Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Short Communication

Differences in moral judgment predict behavior in a Covid triage game scenario

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ABSTRACT

Moral beliefs influence decisions across many contexts, but researchers typically test how these beliefs translate into moral judgments in hypothetical dilemmas. While this is important, in this study (N = 248), we sought to extend these findings by exploring whether moral judgment (specifically utilitarian or deontological processing) predicted behavior in a commons dilemma game against other players (programmed bots) across multiple rounds in the context of the Covid-19 pandemic. Importantly, participants had to weigh short-term needs against long-term dangers of exhausting the community pool (i.e., a tragedy of the commons). As hypothesized, increased utilitarian processing predicted reduced resource extraction from the community pool. In addition to showing that differences in moral judgment predict behavior in a game situation that simulates a somewhat ecologically valid dilemma, these results also replicate previous research connecting morality to opinions about Covid-19 vaccine requirements.

1. Introduction

Moral sensibilities are among the defining characteristics of what makes us human. A recognition of this fact explains why morality has been a compelling area of psychological study. Here, there is a long interdisciplinary history, where philosophers and psychologists have bridged fields by examining people's judgments in hypothetical moral dilemmas (often referred to as Trolley Problems). While important findings have been made, questions have been raised regarding the external validity of research that exclusively collects data on peoples' moral judgments in the context of hypothetical sacrificial dilemmas (e.g., is it morally appropriate to kill one person to save five). That is, are people's responses to these hypothetical dilemmas predictive of their behaviors in other morally significant situations that closer approximate the decisions people are accustomed to making in real life?

Interestingly, the Covid-19 pandemic has created many real-world moral dilemmas. These dilemmas run the gamut from personal decisions about masking up to international decisions about vaccine passports. In the face of such a seminal event, research has been forthcoming about people's moral beliefs (Rosenfeld & Tomiyama, 2021), judgments (Navajas et al., 2021), and behaviors (Chan, 2021) concerning the pandemic. Previous research investigating moral judgment has often examined the degree to which peoples' moral decisions correspond to the tenets of two dominant philosophical theories (i.e., utilitarianism and deontology). At their core, these theories support differing rubrics of morality. While utilitarianism reduces morality to questions of the greater good, deontology prioritizes individual rights and duties. For example, while utilitarianism supports sacrificing a few to save many in dilemmas like the trolley problem, deontology cannot condone the sacrifice, as it would be a violation of the person's rights.

Within our current context, it is clear to see how support for one moral theory over another might predict beliefs or behaviors related to Covid-19 (e.g., vaccine mandates). Recent studies have found that increased deontological processing is associated with less support for vaccine mandates in the United States (Clarkson & Jasper, 2022) and that the increased willingness of national leaders to engage in utilitarian sacrifices in dilemmas associated with the pandemic has eroded trust in leadership (Everett et al., 2021). While some work has been done (e.g., Everett et al., 2016), the need for further investigations, which explore associations between morality and in-game behavior, has been broached by recent reviews (Clarkson, 2022). Critically, some argue that a sincere commitment to utilitarianism is especially important for avoiding disaster (or tragedies of the commons) in collective action situations (see Greene, 2013). Thus, in the current study participants' moral judgments were compared to their behavior in a common's dilemma game in the context of the Covid-19 pandemic.

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The study commenced across two phases. In phase one, participants were asked to rate their perceptions of the seriousness of the Covid-19 pandemic and their agreement with a vaccine mandate. Past research (i.e., Clarkson & Jasper, 2022) found that while utilitarian processing showed no relationship, deontological processing was negatively associated with agreement for a government-imposed vaccine mandate for participants on MTurk. Thus, in phase one we hoped to replicate (Hypothesis 1) and extend these findings to a different population (undergraduate students). In phase two, participants responded to a variety of moral dilemmas before playing a hypothetical commons game. In the game, participants acted as heads of state where they could harvest a hypothetical cure for Covid-19 from a partially replenishing community pool across multiple rounds. As constructed, participants needed to limit their extraction of these life-saving resources in the short term to avoid exhausting the community pool completely, which would lead to a tragedy of the commons and worse long-term outcomes. We hypothesized that increased utilitarian processing would predict reduced resource extraction in the game (Hypothesis 2) since utilitarianism reduces morality to questions of consequences.

