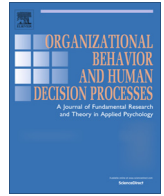




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Poker-faced morality: Concealing emotions leads to utilitarian decision making



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ABSTRACT

This paper examines how making deliberate efforts to regulate aversive affective responses influences people's decisions in moral dilemmas. We hypothesize that emotion regulation—mainly suppression and reappraisal—will encourage utilitarian choices in emotionally charged contexts and that this effect will be mediated by the decision maker's decreased deontological inclinations. In Study 1, we find that individuals who endorsed the utilitarian option (vs. the deontological option) were more likely to suppress their emotional expressions. In Studies 2a, 2b, and 3, we instruct participants to either regulate their emotions, using one of two different strategies (reappraisal vs. suppression), or not to regulate, and we collect data through the concurrent monitoring of psycho-physiological measures. We find that participants are more likely to make utilitarian decisions when asked to suppress their emotions rather than when they do not regulate their affect. In Study 4, we show that one's reduced deontological inclinations mediate the relationship between emotion regulation and utilitarian decision making.

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Introduction

In the 2009 film *Up in the Air* (2009), the character Natalie Keener, played by Anna Kendrick, takes a job with Career Transition Corporation, a company that institutes layoffs on behalf of other companies. Kendrick proposes a plan to cut costs by conducting layoffs via videoconferencing. Piloting the virtual-firing program online, with no trace of emotion on her face, Natalie matter-of-factly informs Mr. Samuels, a 57-year-old employee, that he has been let go. Even as Mr. Samuels becomes upset and starts to cry, Natalie continues to suppress her emotional expressions, mechanically telling him to pack his belongings.

In both our professional and personal lives, we often face moral dilemmas in which making a choice based on our principles of right and wrong (i.e., a deontological approach) conflicts with making a choice based on creating the greatest good (i.e., a utilitarian approach). More specifically, decision makers in various professional settings regularly engage in harmful actions toward others in pursuit of greater overall goals. Managers sometimes must fire employees to save their company, judges sometimes hand down capital punishment to uphold legal principles, and regulators often approve new drugs that can have dangerous side effects.

Like Natalie, people often appeal to utilitarian logic to justify their decisions to harm others. [Molinsky and Margolis \(2005\)](#)

coined the term “necessary evils” to refer to tasks in which a person must knowingly and intentionally cause harm to another human being in the service of achieving some perceived greater good or purpose. Interviews conducted to determine how professionals who carry out necessary evils experience such incidents (e.g., surgeons operating on infants) found that 46% reported staying psychologically disengaged ([Margolis & Molinsky, 2008](#)). As a result, they denied experiencing prosocial emotions toward those (if only temporarily) harmed and reported trying to dissociate from the harmed target's experience. This research highlights that once a utilitarian decision has been made and is about to harm someone, people often try to detach themselves emotionally from the event and show behavior lacking in interpersonal sensitivity.

Whereas this line of research treats emotional expressions as a consequence of justifying utilitarian decision-making, our research asks if regulating emotional expression can lead to more utilitarian decision making when people face moral dilemmas. Given the pervasiveness of such choices in our daily lives, in this paper we aim to investigate the emotion-regulation processes that precede moral decision making and to understand the mechanism by which suppressing emotional expressions may lead to more utilitarian decision making.

Utilitarian vs. deontological decision making in moral psychology

Given the importance of moral decision making in dilemmas, moral psychology research has begun to identify the psychological

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processes by which people evaluate moral dilemmas. Cognitive and emotional processes are often in conflict when a moral decision needs to be made (Bartels, 2008; Greene, 2001; Greene, Morelli, Lowenberg, Nystrom, & Cohen, 2008). One early manifestation was found in neuroimaging studies conducted to distinguish how individuals respond to personal, impersonal, and non-moral dilemmas (Greene, 2001). Personal dilemmas, in particular, trigger processing in brain regions closely associated with emotions, and this affective processing interferes with the utilitarian choice to avoid doing harm to others. Such emotions have also been identified in the form of a host of discrete intrapersonal emotions (such as victim distress and empathy; Blair, 1995), as well as visceral, physiological reactions associated with engaging in harmful actions (Cushman, Gray, Gaffey, & Mendes, 2012). When such strong aversive emotions are tied to a moral dilemma, people no longer prefer the utilitarian option (“Doing harm is morally acceptable in circumstances that improve well-being”) and instead tend to choose the more morally intuitive, deontological one (“Doing harm is morally unacceptable”). As this research from the dual-process model of moral judgment suggests, when people face difficult, personal moral dilemmas, both cognitive and emotional considerations can influence their decisions.

