Moral Judgments and Emotions: Exploring the Role of 'Inevitability of Death' and 'Instrumentality of Harm'

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Abstract

In the current study, strictly controlled moral dilemmas are used to study intuitions in moral judgments concerning situations in which one human life has to be sacrificed in order to save more human lives. The influence of two factors (*inevitability of death* and *instrumentality of harm*) is explored. Both of them are found to influence moral judgments. To study the emotional processing in judgments, response times and skin-conductance reactions are analyzed. It is found that responses to dilemmas involving *incidental harm* produce longer response times and are accompanied by higher arousal (as indexed by the skin conductance reactions). Reported results imply that when *instrumentality of harm* is considered, judgment is influenced by emotional reactions.
Keywords: moral dilemmas, moral judgments, emotional engagement, skin conductance response

Introduction

Moral Dilemmas

Moral judgments (the judgments of what is right and what is wrong) have been of great interest to philosophers, psychologists and other scientists for centuries. Are there universal laws that should be applied in such judgments? Are they innate? How in fact do people decide what is right and what is wrong? What is the role of reasoning and what is the role of the emotions in making such judgments? These are some of the questions that have been considered for many years and still provoke the interest of the researchers. These questions don't have an easy answer especially when we are presented with a moral dilemma – situations in which there is a conflict between moral values, rules, rights.

Philosophers study moral judgments by looking for general principles that should be followed by humans. Some philosophers (e.g. Kant, 1785/1983) propose the deontological view stating that the rightness or wrongness of an act depends on the principle that this act is representing (and not on the good or bad consequences of that act). In this view, an action could be considered moral if it could represent a universal law that should be mandatory to follow. On the other hand, the utilitarian view on morality states that actions achieving greater good and maximizing utility are the moral ones.

Apart from these normative theories, psychologists are interested in the actual moral judgments made by people. To explore the judgments in moral dilemmas, very often the famous 'Trolley problem' (Foot, 1978) is used (e.g. Petrinovich et al., 1993; O'Neill and Petrinovich, 1998; Mikhail, 2007; Greene et al., 2001; Greene et al., 2004). Usually, the dilemma is presented as follows: *"A runaway trolley is headed for five people who will be killed if it proceeds on its present course. The only way to save them is to hit a switch that will turn the trolley onto an alternate set of tracks where it will kill one person instead of five. Is it morally appropriate to turn the trolley in order to save five people at the expense of one?"* (Greene et al., 2001). Most of the participants, exposed to this dilemma in experiments, find the proposed action to be morally permissible. However, if they are presented with the 'Footbridge dilemma' (it describes the same situation but suggests that a bystander is pushed from a footbridge in front of the trolley in order to save the other people present) most participants find the action to be not morally permissible (Greene et al., 2001).

Different theoretical explanations, emphasizing the role of several factors, have been proposed in order to interpret the behavioral dissociation. The most important ones are summarized below.

Factors Affecting Moral Judgments

The ***'personal vs. impersonal'*** distinction is proposed as one of the factors affecting moral judgment (Greene et al., 2001; Moore et al., 2008). The idea is that when the harm is inflicted 'up close and personal' (as in the 'Footbridge dilemma') the action is seen as less permissible compared to the cases in which the harm is caused by using mediating mechanical means from a distance (as in the 'Trolley problem').

The ***'instrumentality of harm'*** is also considered a factor that could shape judgment (e.g. Borg et al., 2006; Hauser et al., 2007; Moore et al., 2008). The harm could be either inflicted intentionally as a 'mean to an end' (instrumental harm) or it could be a 'side effect' from saving more people endangered (incidental harm). It is found that the unintended incidental harm (foreseen but unintended) was judged as more permissible compared to intended instrumental harm (Hauser et al., 2007; Moore et al., 2008).

The ***'inevitability of death'*** was also found to be a significant factor when moral dilemmas are deliberated. Some moral scenarios suggest a situation where all of the people in a scene are threatened and would be killed if nothing is done – i.e. inevitable dilemmas. In other scenarios, one of the persons in the scene is not threatened by the situation and would die only in case of intervention aiming to save the other threatened persons – i.e. death is avoidable. According to the study of Moore et al. (2008), judgment differed among scenarios where the hypothetical victim would die regardless of subjects' intervention (inevitable death) or will not die (avoidable death). Inevitable scenarios were considered to be more permissible compared to avoidable scenarios. That distinction is thought to be rationally processed and taken into account while making moral judgments.

