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Incidental emotions in moral dilemmas: The influence of emotion regulation

Raluca D. Szekely and Andrei C. Miu

Cognitive Neuroscience Laboratory, Department of Psychology, Babeş-Bolyai University, Cluj-Napoca, Romania

Recent theories have argued that emotions play a central role in moral decision-making and suggested that emotion regulation may be crucial in reducing emotion-linked biases. The present studies focused on the influence of emotional experience and individual differences in emotion regulation on moral choice in dilemmas that pit harming another person against social welfare. During these "harm to save" moral dilemmas, participants experienced mostly fear and sadness but also other emotions such as compassion, guilt, anger, disgust, regret and contempt (Study 1). Fear and disgust were more frequently reported when participants made deontological choices, whereas regret was more frequently reported when participants made utilitarian choices. In addition, habitual reappraisal negatively predicted deontological choices, and this effect was significantly carried through emotional arousal (Study 2). Individual differences in the habitual use of other emotion regulation strategies (i.e., acceptance, rumination and catastrophising) did not influence moral choice. The results of the present studies indicate that negative emotions are commonly experienced during "harm to save" moral dilemmas, and they are associated with a deontological bias. By efficiently reducing emotional arousal, reappraisal can attenuate the emotion-linked deontological bias in moral choice.

Keywords: Moral dilemmas; Moral choice; Emotions; Emotion regulation; Reappraisal.

The involvement of emotions in moral decision-making has been increasingly studied in cognitive psychology and neuroscience in the last decade. In contrast to early philosophical (Kant, 1959) and psychological perspectives (Kohlberg, 1971; Turiel, 1998), which excluded any influence of emotions from moral behaviour, contemporary approaches, quintessentially experimental and interdisciplinary (Greene, 2011), have grown to appreciate the complex interplay between affective reactions and cognitive reasoning in moral decision-making (Greene & Haidt, 2002). It has been generally

Correspondence should be addressed to: Andrei C. Miu, Department of Psychology, Babes-Bolyai University, 37 Republicii Street, 400015 Cluj-Napoca, Romania. E-mail: andreimiu@psychology.ro

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argued that emotions signal socio-moral concerns and prioritise specific decisions in dilemmas that involve conflict between two moral norms (Horberg, Oveis, & Keltner, 2011; Pizarro, 2000; Rozin, Lowery, Imada, & Haidt, 1999), thus playing both "alarm-bell" and "currency-like" roles (Cushman, Young, & Greene, 2010; Greene, 2008). Such dilemmas have provided an excellent testing ground for the role of emotions in moral decision-making (Cushman & Greene, 2012).

EMOTIONS AND "HARM TO SAVE" MORAL DILEMMAS

Social norms prohibit harmful actions against other people and favour collective rather than individual benefit. It has been suggested that an emotional aversion to harming others may have evolved in humans (Haidt, 2007). Indeed, recent studies found that the possibility of harming other people triggers strong emotional reactions at the subjective, cognitive and physiological levels (Cushman, Gray, Gaffey, & Mendes, 2012; Houser, Cushman, Young, Jin, & Mikhail, 2007), especially if the harmful action involves physical force and intention (Cushman, Young, & Hauser, 2006; Greene et al., 2009).

However, there are situations in which harming another person is pitted against aggregate social welfare (Koenigs et al., 2007). In "harm to save" (H2S) moral dilemmas, one must decide whether to kill one person in order to save more lives (Greene, Nystrom, Engell, Darley, & Cohen, 2004; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Koenigs et al., 2007). There are two possible courses of action in these dilemmas: refusing to harm another person, despite all consequences (deontological and norm-congruent decision); or saving as many people as possible, even at the cost of harming one person (utilitarian, H2S decision).

Several lines of evidence support the central role of negative emotions in moral decision-making. Early functional neuroimaging studies showed that responding to H2S moral dilemmas involves activity in brain areas (e.g., medial prefrontal cortex, posterior cingulate cortex and superior temporal sulcus) associated with emotional reactivity, emotion regulation and social cognition (Greene et al., 2001, 2004). Neuropsychological studies found that patients with focal lesions in the ventromedial prefrontal cortex, a brain region associated with emotional biases in decision-making (Bechara, Damasio, & Damasio, 2000), endorse more utilitarian H2S actions (Ciaramelli, Muccioli, Ladavas, & di Pellegrino, 2007; Koenigs et al., 2007). Psychopathic traits, which are characterised by emotional callousness, are also associated with increased endorsement of utilitarian H2S action in these dilemmas (Bartels & Pizarro, 2011). In contrast, experimental stress induction in healthy volunteers reduces the proportion of utilitarian choices in moral dilemmas (Starcke, Ludwig, & Brand, 2012; Youssef et al., 2012). These landmark results suggest that emotional experience might promote deontological decisions in moral dilemmas, and overcoming this bias would involve emotion regulation.

Greene's dual-process theory (Greene, 2008) championed these ideas by arguing that H2S moral dilemmas involve a tension between automatic affective processes related to harming another person and controlled reasoning processes that favour maximal utility; in this framework, utilitarian responses involve overriding the prepotent affective reactions. Others (Moll & de Oliveira-Souza, 2007; Tassy et al., 2012) suggested that rather than having mutually competing roles, emotions and reasoning jointly contribute to moral decision-making or that different types of emotions may sometimes be in conflict. For instance, the perspective of personally harming another person may be associated with self-focused emotions (e.g., fear, sadness, anger and disgust), while representing the outcomes of prospective actions may be associated with other-focused or social emotions (e.g., compassion, guilt, regret and contempt) (Moll & de Oliveira-Souza, 2007). Whether competitive or collaborative, the interactions between emotions and cognition in moral dilemmas may be influenced by individual differences in emotion regulation (Pizarro, 2000; Talmi & Frith, 2007).