Researchers have since proposed several ways in which one can elect the more utilitarian choice even in the presence of strong emotions. For example, when people engage in deliberative thinking (Greene, 2001; Greene, Nystrom, Engell, Darley, & Cohen, 2004) or have a higher working memory capacity (Bartels, 2008; Feltz & Cokely, 2008; Moore, Clark, & Kane, 2008), they tend to make more utilitarian judgments. Whereas this research has recognized the important role of cognitive styles and executive functions in driving moral judgments and decisions, recent evidence suggests that there is an alternate, affective route to influence our utilitarian vs. deontological decisions. For example, individuals who suffer damage to brain areas associated with emotions make more utilitarian decisions (Ciaramelli, Muccioli, Ladavas, & di Pellegrino, 2007; Koenigs et al., 2007), and visualizing or imagining a harm vividly (Amit & Greene, 2012; Bartels, 2008; Petrinovich, O’Neill, & Jorgensen, 1993) also increases the tendency to make deontological judgments.

Role of emotion-regulatory efforts in moral decision making

Less scholarly attention has been paid to the ways in which people regulate the emotions that arise from moral dilemmas themselves. If emotions are indeed critical in deterring people from making utilitarian decisions, then one’s decision to regulate one’s emotional reactions in the face of a moral dilemma is likely to be crucial in determining whether one chooses options that are more or less utilitarian. We consider distinct psychological routes to more utilitarian decisions by focusing on the role of regulating affective responses that arise from moral dilemmas.

Research has identified two types of emotion-regulation strategies, *expressive suppression* and *cognitive reappraisal*, and examined their differential consequences on behavior (Ochsner & Gross, 2005, 2008). Suppression involves concealing our emotions after the initial emotional response has occurred. It is unlikely to help one feel less negative, and it impairs the efficiency of cognitive processing, such as memory and problem solving (Richards, 2004; Richards & Gross, 2000). In contrast, cognitive reappraisal alters one’s thoughts about a target event to control the initial emotional response. Individuals who chronically engage in reappraisal have been shown to have a more adaptive profile of physiological responses (Gross & Levenson, 1997) and are psychologically healthier in the long term than those who do not (Gross, 2002; Gross & John, 2003). As compared to controls, individuals who were instructed to use reappraisal felt less negative after experi-

encing a negative event and had less sympathetic nervous system arousal (Gross, 1998, 2002). Taken together, the empirical evidence to date suggests that the use of reappraisal reduces one’s subjective and physiological experience of emotions.

Although such adaptive profile of reappraisal and maladaptive profile of suppression are well-documented, few studies to date have examined the role of emotion-regulation strategies in moral decision making. Feinberg, Willer, Antonenko, and John (2012) demonstrated the relevance and efficacy of the reappraisal strategy in reducing moral intuitions (e.g., disgust that arises from reading a scenario describing a family eating a deceased pet dog). In their research, individuals who employed the reappraisal strategy, as compared to those who did not, judged the family’s action to be less morally wrong. Although most people experienced disgust initially, the use of reappraisal helped them to reconstrue the situation such that they felt less negative (e.g., “The dog has already been killed in an accident, so no real harm was done to the dog, and therefore I cannot judge this family’s action to be morally wrong”). Importantly, Feinberg et al. (2012) found that habitual suppression is not significantly associated with reducing moral intuitions, which led them to focus on reappraisal only. This research pioneered the study of emotion regulation and moral decision-making using scenarios that induce moral emotions such as disgust and contempt. However, it has a limitation: the types of scenarios used do not capture the wide variety of moral dilemmas present in the world.

There are several key differences between the moral scenarios used in Feinberg et al. (2012) and the moral dilemmas we discuss and use here. First, our research focuses on moral dilemmas that involve a conflict between two moral principles: utilitarian and deontological. Our moral dilemma scenarios highlight a tension between two conflicting goals that can be justified using two distinct moral principles. When people feel torn between the options, they experience strong aversive emotions (Luce, Bettman, & Payne, 1997; Tetlock, Kristel, Elson, Green, & Lerner, 2000). Second, our moral dilemmas involve inevitable harm. No matter what decision the agent makes, some level of individual sacrifice in the form of physical harm or suffering is unavoidable (Moore et al., 2008). Third, instead of reacting to what has already been done from a third-person perspective, our dilemmas ask participants to make moral judgment about the agent’s potential utilitarian actions or to make an active decision from a first-person perspective.

Deontological inclinations as an underlying mechanism for the relationship between emotion regulation and utilitarian decisions

Due to such differences, we argue that our moral dilemmas are more conflicting and emotionally charged by nature than those used in Feinberg et al. (2012). As such, predictions regarding the relationship between emotion regulation and moral decision making should be made with caution. A primary criticism of the previous research on moral decision making is that utilitarianism and deontology are measured on one scale, on the assumption that these two moral principles are perfectly inversely related (i.e., a stronger preference for utilitarian judgment means a weaker preference for deontological judgment). However, given that these moral principles stem from two independent psychological systems (Greene, 2007), Conway and Gawronski (2013) used Jacoby’s (1991) process-dissociation approach to quantify the relative strength of deontological and utilitarian inclinations within individuals. This technique allowed them to determine whether an increase in utilitarian choice or judgment is driven by a heightened utilitarian inclination or by a decreased deontological inclination. We thus adopted this methodology to understand the mechanisms by which specific emotion-regulation strategies influence moral decision-making.