The ***'magnitude of the consequences'*** is another very important factor, recognized by many researchers in the field. This magnitude of the consequences is represented by the number of people that are endangered (and possibly rescued through intervention): e.g. they could be one, five, a hundred, a whole city, etc. Bartels (2008) demonstrated that sensitivity to magnitude of consequences is present when trolley-like moral dilemmas are evaluated. Approval of harmful action increased with the number of lives that could possibly be saved through intervention (Bartels, 2008).

Role of Emotions in Moral Judgment

Another important stream in studying moral judgments is devoted to exploring the role of emotions in such judgments. A tradition starting with Hume (1978) suggests that emotions and intuitions are the driving forces of moral judgments and that reason is 'a slave of the passions'.

A contemporary theory in such direction is the one proposed by Haidt (2001) – a social intuitionist theory that also states that morality is based on emotions rather than logical reasoning. According to that theory, the moral judgments are automatic, intuitive, and guided by emotion. Conscious reasoning serves just as a post-hoc justification (Haidt, 2001). In support of social intuitionism, Haidt (2001) provides some evidence from "moral dumbfounding" studies – when asked to judge a certain behavior (e.g. incest) people are confident that it is not appropriate, but find it difficult to logically justify their judgment.

One of the most influential studies in the field is the one by Greene et al. (2001) that studies the neurological basis of emotional processing in moral judgments. In Greene et al. (2001) the dual-process theory is introduced. According to this theory both emotions and reason play a role in moral judgments but their role differs according to the personal-impersonal distinction. More precisely, the authors suggest that '*personal'* moral problems (e.g. 'Footbridge dilemma') evoke fast emotional response that interferes with rational, utilitarian reasoning; while '*impersonal'* dilemmas (e.g. 'Trolley dilemma') fail to provoke emotionally salient response and a utilitarian resolution is preferred. Researchers hypothesized that different brain systems are engaged when processing both types of dilemmas. Using fMRI data they found that *personal* moral dilemmas elicit brain activation in regions previously identified as being involved in emotional processing, while judgment of *impersonal* moral dilemmas activate regions underlying working memory and cognitive control. The authors also reported longer response times when personal harm is judged as appropriate, speculating that automatic emotional response interfered with utilitarian reasoning.

However, closer examination of the stimulus material used in Greene et al. (2001) reveals that the dilemmas used in the study differ not only with regard to the personal-impersonal distinction, but they also differ with respect to other factors that are possible confounds (e.g. personal dilemmas involved more severe consequences, they involved babies, etc.). Further reanalysis of the data (McGuire et al., 2009) revealed that the results of Greene et al. (2001) are due to the strong effects elicited by few items in the stimulus material. In the study of Moore et al. (2008), the authors eliminated the possible confounds made in Greene et al. (2001) and failed to replicate their response time findings: there was no significant difference between responses "permissible" and "not permissible" to personal dilemmas. What they found is that overall personal dilemmas are judged faster than impersonal ones.

Although Moore et al. (2008) severely criticized the design of Greene et al. (2001), in their study, the authors themselves still did not control for a number of potential confounds. Some of their scenarios implied responsibilities or duties towards potential victims; others suggested causing harm to relatives or children. These factors, as well as the number of persons to be saved, were neither strictly controlled across the other conditions.

Goals and Hypothesis

The current study aims to explore the role of emotions in moral judgments. Greene et al. (2001) put forward the idea about the role of emotions in making utilitarian judgments in *personal* dilemmas. Here, we want to study the emotions in moral dilemmas taking into account two other factors that are not considered by Greene et al. (2001) but which have been identified as significant in moral judgment (see e.g. Moore et al., 2008) as described above:

- ***inevitability of death*** – deathful harm needs to be inflicted either to a person that is going to die anyway (*inevitable* death), or to a person that is not endangered by the situation described in the scenario (*avoidable* death);
- ***instrumentality of harm*** – harm is inflicted intentionally as an instrument to save other endangered people (*instrumental* harm) or is a byproduct of another act, aiming to save more people threatened (*incidental* harm).