EMOTION REGULATION AND MORAL DECISIONS

The involvement of emotion regulation in moral decision-making has been discussed from several theoretical perspectives. Pizarro (2000) emphasised that emotions are not passive experiences, and consequently, they do not necessarily undermine moral decision-making (as traditionally thought). Moral development might equally depend on experience with social situations that evoke affect and better developed regulation abilities that buffer against emotional evocation (Decety, Michalska, & Kinzler, 2011). Cognitive strategies allow adults to flexibly regulate their emotions, depending on social context and personal goals (Talmi & Frith, 2007).

Direct evidence for the role of emotion regulation in moral judgement was recently reported (Feinberg, Willer, Antonenko, & John, 2012). In these studies, the participants judged whether harmless, but disgust-eliciting actions (e.g., cooking and eating a family's pet dog that recently died in an accident) were morally wrong. Individual differences in cognitive reappraisal (i.e., a cognitive emotion regulation strategy) (Gross, 2013; Miu & Crişan, 2011) were associated with fewer disgust-driven judgements of immorality. In addition, the manipulation of reappraisal during a sadness-inducing film (which preceded the presentation of moral dilemmas) reduced both the disgust associated with the moral dilemmas and the judgements of immorality (Feinberg et al., 2012).

That study (Feinberg et al., 2012) focused on moral judgement which involves assessing the morality of an action from an impersonal, allocentric perspective. Moral judgement has been distinguished from moral choice in which participants are asked to report what action they would themselves endorse in a moral dilemma. Through increased self-relevance, moral choice may be more emotionally salient than moral judgement. It has recently become clear that abstract judgement and personal choice of action in moral dilemmas rely on distinct psychological and neural processes. When participants have to judge the moral acceptability of a utilitarian course of action in a moral dilemma (i.e., moral judgement) and then report their own choice of action (i.e., moral choice), they make more deontological judgements but more utilitarian choices (Tassy, Oullier, Mancini, & Wicker, 2013). Variations of the affective proximity between participants and the potential victim (e.g., brother versus stranger) described in moral dilemmas influences moral choice, but not moral judgement (Tassy, Oullier, et al., 2013). Psychopathic traits are associated with utilitarian choices, but they do not influence moral judgement (Tassy, Deruelle, Mancini, Leistedt, & Wicker, 2013). In addition, transient disruptions of the right dorsolateral prefrontal cortex in healthy volunteers increase utilitarian judgments; utilitarian choices are also increased, but only in the "high-conflict" moral dilemmas, with the largest response latencies (Tassy et al., 2012). It was suggested that in addition to prospective thinking and social emotions, which probably contribute to moral decision–making, in general, moral choice may involve increased self-focused emotions relative to moral judgement (Tassy et al., 2012). These findings raise the question of whether emotion regulation influences moral choice.

THE PRESENT STUDIES

The present studies investigated the relations between emotional reactivity, emotion regulation and moral choice in H2S dilemmas. We focused on moral choice rather than moral judgement because it is possible that projecting oneself in moral dilemma situations and deciding what course of action to follow could be more emotionally salient and more readily uncover emotional biases on decision. In addition, in comparison to moral judgement, moral choice might involve increased self-relevant emotions (Moll & de Oliveira-Souza, 2007; Tassy et al., 2012). A subset of the moral dilemmas battery developed by Greene et al. (2004) was used; these dilemmas were classified as "high-conflict" and may be more sensitive to individual variation in emotional reactivity (Koenigs et al., 2007). All the dilemmas

described various threatening situations (e.g., war, terrorist attack, speeding train and global epidemic) in which physically hurting or killing one person would save several others. In the present studies, emotional reactivity to these moral dilemmas was assessed by both discrete emotion (Study 1) and dimensional measures (i.e., emotional arousal and valence in Study 2). In Study 2, we also investigated the influence of individual differences in the habitual use of several emotion regulation strategies.

STUDY 1

This study was designed to describe the emotional experience and moral choices in H2S moral dilemmas. It was suggested (Haidt, 2003) that people may experience a wide range of emotions during moral dilemmas, including "other-condemning" emotions (e.g., contempt, anger and disgust), "self-conscious" emotions (e.g., shame, embarrassment and guilt), "other-suffering" emotions (e.g., sympathy and compassion) and "other-praising" emotions (e.g., gratitude, awe and elevation). Other theories distinguished between self-focused emotions (e.g., fear, sadness and disgust) associated with imagining oneself in moral dilemma and social emotions (e.g., compassion, guilt and regret) related to representing the outcomes of prospective actions (Moll & de Oliveira-Souza, 2007; Tassy et al., 2012). However, only one study to our knowledge investigated whether these incidental emotions actually occur in H2S moral dilemmas (Hutcherson & Gross, 2011). In the present study, the participants were asked to report if they felt an emotion during each dilemma, identify the emotion that they experienced and rate their emotional arousal.

