RESEARCH ARTICLE

Wait, did I do that? Effects of previous decisions on moral decision-making

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Abstract
Previous studies have investigated moral decision-making by using moral dilemmas that involve a single decision. This article extends this paradigm, introducing two-stage scenarios to examine how moral decision-making is influenced by previous decisions in the same narrative—especially whether people tend to stay consistent or to reconsider within a morally challenging situation. It further compares decision-making between two-stage and one-stage scenarios. In Study 1 (N = 239), participants read scenarios requiring two successive decisions of harming one person to spare multiple people (utilitarian action), or vice versa (deontological action), within the same narrative. Second decisions were mostly found to be consistent with first decisions. Remarkably, inconsistent responding (switching) was robustly observed in about 29% of cases. Study 2 (N = 63), using one-stage scenarios, showed that having made a previous decision in the same narrative generally decreased utilitarian responding. Potential explanations for these phenomena are discussed. The present article concludes that prior choices within the same setting significantly influence decision-making. It also reveals the potential of gaining new insights using multiple-stage scenarios in moral decision-making research.

KEYWORDS
moral decision-making, moral dilemmas, moral self-concept, previous decisions, sunk-cost effect, switching

1 | INTRODUCTION

What would you do if you were faced with the choice of saving multiple lives by ending another? How far can or will people go for the “greater good”? While these questions have presumably been discussed throughout human history, their importance has recently been underscored by developments such as the advancement of autonomous systems (such as self-driving cars) and the implementation of restrictive actions for pandemic control (such as lockdown or triage). Recent literature has tried to answer these moral questions by confronting people with fictitious moral dilemmas (e.g., Awad et al., 2020), in which one has to decide whether to cause a person harm in order to avert harm for multiple others. This has so far yielded insights into several factors that influence moral decision-making, such as personal versus impersonal actions as well as modality and language in which dilemmas are presented (e.g., Brouwer, 2019, 2020; Costa et al., 2014; Greene et al., 2008).

A factor that remains to be examined, however, is the impact of preceding decisions on a moral decision being made. Overall, previous studies have limited themselves to experimental paradigms with...
“classical” moral dilemmas, that is, one-time binary moral choices. This article extends this scope by using moral scenarios that involve two connected dilemmas within the same narrative. The objective here is to explore the impact of previous decisions in moral dilemma situations, that is, whether people make two different responses (switching) or decide consistently when faced with two moral decisions within a single narrative. Furthermore, we investigate whether people’s decision behavior generally differs between a one-stage and two-stage paradigm.

1.1 Processes and factors underlying moral decision-making

Moral decision-making has been defined as deciding in relation to a set of rules that are often determined by culture or society (Haidt, 2001). In describing decision-making, a broad distinction between two philosophies is commonly made, namely, between deontological (cf. Kant, 1785/2004) and utilitarian reasoning (cf. Mill, 1863). Broadly speaking, deontological reasoning is based on general moral rules or laws, such as the rule that one should not kill another person. Utilitarian reasoning, on the other hand, is outcome-oriented thinking, that is, focused on maximizing net welfare. Moral decision-making is often studied by looking at people’s responses to fictitious moral dilemmas. Probably the most famous moral dilemma is the so-called footbridge dilemma, in which one has to decide whether to kill a person by pushing them in front of a train in order to save five other people from getting killed by the train (Foot, 1978; Thomson, 1985). In this kind of moral dilemmas, deontological and utilitarian reasoning are pitted against each other. When faced with the choice of killing one person in order to save five others, a deontological standpoint would advocate against the action (“You should not kill a person”) while a utilitarian perspective would be in favor of the action (“One life for five means a net gain of four lives”). It is important to note that both deontology and utilitarianism are complex philosophical concepts, the full description of which goes beyond the scope of this paper (see Conway et al., 2018, for a more detailed review). Therefore, in this article, we will use the terms “deontological” and “utilitarian” in the simplified and binary way described above. A “utilitarian decision,” for example, is, for our purposes, a decision that is consistent with utilitarian principles (which does not imply that it was made with these principles in mind).

A framework that is frequently used to describe decision-making is dual-processing theory, including both emotional and rational components (Kahneman, 2003). In this theory, the core idea is that people use two systems of thinking that are distinct from each other: System 1, which is fast, effortless, and automatic thinking, and System 2, which is slow, effortful, and deliberate thinking. While the main focus of the original version of the dual-processing model was based mostly on speed (i.e., differences in reaction times), later research rather made the distinction between affective/intuitive (System 1) and cognitive/rational (System 2) processing (Baron et al., 2012; Koop, 2013). In the context of moral decision-making, it has been argued that deontological decisions are associated with System 1 (fast, affective) thinking, as one merely applies known heuristics (here: moral rules) automatically, while utilitarian decisions require more effort (i.e., weighing the options) and are therefore associated with System 2 (slow, cognitive) thinking (Costa et al., 2017; Greene et al., 2008). This categorical distinction and the related claim of utilitarian decisions being “unintuitive” have recently been challenged, as people have been shown to be capable of “fast”/affect-based utilitarian decisions as well as of “slow”/cognition-based deontological judgments (Bago & De Neys, 2019, 2020; Bialek & De Neys, 2017; Gamez-Djokic & Molden, 2016; Rosas & Aguilar-Pardo, 2019).

1.2 Effects of previous decisions

Virtually, all previous studies into moral decision-making have exclusively used one-shot moral dilemmas, that is, dilemmas that require only a single choice for a given narrative. In consequence, there is little research about how moral dilemmas influence each other when there is more than one decision to be made. One of the few studies that do report effects beyond a single dilemma (Wiegmans et al., 2012) suggests that there seem to be order effects across different (one-shot) dilemmas: Specifically, it was found that participants responded less in favor of an action that was normally (i.e., in the majority of cases) seen as morally acceptable when it was presented directly after an action that was usually seen as unacceptable. However, no study has so far used moral scenarios that involved more than one decision within the same “story” or fictional situation. The present article will therefore use novel two-stage scenarios. Each of these consists of two subsequent dilemma situations that involve the same parties that will be harmed or spared depending on the respective choice. In comparison to one-shot scenarios, which have two potential outcomes (Yes to redirect harm, i.e., a utilitarian choice, and No to not redirect harm, i.e., a deontological choice), these new scenarios add another decision layer as participants can now stay consistent (i.e., respond deontological/utilitarian on both stages) or “switch” behavior (i.e., respond deontological on the first stage and utilitarian on the second stage, or vice versa) within a scenario.