For that purpose, hypothetical, artificial moral dilemmas are constructed while controlling for possible confounds

unaccounted for in previous research (see the description of the stimuli below).

To study moral judgments, responses about the moral permissibility of the hypothetical resolutions to the dilemmas are elicited.

Response time data is collected to identify potential interference between emotional processing and rational deliberation (interference is supposed to produce longer reaction times).

Skin conductance response (SCR) is used as a measure of emotional involvement in moral judgment. Being a non–invasive and reliable method to identify sympathetic arousal, electrodermal activity measures are widely used to detect emotional engagement in judgment and decision making (Naqvi & Bechara, 2006; Figner & Murphy, 2010). Another significant advantage of the method is that it is sensitive to emotional responses that might not be consciously processed and therefore can not be reported by participants. The SCR is found to be positively correlated with emotional arousal (Dawson, Schell, & Filion, 2007).

It is hypothesized in this paper that killing one person to save more people will be judged as more permissible when death is *inevitable* (compared to *avoidable*). When harm is inflicted as an "instrument" to save other people, we expect it to be evaluated as less permissible compared to *incidental* harm.

It is also hypothesized that moral judgments evoke emotional response that influences the process of moral judgment. However, we think that emotions are important not only in personal dilemmas (as suggested by Greene et al. 2001) but are present in all situations in which difficult decisions involving harm to other persons are made (as suggested also by Moore et al., 2008).

Experiment

Stimuli

As stated above, the stimuli are constructed with the aim to control for possible confounding identified in previous research:

1) All of the stimuli are homogenously structured: introductory paragraph describes the situation, followed by one sentence that introduces the one and only means of escape; finally, a resolution is suggested in a third paragraph. 2) Two *avoidable* and two *inevitable* situations are used. In order to manipulate *instrumentality of harm* only the resolution paragraphs are modified. 3) All dilemmas are *impersonal* in order to control for the influence of the personal-impersonal factor. 4) In all situations, there is a dilemma between killing one person and saving five other people. 4) In all dilemmas participants are assigned to the role of a protagonist who is not endangered by the situation. 5) The introductory paragraph describes simply the presence of the protagonist in some working environment without explicitly assigning a specific role or any responsibilities. 6) All of the six endangered persons are identified with equal roles in the described working environment (one and the same for all six persons – workmen, miners, or crew-members) thus suggesting equal responsibilities. 7) The endangered and potentially to be sacrificed persons are adults only. 8) All situations are designed to illustrate artificial scenarios in order to avoid potential confounding effects, e.g. familiarity with a specific situation or readily available personal opinion on resolutions. 9) The presentation of each situation is followed by one and the same question: 'Is it permissible to act as described?' with two possible responses – 'Yes' and 'No'.

An example of *avoidable* dilemma with 2 possible resolutions (*instrumental* and *incidental*) is the following:

Scenario: *You are in a factory. You are standing on a platform above a railway track. Some loaded trolleys are moving along the rails. One heavy-loaded trolley is speeding towards five workmen as its breaks had suddenly stopped working. There is no time for them to run away and they are going to die. The trolley could be stopped only if a heavy object is set on its way.*

Instrumental resolution: *The only thing that you can do is to push a control button and to release the safety belt of a workman who is hanging from the platform. He is going to fall down on the rails. The workman and the instruments that are attached to his uniform, together, are heavy enough to stop the speeding trolley. He is going to die but the other five persons will be saved.*

Incidental resolution: *The only thing that you can do is to push a control button and to release a heavy container that is hanging from the platform. It is going to fall down on the rails. The container is heavy enough to stop the speeding trolley. There is another workman on the container, who is going to fall down on the ground. He is going to die but the other five persons will be saved.*

An example of *inevitable* dilemma dilemma with 2 possible resolutions (*instrumental* and *incidental*) is presented below:

Scenario*: You are in a mine. Some trolleys are attached to a rope that moves them upward the exit of the mine. Two trolleys are headed upwards. In the upper one, there are five miners and in the bottom one, there is one miner. The rope that brings the trolleys toward the exit is destroyed and in a few seconds, the five miners in the upper trolley and the one that is in the bottom trolley are going to die. In order for the rope not to be totally destroyed, the weight of the trolleys needs to be reduced.*