Method

Participants

N = 63 participants (55 women) volunteered for this study. The mean age was 23.2 ± 4.6 years. Before the study began, an informed consent was obtained. All the information regarding sample size, data exclusions, manipulations and measures is reported here.

Materials

Moral dilemmas. A set of 12 personal H2S moral dilemmas (Greene et al., 2001, 2004) was used in which one must decide whether to harm one person in order to save the lives of several people. For example (the *Crying baby* dilemma, adapted from Greene et al., 2004):

> Enemy soldiers have taken over your village. They have orders to kill all remaining civilians. You and some of your townspeople have sought refuge in the cellar of a large house. Outside you hear the voices of soldiers who have come to search the house for valuables.
>
> Your baby begins to cry loudly. You cover his mouth to block the sound. If you remove your hand from his mouth his crying will summon the attention of the soldiers who will kill you, your child, and the others hiding out in the cellar. To save yourself and the others you must smother your child to death.
>
> Would you smother your child in order to save yourself and the other townspeople?

The participants were asked if they would choose to harm a person in order to save several other people (including themselves, in some of the dilemmas), and they answered with "yes" (i.e., utilitarian decision) or "no" (i.e., deontological decision). The list of the dilemmas used in the present study is presented in Table 1, and the text of all the dilemmas is available in Greene et al. (2004).

Procedure

The moral dilemmas were presented using the stimulus presentation software SuperLab (Cedrus, CA, USA). The order of the dilemmas was randomised between participants. Before the presentation of the dilemmas, the participants were instructed that a series of situations will be described; they will have to imagine themselves as lively as possible in each of those situations and then choose between two courses of action (deontological/utilitarian), as they would in reality.

Table 1. *Moral choices and emotional experience in moral dilemmas (Study 1)*

Moral dilemma	*Deontological response (%)*	*Frequency of emotion (%)*	*Emotional arousal (mean ± SEM)*
Sophie's choice	74.19*	96.92*	4.1 ± 0.14
Modified Lifeboat	46.77	89.23*	3.68 ± 0.15
Crying Baby	90.32*	98.46*	4.34 ± 0.11
Modified Bomb	41.94	84.61*	3.32 ± 0.17
Euthanasia	46.77	95.38*	3.56 ± 0.17
Lawrence of Arabia	43.55	90.77*	3.45 ± 0.15
Footbridge	88.71*	90.77*	3.97 ± 0.14
Sacrifice	88.71*	96.92*	4.24 ± 0.14
Modified Safari	32.26*	87.69*	3.65 ± 0.15
Submarine	27.42*	92.31*	3.61 ± 0.16
Vaccine Test	17.74*	90.77*	3.45 ± 0.16
Vitamins	69.35*	90.77*	3.76 ± 0.16

SEM, standard error of the mean.
*$p < .01$.

Immediately after responding to each dilemma, the participants were asked to indicate if they felt an emotion during the deliberation on the dilemma (yes/no); if they did, they had to identify the predominant emotion and rate its intensity (i.e., emotional arousal) on a 5-point Likert scale (1, not at all–5, very intense). It was emphasised to the participants that they had to indicate only one emotion, the one that they experienced most clearly and strongly during the deliberation on the dilemma.

Statistical analyses

The frequency of moral choices (deontological versus utilitarian) was analysed using chi-square tests. The emotion labels reported by the participants were categorised by two trained psychologists who independently identified the synonyms and named the categories. An inter-rater agreement was considered excellent if Cohen's k was over 0.75, fair to good if it ranged between 0.4 and 0.75 and poor if it was below 0.4 (Fleiss, 1971). All the analyses were run in SPSS.

Results and discussion

The mean percent of deontological responses across dilemmas was 56.45% (see Table 1), which is similar to other reports (Greene, Morelli, Lowenberg, Nvstrom, & Cohen, 2008; Tassy, Oullier, et al., 2013). However, chi-square tests indicated that deontological responses were significantly more frequent than utilitarian responses in only five dilemmas (Table 1): *Sophie's choice, Crying Baby, Footbridge, Sacrifice* and *Vitamins*. In the remaining dilemmas, the frequencies of deontological and utilitarian responses were equivalent (i.e., *Lawrence of Arabia*, *Euthanasia*, *Modified Bomb* and *Modified Lifeboat*) or utilitarian responses were more frequent than deontological responses (i.e., *Modified Safari*, *Submarine* and *Vaccine Test*).

The presence of emotion was significantly reported by over 80% of participants in all the moral dilemmas (Table 1). Therefore, despite the between-dilemma variability of moral choices in this sample, emotional experience was common in all the dilemmas. Emotional arousal collapsed across dilemmas was increased (M = 3.76, SD = 1.21) and significantly correlated with moral choices (Spearman's r = 0.15, $p < .01$). Higher emotional arousal was associated with deontological choices, in line with the findings of Tassy et al. (2012).

The emotional labels reported by the participants were independently categorised with excellent inter-rater agreement (Cohen's k = 0.87). As shown in Table 2, 62.16% of emotional labels were related to fear and sadness; the other responses described emotions related to compassion, guilt, anger, disgust, regret and contempt.