One phenomenon that is promising when looking at two connected decisions is the sunk-cost effect. The sunk-cost effect is characterized by the tendency to further invest into endeavors that one has already invested into, with investments being time, effort, money, or other physical or psychological resources (Arkes & Blumer, 1985). Intriguingly, this preference persists even in the face of other, better options. One example for this was reported by Coleman (2010): In an experimental study about course choices in an educational context, participants chose investing more time into a course they had already invested in over investing in another course, even though that course was identical in content and promised significantly better results. The sunk-cost effect has been explained by an instinctive aversion towards “wasting” the earlier investment (Arkes & Blumer, 1985). It has further been suggested that the sunk-cost effect is due to expectations of feelings of regret: The anticipated regret for “wasting” the
investment that was already made is higher than for staying persistent (Wong & Kwong, 2007). A recent study has demonstrated that sunk-cost effects also occur in the moral domain: In experiments by Meyers et al. (2019), people decided to stay on a path they had invested in despite it being nonbeneficial and immoral. They also generally rated other decisions that had been invested in as more morally acceptable. However, due to lack of studies in this area, the existence of the sunk-cost effect in the moral domain is currently being debated (see Hamzagic et al., 2021). In the two-stage scenarios used in Study 1 of the present article, the sunk-cost effect could manifest in a preference for staying with one’s initial investment of saving someone rather than abandoning it.

However, people might also respond inconsistently when faced with two connected decisions, that is, perform a “switch.” One possible framework for this could be moral self-concept theory (Mazar et al., 2008). According to that theory, people strive to keep up a certain sense of moral self, which is affected by actions that are perceived as moral or immoral. Therefore, moral compensatory behavior can occur after a person does a morally “good” or “bad” deed, resulting in an action that goes into the opposite direction (Conway & Peetz, 2012; Jordan et al., 2011; Zhong et al., 2009). In the present setup, this could lead to switching behavior. Another potential explanation for switching might be given by the morality preference hypothesis, according to which people strive to decide to take decisions that will be perceived as morally right (Capraro & Rand, 2018; Tappin & Capraro, 2018). Following this hypothesis, being confronted with a second decision might make people think that their first action was perceived as morally wrong, leading them to switch their course of action. Furthermore, it has been remarked earlier that the severity of potential consequences can also shape the response to a dilemma (Trémolière & De Neys, 2013). When consequences are perceived to be more severe, people are less likely to endorse utilitarian actions. As severity always increases in the two-stage scenarios of the present article, this could cause people to switch from utilitarian to deontological responses.

### 1.3 Study objectives

The primary objective of this article is to examine decision patterns in a two-stage moral decision paradigm, that is, seeing whether people switch or stay consistent within a scenario. The secondary objective is to investigate whether decision behavior in two-stage scenarios generally differs from behavior in one-stage scenarios. In our experimental studies, participants are presented with several moral scenarios and are asked to indicate whether they would take a certain action (utilitarian response) or not (deontological response). In Study 1, these scenarios are novel two-stage experimental scenarios (consisting of two connected dilemmas each), while for Study 2, these are one-stage variants of those scenarios. The two-stage scenarios in Study 1 were designed to include two successive stages of the same narrative and thus always involve two decisions affecting the same parties (i.e., people that are potentially harmed or saved from harm) (see Figure 1). The consequences of the participants’ decision on the first stage for these parties are presented again in the introduction of the second stage (i.e., depend on the choice of the participants).

Regarding decision patterns in the two-stage paradigm (i.e., Study 1, which includes being confronted with the consequences of the first decision directly before making the second), it can be expected that a decision on the second stage will be influenced by the first decision to some degree. A general random alternating pattern is unlikely as participants do not know which scenarios contain more than one decision. However, for any given experimental scenario, there are $2 \times 2$ options, as demonstrated in Figure 1. For example, the first stage of the Surgeon scenario involves deciding whether a coma patient or five accident victims should be harmed to save the respective other party from harm. The second stage is set to take place after the consequences of the first stage and involved deciding about whom to sacrifice (of the same two parties, here: the coma patient or the five accident victims) for the survival of the respective other. Generally, two of these $2 \times 2$ options represent sticking to a chosen “path,” that

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**FIGURE 1** Overview of possible decision patterns in experimental scenarios, illustrated by the Surgeon example
is, deontological on the first decision and deontological again on the second decision, or utilitarian on both first and second, respectively, while the other two would mean “switching” between first and second scenarios (i.e., deontological first, utilitarian second, or vice versa).

In terms of scenario narrative, choosing the same option in both stages of a scenario means that one of the parties involved in the scenario is “protected” twice, while the other party is “harmed” twice. If in the Surgeon scenario, one decides in a utilitarian way in both stages, for example, the coma patient would be seriously harmed by paralysis (first stage) and then be killed (second stage), while the five accident victims would be saved from paralysis (first stage) and then from death (second stage). This illustrates that by sticking to a line of reasoning, one protects and cements the first stage’s outcomes. Research has shown that people prefer to stick to things they have already invested into, which is described by the sunk-cost effect (see Arkes & Blumer, 1985; Coleman, 2010). Consistent responses could thus mean that people are trying to protect their “investment” or just generally prefer to be consistent.

Switching the line of reasoning is represented by either responding utilitarian on the first stage and deontological on the second or vice versa. In both cases, switching means that someone will be killed by the second decision who was protected by the first, as well as that the other party will be protected while having been harmed at first. One could argue that this is somewhat counterintuitive as it makes the first decision seem worthless. However, switching could make sense if one relates this to a sense of guilt or distribution of harm, as switching means deciding to save a party that has been injured by one’s previous decision. Switching could also be explained in terms of moral self-concept theory (Mazar et al., 2008): It is possible that if participants interpret their actions in terms of morally “good” or “bad,” moral compensatory behavior could occur (Sachdeva et al., 2009; West & Zhong, 2015), resulting in two opposite decisions, that is, switching from a deontological to a utilitarian action or vice versa. Similarly, seeing the second decision as an implicit suggestion that their first decision was wrong, people might also switch according to the morality preference hypothesis (Capraro & Rand, 2018; Tappin & Capraro, 2018). Furthermore, as potential consequences in the two-stage setup generally increased in terms of severity from first to second stage, a severity effect (Trémolière & De Neys, 2013) is also possible. In that case, participants would become more averse to utilitarian responding on the second stage, resulting specifically in switches from utilitarian to deontological responding (rather than vice versa).

