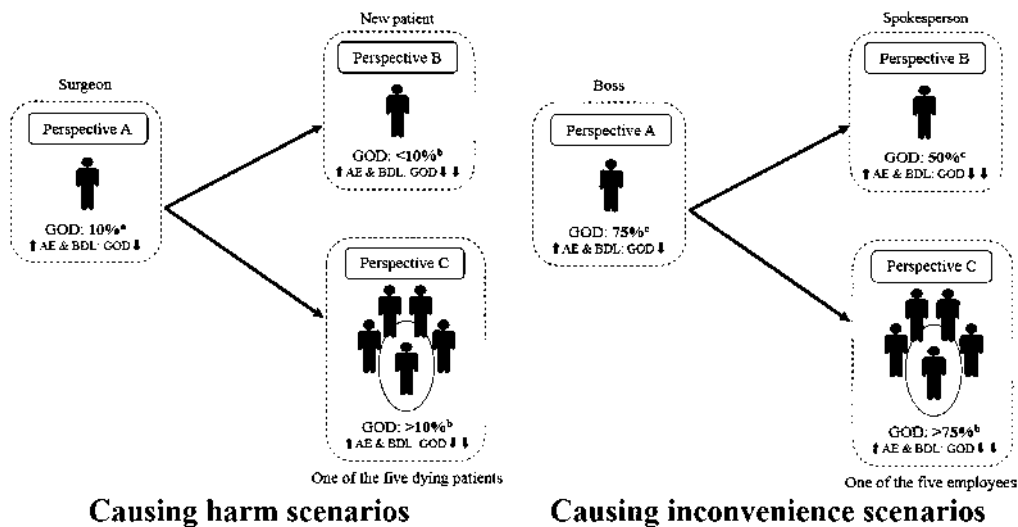
Objectives and Hypotheses

This study had two principal purposes: (1) demonstrating and extending the causal effect of participants' perspectives on moral decision-making and (2) determining whether higher affective empathy and borderline traits significantly predict lower GOD in trolley problems and variants. All hypotheses have been depicted in [Figure 2](#).

Like Nasello et al. ([2021](#)), we aimed to demonstrate that participants' perspectives in trolley scenarios cause significant changes in their moral decision-making. In the present study, we introduce a third perspective (i.e., Perspective C) to complement perspectives A and B (see [Figure 1](#)) already used by these authors. To generalize this causal impact, we used two types of scenarios: a *causing harm* scenario (i.e., one or five protagonist(s) will die according to the participant's decision) and a *causing*

inconvenience scenario (i.e., one or five protagonist(s) will get fired according to the participant's decision). Following the predictions made from the DPM (Greene et al., 2001), the *causing harm* scenario should display lower GOD levels than the *causing inconvenience* scenario. Note that we chose GOD as a reference because it was the common option in the three perspectives of both scenarios. Therefore, lower GOD involved more individual-oriented or self-oriented decisions and vice versa.

Figure 2. Hypotheses



Abbreviations. GOD = Group-Oriented Decision; AE = Affective Empathy; BDL = Borderline traits. ^aHauser et al. (2007). ^bGreene et al. (2001). ^cNasello et al. (2021).

In the company's dilemma (i.e., the causing inconvenience scenario), we hypothesized that Perspective A would present higher GOD levels (around 75%, like Nasello et al.'s findings, 2021) and Perspective C even higher GOD levels. However, Perspective B would present lower GOD levels (around 50%, like Nasello et al.'s findings, 2021). In the transplant dilemma, we expected around 10% of group-oriented decisions (GOD) in Perspective A, as found by Hauser et al. (2007) and as predicted by the DPM (Greene et al., 2001). Note that Perspective A is the only perspective tested in trolley dilemmas' scientific literature. For other perspectives, we hypothesized that Perspective B would present lower GOD and Perspective C the highest GOD levels: depending on which perspective the participant is, s/he will tend to favor his/her position if the consequences of the decision will directly impact him/her (see [Figure 2](#) for an illustration).

Second, based on the predictions made from the DPM (i.e., higher social-emotional responses elicited by dilemmas lead to lower GOD levels), we hypothesize that higher affective empathy and higher BDL traits will predict lower GOD levels in trolley problems and variants. The prediction made for BDL traits lies on two main assumptions: (1) BDL people are characterized by higher affective empathy levels, according to a recent systematic review (Salgado et al., 2020), and higher levels of affective empathy are expected to decrease GOD levels on decision-making. (2) BDL people present the opposite emotional semiology compared to psychopaths (a population displaying higher GOD levels). Therefore,

because BDL people are more prone to experience intense and unstable emotions, we sought to determine whether higher BDL traits (and affective empathy) would significantly predict less GOD in trolley problems and variants. Based on the DPM, we can speculate that higher affective empathy and BDL traits would significantly predict lower GOD levels in Perspectives B and C than in Perspective A (see [Figure 2](#)).