Given the previous research on how suppression leads to more negative physiological arousal associated with emotional stimuli (Gross, 1998), suppressing negative affect arising from moral dilemmas may not help individuals feel less negative. Similar to the finding that habitual suppression is not significantly correlated with moral judgment (Feinberg et al., 2012), one could hypothesize that suppression will not be effective in increasing one's preference for a utilitarian choice or may even decrease one's utilitarian inclinations if aversive arousal is heightened and consciously felt as a moral "gut feeling." However, reappraisal would be more effective in leading individuals to make a utilitarian choice, as it reduces physiological arousal (Gross, 1998). These predictions are based on the assumption that such physiological arousal can influence our conscious decision-making by modulating the experience of empathic concerns for potential victims. If this is true, suppression would increase deontological inclinations, and reappraisal would decrease deontological inclinations.

However, a different prediction could be made if suppression actually helps reduce one's tendency to make a more emotionally driven decision. It is possible that the suppression of emotion-related facial expressions may function as feedback, providing information that in turn influences one's moral judgment. Drawing from the Facial Feedback Hypothesis (Tomkins, 1963), past research has found that facial feedback influences social-cognitive processes, such as emotional experience (Davis, Senghas, Brandt, & Ochsner, 2010) and empathic accuracy (Neal & Chartrand, 2011). As a result of facial feedback, individuals who express emotions may become more sensitive toward a victim's suffering associated with the utilitarian choice. If suppression of facial feedback (either by instruction to suppress muscle movement or by the injection of botulinum toxin to paralyze the facial muscles) were to reduce people's experience and appraisal of emotions, it might reduce one's empathic distress associated with the victims harmed and sacrificed as a result of the moral decision. If a decision maker expects to experience negative feelings and knows it would be difficult to avoid such an aversive psychological state, suppression may successfully tamper with emotional influence, thereby helping to generate a disconnect between one's emotional reactions and the decision at hand. Conway and Gawronski (2013) have demonstrated that showing a photograph of the victim enhanced empathic concerns and emotional distress, thus selectively increasing one's deontological inclinations. Thus, we theorize that suppressing facial expressions of aversive emotions will reduce one's deontological inclinations and therefore facilitate a utilitarian choice.

Hypothesis 1a. The use of suppression strategy will be associated with more utilitarian decision-making.

Hypothesis 1b. The relationship between suppressing emotional reactions and making utilitarian decisions will be explained by reduced deontological inclinations.

Based on prior research on the efficacy of reappraisal in down-regulating negative affect, we expect to replicate the finding from Feinberg et al. (2012) but further probe the mechanisms by which reappraisal leads to a more utilitarian choice. Cameron and Payne (2011) proposed a motivational account of emotion regulation to explain the "collapse of compassion," or the tendency for people to reduce their compassion as the number of people in need of help increases. Individuals who had been instructed to down-regulate (reappraise) emotions as they learn about one or eight victims expecting help were more likely to experience the "collapse of compassion" as compared to those who were told to experience their emotions. Cameron and Payne (2011) demonstrated that peo-

ple tend to predict that the needs of large groups will be more overwhelming to them than the needs of one person; therefore, people are motivated to engage in emotion regulation to prevent themselves from experiencing such an aversive psychological state. This explains why people tend to be insensitive to mass suffering. Along the same lines, we expect that reappraisal would reduce empathic concerns for the possible victims of the utilitarian choice. Taken together, we predict that reappraising aversive emotions will reduce one's deontological inclinations, thereby facilitating a utilitarian choice. Specifically, we hypothesize the following:

Hypothesis 2a. The use of reappraisal strategy will be associated with more utilitarian decision-making.

Hypothesis 2b. The relationship between reappraising emotional experience and making utilitarian decisions will be explained by reduced deontological inclinations.

Overview of the present research

The main goal of this research is to contribute to the intersection between emotion regulation and utilitarian decision-making, and to clarify the underlying mechanisms by which emotion regulation affects morality. Using both correlational and causal designs, we examine how different emotion-regulation strategies influence moral decisions when people are faced with a difficult moral dilemma. Our goals are (1) to first show that concealing and rethinking emotions increases one's preference for utilitarian choice and (2) to test our hypothesis regarding why regulation emotions has this specific effect on utilitarian decision making using a process-dissociation approach.

Across five studies, we test our main predictions and find that regulating emotions increases people's likelihood of making utilitarian decisions. We use a variety of emotionally charged moral dilemmas and vary the dependent measures to include either making a moral judgment (i.e., Is it morally appropriate?) or making a moral decision (i.e., Which decision will you make if you were the agent?).

In Study 1, we examine whether individuals who choose a utilitarian option are more likely to suppress emotions than those who make a deontological choice. Given the correlational nature of Study 1, in Study 2–4, we manipulate participants' emotion-regulation strategies and examine the effects of such strategies on their moral decisions in a dilemma situation. Here we test our Hypothesis 1a and 2a, which suggests that individuals who are instructed to regulate their emotions are more likely to make utilitarian decisions as compared to those who are not instructed to do so. Importantly, to closely track the effect of each emotion-regulation strategy on participants' physiological arousal, we use data from concurrent monitoring of psycho-physiological indices of emotion in Study 2b and 3. We test the alternative hypothesis that suppression decreases preference for utilitarianism through heightened physiological arousal, while reappraisal increases preference for utilitarianism through reduced physiological arousal. Finally, in Study 4, we test our Hypothesis 1b and 2b on the mechanisms using the process-dissociation approach, which suggests that both strategies selectively reduce deontological inclinations, thus leading to greater preference for utilitarian decisions.