It is further to be expected that decision behavior in two-stage scenarios (Study 1) will differ from behavior in one-stage scenarios (Study 2). We will explore how likely a certain decision is to be endorsed when it is preceded by a related decision (two-stage) as opposed to when it is not (one-stage). If there is indeed a global difference here, there are different possible results; due to the exploratory nature of this article, a few different possibilities will be given here. One possibility might be that decisions are generally more likely to be judged in a utilitarian way when preceded by a related decision, which could be because there is more time and incentive to reconsider, following traditional dual-processing theory (Cummins & Cummins, 2012; Kahneman, 2003; Paxton et al., 2012). However, the opposite effect could also occur, for example, if considering a previous decision and its consequences has the effect of focusing the participant’s moral compass and/or inducing feelings of guilt (cf. Sachdeva et al., 2009; Schwartz, 1968). Other effects, such as an amplifying effect from the first to the second decision, are also imaginable. In general, several different factors could be relevant for the comparison between two-stage and one-stage paradigm; for example, in two-stage scenarios, people “know” the parties involved for a bit of time (and one decision) longer than in one-stage scenarios. Furthermore, two-stage scenarios could also be seen as more realistic (due to a longer “story” one can relate to) and also show the efficacy of the participants’ actions, whereas one-stage scenarios always end with the first and only decision (and give no feedback about the announced consequences actually happening).

## 2 | STUDY 1—TWO-STAGE SCENARIOS

### 2.1 | Method

#### 2.1.1 | Participants

The final sample for this study consisted of 239 participants (183 female, 1 other gender, and 1 unspecified gender, \(M_{\text{Age}} = 23.6\) years, \(SD_{\text{Age}} = 8.6\)). An a priori power analysis using the application G*Power (Faul et al., 2007, 2009) using an estimated medium effect size of Cramer’s \(V = 0.25\) and a target power of 0.95 had yielded a minimum requirement of 208 participants. We opted to increase this number to allay any concerns about additional variability introduced from running the study online. To increase data quality further, we applied the following exclusion criteria: While originally, 278 participants had been recruited, 11 were excluded due to incomplete or (self-reported) unusable responses. Additionally, we chose to exclude all participants who did not pass the comprehension check questions (\(N = 13\)). Due to the reduced experimental control of online recruitment, we further excluded all participants who completed the study in less than 10 min (\(N = 15\)) according to benchmarks from our fastest online pilot tests (a post hoc reanalysis of the data with these 15 responses included did not show significantly different results). All participants had at least a high school degree that qualified them for university, with 20.9% also having a university degree.

Participants were recruited by distributing the questionnaire via word of mouth, social media, and posters in public places in several cities. A large part of the participants (66.9%) was recruited from the participant pool of the Radboud University. For achieving larger sample sizes, we chose to invite both German and Dutch native speakers to participate in the study (in their respective native language), with the final sample consisting of 131 (54.8%) Dutch native speakers. In our analyses, splitting the data by native language yielded no significantly different results. Participants received either study credit or the chance to win a €10 voucher for their participation. Prior to recruiting,
the study was approved by the Ethics Assessment Committee Humanities of Radboud University, Nijmegen (EAC File Number 2018-9380).

### 2.1.2 | Materials

The questionnaire used in this study was created using the Qualtrics web platform (Qualtrics, 2019). As two different native language pools were used, that is, German and Dutch, all original English materials were translated. This was done with the help of three German native speakers (all with English at C2 proficiency level and one being a certified translator) and respectively with the help of two Dutch native speakers (English C1 and C2 levels) and a Dutch–English early bilingual. Retranslation checks were run to verify the accuracy of the translations.

In total, 15 scenarios were used for this study (see Table 1 for a short summary of each scenario). These were slightly adapted from Greene et al. (2008), Conway and Gawronski (2013; as cited in short summary of each scenario). These were adapted from translations. Retranslation checks were run to verify the accuracy of the speakers (English C1 and C2 levels) and a Dutch–English early bilingual. Retranslation checks were run to verify the accuracy of the translations.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Plot summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental</strong></td>
<td></td>
</tr>
<tr>
<td>Car accident</td>
<td>You are driving through a busy street and have to decide [whether to hit and injure a woman with a baby or an elderly woman instead and then] whether the woman with her baby or the elderly woman is hit and killed by a truck.</td>
</tr>
<tr>
<td>Hard times</td>
<td>You are head of a poor family and have to decide [whether to employ your daughter in the porn industry to feed your family to avoid having to beg and then] whether to marry your daughter off to a foreign country in order to avoid starvation permanently for the rest of the family.</td>
</tr>
<tr>
<td>Soldier</td>
<td>You are the leader of a group of soldiers and have to decide [whether to send your scout into poisonous traps in order to avoid them for the rest of the group and then] whether to leave the scout to die in order to avoid death for the whole group.</td>
</tr>
<tr>
<td>Surgeon</td>
<td>You are a surgeon and have to decide [whether to paralyse a coma patient in order to save five accident victims from paralysis and then] whether to kill the coma patient to save the five accident victims from death.</td>
</tr>
<tr>
<td>The choice</td>
<td>In an occupied country, you have to decide [whether to volunteer one of your children for torturous experiments in order to avoid harm to both of them and then] whether to volunteer one of your children for lethal experiments in order to avoid both dying.</td>
</tr>
<tr>
<td>Torture</td>
<td>You are a police officer and have to decide [whether to torture a man in order to prevent injuries to many others and then] whether to let the man be killed in a fire in order to save five other prisoners’ lives.</td>
</tr>
<tr>
<td>Vaccine</td>
<td>You are working on a vaccine for a dangerous disease that has spread around the globe and have to decide [whether to do a painful test on a patient in order to prevent many other people getting sick and then] whether to do a medical experiment that will kill a patient in order to save countless other lives.</td>
</tr>
<tr>
<td>Vitamins</td>
<td>You are the leader of a mountaineering expedition and have to decide [whether to take a kidney of a geologist in order to save a family of six from permanent health damage and then] whether to make the geologist fall to death in order to save the six family members.</td>
</tr>
<tr>
<td>Warrior tribe</td>
<td>You are the leader of a people consisting of two tribes and have to decide [whether to torture one criminal tribesman publicly as punishment in order to prevent infighting that would injure many more and then] whether to kill the tribesman publicly in order to prevent a war that would cost many lives.</td>
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| **Control**                                                                                                                                     |                                                                                                                                                            |
| Footbridge   | You are standing next to train tracks and have to decide whether to push a person next to you onto the tracks in order to prevent an accident in which five other people would be hit by a train and killed. |
| Motocross    | You are part of a motorcycle race and have to decide whether to make another participant crash lethally in order to prevent a mass collision that would kill six others. |
| Switch       | You are on a runaway trolley bound to lethally hit five railway workers and have to decide whether to switch to another track, thereby hitting and killing one other worker instead. |