2. Method

2.1. Participants

Two hundred forty-eight participants (135 females; $M_{age} = 19.7$, SD = 3.28) completed the study on Qualtrics after passing a series of attention and quality checks. Participants were recruited from the universities' undergraduate research pool via Sona and were compensated with course credit. Informed consent was obtained from all participants before data collection, which occurred between January and May of 2021.

2.2. Measures

2.2.1. Moral judgment

Participants responded to two sets of moral dilemmas. The first set, developed by Conway and Gawronski (2013), allows for an analysis of participants' utilitarian and deontological processes independently, using 20 specially-constructed moral dilemmas. After assessing their responses, continuous measures of participants' utilitarian and deontological process strengths were calculated (see Conway & Gawronski, 2013 for a review).

2.2.2. Conservatism

The social and economic conservatism scale (Everett, 2013) assessed participants' rates of social ($\alpha = 0.84$), economic ($\alpha = 0.68$), and overall ($\alpha = 0.87$) conservatism. Across 12-items, participants were asked to rate their views about specific politically relevant topics (e.g., welfare benefits) on a scale of 0–100. Higher values indicate greater rates of conservatism.

2.2.3. Perception and opinion about Covid-19

To assess participants' perception of the seriousness of Covid-19 and their opinion about a governmental vaccine mandate, they answered two questions. First, "Please rate on the scale below how serious you believe the current Covid-19 global pandemic is?", was assessed on a 100-point scale, ranging from 0 (*Not very serious*) to 100 (*Very serious*). Second, "If a vaccine to Covid-19 were to be created and become publicly available, do you think the government should require that all adult citizens take the vaccine?", was assessed on a 7-point scale, ranging from 1 (*Not at all*) to 7 (*Very Much*).

2.2.4. Reefs Covid-19 game

Participants' primary task in phase two was to play a new game that we modeled from prior research (i.e., Sheldon & McGregor, 2000). In the game, participants were tasked with acting as heads of state in a hypothetical situation during the Covid-19 pandemic. While an appendix further explaining the game is added as supplementary material, the most pertinent details are presented below.

In the game, participants were told a lifesaving treatment for Covid-19 was found in a rare species of coral reefs, which was only 200 acres in size, and located in international waters. For every acre of reef harvested, enough treatment could be extracted to save 1000 sick and dying people with Covid-19. As their country (and others) await shipment of vaccines, 10,000 citizens in these countries are dying monthly from Covid-19. As such, the international community has decided to allow their country (and three others that are similarly afflicted) to harvest from the reef. However, since the reef only replenishes 10% each month, countries were only allowed to harvest up to 10 acres of reef per month. Thus, participants were asked to decide how many acres to harvest from the reef per round (which were represented as months). Participants could harvest the maximum number of acres to save all their sick and dying citizens per month. However, this could lead to the total exhaustion of the reef, leaving all four countries without a supply of the treatment before the vaccine was available. Note, participants were not given information about the bids of individual countries, but only the total monthly harvesting between them. Thus, participants needed to balance the danger of under-harvesting the reef (i.e., letting citizens die in the short term) against over-harvesting (i.e., letting citizens die in the long term).

After reading the description of the scenario participants' harvesting decisions were recorded for 12 rounds of the game (or until the community pool was exhausted). The other countries in the game were preprogrammed bots, that exhibited one of three fixed behaviors. Across three between-subjects conditions (i.e., low-bid, equilibrium-bid, high-bid) these behaviors were designed to mimic three separate strategies. Bot players were programmed to collectively harvest 4–6 (low-bid), 14–16 (equilibrium-bid), or 27–30 (high-bid) acres per round. While the behavior of the bots was fixed, some variation in their bids was added to mimic potential variations in human bidding behavior. Participants' in-game behaviors (i.e., total bids of 0–120 acres) were recorded.

3. Results

Inter-correlation coefficients between variables were calculated with Pearson's *r*. The perceived seriousness of Covid-19 and agreement with a government-based vaccine mandate correlated negatively with economic ($r = -0.55$, $p < .01$; $r = -0.35$, $p < .01$) and social conservatism ($r = -0.42$, $p < .01$; $r = -0.42$, $p < .01$). The moral judgment variables (D-process, and U-process) showed no relationship with participant-perceived seriousness of Covid-19. Participants' U-process correlated positively with support for a mandated vaccine ($r = 0.13$, $p = .047$), while their D-process was negatively correlated ($r = -0.17$, $p = .01$).