Study 1

In Study 1, we use a hypothetical scenario to test whether individuals who make utilitarian decisions predict that they will experience more negative, high-arousal emotions, and will thus be

willing to use more emotion-regulation strategies, as compared to those who make deontological decisions. To ensure that participants are given at least two emotion-regulation strategies, we asked them to first make a moral decision and then indicate their willingness to use suppression and reappraisal strategies.

Method

Participants

We recruited 186 workers ($M_{age} = 37.21$, $SD = 12.98$; 38% male) from an online labor market (Amazon Mechanical Turk) to participate in a 10-min survey for \$0.40.

Procedure

The study's instructions informed participants that they would read a hypothetical scenario (adapted from [Uhlmann, Zhu, & Tannenbaum, 2013](#)). In this scenario, an agent is about to decide whether to approve the use of \$2 million to save one child's life (deontological choice) or to use it for other hospital needs that could save 200 future patients' lives (utilitarian choice) ([Tetlock et al., 2000](#); see Appendix A for the scenario). After reading the scenario, participants were presented with two choices: a deontological or a utilitarian choice.

In addition, participants answered two questions assessing how they felt as they made the decision and some demographic questions. To better understand the emotions people expect to experience as they considered making moral choices, we asked two questions predicting their emotional valence and arousal. The first measured valence by asking participants to indicate how positively or negatively they felt (with 0 = extremely unhappy/unpleasant, 5 = neutral, and 10 = extremely happy/pleasant). The second measured arousal by asking participants to indicate how aroused they would feel (with 0 = low level of arousal, 5 = a moderate (everyday) level of arousal, and 10 = a high level of arousal).

Participants were then asked to decide how they would display their emotions. Then we presented two ways to display emotions and asked how willing they would be to use such strategies (1 = not at all, 7 = extremely willing): suppression ("I will try not to show any emotional expressions on my face."), reappraisal ("I will try to change the way I think about the situation so I feel less negative."). We also asked participants to rate how much emotion they would actually express as they informed the transplant department of their decision (1 = none, 5 = all) and to write a few sentences to describe what facial expression they would have. Participants' responses to this open-ended question were coded by two research assistants who were blind to the study's hypotheses. The two coders scored the responses based on the extent to which the participants suppressed their emotional reactions (1 = no attempt to suppress emotion, 7 = complete suppression of emotion).

Finally, participants completed a demographics questionnaire. Although testing the gender effects is outside the scope of this research, we included gender in all our analyses, as participants' gender may influence both one's tendency to make a utilitarian vs. deontological choice and one's emotion-regulation strategy.¹

Results

Table 1 reports the descriptive statistics of the main variables and their zero-order correlations. Of the participants, 65.6% chose to make a utilitarian decision by denying the transplant request, and 34.4% made a deontological decision by approving the transplant request. There was a significant gender difference: males (53 out of 66) were more likely to make a utilitarian choice than were females (62 out of 110), $\chi^2(1, N = 176) = 10.44$, $p = .001$, $V = 0.02$.

Individuals who made the utilitarian decision ($M = 3.41$, $SD = 2.67$) predicted feeling more negative emotions than those who made the deontological decision ($M = 6.15$, $SD = 2.40$), $t(176) = 6.92$, $p < .001$, $d = 1.07$. Similarly, utilitarian decision makers ($M = 3.97$, $SD = 2.75$) predicted experiencing more arousal than deontological decision makers ($M = 4.90$, $SD = 2.94$), $t(176) = 2.03$, $p = .04$, $d = 0.33$.

We used a mixed ANOVA in which the participants' willingness to use emotion-regulation strategy served as a dependent variable, emotion-regulation type (suppression vs. reappraisal) served as a within-subject factor, and moral decision (utilitarian vs. deontological) served as a between-subject factor. Participants reported that they were more likely to use reappraisal ($M = 3.99$, $SD = 1.96$) than suppression ($M = 3.57$, $SD = 2.06$) when facing the moral dilemma, $F(1, 175) = 7.83$, $p = .006$, $\eta_p^2 = 0.04$. More importantly, this difference was driven by the significant difference in willingness to use suppression when making a utilitarian choice ($M = 3.80$, $SD = 2.15$) as compared to when making a deontological choice ($M = 3.13$, $SD = 0.23$), $t(177) = 2.18$, $p = .03$, $d = 0.15$. However, we did not find a significant difference on the willingness to reappraise emotions across utilitarian and deontological decision making, $t(177) = -0.60$, $p = .55$, $d = 0.09$. **Fig. 1** summarizes this relationship. Lastly, participants who made a utilitarian choice reported that they were less likely to display emotional expressions when notifying others of their decision ($M = 2.55$, $SD = 0.91$) as compared to those who made a deontological choice ($M = 3.06$, $SD = 0.91$), $t(175) = 3.56$, $p < .001$.