Note: The additional first part (in brackets) was present for the experimental scenarios in Study 1 only.
and B in the supporting information). In terms of the personal/impersonal distinction (cf. Moore et al., 2011), only personal scenarios were used. This was done as several studies have demonstrated that several effects tend to be more likely to appear with personal scenarios (which involve actively/physically and severely affecting someone in the scenario), as they evoke a stronger emotional response (Brouwer, 2020; Chan et al., 2016; Costa et al., 2014; Moore et al., 2011). Scenarios were further selected for greatest plausibility and for the fact that they had been used by several previous studies (Brouwer, 2020; Hauser, 2006; Hayakawa et al., 2017; Kamm, 2007; Wiegmann et al., 2012).

The main modification of the original dilemma materials consisted of the addition of a second dilemma stage within the same scenario. Half of the scenarios were designed such that the adapted dilemma (i.e., the one taken from previous literature) formed the first stage of a scenario, while the other half were edited such that the adapted dilemma formed the second stage of a scenario. The respective other stage was written to be similar in writing style and content to fit within the narrative. All stages were compared in terms of length (first vs. second stages; deontological vs. utilitarian second stages) using independent-samples t tests, yielding all ps > .100.

The sequence in an experimental scenario was as follows (see Surgeon example in Figure 2): Initially, the first stage of the scenario was

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**Scenario: Surgeon**

You are a surgeon in a small hospital.

One day, an accident occurs, and five people are badly hurt and have to undergo surgery. All five of them have lost large amounts of blood. They need blood transfusions but your hospital’s blood bank is currently almost empty. The only way to prevent the five from being paralysed for life is to take blood from another patient. He has been in a coma for several weeks and it is unclear whether he will ever wake up again. Taking his blood will make him paralysed, but the five accident victims will be saved from harm.

Would you take blood from the coma patient in order to save the five other patients from being paralysed?

**Surgeon – Part 2**

[If utilitarian/Yes in first stage:] You decide to take blood from the coma patient, with which you are able to prevent the five accident victims from getting paralysed. The coma patient will never be able to walk again should he ever wake up.

[If deontological/No in first stage:] You decide against taking blood from the coma patient. Without those blood transfusions, the five accident victims survive the operation but it turns out that they will never be able to walk again. The coma patient stays unharmed.

[Following, in both cases:] A few hours later, you discover that the five accident victims have also suffered organic damage that is life-threatening. They all need organ transplants immediately or they will die. The coma patient still has healthy organs. You could end his life support and take his organs for the five accident victims, so that their lives will be saved.

Would you end the patient’s life support and take his organs in order to help the others?

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**FIGURE 2** Two-stage scenario as used in Study 1 (Surgeon example)
introduced, that is, a title, an introductory, and a description of the dilemma. This was followed by the question whether or not to take an action that would harm one person to save others. The second stage of a scenario was presented on the next page right after the participant’s response (Yes/No) to the first stage. Second stages of scenarios were formatted like all other dilemmas. The title, however, was chosen to indicate that it was still the same scenario (e.g., for Surgeon, it read Surgeon—Part 2). In the first paragraph of the second dilemma, the consequences of taking the action chosen by the participant were presented. This means that this first paragraph came in either a utilitarian version if the participant had responded with Yes on the first stage or in a deontological version if the participant had responded with No. Note that all consequence descriptions were designed to (a) depict the consequences as they had been indicated at the first stage and (b) explicitly mention both parties. This was followed by a new dilemma involving the same or comparable parties, which was in turn followed by a question whether or not to take the described action. After the response to this question, the next scenario was presented. Notably, the severity of the consequences for the parties mentioned in the dilemmas always increased within a scenario (i.e., from the first to the second stage in Study 1). This was intended to (a) make for a somewhat more engaging and dramatic narrative and (b) make the dilemmas asymmetrical in the sense that a “switch” in responses was maximally inconsistent. In other words, we ensured that participants did not have the possibility of establishing a form of equity by harming each party once, which would have been present had stakes been the same on both stages.

Control and filler scenarios

Five other scenarios were implemented by adapting moral dilemmas from earlier studies (see Appendix A in the supporting information). These only consisted of one stage. These scenarios were adapted to the experimental scenarios in terms of text formatting and question phrasing; that is, the text structure of all descriptions was kept the same and all questions followed the Would you ... in order to ...? phrasing. Three of these scenarios (Footbridge, Switch, and Motocross) were “control” items, representing three well-known “classic” dilemmas used previously by other studies, that is, a one-stage choice of saving five by killing another person. The other two scenarios (Wood Press and Border Crossing), taken from Hayakawa et al. (2017), were filler items, as they did not include the usual moral dichotomy: That is, these had been designed in such a way that the Yes option was not utilitarian; it was rather a choice that would be expected from neither a deontological nor a utilitarian standpoint (killing a person to prevent them from working illegally in a country; killing a person in order to prevent mere injury on others). All of these five items were added so that participants could not predict whether a scenario would consist of one or two stages and to break potential answering strategies. Furthermore, including the control items allowed for a cross-comparison, that is, between studies within dilemma type.