To examine this relationship further, a hierarchical linear regression was conducted with participant agreement with a government vaccine mandate entered as the outcome variable. Participants' seriousness ratings of Covid-19 were entered into the first step of the model. In the second step, participants' composite conservatism, D-process, and U-process variables were entered.

The first step was significant, $F(1,246) = 36.18$, $p < .001$, $R^2 = 0.13$. More importantly, the second step in the model was also significant, ΔF (3243) = 12.33, p < .001, $\Delta R^2 = 0.12$, indicating that participants' conservatism and moral processes accounted for an additional 12% of the variance above and beyond their perceived seriousness of the Covid-19 pandemic. However, only participants' conservatism ($\beta = -0.32$; $p < .01$) and D-process ($\beta = -0.16$; $p < .01$) were significantly associated with their opinions about a vaccine mandate.

In the reefs game, participants harvested 65.58 acres across all rounds but showed differences between conditions of different bot strategies, i.e., 80.68 (low-bid), 72.59 (equilibrium-bid), and 43.70 (high-bid). A hierarchical linear regression was conducted on the total number of acres harvested. In step one, participants' U- and D-process

variables were entered. Composite conservatism and the bot strategies (as a dummy coded variable) were entered into the model in the second and third steps, respectively.

The first step was significant, $F(2,245) = 3.89$, $p = .02$, $R^2 = 0.03$. However, only participants' U-process predicted their behavior (see Table 1). The second step in the model was also significant, $\Delta F(3244) = 4.16$, $p = .04$, $\Delta R^2 = 0.02$, indicating that participants' conservatism accounted for an additional 2% of the variance. Finally, the third step in the model was significant, $\Delta F(5242) = 84.8$, $p < .001$, $\Delta R^2 = 0.39$, indicating that bot strategy accounted for an additional 39% of the variance.

Table 1
Regression analysis for resource harvesting.

	F	R^2	β	95% CI		*p*
				LL	UL	
Step 1	3.89	0.03				
U-process			−0.18	−7.39	−1.27	.006*
D-process			0.003	−2.99	3.14	.96
Step 2	Δ4.16	Δ.02				
Conservatism			0.13	0.11	6.24	.042
Step 3	Δ84.80	Δ.39				
Low-bid			0.15	2.01	13.58	.009*
High-bid			−0.54	−34.07	−22.41	.001*

Note. All variables were standardized. N = 248.
* Significant after applying Bonferroni correction.

4. Discussion

The purpose of this study was two-fold. First, we sought to replicate and extend prior research that found associations between moral processing and judgments surrounding Covid-19 (such as agreement with a vaccine mandate). Supporting Hypothesis one, our results are consistent with prior findings (i.e., Clarkson & Jasper, 2022), as the D-process (and conservatism) negatively correlated with agreement for a vaccine mandate. However, in contrast, in that prior study, the U-process positively correlated with agreement for the mandate. Despite this difference, these results are consistent with past theoretical predictions. Specifically, utilitarianism's reduction of moral questions to questions about consequences indicates that increased utilitarian processing should lead to greater agreement with policies expected to lead to better consequences, such as mandatory vaccine requirements.

This research also investigated whether participants' moral processing would predict their behavior in a hypothetical game situation (i.e., a commons dilemma). While the game situation was fictitious, the results show for the first time that moral processing (specifically the U-process) predicts behavior (less resource extraction) in a collective action game scenario (supporting Hypothesis 2). Indeed, prior reviews have called for such methods and the current results are consistent with earlier arguments that highlight the importance of utilitarianism to solve real-life collective actions problems. In line with theory-based predictions, these results indicate that utilitarian processing may be especially important for avoiding collective tragedy in disaster triage situations. As such, not only does this research speak to a timely issue (the Covid-19 Pandemic) but it also informs questions at the intersection of the philosophical and psychological study of morality.

Future research should further investigate how morality influences behavior in-game situations that simulate current and future collective action problems. Studies could advance these findings by investigating if dimensions of utilitarianism (like impartial beneficence) predict specific behaviors or test how attaching real-world incentives (e.g., money) to the game influences behavior.

CRediT authorship contribution statement

Evan Clarkson: Conceptualization, Methodology, Software, Data curation, Writing – original draft, Visualization, Investigation, Formal analysis. **John D. Jasper:** Supervision, Writing – review & editing. **Brelaina Gugle:** Writing – review & editing.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.paid.2022.111671.

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