Our content analysis also confirms that participants who made the utilitarian choice were more likely to engage in suppression. Our intercoder reliability kappa was 0.74, $p < .001$, so we created a composite score using an average. Utilitarian decision makers ($M = 4.17$, $SD = 2.22$) suppressed emotional reactions more than deontological decision makers ($M = 3.19$, $SD = 2.01$), $t(174) = 2.92$, $p = .004$, $d = 0.46$. Examples of a suppression response followed by a utilitarian decision include the following: "I would have to keep my mouth shut very tight to keep my emotions from getting out of control," "I would try to be as calm and stoic as possible," and "I would try to stonewall it." Examples of a no-suppression response followed by a deontological decision included: "I would show the pain and struggle of this decision in my expression" and "I would be sad and wouldn't be afraid of showing it. I don't think there is much point in hiding the fact that my decision causes someone to suffer."

Controlling for gender did not change the direction or significance of the results, although being female was positively associated with expressing emotions but negatively associated with suppressing and reappraising emotions. Similarly, controlling for predicted emotions (both valence and arousal) did not change the direction or significance of the results.

Discussion

In this study, participants' emotional displays served as our primary measure of interest as a function of the choice they made (whether utilitarian or deontological). Our findings demonstrated that utilitarian decision making, as compared to deontological decision making, involved predicting the experience of more negative and high-arousal emotions. This suggests that sacrificing one person to save 200 lives in the near future still generates more

¹ We included gender in our analyses for two main reasons. First, the gender effect on moral decision making is still debated by many scholars; it has been theorized that females are more likely to be driven by emotion, empathy, and care for others than males ([Gilligan, 1982](#)). While some researchers found a small effect or no effect of gender ([Brabeck & Shore, 2003](#); [Jaffee & Hyde, 2000](#)), others found that females are more likely to have deontological inclinations ([Aldrich & Kage, 2003](#); [Indick, Kim, Oelberger, & Semino, 2000](#)). Second, the gender effect on the type of emotion-regulation strategy that individuals choose is well-documented; males use suppression strategy more frequently than females ([Tamres, Janicki, & Helgeson, 2002](#)).

Table 1

Zero-order correlations among utilitarian decision making, self-reported emotions, and emotion-regulation decision, Study 1.

	Mean (SD)	1	2	3	4	5	6
1. Utilitarian Decision	0.65 (0.48)						
2. Suppress	3.57 (2.06)	0.15 [*]					
3. Reappraise	3.99 (1.96)	0.04	0.38 ^{***}				
4. Emotions Displayed	2.72 (0.94)	-0.26 ^{***}	-0.54 ^{***}	-0.28 ^{***}			
5. Predicted Valence	4.36 (2.89)	-0.45 ^{***}	0.08	0.03	0.17 [*]		
6. Predicted Arousal	4.29 (2.84)	-0.15 [*]	0.03	-0.01	0.10	0.30 ^{***}	
7. Sex (1 = male, 2 = female)	1.62 (0.48)	-0.24 ^{**}	-0.25 ^{***}	-0.19 [*]	0.07	-0.05	-0.05

Note. Likelihood of utilitarian decision was 1 if utilitarian option was chosen, 0 if not; likelihood of suppression decision was 1 if suppress, 0 if not; the higher the score of emotional valence, the more negative participants felt (5 = neutral).

^{*} $p < .10$.

^{*} $p < .05$.

^{**} $p < .01$.

^{***} $p < .001$.

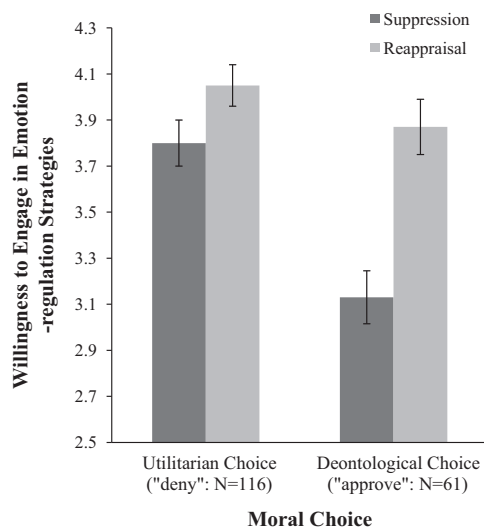


Fig. 1. Results for the willingness to engage in emotion-regulation strategies as a function of the moral choice made. Error bars represent standard errors (Study 1).

aversive emotional reactions, despite the positive emotions that arise from saving 200 lives in the distant future. Individuals who decided to make the utilitarian choice were also more willing and likely to suppress emotional expressions, while those who made the deontological choice were less likely to do so. However, participants' willingness to use reappraisal did not differ based on the moral decision made. It should be noted that this result is driven by lower levels of suppression when a deontological decision is made; people tended to express emotions when making a deontological choice. Thus, this study demonstrated that both suppression and reappraisal are relevant emotion-regulation strategies when dealing with emotionally charged moral dilemmas.