Instrumental resolution: *The only thing that you could do is to push a control button so that the bottom trolley would be tilted. The miner who is in the trolley is going to fall and the weight would be reduced enough. He is going to die but the other five persons will be saved.*

Incidental resolution: *The only thing that you could do is to push a control button so that the bottom trolley would be tilted. The load that is inside the trolley is going to fall down and the weight would be reduced enough. In the second trolley there is another person who is going to fall as well. He is going to die but the other five persons will be saved.*

Method

Design and Procedure *Instrumentality of harm* (*instrumental* vs. *incidental*) and *inevitability of death* (*avoidable* vs. *inevitable*) are investigated in a within-subjects design.

Each participant is presented with 8 dilemmas in a randomized order – 4 scenarios (2 *avoidable* and 2 *inevitable*) each presented twice – once with an *instrumental* resolution and once with an *incidental* resolution.

For each dilemma the following measures are analyzed: number of responses 'permissible', response times, skin-conductance reaction (SCR) during the response period. The calculation of the measures is described below.

Procedure Participants are tested individually. First, the electrodes for recording skin conductance are attached. Next, the experimenter reads the instructions. In the instructions it is emphasized that participants have to imagine that the action described is the only possible action; that they have to disregard legality and have to consider only moral appropriateness of judgment. Each participant is asked to remain relatively still in order to avoid artifacts in the recordings.

First, three practice dilemmas are shown. Next, the eight stimuli are presented in random order using the E-Prime 1.2 software. Each dilemma is presented on a single screen. Participants give self-paced confirmation for reading completion and comprehension of the presented dilemma by pressing a key. After the key press the screen is changed – the description of the dilemma disappears and the following question appears: 'Is it permissible to act as described?'. Participants respond either 'Yes' or 'No' using the computer keyboard. The response is followed by 8 seconds inter-trial interval.

Responses and Response Time Data Recordings Responses and response time data are collected via E-Prime 1.2. The *response time* is considered the interval between the question onset and the YES/NO response.

Skin Conductance Recordings Skin conductance is recorded using the Biopac, Inc. MP 150 system and the GSR100C amplifier with a sampling rate of 200 samples/s. Constant voltage (0.5 V) is used to measure skin conductance. The amplifier is connected to TSD203 Ag-AgCl, unpolarizable finger electrodes. The electrodes are placed on the left hand of the participants and they used their right hand to select choices with the computer keyboard.

As the skin-galvanic reaction is developing slowly after a stimulus presentation, skin conductance signal (SCR) is shifted by 200 samples (1 s). In order to remove the high frequency noise and the tonic component the SCR signal is smoothed (smoothing interval of 200 samples) and then a moving-difference function (10 samples difference interval) is applied, leaving only the phasic changes (Naqvi & Bechara, 2006).

The markers generated by the presentation software are used to synchronize the skin conductance recordings with the task. We use these markers to select portions of the signal that are related to the response selection process. Following Naqvi & Bechara (2006), for each such period an integral corresponding to the area defined by the differenced skin conductance signal and the line connecting the end points of the signal for the analyzed period is calculated. Then, the resulting value is divided by the measurement interval (in seconds) so the final measure used for the SCR is in μS/s.

Participants A total of 32 participants (14 male, 18 female) took part in the experiment. The age range was from 19 to 40 (M = 23.3). The participants took part in the experiment in exchange for partial credit toward undergraduate course requirements. SCR data from 4 participants were discarded due to technical difficulties.

Results

Responses to the Dilemmas The percentage of affirmative responses is presented at Figure 1. Mean number of responses 'permissible' is analyzed in a repeated-measures ANOVA with 2 within-subjects factors – *Instrumentality* of harm (*instrumental* vs. *incidental*) and *inevitability* of death (*avoidable* vs. *inevitable*).

The analysis revealed main effects of *instrumentality of harm* ($F(1, 31) = 9.27$, $p = 0.005$, $\eta_p^2 = 0.23$) and *inevitability of death* ($F(1, 31) = 25.53$, $p < 0.001$, $\eta_p^2 = 0.45$). The two factors interacted significantly ($F(1, 31) = 8.86$, $p = 0.006$, $\eta_p^2 = 0.22$).