Method

PARTICIPANTS & PROCEDURE

Four hundred and twenty-seven participants voluntarily took part in our study ($N = 427$; $n_{women} = 231$; $M_{age} = 25.3$; $SD_{age} = 5.10$, see [Table 1](#)). The majority of participants were Caucasians (88%), unmarried (77%), and had completed at least a Bachelor's degree (60%). Participants were required to have no history of psychiatric or neurological disorders to be eligible to participate. They were recruited online through social media advertisements and were not offered any financial compensation for their participation. Participants completed three questionnaires (i.e., a demographic questionnaire, the

Table 1. Descriptive Statistics.

Variables	<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>	ω
Age	427	25.3	5.10	18	38	
Women	231	25.4	4.84	18	38	
Men	196	25.3	5.40	18	38	
Empathy						.85
<i>Affective empathy</i>	427	41.3	7.27	14	55	.81
Women	231	44.4	6.13	17	55	
Men	196	37.6	6.75	14	55	
<i>Cognitive empathy</i>	427	36.8	4.51	20	45	.81
Women	231	37.9	4.05	22	45	
Men	196	35.5	4.67	20	45	
Borderline traits						
<i>Total</i>	427	110	27.7	54	188	.94
Women	231	112	27.7	54	188	
Men	196	109	27.8	54	186	

Basic Empathy Scale, and the Five-Factor Borderline Inventory, Short Form) before being presented with two types of trolley problems, each containing three perspectives (i.e., A, B, and C, as shown in [Figure 1](#)) in random order. Sample size was determined using G*Power 3.1.9.7 (Faul et al., [2007](#)), with standard criteria set at $\alpha = 0.05$ and power = 0.80, requiring a minimum of 372 participants.

The Research Ethics Committee of the Psychology Department at the University Liège (Belgium) approved this research, Ref.: 1920-92

MATERIALS

EMPATHY

The Basic Empathy Scale (Jolliffe & Farrington, [2006](#); French version: D'Ambrosio et al., [2009](#)) is a 20-item scale assessing two empathy components (i.e., affective and cognitive empathy). Affective empathy refers to *the capacity to experience the emotions of another* (Bryant, [1982](#)) and is composed of 11 items (e.g., *I get caught up in other people's feelings easily*). On the other hand, cognitive empathy is defined as *the capacity to comprehend the emotions of another* (Hogan, [1969](#)) and is composed of 9 items (e.g., *I can often understand how people are feeling even before they tell me*). Items are rated on a 5-point Likert scale from 1 (*It does not describe me very well*) to 5 (*It describes me very well*). The scale displays good internal reliability (present study: affective empathy: $\omega = .81$; cognitive empathy: $\omega = .81$; total empathy: $\omega = .85$).

BDL TRAITS

We used the 48-item self-rated Five-Factor Borderline Inventory, Short Form (FFBI-SF, DeShong et al., [2016](#); French version: Nasello et al., [2023](#)) to measure subclinical borderline traits. Each item is rated on a 5-point Likert scale, from 1 (*Strongly disagree*) to 5 (*Strongly agree*) (e.g., *"I often conflict with people that are close to me"* or *"My emotions can get out of control"*). In this study, we based our analyses on the total BDL score. Nasello et al. ([2023](#)) reported that people scoring ≥ 162 could be considered as presenting salient BDL traits. The FFBI-SF displays good internal reliability (present study: $\omega = .94$).

TROLLEY PROBLEMS AND VARIANTS

Two types of trolley problems, each with three perspectives, were used to assess moral decision-making (i.e., Perspectives A and C: GOD versus Individual-Oriented Decisions, Perspective B: GOD versus Self-Oriented Decisions). Note that Perspective C involves a mixed decision between GOD and Self-Oriented Decisions. As a classical trolley problem, the transplant dilemma is a *causing harm* scenario. In this scenario, a brilliant surgeon has five patients suffering from a specific organ failure, and they will die without a transplant. Another patient enters the hospital because s/he needs urgent but benign surgery. This surgeon notices that this new patient's organs are all compatible with the five dying patients. The participant is presented with two options: (1) perform a lethal maneuver on the new patient during their surgery to save the five dying patients (the new patient will die, but the other five will live); (2) perform the new patient's surgery according to best practices to save his/her life (the

new patient will live, but the other five will die). The participant is randomly assigned to be the surgeon, the new patient, or one of the five dying patients.

The second dilemma was a *causing inconvenience* scenario, named the company's dilemma. The general parameters of this everyday trolley-like problem are that the participant is a worker of a small company (i.e., the boss, the spokesperson, or one of the five employees) and, because of the current pandemic situation, this company has to downsize its workforce. Panicked, the six employees have decided to go on strike to claim employment security and termination indemnity in case of layoff. To calm down the situation, the boss has called for a meeting with the spokesperson of the employees. In this meeting, the boss tries to understand the spokesperson's situation and explains that s/he does not have several options. In the three perspectives, the boss proposes a two-option arrangement behind closed doors (with immediate effects and no consultation meeting with the other employees). The first option is to contractually protect the spokesperson's job but lay off the other five employees without indemnity termination. The other option is to lay off the spokesperson without indemnity termination but to contractually protect the jobs of the other five employees¹.