By cross-tabulating the emotional categories by the responses to the moral dilemmas (Table 2), we found that fear and disgust were significantly more frequent when the responses were deontological, whereas regret was significantly more frequent when the responses were utilitarian. The frequency of the other emotions did not differ between deontological and utilitarian responses. These results support the view that both self- and other-focused (social) emotions are experienced

Table 2. *Categories for the emotional labels reported in moral dilemmas (Study 1)*

		Frequency (%)[b]		
Emotion	*Synonyms*[a]	*Utilitarian response*	*Deontological response*	*Dilemma with the highest frequency of this emotion*
Fear	Anxiety, worry, panic, terror, horror	13.85	25.93*	*Crying Baby*
Sadness	Upset, depression, despair	9.77	12.61	*Euthanasia, Sacrifice*
Guilt	Culpability, burden	4.26	3.20	*Lawrence of Arabia, Modified Safari, Vaccine Test*
Compassion	Pity	5.15	4.09	*Modified Bomb*
Disgust	Abomination, revulsion	1.95	4.09*	*Lawrence of Arabia*
Regret	Sorrow, remorse	3.20	0.53*	*Submarine*
Anger	—	3.73	5.51	*Sacrifice, Sophie's choice*
Contempt	Hatred, hostility	0.71	1.42	*Sophie's choice*

[a]This column illustrates the various emotional labels reported by the participants.
[b]Out of the total 756 expected responses, 12 were missing, 50 reported no emotion (23 associated with deontological choices and 17 associated with utilitarian choices) and 131 reported labels that could not be categorised as emotions (e.g., sacrifice, need for action, need for persuasion, uncertainty, determination, cruelty, faith and hope). This column reports the percent of emotion labels that were successfully categorised and compares the frequency of responses pertaining to each emotional category between deontological and utilitarian choices.
*$p < .01$.

during moral choice (Moll & de Oliveira-Souza, 2007; Tassy et al., 2012).

STUDY 2

The aims of this online study were to investigate the influence of individual differences in the habitual use of several emotion regulation strategies on moral choice, and whether these effects were carried through emotional arousal.

Method

Participants

Three hundred and forty-five participants (287 women) volunteered for this study. The mean age was 24.5 ± 6.3 years. They were all students of different specialties (e.g., Psychology, Law, Theology and Medicine) and various religious confessions (e.g., Orthodox, Roman Catholic, Greek Catholic and Reformed), who responded to campus advertisements. Participants completed the moral dilemmas and the questionnaires online, through a secure website. Prior to study participation, written informed consent was obtained from all the volunteers. All the information regarding sample size, data exclusions, manipulations and measures is reported in this manuscript.

Materials

Moral dilemmas. The same set of personal H2S moral dilemmas were used (see Study1).

Emotion regulation assessment. Individual differences in cognitive emotion regulation (i.e., habitual thinking styles in stressful situations) were assessed using the Cognitive Emotion Regulation Questionnaire (CERQ) (Garnefski, Kraaij, & Spinhoven, 2001; Perţe & Miclea, 2011). We focused on the habitual use of four emotion regulation strategies: (1) positive reappraisal (i.e., thoughts of attaching a positive meaning to negative events, in terms of personal growth) (Cronbach's alpha = 0.84 in this sample); (2) acceptance (i.e., thoughts of accepting what oneself has experienced and resigning oneself to what has happened) (Cronbach's alpha = 0.72 in this sample); (3) rumination (i.e., thinking about the

feelings and ideas associated with negative events) (Cronbach's alpha = 0.8 in this sample) and (4) catastrophising (i.e., thoughts of emphasising the detrimental impact of negative events) (Cronbach's alpha = 0.72 in this sample) (Garnefski et al., 2001; Perţe & Miclea, 2011). Each subscale has four items, and the participants were instructed to rate each item on a scale from 1 (almost never) to 5 (almost always).

Procedure

First, the participants filled in the CERQ. Then, they were instructed that a series of situations will be described, and they will have to imagine themselves in each of those situations as vividly as possible and choose between two courses of action as they would in reality. The moral dilemmas were presented in the order shown in Table 3. After each dilemma, the participants were requested to (1) indicate if they felt an emotion while they were deliberating on the situation (yes/no); (2) rate their emotional arousal (5-point Likert scale: 1, not at all intense–5, very intense); (3) rate the valence of their emotion (5-point Likert scale: 1, unpleasant–5, pleasant) and (4) rate the success in transposing themselves (i.e., personal involvement) in the situation described by the moral dilemma (5-point Likert scale: 1, low–5, high).

Statistical analyses

In line with statistical guidelines (Hanley, Negassa, Edwardes, & Forrester, 2003) and previous research using moral dilemmas (Koenigs et al., 2007; Tassy, Deruelle, et al., 2013), the relations between individual differences in emotion regulation and moral choices were analysed using multiple logistic regressions fitted with generalised estimating equations to account for within-subject correlations. The CERQ emotion regulation scores were entered as predictors, and each dilemma response was used as dependent variable (utilitarian = 0; deontological = 1). Considering that the present sample included more women than men, sex was also included in the analysis. In addition, the bootstrapping method (bias corrected, with 1000 iterations) (Preacher & Hayes, 2004; Shrout & Bolger, 2002) was used to test for the significance of indirect effects (i.e., mediation) of individual differences in emotion regulation on moral choices through emotional arousal. Indirect effects were considered significant if the bootstrapping confidence interval did not include zero (Frazier, Tix, & Barron, 2004; Shrout & Bolger, 2002).