### 2.1.3 Procedure

The whole study was web-based and took about 25–30 min. Participants did the study completely in their native language (Dutch/German). After obtaining their consent to the study, participants were presented with the 15 scenarios (10 experimental, 3 control, and 2 filler scenarios) in randomized order. For each scenario, participants had to make binary choices, that is, whether or not they would take a certain action that would hurt one person to save multiple other people from harm. After the scenarios, two multiple-choice proficiency quiz questions from Hayakawa et al. (2017) were asked to check for issues with comprehension (as given in Appendix C in the supporting information). Participants then completed a demographic questionnaire. Finally, one self-exclusion question was asked to check for potentially unusable data to ease filtering of the final dataset.

### 2.2 Results and discussion

We conducted our analysis on the experimental scenarios only. One experimental scenario (Grizzly) was removed post hoc due to experimental issues (scenario description was not in line with other descriptions). Reanalyses showed that this had no influence on the results. With regard to our objective of exploring the influence of first-stage decisions on second-stage decisions, proportions were calculated for the different response patterns within experimental scenarios across all responses in Study 1 (see Table 2). It was apparent that in the majority of cases (71.4%), people stayed consistent within the two stages of a scenario. Pearson’s chi-square test revealed a highly significant relation between decision on the first and decision on the second stage ($\chi^2(1) = 393.40, p < .001; V = 0.43$). However, that also means that in the remaining 28.6% of cases, people decided to switch responses between the first and second stages of a scenario. Of the switching cases, 58.3% represented a switch from a utilitarian

<table>
<thead>
<tr>
<th>TABLE 2 Overall distribution of utilitarian versus deontological responses across the first and second stages (Study 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>First stage</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Utilitarian/Yes</td>
</tr>
<tr>
<td>Deontological/No</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
response on the first stage to a deontological response in the second stage of scenarios, while showing the reverse pattern in 41.7% of cases. The former pattern (utilitarian to deontological) occurred significantly more often per participant, as shown by a paired-samples t test \( t(238) = 3.90, p < .001, \text{Cohen's } d = 0.25 \).

These results indicate that in the majority of cases, people decide consistently (e.g., choose the utilitarian option on both stages). However, there seems to be a robust tendency to reconsider/switch from Stage 1 to Stage 2. These switches are more likely to occur from utilitarian to deontological responding. In terms of global consistency (e.g., due to a participant-inherent preference for deontological/utilitarian responding), we found that the average percentage of utilitarian decisions on experimental stages per person was 52.9% (SD = 18.4), with this percentage being nearly normally distributed across the sample (see Appendix D in the supporting information).

3 | STUDY 2—ONE-STAGE SCENARIOS

3.1 | Method

3.1.1 | Participants

The final sample for this study consisted of 63 participants (49 female and 14 male, \( M_{\text{Age}} = 19.9 \) years, \( SD_{\text{Age}} = 2.9 \)). An a priori power analysis using the application G*Power (Faul et al., 2007, 2009) using an estimated medium effect size of Cohen's \( d = 0.50 \) and a target power of 0.95 had yielded a minimum requirement of 54 participants. We opted to increase this number to allay any concerns about additional variability introduced from running the study online. To increase data quality further, we applied the following exclusion criteria: While originally, 70 participants had been recruited, four were excluded due to incomplete or (self-reported) unusable responses. Additionally, we chose to exclude all participants who did not pass the comprehension check questions (\( N = 3; \) see Appendix C in the supporting information).

Due to the reduced experimental control of online recruitment, we further excluded one participant who completed the study in less than 5 min according to benchmarks from our fastest online pilot tests (a post hoc reanalysis of the data with this response included did not show significantly different results). All participants were recruited from the participant pool of the Radboud University and received study credit for their participation. Unsurprisingly, all participants indicated having at least a high school degree that qualified them for university, with one participant also having a university degree. Prior to recruiting, the study was approved by the Ethics Assessment Committee Humanities of Radboud University, Nijmegen (EAC File Number 2018-9380).

3.1.2 | Materials

The questionnaire used in this study was created using the Qualtrics web platform (Qualtrics, 2019). The questionnaire was identical to the one used in Study 1 except for the fact that the experimental scenarios were now modified to include only the second stage, that is, except for the phrases necessary to introduce the general setting of the scenario, the first stage was completely removed (see Table 1, with the bracketed parts being the ones removed). Thus, scenarios in Study 2 were effectively stripped of the scenario stage with “less severe” consequences that was included in Study 1 (i.e., in most cases, participants' choices in Study 2 involved the death of one of the parties) (see Figure 3 for the one-stage Surgeon example and Appendix B in the supporting information for the full set). Apart from that, the same one-stage control and filler items as in Study 1 were included (see Appendix B in the supporting information).

3.1.3 | Procedure

The whole study was web-based and took about 15–20 min. Participants did the study completely in their native language (Dutch). After

<table>
<thead>
<tr>
<th>Scenario: Surgeon</th>
</tr>
</thead>
<tbody>
<tr>
<td>You are a surgeon in a small hospital. One day, an accident occurs, and five people are badly hurt and have to undergo surgery. All five of them have suffered organic damage that is life-threatening. They all need organ transplants immediately or they will die. Another patient still has healthy organs. He has been in a coma for several weeks and it is unclear whether he will ever wake up again. You could end his life support and take his organs for the five accident victims, so that their lives will be saved. Would you end the patient’s life support and take his organs in order to help the others?</td>
</tr>
</tbody>
</table>
obtaining their consent to the study, participants were presented with the 15 scenarios (10 experimental, 3 control, and 2 filler scenarios) in randomized order. For each scenario, participants had to make a binary choice, that is, whether or not they would take a certain action that would hurt one person to save multiple other people from harm. After the scenarios, two multiple-choice proficiency quiz questions from Hayakawa et al. (2017) were asked to check for issues with comprehension (as given in Appendix C in the supporting information). Participants then completed a demographic questionnaire. Finally, one self-exclusion question was asked to check for potentially unusable data to ease filtering of the final dataset.