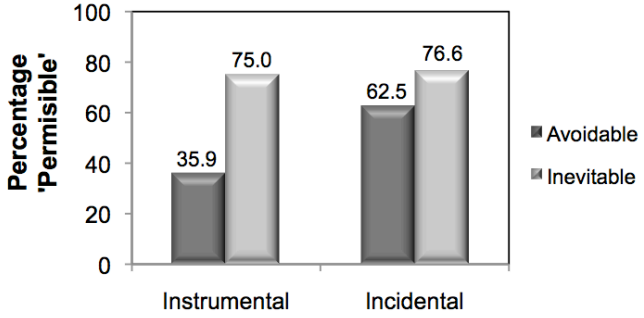

Figure 1: Percentage of responses 'permissible' .

The results from the analysis confirmed that *incidental* harm was judged to be more appropriate than *instrumental* harm (69.5% vs. 55.5% responses 'permissible'). Killing someone whose death was *inevitable* was judged to be more permissible than killing a person whose death was *avoidable* (75.8% vs. 49.2 %).

Further analysis of the interaction shows that for *inevitable* dilemmas there was no significant difference between *instrumental* and *incidental* resolutions (75% vs. 76.6%). For *avoidable* dilemmas, *incidental* resolutions were judged as more permissible than *instrumental* ones (62.5% vs. 35.9%, $p<0.001$).

Response times Average response times in each of the experimental conditions are presented in Figure 2. Response times were analyzed using a 2 (*instrumental* vs. *incidental*)

x 2 (*avoidable* vs. *inevitable*) repeated measures ANOVA. There was no significant effect of *inevitability of death* ($F(1, 31) = 0.3$, $p=0.59$) and factors did not interact ($F(1, 31) = 1.28$, $p = 0.27$). Only *instrumentality* of harm demonstrated main effect ($F(1, 31) = 4.64$, $p = 0.04$, $\eta_p^2 = 0.13$).

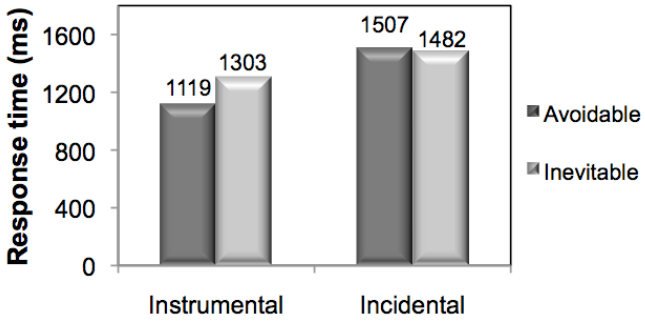

Figure 2: Average response time by condition.

Participants needed more time to respond to dilemmas that suggested *incidental* harm compared to *instrumental* one (1494 ms vs. 1211 ms).

It could be speculated that the greater proportion of responses 'permissible' for *incidental* dilemmas is responsible for the longer deliberation time in incidental dilemmas. So, it is considered important to check what is the influence of the response given ('permissible' or 'not permissible') on response times. It was not possible to include this additional factor in the repeated measures ANOVA, as most of the participants' data had at least one empty cell. Therefore, response times for 'permissible' and 'not permissible' responses were collapsed (regardless of the experimental condition) for each participant that has given both responses (25 participants).

Repeated-measures ANOVA failed to demonstrate significant effect of *response type* on response times ($F(1, 24) = 2.88$, $p = 0.102$) although the mean values were in the expected direction – 'permissible' responses were given more slowly (1612 ms) compared to 'not permissible' responses (1294 ms).

Integral SCR Average SCR data is presented in Figure 3. SCR data were analyzed using a 2 (*instrumental* vs. *incidental*) x 2 (*avoidable* vs. *inevitable*) repeated measures ANOVA. 4 subjects were excluded because of empty cells. Data from 28 subjects were analyzed.

There was no significant effect of *inevitability of death* ($F(1, 27) = 0.01$, $p = 0.94$), and factors did not interact ($F(1, 27) = 0.82$, $p = 0.37$). *Instrumentality* of harm demonstrated marginally significant main effect ($F(1, 27) = 3.32$, $p = 0.08$, $\eta\rho2 = 0.11$).