Table 3. *Moral choices and emotional experience in moral dilemmas (Study 2)*

Moral Dilemma	*Deontological response (%)*	*Presence of emotion (%)*	*Emotional arousal (mean ± SEM)*	*Emotional valence (mean ± SEM)*	*Personal involvement (mean ± SEM)*
Sophie's choice	71.01**	93.04**	3.59 ± 0.07	1.53 ± 0.06	3.81 ± 0.05**
Modified Lifeboat	60.29**	85.51**	3.16 ± 0.08	1.61 ± 0.07	3.85 ± 0.05**
Crying Baby	93.91**	89.28**	3.8 ± 0.08	1.38 ± 0.06	4.06 ± 0.05**
Modified Bomb	38.55**	77.97**	2.8 ± 0.09	1.41 ± 0.06	3.73 ± 0.06**
Euthanasia	55.36*	80.29**	3.04 ± 0.09	1.3 ± 0.06	3.68 ± 0.06**
Lawrence of Arabia	60**	70.72**	2.53 ± 0.1	1.19 ± 0.06	3.37 ± 0.06**
Footbridge	92.75**	74.78**	3.73 ± 0.1	1.22 ± 0.06	3.64 ± 0.06**
Sacrifice	92.17**	85.8**	3.42 ± 0.09	1.22 ± 0.05	3.79 ± 0.06**
Modified Safari	42.32**	74.78**	2.83 ± 0.1	1.19 ± 0.06	3.51 ± 0.06**
Submarine	36.52**	75.94**	2.76 ± 0.1	1.19 ± 0.06	3.63 ± 0.06**
Vaccine Test	37.1**	75.65**	2.78 ± 0.1	1.34 ± 0.06	3.74 ± 0.06**
Vitamins	75.94**	73.62**	3.71 ± 0.1	1.28 ± 0.06	3.59 ± 0.06**

SEM, standard error of the mean.
*$p < .05$; **$p < .01$.

Results and discussion

The mean percent of deontological responses across dilemmas was 62.99% (Table 3). In line with Study 1, chi-square tests indicated that the deontological responses were significantly more frequent than utilitarian responses in all the dilemmas (all *p*s < .05) (Table 3), except *Modified Bomb, Modified Safari, Submarine* and *Vaccine Test*, in which utilitarian responses were more frequent. The participants also reported increased personal involvement across moral dilemmas (M = 3.7, SD = 1.09).

Emotion was significantly reported by over 70% of participants in all the dilemmas (Table 3). As indicated by emotional arousal (M = 3.01, SD = 1.75) and emotional valence scores (M = 1.32, SD = 1.1), participants experienced moderately intense negative emotions across dilemmas (Table 3).

Multiple logistic regression fitted with generalised estimating equations indicated that individual differences in positive reappraisal significantly predicted moral choices (Table 4). The higher the reappraisal score, the lower the likelihood of deontological responses. Individual differences in acceptance, rumination, catastrophising or sex were not significant predictors of moral choices.

Using the bootstrapping method, we tested whether emotional arousal was a mediator of the influence of reappraisal on moral choices. The bootstrapping confidence interval [−0.02, −0.01] did not include zero for reappraisal, which indicated that there was a significant indirect effect of reappraisal on moral choices through emotional arousal. Reappraisal negatively predicted emotional arousal (B = 0.07, p < .01) and the latter positively predicted deontological choices (B = 0.08, p < .05). The effect of reappraisal on moral choice remained significant after controlling for emotional arousal (B = 0.16, p < .05), which suggested partial mediation.

Table 4. *Logistic regression coefficients for the relations between individual differences in emotion regulation, sex and moral choices (Study 2)*

Predictors	*B*	*SE B*	*Wald* χ^2	*Exp(B)*
Positive reappraisal	−0.04	0.02	4.15*	0.9
Acceptance	0.03	0.02	2.73	1.03
Rumination	0.01	0.02	0.02	1
Catastrophising	−0.04	0.02	3.72	0.96
Sex (men = 0; women = 1)	0.25	0.15	2.78	1.29

Note: Utilitarian choices were coded 0, and deontological choices were coded 1.

B, unstandardised regression coefficient; SE, standard error; Exp, exponential.

*p < .05.

GENERAL DISCUSSION

Using H2S moral dilemmas, the present studies yielded three main findings: (1) a wide spectrum of emotions are experienced during these moral dilemmas, with self-focused emotions such as fear and sadness being the most common (Study 1); (2) there is a positive relation between emotional arousal during moral dilemmas and deontological choices (Studies 1 and 2); and (3) individual differences in reappraisal, but not other emotion regulation strategies (i.e., acceptance, rumination or catastrophising) are negatively associated with deontological choices and this effect is carried through emotional arousal (Study 2).

Self- and other-focused emotions

It was assumed in the literature that a wide range of emotions may be experienced in moral dilemmas (Haidt, 2003), but recent studies suggested that the dominant emotion type (e.g., self- versus other-focused) may vary with personal involvement in decision-making (Tassy, Oullier, et al., 2013). In particular, moral choice is characterised by an egocentric frame of reference which may increase self-focused emotions (Tassy et al., 2012). By asking participants to imagine themselves in H2S moral dilemmas and choose the course of action that they would endorse in reality, the present study found that over 80% (Study 1) or 70% (Study 2) reported emotional experience. In addition, over half of the labels by which the participants in Study 1 described their emotional

experience could be categorised as fear and sadness, whereas the rest included both self-focused (i.e., disgust and anger) and other-focused emotions (i.e., guilt, compassion, regret and contempt).