Note that in all scenarios, the decision-maker makes the decision alone; there is no joint decision between the participant and the other protagonists. Both scenarios were primed using the COVID-19 pandemic to enhance their immersive quality (see [Supplementary Materials](#) for a complete description). In Perspectives A and C, participants were presented with same-gender scenarios, with the target being a man when the participant was a man and a woman when the participant was a woman.

DATA ANALYSES AND EXPERIMENTAL DESIGN

The principal analyses were performed using a Generalized Mixed Model (GMM) to determine whether perspectives, empathy, and BDL traits significantly predict moral decision-making in trolley problems and variants. For this purpose, we run two GMMs separately: one for *causing harm* scenarios and one for *causing inconvenience* scenarios. There were three continuous independent variables (i.e., BDL traits, affective and cognitive empathy) and *Perspective* as predictors of the binary choices (GOD were coded "1" and other choices "0", i.e., individual-oriented decisions or self-oriented decisions). Intercept and ID were entered as random effects, and all continuous

predictors were centered. See Gallucci (2019) for a complete description of the GMM procedure. Because of significant differences between men and women, gender was introduced in the GMM for *causing harm* scenarios but not for *causing inconvenience* scenarios. As descriptive statistics, chi-square tests highlighted choice differences in the two types of scenarios (x 3 perspectives).

The analyses were conducted using the JAMOVI computer software, version 1.6.23 (The Jamovi Project, 2019). The raw data file can be found at the following DOI link: <https://osf.io/t4h7f/>.

Results

DESCRIPTIVE STATISTICS

CAUSING INCONVENIENCE SCENARIOS

As expected, participants made higher GOD levels (i.e., laying off the spokesperson) in Perspectives A and C (P_A : 92% of GOD; P_C : 94% of GOD; see [Figure 3a](#)). There was no significant choice difference between these two perspectives ($\chi^2_{(1)} = 0.081$; $p = .776$). Also in line with our expectation, the GOD frequency significantly dropped down in Perspective B (54% of GOD) compared to Perspectives A and C ($P_{Avs.B}$: $\chi^2_{(1)} = 41.03$; $p < .001$; $P_{Cvs.B}$: $\chi^2_{(1)} = 44.7$; $p < .001$). There was no difference between men and women in the three perspectives (P_A : $\chi^2_{(1)} = 1.08$; $p = .299$; P_B : $\chi^2_{(1)} = 0.087$; $p = .769$; P_C : $\chi^2_{(1)} = 3.38$; $p = .066$).

CAUSING HARM SCENARIOS

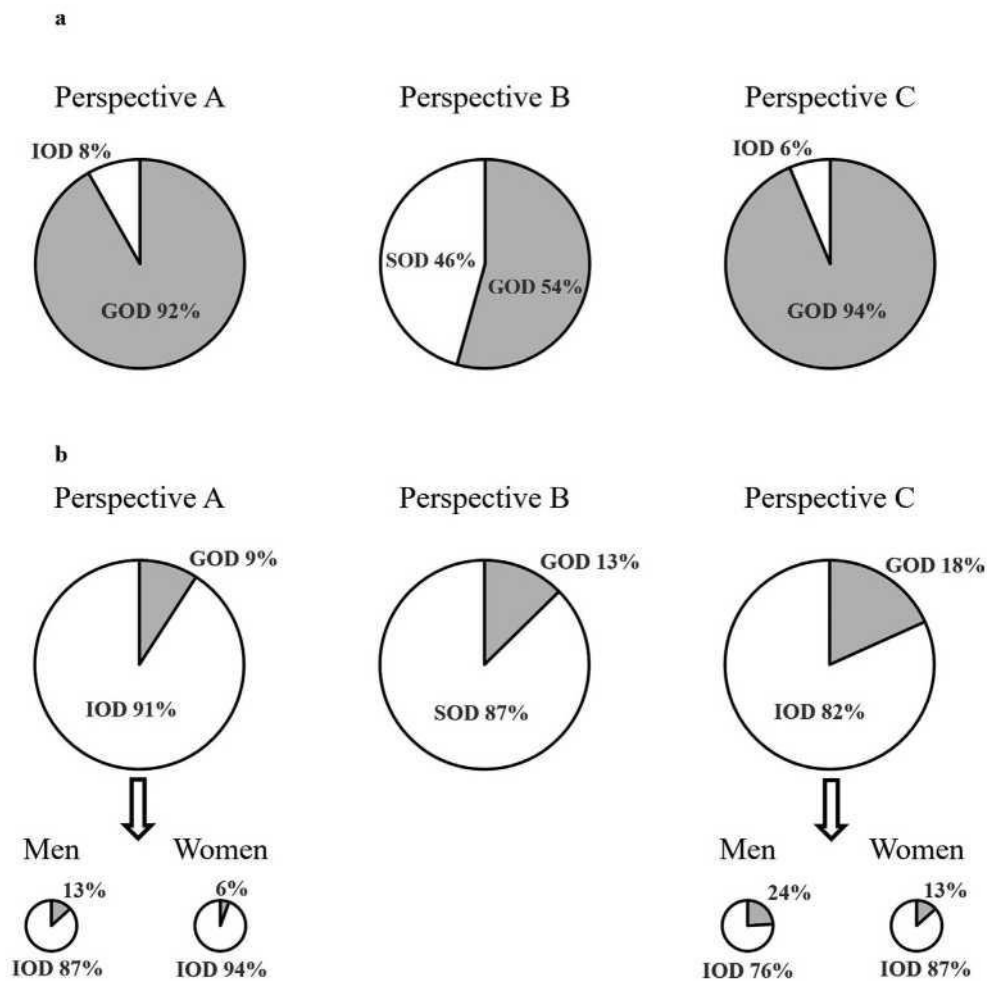
As expected, the GOD levels (i.e., killing the new patient) were low in the three perspectives (P_A : 9% of GOD; P_B : 13% of GOD; P_C : 18% of GOD; see [Figure 3b](#)). Furthermore, there were significant differences between Perspectives B and C ($P_{Cvs.B}$: $\chi^2_{(1)} = 4.36$; $p = .037$) and Perspectives A and C ($P_{Avs.C}$: $\chi^2_{(1)} = 13$; $p < .001$), but we did not find any significant difference between Perspectives A and B ($P_{Avs.B}$: $\chi^2_{(1)} = 2.42$; $p = .120$). The GOD level of Perspective B was unexpected. Finally, we found significant gender differences in Perspectives A and C (P_A : $\chi^2_{(1)} = 7.45$; $p = .006$; $\phi = .132$; P_C : $\chi^2_{(1)} = 7.92$; $p = .005$; $\phi = .136$). In Perspective A, men made 13% of GOD and women 6%, and men made 24% of GOD and women 13% in Perspective C. In both perspectives, men made more than twice GOD as women.