Study 2

Study 1 showed that when individuals can rate each of the emotion-regulation strategies that are likely to use, utilitarian decision makers are more willing to use suppression than deontological decision makers. We found no significant difference in the use of reappraisal. Based on the promising correlations linking utilitarian decision making with emotion-regulation strategies (suppression, in particular), in Study 2 we examined the causal relationship between regulatory strategies (by randomly assigning participants to one of the three conditions—control, reappraisal, and suppression) and moral decisions. Specifically, we investigated whether an emotion-regulation strategy employed at the moment of decision affects one's moral decisions.

In Study 2a, we first instructed participants to use a specific emotion-regulation strategy and then presented them with five moral dilemma scenarios. In each, participants judged whether the agent's utilitarian action is morally appropriate or not. In Study 2b, we asked participants to watch a video clip depicting a moral dilemma and then asked them to make a high-conflict moral decision by taking the perspective of the main character in the clip. In Study 2b, we included skin conductance as a measure of emotional involvement in moral dilemmas as well as a manipulation check of the emotion-regulation strategies. Skin conductance levels, which reflect individuals' tonic electrodermal activity, have been associated with indices of arousal, attention, fear, and anxiety (Mendes, 2009). A key benefit of using skin conductance is that it cannot be voluntarily controlled or consciously processed. Scholars have thus used skin conductance to reduce self-report biases and to detect emotional engagement in judgment and decision making (Figner & Murphy, 2011).

Study 2a method

Participants and procedure

One hundred sixty-three individuals ($M_{age} = 35.75$ years, $SD = 11.70$; 38% male) from Amazon Mechanical Turk participated in a 10-min long study for \$0.50. Participants were randomly assigned to one of three conditions, in which they were asked to employ different emotion-regulation strategies (adapted from Shiota & Levenson, 2009): suppression, reappraisal, or no strategy at all (control). In the suppression condition, the instructions read:

As you listen to the audio clips, if you have any feelings, please try your best not to let those feelings show. Please listen carefully, and try to behave so that someone watching you would not know that you are feeling anything at all.

In the reappraisal condition, the instructions read:

As you listen to the audio clips, please think about what you are seeing objectively. Please listen carefully, and try to think about what you are seeing in such a way that you feel less negative emotion.

Finally, in the control condition, participants were asked to "Please listen carefully."

Then participants listened to five moral dilemmas in the same order (see Appendix B for the transcribed materials) and were asked to rate whether the utilitarian action of the agent is morally appropriate (1 = very inappropriate to 6 = very appropriate).

Results

Using a multiple regression analysis, we tested our hypothesis that regulating one's emotions would be associated with an

increased likelihood of making a utilitarian decision, as compared to controls. We included gender as a covariate; being a male was associated with rating the agent's utilitarian action to be more morally appropriate, $B = 0.46$, $SE = 0.17$, $p = .006$. The suppression dummy variable had significant regression weights, $B = 0.51$, $SE = 0.21$, $p = .01$, as did the reappraisal dummy variable, $B = 0.50$, $SE = 0.20$, $p = .01$.

Study 2b method

Participants and procedure

One hundred ten individuals ($M_{age} = 30.51$ years, $SD = 12.85$; 46% male) from the Boston/Cambridge area participated in the study for \$15. They completed the study at individual computer terminals. We used the same instructions for each of the conditions (Shiota & Levenson, 2009).

At the beginning of the experiment, we applied physiological sensors to participants to measure their physiological responses from electrodermal activities throughout the entire study. We first asked them to self-report their current emotions. After reading the emotion-regulation instructions to suppress or reappraise their emotions (no specific instructions were given to controls), participants watched a four-minute video clip from the movie *Vertical Limit* (2000). The video clip presents a moral dilemma that triggers strong emotional reactions. Specifically, it shows a rock-climbing accident that endangers a father, his daughter, and his son. The father presents his son with a difficult choice: (1) cut the rope, an action that would save the son and daughter but kill the father; or (2) not cut the rope, which would cause all three people to die. Thus, in this scenario, the utilitarian choice is to cut the rope (i.e., save two people rather than none). After watching the video clip, participants indicated the decision they would make if they faced the same choice as the son depicted in the movie.

Next, they completed a questionnaire that measured their state emotions and were asked demographic questions.

Measures

Autonomic responses. All physiological data were scored manually using Mindware software modules (Mindware Technologies, Gahanna, OH) by research assistants who were blind to both the study hypotheses and conditions. In addition, we rescored a subsample to ensure reliability. *Skin-conductance level* was assessed by two Ag/AgCL electrodes attached to the palm of the non-dominant hand. Skin conductance was recorded continuously throughout the study, and the skin-conductance levels were retained for analysis.