To our knowledge, this is the first study that used free self-report descriptions of emotional experience during moral dilemmas. In comparison with forced choice between emotions selected by researchers, this approach is not constrained by the theoretical expectations of researchers and may offer a more complete picture of participants' conscious emotional experience. The participants to this study reported emotion labels that were successfully categorised and allowed us to show that self-relevant emotions predominate during moral choice. By imagining themselves in H2S dilemmas, the participants in Study 1 experienced mostly fear and sadness. Similar results were recently reported in a study (Hutcherson & Gross, 2011) in which participants imagined themselves, a friend or a stranger as victims of moral transgressions. Anger and fear (chosen from a list of six emotions) were highest in the "self" condition, lower in the "friend" condition and lowest in the "other" condition. Moreover, sadness was the most intense emotion when participants judged a situation involving physical harm (i.e., "A child hits another child") (Hutcherson & Gross, 2011). Therefore, it seems that egocentric framing (Tassy et al., 2012) and personal H2S actions (Cushman et al., 2006; Greene et al., 2009) are associated with self-focused emotions in moral situations, irrespective of whether one imagines oneself as an agent or a victim of the moral transgression.

Emotion-linked moral choice biases

As expected, we also found a positive association between self-reported emotional arousal and deontological choices. These results are complementary to a previously reported negative relation between emotional arousal and the probability of utilitarian judgements (Tassy et al., 2012). The emotion-linked deontological bias that we found is also in line with clinical studies showing that emotion deficits are associated with increased utilitarian choices in patients with prefrontal lesions (Ciaramelli et al., 2007; Koenigs et al., 2007) or psychopathy (Bartels & Pizarro, 2011; Tassy, Deruelle, et al., 2013), as well as experimental studies in which stress decreases utilitarian choices in healthy volunteers (Starcke et al., 2012; Youssef et al., 2012).

In Study 1, fear and disgust were associated with deontological responses, whereas regret was associated with utilitarian responses. Fear and disgust may have been related to the action of physically hurting or killing another person, but it is not clear if these emotions were associated with deontological decisions because participants wanted to avoid unpleasant actions (Mellers & McGraw, 2001), and they chose the alternative course of action, which happen to be in line with a social norm, or they conformed to the social norm against harming others, which may have been more emotionally salient than the social welfare benefits (Nichols, 2002). The difficulty in distinguishing between these explanations is related to the conflation of deontological and utilitarian tendencies in a single index that treats them as inversely related dimensions of a bipolar continuum (Conway & Gawronski, 2013). This limit is common in moral psychology, but recent studies have described ways of disentangling norm conformity and consequentialism in moral dilemmas (Conway & Gawronski, 2013). The other observed association between regret and utilitarian decisions in Study 1 may point to the role of anticipating the cost of future actions in considering utilitarian decisions (Connolly & Zeelenberg, 2002). Overall, these associations that were uncovered in Study 1 suggest that the focus on self may contribute to deontological decisions (when deontological and utilitarian tendencies are assessed as inversely related dimensions), whereas the focus on others may enhance utilitarian decisions. This fits with the recent suggestion that different types of emotions may play "currency-like" roles in moral decision-making, by adding limited motivational weights to alternative courses of action which are then integrated and prioritised through reasoning processes (Baron, 2011; Cushman et al., 2010).

Habitual reappraisal and moral choices

The habitual use of reappraisal was a significant predictor of moral choices in Study 2. This finding is in line with the results of Feinberg et al. (2012), which showed that habitual reappraisal was associated with reduced judgements of immorality in disgust-eliciting dilemmas. In the present study, we extended this effect to H2S moral dilemmas which were associated with a wider spectrum of emotions, including disgust. Moreover, we assessed moral choice (i.e., one's hypothetical or desired behaviour in moral dilemmas) instead of abstract moral judgement. In comparison to moral judgement, moral choice may be associated with increased self-focused emotions (Tassy et al., 2012). In addition, research on the phenomenon of "the collapse of compassion" (i.e., the inverse relationship between compassion and the number of people in need of help) suggests that people use emotion regulation strategies, such as reappraisal, to reduce their prosocial emotions only in situations that have costs for themselves (e.g., they expect to be asked to help the victims) (Cameron & Payne, 2011). Therefore, self-relevant moral choice may increasingly involve emotion regulation. Motivated by these potential differences between moral judgement and choice, we showed that habitual reappraisal is associated with fewer deontological choices, and this effect is significantly carried through emotional arousal. Individual differences in other cognitive strategies that are commonly used to regulate negative affect (i.e., acceptance, rumination and catastrophising) (Garnefski et al., 2001) were not related to moral choice.

LIMITATIONS AND FUTURE DIRECTIONS

One of the limits of Study 1 is that the participants identified the emotions retrospectively, after they responded to the moral dilemmas. However, they were prompted to label emotions immediately after they responded to the dilemmas, and it was emphasised that they had to report emotions that were specifically experienced during the deliberation on the dilemmas. Another limit of this study is that by assessing deontological and utilitarian responses as inversely related dimensions of a single index, this study conflated moral norm conformity and consequentialist reasoning in moral dilemmas. Finally, the present results are based on H2S dilemmas and cannot be generalised to other moral transgressions. Therefore, future studies might use continuous subjective and physiological assessments of emotion during moral dilemmas and following Conway and Gawronski (2013), take a process dissociation approach to assessing moral choice. In addition, future research might find ways of increasing the realism and emotional saliency of moral vignettes, as well as venture into describing the influence of incidental emotions from everyday life on moral decision-making using experience sampling designs.