GENERALIZED MIXED MODEL ANALYSES CAUSING INCONVENIENCE SCENARIOS (SEE [SUPPLEMENTARY MATERIALS](#) FOR THE CORRELATION MATRIX)

The GMM ($\chi^2/df = 0.836$; $R^2_{Marg.} = .308$; $R^2_{Cond.} = 0.373$) showed that "Perspective" was a strong significant predictor of decision-making (P_{C-B} : $B = 2.709$; $exp(B) = 15.02$; $p < .001$; P_{A-B} : $B = 2.42$; $exp(B) = 11.25$; $p < .001$; see [Table 2](#)). When moving from Perspective B to C, the odds of making a GOD were multiplied by 15, whereas when moving from Perspective B to A, the odds were multiplied by 11.3. Furthermore, BDL traits significantly and negatively predicted GOD ($B = -0.01$; $exp(B) = 0.992$; $p = .009$; see [Table 2](#)): each additional point of BDL traits decreased by 1% the odd to make a GOD. Finally, affective empathy was a positive and significant predictor of GOD ($B = 0.037$; $exp(B) = 1.038$; $p = .006$; see [Table 2](#)): each additional affective empathy point increase of 4% the odd to make a GOD.

Graphical plots showed significant predictive effects of affective empathy and BDL traits in Perspective B (see [Figure 4A and B](#)). However, cognitive empathy did not significantly predict GOD ($B = 0.013$; $p = .567$; see [Table 2](#)).

Figure 3. (a) Causing inconvenience scenarios, (b) Causing harm scenarios.



Note. Diagrams displaying men and women's choices were represented when a significant gender difference was found.
 Abbreviations: GOD = Group-Oriented Decision; SOD = Self-Oriented Decision; IOD = Individual-Oriented Decision.

Table 2. Coefficients of the General Mixed Model Analysis.

Names	E	SE	Exp(B)	95% Exp(B) CI		z	p
				Lower	Upper		
CI Intercept	1.902	0.130	6.70	5.20	8.64	14.7	< .001
Perspective _{C-B}	2.71	0.251	15.02	9.19	24.6	10.8	< .001
Perspective _{A-B}	2.42	0.231	11.3	7.15	17.7	10.5	< .001
Affective empathy	0.037	0.014	1.038	1.01	1.07	2.74	0.006
Cognitive empathy	0.013	0.022	1.013	0.970	1.06	0.573	0.567
BDL Traits	-0.008	0.003	0.992	0.985	0.998	-2.61	0.009
CH Intercept	-3.11	0.298	0.045	0.001	0.071	-10.5	< .001