3.2 | Results and discussion

To investigate the influence of a preceding decision on moral dilemma responding, we compared the percentage of utilitarian responses between Study 1 and Study 2. As the scenarios of the second stage in Study 1 were essentially identical to the scenarios in Study 2, these scenarios were compared directly, taking Study 2 as a baseline for responses. Notably, utilitarian judgments tended to be less frequent in the second stage of the two-stage setting (Study 1) than in the scenarios of the one-stage setting (Study 2). This tendency was present in almost all scenarios, as shown in Table 3. When looking at the direct comparison of Study 2 with the second stage of Study 1 (same scenario, except in Study 1 preceded by another decision stage), we found that on average, participants responded in a utilitarian way in 50.5% of experimental scenarios ($SD = 23.3$) in the second stage of Study 1, as opposed to 60.9% ($SD = 15.4$) in Study 2. The average percentage of utilitarian responses to control scenarios (classic one-stage scenarios included in both studies) was 39.9% ($SD = 26.4$) in Study 1 and 41.8% in Study 2 ($SD = 23.2$).

We conducted a mixed ANOVA on the percentage of utilitarian responses per participant to investigate these differences further, using Study (Study 1 vs. Study 2) as a between-subjects factor and Scenario type (Experimental vs. Control) as a within-subjects factor. This analysis showed significant main effects for both Study ($F(1, 300) = 4.46, p = .035$, partial $\eta^2 = .015$) and Scenario type ($F(1, 300) = 71.69, p < .001$, partial $\eta^2 = .193$). Furthermore, an interaction effect of these two factors was also found ($F(1, 300) = 5.82, p = .016$, partial $\eta^2 = .019$). Unpacking the interaction effect revealed that the difference in percentage of utilitarian responses to experimental scenarios was significant ($t(145) = 4.21, p < .001$, Cohen’s $d = 0.47$); that is, there were significantly more utilitarian responses in Study 2 (one-stage setting) than in Study 1 (two-stage). However, the percentage of utilitarian responses to control scenarios (classic one-stage scenarios included in both studies) did not differ significantly between the two studies, with $t(300) = 0.52, p = .601$, Cohen’s $d = 0.07$.

In sum, comparing Study 1 with Study 2 showed significant differences in utilitarian responding. Utilitarian responses were significantly less likely in two-stage scenarios (Study 1) than in one-stage variants of the same scenarios (Study 2). Furthermore, this is unlikely to be due a general difference between the samples, as demonstrated by the fact that responses to control scenarios did not differ significantly between studies. Thus, having made a prior decision within the same scenario seems to be the cause for the decrease in utilitarian decision tendencies.

4 | General Discussion

The main goals of this article were (a) to examine switching behavior in two-stage moral decision situations and (b) to see whether decision behavior differed between two-stage and one-stage moral dilemma scenarios. Two experimental studies were conducted, presenting the same moral dilemma scenarios in different paradigms: In Study 1, participants were presented with two-stage versions and in Study 2 with

### Table 3: Percentage of utilitarian decisions per scenario stage by study

<table>
<thead>
<tr>
<th>Scenario</th>
<th>% util. (Study 1, Stage 1)</th>
<th>% util. (Study 1, Stage 2)</th>
<th>% util. (Study 2)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car accident</td>
<td>88.7</td>
<td>75.7</td>
<td>82.5</td>
</tr>
<tr>
<td>Hard times</td>
<td>8.4</td>
<td>6.7</td>
<td>7.9</td>
</tr>
<tr>
<td>Soldier</td>
<td>87.0</td>
<td>73.2</td>
<td>85.7</td>
</tr>
<tr>
<td>Surgeon</td>
<td>49.4</td>
<td>25.1</td>
<td>31.7</td>
</tr>
<tr>
<td>The choice</td>
<td>38.9</td>
<td>42.7</td>
<td>38.1</td>
</tr>
<tr>
<td>Torture</td>
<td>61.9</td>
<td>74.1</td>
<td>88.9</td>
</tr>
<tr>
<td>Vaccine</td>
<td>79.9</td>
<td>64.0</td>
<td>73.0</td>
</tr>
<tr>
<td>Vitamins</td>
<td>10.9</td>
<td>35.1</td>
<td>58.7</td>
</tr>
<tr>
<td>Warrior tribe</td>
<td>72.0</td>
<td>57.7</td>
<td>81.0</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Footbridge</td>
<td>14.6</td>
<td>—</td>
<td>14.3</td>
</tr>
<tr>
<td>Motocross</td>
<td>23.4</td>
<td>—</td>
<td>19.0</td>
</tr>
<tr>
<td>Switch</td>
<td>81.6</td>
<td>—</td>
<td>92.1</td>
</tr>
</tbody>
</table>
one-stage scenarios of these scenarios. In terms of switching, results showed that consistent responses dominated while switching behavior could also be observed. Furthermore, differences between Study 1 and Study 2 could be observed, namely, that utilitarian responses to a dilemma were less likely when preceded by another dilemma (Study 1) than when not preceded by another dilemma (Study 2).

4.1 Consistent versus switching behavior

Within a given scenario, participants responded consistently (i.e., utilitarian/Yes on first and second stages or deontological/No on first and second stages) in the majority of cases. This could be related to phenomena such as the sunk-cost effect (Arkes & Blumer, 1985), which describes people’s aversion to abandoning past investments. Having saved a certain party from harm in the first stage of a scenario could be seen as such an investment, which would in turn be protected by saving that party again in the second stage. Furthermore, it could also be the case that people have a general preference for consistency that is unrelated to moral matters. Such a preference could, for example, be associated with personality traits such as high conscientiousness (cf. De Raad, 2000). It would therefore be promising to further investigate whether personality measures can be shown to influence responses to two-stage moral decision situations. Another explanation for a preference for consistency could be cognitive dissonance theory (Festinger, 1957; Harmon-Jones & Mills, 2019), which states that people have a tendency to justify their actions afterwards (which they might do in Study 1 by staying consistent within a scenario).

Interestingly, participants still tended to engage in switching in about 30% of the time. Switching within a scenario meant that a party that had been harmed by one’s first decision was saved by one’s second decision, while the respective other party was spared first and sacrificed second. One potential theory that could account for engaging in switching is moral self-concept theory (Mazar et al., 2008), which states that people sometimes tend to compensate actions that they perceive as morally “good” or “bad” by engaging in an action of the opposite valence after such an action. Thus, switching might have been caused to some extent by such compensatory mechanisms. A question that remains to be answered is under what circumstances people will switch from deontological to utilitarian responding and vice versa (in spite of a preference for consistency). It should be emphasized here that the present experimental design explicitly confronted people with the consequences of their choice on the first stage when presenting the second stage. This was similar to another study in which participants were made aware of their previous moral behavior by being required to recall previous actions, which also showed moral compensatory effects (Jordan et al., 2011). It can therefore be supposed that in the present study, the prevalence of these moral compensatory phenomena was possibly influenced by the second confrontation with the consequences of the first choice.