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REFERENCES

Baron, J. (2011). Utilitarian emotions: Suggestions from introspection. *Emotion Review*, *3*, 286–287. doi:10.1177/1754073911402377

Bartels, D. M., & Pizarro, D. A. (2011). The mismeasure of morals: Antisocial personality traits predict utilitarian responses to moral dilemmas. *Cognition*, *121*, 154–161. doi:10.1016/j.cognition.2011.05.010

Bechara, A., Damasio, H., & Damasio, A. R. (2000). Emotion, decision making and the orbitofrontal cortex. *Cerebral Cortex*, *10*, 295–307. doi:10.1093/cercor/10.3.295

Cameron, C. D., & Payne, B. K. (2011). Escaping affect: How motivated emotion regulation creates insensitivity to mass suffering. *Journal of Personality and Social Psychology*, *100*(1), 1–15. doi:10.1037/a0021643

Ciaramelli, E., Muccioli, M., Ladavas, E., & di Pellegrino, G. (2007). Selective deficit in personal moral judgment following damage to ventromedial prefrontal cortex. *Social Cognitive and Affective Neuroscience*, *2*(2), 84–92. doi:10.1093/scan/nsm001

Connolly, T., & Zeelenberg, M. (2002). Regret in decision making. *Current Directions in Psychological Science*, *11*, 212–216. doi:10.1111/1467-8721.00203

Conway, P., & Gawronski, B. (2013). Deontological and utilitarian inclinations in moral decision making: A process dissociation approach. *Journal of Personality and Social Psychology*, *104*, 216–235. doi:10.1037/A0031021

Cushman, F., Gray, K., Gaffey, A., & Mendes, W. B. (2012). Simulating murder: The aversion to harmful action. *Emotion*, *12*(1), 2–7. doi:10.1037/a0025071

Cushman, F., & Greene, J. D. (2012). Finding faults: How moral dilemmas illuminate cognitive structure. *Social Neuroscience*, *7*, 269–279. doi:10.1080/17470919.2011.614000

Cushman, F., Young, L., & Greene, J. D. (2010). Our multi-system moral psychology: Towards a consensus view. In J. Doris, G. Harman, S. Nichols, W. Prinz, W. Sinnott-Armstrong & S. Stich (Eds.), *The Oxford handbook of moral psychology* (pp. 47–72). Oxford: Oxford University Press.

Cushman, F., Young, L., & Hauser, M. (2006). The role of conscious reasoning and intuition in moral judgment: Testing three principles of harm. *Psychological Science*, *17*, 1082–1089. doi:10.1111/j.1467-9280.2006.01834.x

Decety, J., Michalska, K. J., & Kinzler, K. D. (2011). The developmental neuroscience of moral sensitivity. *Emotion Review*, *3*, 305–307. doi:10.1177/1754073911402373

Feinberg, M., Willer, R., Antonenko, O., & John, O. P. (2012). Liberating reason from the passions: Overriding intuitionist moral judgments through emotion reappraisal. *Psychological Science*, *23*, 788–795. doi:10.1177/0956797611434747

Fleiss, J. L. (1971). Measuring nominal scale agreement among many raters. *Psychological Bulletin*, *76*, 378–382. doi:10.1037/h0031619

Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of Counseling Psychology*, *51*(1), 115–134. doi:10.1037/0022-0167.51.1.115

Garnefski, N., Kraaij, V., & Spinhoven, P. (2001). Negative life events, cognitive emotion regulation and emotional problems. *Personality and Individual Differences*, *30*, 1311–1327. doi:10.1016/S0191-8869(00)00113-6

Greene, J. D. (2008). The secret joke of Kant's soul. In W. Sinnott-Armstrong (Ed.), *Moral psychology* (Vol. 3, pp. 35–80). Cambridge, MA: MIT Press.

Greene, J. D. (2011). Emotion and morality: A tasting menu. *Emotion Review*, *3*(3), 1–3. doi:10.1177/1754073911409629

Greene, J. D., Cushman, F. A., Stewart, L. E., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2009). Pushing moral buttons: The interaction between personal force and intention in moral judgment. *Cognition*, *111*, 364–371. doi:10.1016/j.cognition.2009.02.001

Greene, J. D., & Haidt, J. (2002). How (and where) does moral judgment work? *Trends in Cognitive Sciences*, *6*, 517–523. doi:10.1016/S1364-6613(02)02011-9

Greene, J. D., Morelli, S. A., Lowenberg, K., Nvstrom, L. E., & Cohen, J. D. (2008). Cognitive load selectively interferes with utilitarian moral judgment. *Cognition*, *107*, 1144–1154. doi:10.1016/j.cognition.2007.11.004

Greene, J. D., Nystrom, L. E., Engell, A. D., Darley, J. M., & Cohen, J. D. (2004). The neural bases of cognitive conflict and control in moral judgment. *Neuron*, *44*, 389–400. doi:10.1016/j.neuron.2004.09.027

Greene, J. D., Sommerville, R. B., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, *293*, 2105–2108. doi:10.1126/science.1062872

Gross, J. J. (2013). Emotion regulation: Taking stock and moving forward. *Emotion*, *13*, 359–365. doi:10.1037/a0032135

Haidt, J. (2003). The moral emotions. In R. J. Davidson, K. R. Scherer & H. H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 852–870). Oxford: Oxford University Press.