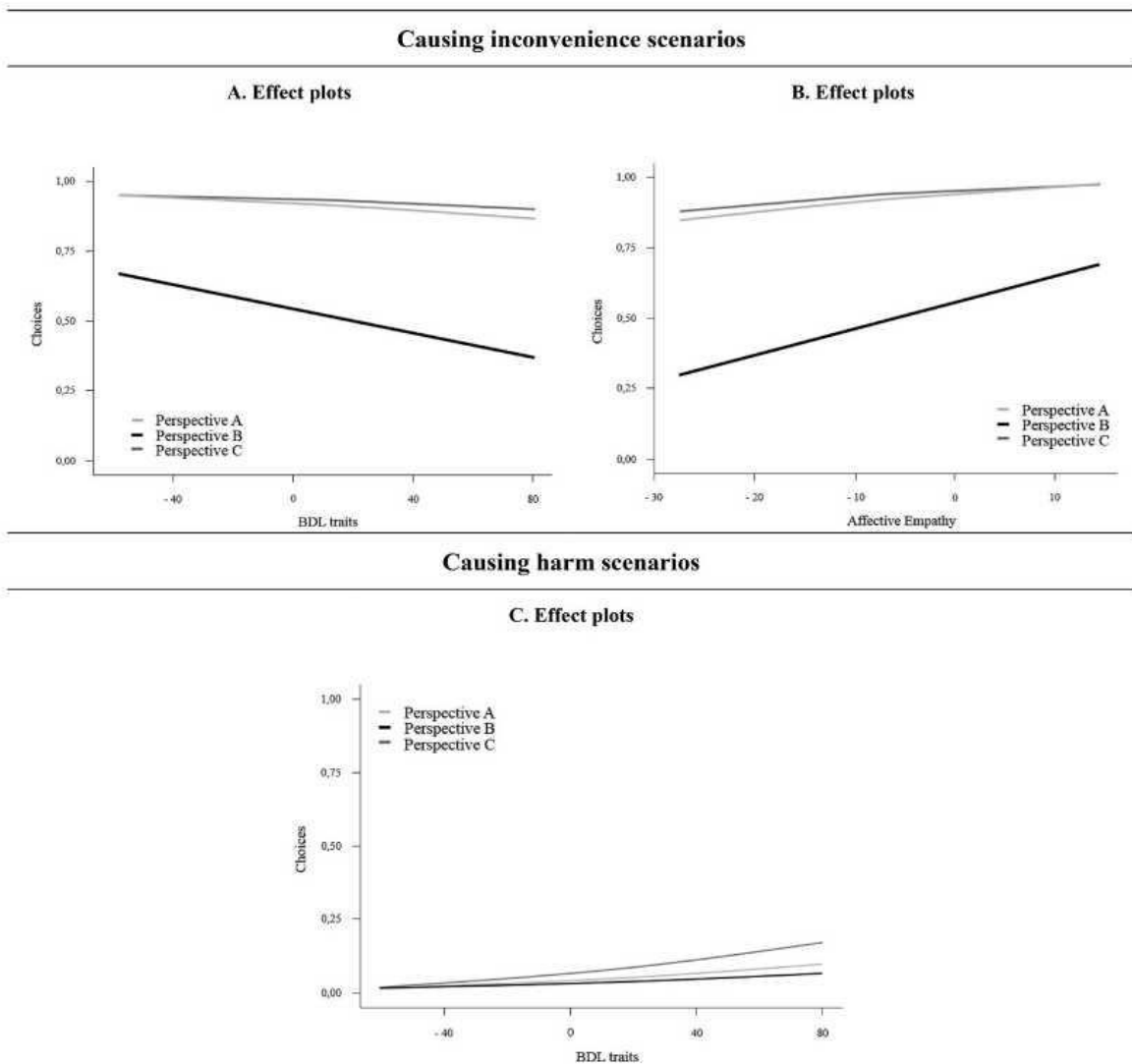
Gender	-0.835	0.337	0.434	0.165	0.961	-2.48	0.013
Perspective _{C-B}	1.15	0.261	3.151	1.83	10.2	4.40	< .001
Perspective _{A-B}	0.514	0.266	1.673	1.053	5.35	1.94	0.053
Affective empathy	-0.007	0.025	0.993	0.924	1.06	-0.284	0.776
Cognitive empathy	-0.062	0.038	0.940	0.872	1.03	-1.63	0.102
BDL Traits	0.013	0.006	1.013	1.001	1.02	2.29	0.022

Abbreviations: CI = Causing Inconvenience; CH = Causing Harm; BDL Traits = Borderline Traits.

CAUSING HARM SCENARIOS

The GMM ($\chi^2/df = 0.381$; $R^2_{Marg.} = .0896$; $R^2_{Cond.} = 0.583$) displayed a significant predictive effect of “Perspective” on GOD (P_{C-B} : $B = 1.15$; $exp(B) = 3.15$; $p < .001$; see [Table 2](#)): changing from Perspective B to C multiplied by 3.2 the probability to make a GOD (i.e., killing the new patient to save the five). BDL traits also significantly predicted (in a positive way) GOD ($B = 0.013$; $exp(B) = 1.013$; $p = .022$; see [Table 2](#)), meaning that each additional point on the FFBI-SF increased by 1% the odd to make a GOD. This effect was especially true for Perspective C (i.e., when the participant is one of the five dying patients; see [Figure 4C](#)). Gender significantly predicted GOD ($B = -0.835$; $exp(B) = 0.434$; $p = .013$; see [Table 2](#)). Surprisingly, neither affective empathy ($B = -0.007$; $p = .776$) nor cognitive empathy ($B = -0.062$; $p = .102$; see [Table 2](#)) showed a significant predictive effect on GOD.