This influence might be explained by people’s morality preference, in the sense that participants perceived the second decision as implicit feedback that their first decision was not morally right (cf. Capraro & Rand, 2018; Tappin & Capraro, 2018). A similar explanation could be a certain tendency to “distribute” their decisions equally (cf. Gordon-Hecker, Choshen-Hillel, et al., 2017; Gordon-Hecker, Rosensaat-Eshel, et al., 2017) or wanting to appear impartial (Shaw et al., 2018). The latter seems unlikely, however, as the increase in stakes from Stage 1 to Stage 2 in Study 1 made equity impossible. Also, both morality preference and the need for equity would not yet explain the relatively low percentage of switching. In general, the impact of the present design should be verified in future research. It would be especially interesting to see whether switching behavior is influenced by the confrontation with the consequences, that is, to directly compare a paradigm in which people are notified about the outcome of their first choice (as implemented in the present study) to a paradigm that does not include such feedback. Additionally, the general assumptions regarding moral compensatory mechanisms made here should be checked. It is uncertain, for example, when and to what degree dilemma actions (be they deontological or utilitarian) can be classified by individuals as morally “good” or “bad.” It would therefore be very important to find out how people generally relate such actions to (im)morality. This could, for instance, be assessed with larger-scale representative polls.

Intriguingly, we observed that a switch from utilitarian to deontological responding occurred more often than vice versa. According to a previous study (Trémolière & De Neys, 2013), this could be due to the difference in severity of the potential consequences. In that study, utilitarian responses decreased as the severity of harm involved increased, especially when comparing nonlethal with lethal consequences. Since in each of our experimental scenarios, an increase in severity took place as the stakes changed between first and second stages (with the first stage involving severe harm and the second stage involving death in most cases), this severity effect would explain why the switch from utilitarian to deontological responding was observed more often than from deontological to utilitarian.

Finally, it is important to note here that the novelty of the two-stage setup allows us to only speculate about potential underlying mechanisms of switching. Further research with comparable paradigms is needed to capture the whole complexity of connected, multiple-step decisions. Furthermore, an order effect as introduced by Wiegmann et al. (2012), that is, a carryover effect between different scenarios, cannot be excluded. This is due to our setup including multiple scenarios, that is, virtually all dilemma decisions being technically preceded by a different scenario. However, the order effect mentioned by Wiegmann et al. (2012) would probably only have shifted the baseline of utilitarian responding in the first stages of scenarios in Study 1, as those were the ones preceded by a less agreeable stage (a second stage of the preceding scenario). Other order effects are imaginable, such as that for participants, switching between deontological and utilitarian responding between scenarios (as opposed to between stages) was also perceived as switching. Even though measures for minimizing such effects were taken (control scenarios, multiple experimental studies, randomization, etc.), potential order effects are a drawback to the current setup including multiple
scenarios. The great advantage of this setup, however, is that it allows us to investigate a phenomenon such as switching or one-stage versus two-stage behavior without needing exorbitantly large sample sizes. Also, using multiple scenarios decreases the dependence on one specific scenario, increasing the reliability and generalizability of the found effects.

4.2 Two-stage versus one-stage decision behavior

The comparison of the two experimental studies showed that people were more likely to respond in a utilitarian way (i.e., to sacrifice one person for the sake of saving multiple others) when a dilemma was not preceded by another part (i.e., when not having already decided once about the fate of the parties involved, involving serious harm/injury). Thus, being confronted with a multiple-stage decision seems to make a difference in how people resolve moral dilemmas. In this case, the presence of a previous stage (including experiencing the consequences of one’s decision on that stage) generally decreased utilitarian decisions on the following stage; interestingly, this decrease occurred independently of the fact whether the majority of people favored utilitarian action in that scenario or not. Due to the exploratory nature of this article, we can only speculate about possible explanations of this effect of previous decisions.5

As mentioned above, people have been shown to be more averse to utilitarian responding when faced with increasingly severe consequences (Trémolière & De Neys, 2013). This finding is further supported by the difference found between the current studies, seeing as participants who were presented with a less severe stage before the more severe stage were more averse to utilitarian responding than participants who were presented with the more severe stage only. That points to the fact that an experienced increase in severity (rather than just the “absolute” level of severity) indeed influences people’s responses.

It is further imaginable, for example, that the effect stems from emotional causes, such as the participants getting to “know” the parties involved (by being engaged in two situations “with” them and by directly influencing the course of events). Considering the existence of effects such as the endowment effect (cf. Kahneman et al., 1990) or the mere-exposure effect (cf. Zajonc, 2001), both of which describe forming emotional attachment just by being exposed to something or someone, even if only briefly, it seems quite possible that people form some kind of (however weak) bond to the fictional people involved in the scenarios. This could explain the pattern that was found here, as deontological reasoning has previously been associated with emotional reasoning and empathy (Conway & Gawronski, 2013). In line with that, we could argue that experiencing a two-stage scenario increases the amount to which people are exposed to the parties involved which then leads to more deontological (i.e., less utilitarian) reasoning. A parallel factor to the mere exposure might also be the amount of immersion: Within a two-stage-scenario, people might feel more immersed since the story is longer and gives more stimuli for potential mental imagery, which has in turn been suggested to increase deontological reasoning (Amit & Greene, 2012). Furthermore, the fact that people’s decisions have a direct effect on the “world” (feeling of agency) might also have increased immersion. Agency and immersion have already been associated with stronger emotional responses and attachment to fictional characters in the context of video games (Waltemate et al., 2018).