Haidt, J. (2007). The new synthesis in moral psychology. *Science*, *316*, 998–1002. doi:10.1126/science.1137651

Hanley, J. A., Negassa, A., Edwardes, M. D. deB., & Forrester, J. E. (2003). Statistical analysis of correlated data using generalized estimating equations: An orientation. *American Journal of Epidemiology*, *157*, 364–375. doi:10.1093/aje/kwf215

Horberg, E. J., Oveis, C., & Keltner, D. (2011). Emotions as moral amplifiers: An appraisal tendency approach to the influences of distinct emotions upon moral judgment. *Emotion Review*, *3*, 237–244. doi:10.1177/1754073911402384

Houser, M., Cushman, F., Young, L., Jin, R. K.-X., & Mikhail, J. (2007). A dissociation between moral judgments and justifications. *Mind & Language*, *22*(1), 1–21. doi:10.1111/j.1468-0017.2006.00297.x

Hutcherson, C. A., & Gross, J. J. (2011). The moral emotions: A social-functionalist account of anger, disgust, and contempt. *Journal of Personality and Social Psychology*, *100*, 719–737. doi:10.1037/A0022408

Kant, I. (1959). *Foundations of the metaphysics of morals.* (L. W. Beck, Trans.). Indianapolis, IN: Bobbs-Merrill.

Koenigs, M., Young, L., Adolphs, R., Tranel, D., Cushman, F., Hauser, M., & Damasio, A. (2007). Damage to the prefrontal cortex increases utilitarian moral judgements. *Nature*, *446*, 908–911. doi:10.1038/nature05631

Kohlberg, L. (1971). From is to ought: How to commit the naturalistic fallacy and get away with it in the study of moral development. In T. Mischel (Ed.), *Cognitive development and epistemology* (pp. 151–235). New York, NY: Academic Press.

Mellers, B. A., & McGraw, A. P. (2001). Anticipated emotions as guides to choice. *Current Directions in Psychological Science*, *10*, 210–214. doi:10.1111/1467-8721.00151

Miu, A. C., & Crişan, L. G. (2011). Cognitive reappraisal reduces the susceptibility to the framing effect in economic decision making. *Personality and Individual Differences*, *51*, 478–482. doi:10.1016/j.paid.2011.04.020

Moll, J., & de Oliveira-Souza, R. (2007). Moral judgments, emotions and the utilitarian brain. *Trends in Cognitive Sciences*, *11*, 319–321. doi:10.1016/j.tics.2007.06.001

Nichols, S. (2002). Norms with feeling: Towards a psychological account of moral judgment. *Cognition*, *84*, 221–236. doi:10.1016/S0010-0277(02)00048-3

Perţe, A., & Miclea, M. (2011). The standardization of the Cognitive Emotional regulation Questionnaire (CERQ) on Romanian population. *Cognition, Brain, Behavior. An Interdisciplinary Journal*, *15*(1), 111–130.

Pizarro, D. (2000). Nothing more than feelings? The role of emotions in moral judgment. *Journal for the Theory of Social Behaviour*, *30*, 355–375. doi:10.1111/1468-5914.00135

Preacher, K. J., & Hayes, A. F. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods Instruments & Computers*, *36*, 717–731. doi:10.3758/Bf03206553

Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The CAD triad hypothesis: A mapping between three moral emotions (contempt, anger, disgust) and three moral codes (community, autonomy, divinity). *Journal of Personality and Social Psychology*, *76*, 574–586. doi:10.1037/0022-3514.76.4.574

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychological Methods*, *7*, 422–445. doi:10.1037/1082-989X.7.4.422

Starcke, K., Ludwig, A. C., & Brand, M. (2012). Anticipatory stress interferes with utilitarian moral judgment. *Judgment and Decision Making*, *7*(1), 61–68.

Talmi, D., & Frith, C. (2007). Neurobiology: Feeling right about doing right. *Nature*, *446*, 865–866. doi:10.1038/446865a

Tassy, S., Deruelle, C., Mancini, J., Leistedt, S., & Wicker, B. (2013). High levels of psychopathic traits alters moral choice but not moral judgment. *Frontiers in Human Neuroscience*, *7*, 229. doi:10.3389/fnhum.2013.00229

Tassy, S., Oullier, O., Duclos, Y., Coulon, O., Mancini, J., Deruelle, C., … Wicker, B. (2012). Disrupting the right prefrontal cortex alters moral judgment. *Social Cognitive and Affective Neuroscience*, *7*, 282–288. doi:10.1093/scan/nsr008

Tassy, S., Oullier, O., Mancini, J., & Wicker, B. (2013). Discrepancies between judgment and choice of action in moral dilemmas. *Frontiers in Psychology*, *4*, 250. doi:10.3389/fpsyg.2013.00250

Turiel, E. (1998). The development of morality. In N. Eisenberg (Ed.), *Handbook of child psychology* (5th ed., Vol. 3, pp. 863–932). New York, NY: Wiley.

Youssef, F. F., Dookeeram, K., Basdeo, V., Francis, E., Doman, M., Mamed, D., … Legall, G. (2012). Stress alters personal moral decision making. *Psychoneuroendocrinology*, *37*, 491–498. doi:10.1016/j.psyneuen.2011.07.017