Figure 4. GMM effect plots for causing inconvenience and causing harm scenarios.



Note. The X-axis displays BDL traits (A & C) and affective empathy (B), while the Y-axis depicts participants' choices (the closer to 1, the more GOD). Each separate line represents the three perspectives.

Discussion

THE ROLE OF THE DECISION MAKER'S PERSPECTIVE ON TROLLEY PROBLEMS AND VARIANTS

We have replicated and extended Nasello et al. (2021) findings, demonstrating that the participant's perspective has a causal effect on moral decision-making in causing harm and inconvenience scenarios.

In causing inconvenience scenarios, we replicated Nasello et al. (2021) findings for Perspective B, but we found higher levels of GOD for Perspective A (92% vs. 75%). This discrepancy might be explained by introducing a notion of probabilities to get the lecture for a certain amount of passengers in Nasello

et al. (2021) findings. The notion of uncertainty affecting a few protagonists seems to lower the propensity to make some GOD. For instance, Kahneman (2013) and Kahneman and Tversky (1982) showed that uncertain events influence decision outcomes. However, our GOD level for Perspective A in the causing inconvenience scenario is very close to previous findings using Foot's trolley problem (e.g., Navarrete et al. (2012) reported 90.5% of GOD), suggesting that moral intensity is similar in these two kinds of dilemmas. Despite the major differences in the consequences involved in these moral dilemmas (i.e., someone who dies vs. someone who loses his/her job), the moral agent (i.e., the person who makes the moral decision; Jones, 1991) does not intentionally perform an action that violates moral norms, unlike in Thomson's variant (see below). Jones (1991) stressed that *intention* has a central role in moral decision-making and relied on Fishbein and Ajzen's theory (1975), stating that intention is the best predictor of a person's behavior. Looking at the perspectives in detail, we found that Perspectives A and C presented the same GOD levels, suggesting that the common good interest (the aggregate welfare) is maximized in causing inconvenience conditions as long as people do not have to choose between others and themselves. In that specific case (Perspective B), people were more balanced, and those who made self-oriented choices probably placed higher values on themselves (Jones, 1991) by consolidating the post-decision option using rational elements (e.g., family duties; see Svenson, 1992, 1996).

The situation was utterly different in the causing harm scenarios. The overall GOD levels drastically decreased compared to the causing inconvenience scenarios, aligning our predictions. As mentioned earlier, the moral violation is extremely high in the transplant dilemma because participants must voluntarily perform a lethal maneuver to save the five, demonstrating that intentions played a crucial role (Jones, 1991). Hunt and Vitell (1986) have also perfectly demonstrated that people perceive the factual reality of one ethical problem, assess the inherent righteousness of a decision, and the amount of good or bad embodied in the consequences of that decision. All of these stages, and their combination, play an essential role in moral decision-making.

In this scenario, we replicated the GOD rate (around 10%) obtained by Hauser et al. (2007) in Perspective A, and we found the highest GOD levels in Perspective C, as expected (see Figure 2). However, contrary to our expectations, we did not find the lowest GOD rate in Perspective B compared to Perspectives A and C. The result is surprising because, compared to other perspectives, a substantial number of people would sacrifice themselves to save the five dying patients. To explain this unexpected result, it is possible that some individuals may have considered this situation more like assenting the doctor to commit assisted suicide than murder. This element may have slightly softened the perceived seriousness of the situation, explaining why we obtained a higher percentage than expected (13% instead of <10%). When analyzing the participants who sacrificed themselves in perspective B of the transplant dilemma, we discovered that most were young Caucasian bachelor students (Age: *Mdn* = 22; *SD* = 5,22). The reason why this small segment of the population is more inclined to make this type of decision remains to be determined. For instance, an unmeasured dispositional trait (e.g., extreme altruism or social desirability propensity) might have played a significant role in this perspective².

Finally, we found some gender differences in causing harm scenarios: men were twice as likely as women to make GOD in Perspectives A and C. Gender differences have already been displayed in the

scientific literature in causing harm scenarios (Fumagalli et al., [2010a](#), [2010b](#); Friesdorf et al., [2015](#); Armstrong et al., [2019](#)), but they are nuanced when participants embody the new patient's perspective (i.e., Perspective B; in this perspective, men and women showed similar GOD levels). As Nasello et al. ([2021](#)) mentioned, these differences are presumably due to stronger affective responses to harming someone for women and more cognitive evaluations of outcomes for men.