The difference found in the present studies is not in line with the original version of dual-processing theory (i.e., “slow” vs. “fast” thinking), as defined earlier (Greene et al., 2008; Kahneman, 2003). Having been confronted with the same parties and the consequences of one’s actions before, participants in the two-stage setting should have had time and incentive to engage in System 2 (slow, rational, and deliberate) thinking, which has previously been associated with more utilitarian responses (e.g., Greene et al., 2008). Seeing as we found the opposite effect here, these results do not align with that theory, especially as there were no time constraints for either of our studies.6 However, our findings might still be in line with the version of the dual-processing model that centers on the mapping of deontological to affective and utilitarian to cognitive responding (Baron et al., 2012; Koop, 2013) if some scenarios evoked stronger emotional responses than others (more data would be required to actually investigate this). In any case, it has to be noted that the affective–cognitive distinction of the dual-processing model has been contested before, as many previous studies present similar results to the findings in this article, that is, that people seem to be able to respond in a utilitarian way when thinking “fast”/affectively as well as to respond in a deontological way when engaging in “slow”/cognitive processing (Bago & De Neys, 2019, 2020; Bialek & De Neys, 2017; Gamez-Djokic & Molenk, 2016; Körner & Volk, 2014; McPhetres et al., 2018; Reynolds & Conway, 2018; Rosas & Aguilar-Pardo, 2019).

4.3 Further considerations

The present findings for two-stage scenarios may have substantial implications for real-life decisions. In the studies presented here, a strong influence of previous decisions on second decisions was observed; that is, there was a strong tendency to stay consistent in two successive decision situations.7 If such a tendency for consistency also drives decisions in real life, this could be very momentous in situations where multiple (potentially related) decisions are made. Examples for such situations would be the creation of policies and laws in politics or the planning of diagnostic and therapeutic routines in medicine. In such situations, hidden (and rationally unfounded) influences are usually not desirable. Hence, apart from investigating the nature of the effect of previous decisions further, it would also be promising to see whether the effect of previous decisions can be reduced or canceled. A first approach to accomplishing this might be, for example, to experimentally see whether being consciously aware of the influence of earlier decisions already decreases that effect when compared to being unaware of it. Awareness might be effective as it has also been shown to cancel subliminal
(i.e., unconscious) priming effects (cf. Jaśkowski, 2008), which are also based on previous stimuli. Being able to personally dampen such an effect just by being aware of it would be a very simple start towards further improving decision-making in many fields.

Another interesting factor might be the timing of two-stage decisions. It is possible that deciding to switch takes longer than deciding to stay consistent, for example. In terms of classical dual-processing theory, it is conceivable that consistency is the fastest or easiest way to respond, which should be quantifiable experimentally, for example, by using a comparable setup with finely grained response time measures. Related to that, it could also follow that switching behavior is less frequent in situations where time is limited. In our experimental studies, no time constraints were used, so people could take as long as they needed to (re)consider their options. A future setup involving time constraints might yield different switching behavior. Again, this could potentially reveal a significant factor affecting highly important decisions that are made under time pressure, for example, in the implementation of pandemic control measures. In such situations, being able to recognize and counteract a false preference for consistency could be essential.

One more thing that should be considered is that studies like this one only model moral decision-making on a very simplified and artificial basis, while real moral decisions have been shown to be immensely complex (Bartels, 2008; Nichols & Mallon, 2006). Apart from previous decisions, other influencing factors that have been found are, for example, specific social consensus (i.e., whether one’s immediate peers would approve of an action or not) and perceived impact of consequences (Lincoln & Holmes, 2011). Relatedly, phrasing and presentation of the stimulus material can have a large impact on the results in moral dilemma studies (cf. Christensen & Gomila, 2012). An anonymous reviewer raised the valid concern that the phrasing in the experimental material might also have influenced results: By using the phrasing of “Would you ...” instead of “Should you ...” in the dilemma questions, for example, participants might have responded in a way that is taking social consensus and/or potential other consequences (such as legal/social punishment) into account. This would be problematic as it would mean that participants’ decisions are based less on their internal moral conceptions.

In general, it is difficult to evaluate how much one can generalize to real-life decisions from fictitious moral dilemma studies (cf. Kahane, 2015). Sacrificial dilemmas specifically have been criticized for their lack of realism (Bauman et al., 2014) and because they cannot capture or measure utilitarianism as a complex construct (Conway et al., 2018; Kahane et al., 2018). As an alternative, one approach that might be promising for future iterations of this article is the use of helping dilemmas, which involve the (non-sacrificial) allocation of help between different parties (cf. Erlandsson et al., 2020; Gordon-Hecker, Choshen-Hillel, et al., 2017; Gordon-Hecker, Rosensaft-Eshel, et al., 2017). In general, the development of new measures (e.g., new dilemmas and tasks) is an important step in improving the external validity of moral decision-making studies. In the studies presented here, we made a small attempt at this by increasing the size of the narrative, potentially allowing for greater immersion and more complex decisions (due to the possible influence from a former decision). However, feedback from participants still indicated that most situations that were described were rather unrealistic and somewhat hard to imagine. While a certain degree of abstraction and artificiality generally serves the purpose of not affecting people’s emotional state too much, it is also a disadvantage as reactions can then be significantly different from real-life reactions. Being able to imagine a situation in particular has been shown to influence responses to moral dilemmas (Amit & Greene, 2012). Overall, it remains difficult to generalize from artificial scenarios to real life, especially when people cannot perceive potential consequences as somewhat real and serious.

5 | CONCLUSIONS

Our two studies show that within a two-stage decision situation, people will mostly employ a consistent answering strategy, but do exhibit switching behavior in a significant proportion of times, with this distribution of strategies not being affected by language. Furthermore, this article exemplifies the possibility of using a moral decision measure that goes beyond classical moral dilemmas, enabling for more complex patterns of deciding and reasoning to be observed, such as moral compensatory mechanisms. The impact of previous choices on decision-making should be studied further due to their potential implications, while new ways of studying these factors should also be developed. This could eventually benefit society if it can decrease the number of times that important policymakers (e.g., judges, politicians, and physicians) find themselves in a position thinking “Wait—did I just do that?” because of influences that they were not aware of.

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ENDNOTES

1 Due to this high number, we reran our analyses with gender as an added covariate. However, this did not result in significantly different results ($p > .100$).
2 Due to this high number, we reran our analyses with gender as an added covariate. However, this did not result in significantly different results ($p > .100$).
3 Characteristics of the sample in comparison to Study 1 can be found in Appendix D in the supporting information. Due to differences in distribution of level of education and age, analyses were rerun with these factors included as covariates. However, this did not yield significantly different results ($p > .100$).
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