Incidental dilemmas yielded higher SCR compared to *instrumental* dilemmas (0.52 µS/s vs. 0.36 µS/s).

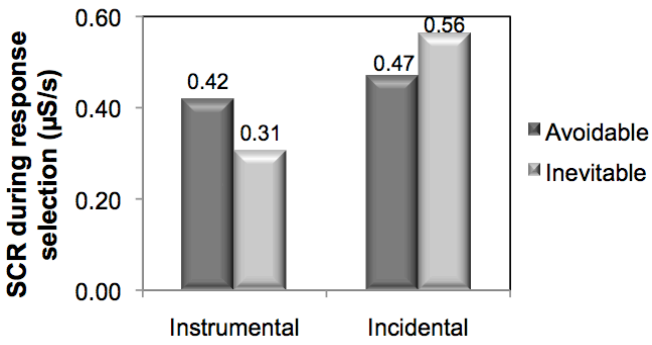

Figure 3: Average SCR during response selection.

Again, it could be suggested that 'permissible' responses induced the observed arousal. The next step was to analyze SCR for 'permissible' and 'not permissible' responses in order to test this assumption. It was not possible to include this additional factor in the repeated-measures ANOVA, as most of the participants' data had at least one empty cell. So, response times for 'permissible' and 'not permissible' responses were collapsed (regardless of the experimental condition) for each participant that has given both responses (22 participants). SCR for 'permissible' responses (0.36 µS/s) and for 'not permissible' responses (0.56 µS/s) was not significantly different ($F(1, 21) = 2.19$, $p = 0.15$).

Summary of the Results

The importance of *inevitability of death* factor was confirmed. *Inevitable* scenarios were judged as more permissible compared to *avoidable*. As hypothesized, deciding to kill one to save five is judged to be more permissible when the death of the person to be killed is inevitable.

In agreement with previous research (Moore et al., 2008; Hauser et al., 2007), it was found that *incidental* harm is considered as more permissible compared to *instrumental*.

Instrumentality was found to interact with *inevitability*. For *inevitable* dilemmas, there was no significant difference between *instrumental* and *incidental* resolutions – in both cases the judgments are in favor of the proposed sacrifice of one person in order to save five others. For *avoidable* dilemmas *incidental* resolutions were judged as more 'permissible' than *instrumental* ones.

When the resolution involved *incidental* death, the response time was longer than when the resolution involved *instrumental* death. Also, the arousal (as measured by SCR) was higher when the resolution was *incidental (*compared to *instrumental)*. It is possible that this pattern of results is due to the higher proportion of responses 'permissible' for the *incidental* resolutions.

Summary and Discussion

In the current study, strictly controlled moral dilemmas are used to study intuitions in moral judgments concerning situations in which one human life has to be sacrificed in order to save more human lives.

The results showed that judgment of hypothetical moral dilemmas are influenced by *instrumentality of harm,* as well as by the *inevitability of death*. Similar to previous research, experiments demonstrated that harm is judged as more permissible when death is *inevitable* compared to *avoidable*. *Incidental* harm is judged as more permissible than the *instrumental* harm when the situation involves *avoidable* death (and there is no difference for the *inevitable* scenarios).

To study the emotional processing in judgments, response times and skin-conductance reactions are analyzed.

Incidental dilemmas took more time for consideration and participants exhibited higher arousal while making a response compared to *instrumental* dilemmas.

While Greene et al. (2001) propose that emotional processing interferes with utilitarian responses only for personal dilemmas, by using more controlled situations we propose that emotional engagement varies with other factors. Based on both SCR and response time data, it could be speculated that when *instrumentality of harm* is considered, judgment is influenced by emotional reactions, as well.

On the other hand, it is important to note that the observed difference could be due to the greater number of utilitarian judgments in favor of *incidental* dilemmas. What actually provoked emotional engagement (indexed by SCR) and thus longer reaction time could be the utilitarian judgments themselves. Such explanation is in contrast with the theories proposing that moral judgments are intuitive and guided by emotions and that reasoning serves just as post-hoc justification. It is possible that in moral judgments people use utilitarian reasoning that requires a person to be sacrificed in the name of greater good, still this judgment provokes emotional arousal.

Further experiments that explore the timing and causal relationship between emotions and moral judgments would be of use to look more clearly at this issue.

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