Overall, we replicated and extended previous findings in this study, demonstrating a causal effect of the decision maker's perspective on trolley problems and variants. Our results highlight the theoretical significance of considering the variable "perspective" in the field of moral decision-making. Specifically, being enrolled in the perspectives of other protagonists forced individuals to balance their personal interests with those of others in a particular situation or scenario, leading to significant changes in moral decision-making.

BDL TRAITS AS A PREDICTOR OF GOD LEVELS

We assumed that higher levels of affective empathy and BDL traits would predict less GOD (see [Figure 2](#)), in accordance with the predictions made from the DPM (Greene et al., [2001](#)). The present study's findings partly confirmed this assumption. Our findings showed that affective empathy and BDL traits significantly predict GOD under specific conditions but not under all perspectives, as we expected.

For causing inconvenience scenarios, affective empathy and BDL traits were significant GOD predictors in Perspective B. However, contrary to our expectations, they did not similarly predict GOD. When the participant was the spokesman, the more affective empathy, the more GOD (this result does not align with the DPM prediction); inversely, the more BDL traits, the less GOD (this result aligns with the DPM prediction). On the other hand, only BDL traits significantly predicted GOD in Perspective C of causing harm

scenarios. Participants with higher BDL traits were more likely to make GOD when they were among the dying patients (this result does not align with the DPM prediction).

These findings suggest subtle egocentric choices for individuals with higher BDL traits. We argue that this tendency is subtle because (1) participants' decisions were made in contexts where other protagonists could not determine who had made the decision (see [Supplementary Materials](#) for a complete description); and (2) because, as previously mentioned, Perspective C of causing harm scenarios is a mixed decision between GOD and self-oriented decisions.

Our results displayed that GOD increased as a function of BDL traits when the participant was the spokesperson, while higher BDL traits increased the likelihood of making a GOD when s/he was one of the five dying patients. These results: (1) support Saunders et al.'s findings ([2015](#)), which demonstrated that people suffering from BDL present selectively impaired altruism, and (2) suggest that BDL individuals may be characterized by a higher propensity to make egocentric choices in specific moral situations.

Furthermore, this subtle propensity for egocentric choices may affect their interpersonal difficulties and unstable relationships. To explain this tendency, individuals with higher BDL traits may be more sensitive to moral intensity (a concept developed by Jones, [1991](#)) or moral violation, leading them to

make different moral decisions. Importantly, it should not be assumed that favoring the group (GOD) is the 'right' decision. From perspective B, we can argue that a GOD is an altruistic decision because participants favor the group instead of themselves. However, a GOD is not necessarily the right decision or the decision that should be favored. Like in classical trolley problems, the same underlying question is present in this perspective: why should the jobs of five coworkers be considered more valuable than one's own, and vice versa?

IS EMPATHY A RELEVANT PREDICTOR OF GOD LEVELS?

Interestingly, affective empathy had the opposite effect of BDL traits in predicting moral decision-making in Perspective B of scenarios involving inconvenience. This finding was unexpected, given the predictions made from the DPM (Greene et al., [2001](#)). The DPM sustains that emotional processes play a significant role in moral decision-making (particularly in personal or direct-impact scenarios such as those in Perspectives B and C), where individuals are expected to make fewer GOD decisions (and this propensity was expected to be even higher for people presenting higher levels of affective empathy). However, our study found that affective empathy linearly predicted more GOD decisions in Perspective B involving inconvenience scenarios (see [Figure 4B](#)). This result was more consistent with the Empathy-Altruism Hypothesis proposed by Batson ([1987, 2011](#)). The Empathy-Altruism Hypothesis assumes that empathic concern (an affective empathy domain) produces altruistic motivation, and this hypothesis was supported by a 35-year review of empirical research (Batson et al., [2015](#)). The authors demonstrated that empathy leads to more sensitive and constant help toward others (Batson et al., [2015](#)), and this appears to be especially true when people are directly involved in causing inconvenience situations (like in Perspective B). In parallel to Batson's claims, Decety and Cowell ([2015](#)) showed that affective empathy (empathic concern) has evolved to favor ingroup members and can bias decision-making by valuing one individual over a group.

However, our results showed only a small overall predictive effect of affective empathy, similar to BDL traits, which suggests that empathy is not the most relevant predictor of moral judgments and decision-making (Decety, [2021](#); Decety & Cowell, [2015](#)). These findings raise two fundamental questions: (1) to what extent do emotional processes affect moral decision-making as proposed by the DPM? (2) why did cognitive processes such as cognitive empathy not significantly predict moral decision-making in our regression models?

Conclusion

As indicated by our results, while the DPM (Greene et al., [2001](#)) provides a good explanation for certain outcomes, it appears to (1) overestimate the role of emotional processes, (2) generate predictions that do not entirely align with empirical findings (as also shown by Smillie et al., [2021](#)), and consequently (3) offer a poor explanation of moral decision-making.