State emotions. We assessed participants' preexisting state emotions and their post-manipulation state emotions (after watching the video and making their moral decision) using the 20-item Positive and Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). We then created four composite variables: pre-task positive affect ($\alpha = 0.76$), pre-task negative affect ($\alpha = 0.82$), post-task positive affect ($\alpha = 0.88$), and post-task negative affect ($\alpha = 0.93$).

Results

Table 2 reports the descriptive statistics of the main variables we assessed in the study and their zero-order correlations. Table 3 reports the mean and standard deviation of the main variables by condition.

Manipulation checks. As a manipulation check, we tested whether different emotion-regulation conditions led to different emotional and physiological consequences. The *Vertical Limit* video clip begins with two minutes of relatively relaxing scenes and ends with two minutes of anxiety-inducing scenes that depict the son's moral

dilemma. We asked participants to report their subjective positive and negative emotions before they watched the video and after they made the moral decisions. We also measured the participants' physiological responses by capturing skin-conductance levels at the baseline period and at the post-decision period (during the moral decision making immediately after the movie). We failed to collect skin conductance data for 18 participants due to measurement issues, and they were thus treated as missing variables in the analysis on manipulation checks.

For subjective feelings, we conducted two mixed ANOVAs in which participants' self-reported positive and negative affect served as dependent variables, time (baseline vs. post-decision period) served as a within-subjects factor, and condition (emotion-regulation strategies) as a between-subjects factor. The ANOVA using positive affect as the dependent variable revealed that positive affect decreased significantly from the baseline to the post-decision period, $F(1,107) = 91.21$, $p < .001$, $\eta_p^2 = 0.46$. The main effect for condition was not significant, $F(2,107) = 2.47$, $p = .09$, nor was the Condition \times Time interaction, $F(2,107) = 1.11$, $p = .33$. Mirroring these results, the ANOVA using negative affect as the dependent variable revealed that negative affect increased significantly over time, $F(1,107) = 135.80$, $p < .001$, $\eta_p^2 = 0.56$. The main effect of condition was again not significant, $F(2,107) = 0.66$, $p = .52$, nor was the Condition \times Time interaction, $F(2,107) = 0.19$, $p = .83$. Together, these results indicate that the emotion-regulation strategies that participants were asked to use while watching the video did not differentially influence participants' emotional state based on participants' self-reported emotions.

For physiological arousal, we conducted a mixed ANOVA in which participants' physiological arousal served as a dependent variable, time (baseline vs. arousal period) served as a within-subjects factor, and condition (emotion-regulation strategies) as a between-subjects factor. There was a significant increase in skin-conductance levels over time, $F(1,90) = 8.95$, $p = .004$, $\eta_p^2 = 0.09$. There was no significant difference across conditions, $F(2,90) = 1.37$, $p = .26$, but was there a significant interaction between the conditions and change over time, $F(2,90) = 4.38$, $p = .01$, $\eta_p^2 = 0.09$. Increase in skin conductance was more pronounced among individuals who suppressed ($B = 3.88$, $SE = 0.98$, $p < .001$), as compared to those who reappraised ($B = -0.11$, $SE = 0.94$, $p = .91$) and controls ($B = 1.31$, $SD = 1.01$, $p = .20$). It should be noted that the skin-conductance levels were not similar across the three conditions at the baseline, $F(2,90) = 2.70$, $p = .07$; they were slightly higher for reappraisal than suppression, $p = .11$. In order to capture the relative skin-conductance levels of the individual at different times, we thus created standardized (ipsatized) scores for skin conductance for each individual and subtracted the scores at the baseline from those at the arousal period. Replicating the same effect, there was a significant difference across conditions, $F(1,91) = 6.04$, $p = .003$, $\eta_p^2 = 0.12$. In the post hoc analysis, the difference score for suppression ($M = 0.42$, $SD = 0.74$) was higher than that for reappraisal ($M = -0.42$, $SD = 1.08$), $p = .004$. However, the difference scores for suppression and reappraisal were not significantly different from controls ($M = 0.30$, $SD = 0.98$), $ps > .18$.

Emotion regulation and utilitarian decisions. Using a binary logistic regression analysis, we tested our hypothesis that regulating one's emotions would be associated with an increased likelihood of making a utilitarian decision as compared to the control condition, controlling for gender. Being male was associated with the higher likelihood of making utilitarian decision, $B = 1.73$, $SE = 0.46$, $p < .001$. The suppression dummy variable had significant regression weights, $B = 1.05$, $SE = 0.53$, $p = .05$, whereas the reappraisal dummy variable did not, $B = 0.45$, $SE = 0.52$, $p = .39$.

Table 2

Zero-order correlations among utilitarian decisions, emotion-regulation conditions, self-reported emotions, and skin-conductance levels, Study 2b.