Given the limited influence of affective empathy on decision-making in this study and prior research (e.g., Nasello et al., [2021](#)), we agree with Horne and Powell's argument ([2016](#)) that the presumed strong connection between emotion and moral judgment or decision-making is probably overstated,

and join Decety's assertion (2021) that empathy is not a reliable and consistent predictor of moral decision-making. However, the lack of a significant predictive effect of cognitive empathy on moral decision-making is still puzzling. As such, while the DPM accurately predicts several outcomes, there appear to be missing pieces to the puzzle that additional features not included in the DPM could likely explain.

We argue that making a decision marks the end of a sequential deliberation process and that moral decision-making is a dynamic process that is impacted by numerous factors. Therefore, both empathy domains may interact at different stages of this process. As a result, some effects may have disappeared, while others may have been reduced by the time the final decision is made (the output).

In conclusion, the key finding of this study was the causal impact of participants' perspectives on moral decision-making. This result highlights the strong influence of this variable on moral dilemmas and underscores the importance of considering this parameter in future research on trolley problems and their variants.

This research investigated several new directions: (1) it confirmed the causal effect of participants' perspective in trolley scenarios and extended this effect by adding a third perspective (Perspective C); (2) it demonstrated that this causal effect also occurred in classical trolley problems (initially, it was only tested on causing inconvenience scenarios); (3) it showed that using everyday trolley-like problems is of great interest as it revealed inter-individual differences and how empathy and BDL traits differently predict moral decision-making; (4) to our knowledge, it is the first study to investigate the role of BDL traits in moral decision-making.

By examining three perspectives on social dilemmas, the trolley problems and variants have become valuable tools for assessing the circumstances under which individuals may prioritize themselves, the community, or the minority. These tools have significant applications in clinical psychology and psychiatry, as they can help clinicians identify specific discrepancies between clinical and healthy control populations, identify associations with impaired social mechanisms, and offer appropriate treatment and support.

LIMITATIONS

There were several limitations in this study. First, similar to previous studies (e.g., Decety & Cowell, [2014](#); Gleichgerrcht & Young, [2013](#); Nasello et al., [2021](#); Patil & Silani, [2014](#); Takamatsu, [2018](#)), a part of the experimental design was correlational. Thus, while affective empathy and BDL traits significantly predict moral decision-making, they do not necessarily cause it. To overcome this limitation, future research could create conditions that elicit varying degrees of affective empathy and test whether they significantly impact moral decision-making. Second, we used a subclinical measure of borderline traits. Thus, future research can focus on the clinical population to confirm our findings. Third, we did not perform analyses of moral decision-making across genders, as men received men's scenarios and women received women's scenarios. Therefore, we cannot claim these results are generalizable regardless of the target's gender. For instance, future research could use a cross-gender design to investigate whether gender differences obtained in causing harm scenarios are modulated. Finally, the transplant dilemma still faces criticisms similar to that of classical trolley problems raised by Bauman

et al. (2014). Due to ethical concerns, only limited experimental approaches can be performed (i.e., using hypothetical scenarios), providing limited evidence. This highlights the need to develop new experimental materials that present more ecologically valid situations for studying moral decision-making in causing harm and causing inconvenience scenarios.

Notes

1. We conducted a pilot experiment ($N = 24$; 17 women; $M_{age} = 26.5$; $SD = 5.32$) to pretest four everyday trolley-like problems (i.e., the dilemmas of the company, the inheritance, the university, and the roommates) and chose the company's dilemma because: (1) it was rated as sufficiently immersive and realistic; (2) participants found it highly distressing, and their choices caused them to feel tormented and concerned; (3) participants rated it as presenting low levels of escape (i.e., elements in the scenario that favor one option over the other). Batson et al. (1981) showed that the ease of escape influences helping behaviors in specific empathic conditions. Moreover, (4) participants reported experiencing a wide range of emotions while reading the scenario (i.e., they felt ashamed, anxious, frustrated, disgusted, nervous, and attentive); and (5) they did not find the scenario amusing at all. Taken together, these elements addressed the criticisms raised by Bauman et al. (2014).

2. Another potential explanation for the high percentage of GOD responders among participants with Perspective B could have been the presence of suicidal thoughts, particularly among those with higher levels of BDL traits. However, several factors make this explanation unlikely. First, all participants reported no history of psychiatric or neurological issues. Second, their scores in BDL traits were within the normal range ($Mdn = 115$; $SD = 25$). Third, BDL traits did not significantly predict moral decision-making in Perspective B, ruling out this interpretation.

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The authors report that there are no competing interests to declare.

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Ethical Approval

All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments, and the American Psychological Association's Ethical Principles in the Conduct of Research with Human Participants (2010). The ethical committee of the Department of Psychology of the University of Liège (Belgium) approved the study, reference n°: 1920-92.

Informed Consent

Informed consent was obtained online from all participants included in the study.

Online Data

The online data file is available on the following DOI link: 10.17605/OSF.IO/T4H7F.

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