Variables	Mean (SD)	1	2	3	4	5	6	7	8	9
1. Utilitarian Decision	0.62 (0.49)									
2. Suppression Dummy	0.34 (0.47)	0.16 [^]								
3. Reappraisal Dummy	0.34 (0.48)	−0.03	−0.51 ^{***}							
4. Positive Affect T1	3.24 (1.93)	−0.14	−0.10	0.19 [^]						
5. Positive Affect T2	1.41 (0.87)	0.09	−0.13	0.10	0.12					
6. Negative Affect T1	2.02 (1.28)	−0.04	0.03	0.05	0.61 ^{***}	0.04				
7. Negative Affect T2	4.61 (2.20)	−0.05	0.08	0.01	−0.05	−0.42 ^{***}	0.20 [^]			
8. Skin Conductance T1	11.11 (10.82)	0.05	−0.14	0.24 [*]	0.11	0.04	0.20 [^]	0.08		
9. Skin Conductance T2	12.81 (12.16)	0.09	−0.00	0.10	0.08	−0.02	0.21 [^]	0.11	0.89 ^{***}	
10. Sex (1 = male, 2 = female)	1.55 (0.49)	−0.36 ^{***}	−0.02	0.06	−0.10	−0.21 [*]	−0.08	0.04	−0.00	−0.01

** $p < .01$.[^] $p < .10$.* $p < .05$.*** $p < .001$.**Table 3**

Means and standard deviations by condition, Study 2b.

Conditions	Likelihood of Utilitarian Decision	Positive Affect at T1	Positive Affect at T2	Negative Affect at T1	Negative Affect at T2	SCL at T1	SCL at T2
Control	0.53 (0.51)	3.00 (0.86)	1.44 (0.96)	1.88 (0.93)	4.33 (2.25)	9.56 (5.13)	10.95 (4.82)
Suppression	0.73 (0.45)	2.97 (0.58)	1.25 (0.77)	2.07 (1.03)	4.85 (2.42)	8.89 (8.53)	12.77 (10.32)
Reappraisal	0.59 (0.50)	3.76 (3.13)	1.53 (0.86)	2.11 (1.74)	4.65 (1.94)	14.54 (15.09)	14.43 (17.14)

Note. Likelihood of utilitarian decision was 1 if utilitarian option was chosen, 0 if not.

Mediation analysis. Additionally, we ran mediation analyses to test whether physiological arousal mediates the relationship between emotion regulation and utilitarian decision making. First, we entered the suppression indicator as an independent variable, utilitarian decision making as a binary dependent variable, and changes in physiological arousal (difference between arousal period and baseline) as a mediating variable, while controlling for the reappraisal indicator and gender as covariates. A bootstrap analysis confirmed that the 95% bias-corrected confidence interval for the size of the indirect effect did not exclude zero (−0.03, 0.13). Second, we repeated the same analysis but using the reappraisal indicator as an independent variable, while controlling for the suppression indicator and gender. A bootstrap analysis similarly confirmed that the confidence interval did not exclude zero (−0.03, 0.11).

Discussion

Together, the results from Study 2a and Study 2b show that making an explicit effort to suppress one's emotional expressions increases utilitarian decisions in personal, emotionally rich moral dilemmas. However, the effect of reappraising emotions was not as robust as that of suppression; reappraisal did not have the same effect in Study 2a as in Study 2b, but did have a similar effect as suppression in Study 2a as in Study 2b.

Previous research (Gross, 1998) found that reappraisal is effective in making people feel less negative, while suppression increases sympathetic activation. Although our findings seem inconsistent with previous work on emotion regulation, the absence of a statistically significant effect of reappraisal on self-reported emotions might be attributed to the fact that we asked participants to rate their emotions *after* they made the moral decision. It is possible that making a difficult decision may have led to negative emotions regardless of the emotion-regulation strategy previously employed.

However, using different emotion-regulation strategies led to differential changes in physiological arousal over time. Consistent with what previous research has found (Gross & Levenson, 1993), suppressors experienced the most sympathetic activation over time, while reappraisers and controls did not have similar sympathetic activation. Although our results show that physiological

arousal tracked one's emotional state during the video more closely than self-reported ratings of emotions, it is important to note that the skin-conductance levels at baseline for those who reappraised were already higher than for those who suppressed or for controls. It is possible that those who were instructed to reappraise their emotions predict the emotion-inducing stimuli to be more difficult to regulate, and these expected emotions may have been sufficient to increase their skin-conductance levels.

It should also be noted that sympathetic activation did not mediate the relationship between the use of emotion-regulation strategies and utilitarian decision-making. This excludes the possibility that physiological arousal is consciously entered into the way people make moral decisions and increases their preference for deontological decision making.

Study 3

In Study 3 we conduct a conservative test of how regulating unrelated emotions influence subsequent moral decision-making. This study also addresses the concern that people's lay belief that the utilitarian choice is less emotionally driven than the deontological choice may play a role when they are told to regulate emotions while making a moral decision. Using a separate-tasks paradigm (Keltner, Locke, & Aurain, 1993), we vary the emotion-regulation strategy participants employ while viewing a series of aversive images as the first task, and then present them with a decision task with moral dilemmas as the second task. Thus, participants are not explicitly told to regulate their emotions while reading moral dilemmas. We predict that this incidental regulation of aversive emotions will carry over to influence decisions even in the unrelated moral domain. We used the same measure of sympathetic activation as in Study 2b as a manipulation check and as a potential mediator.

Method

Participants and procedure

One hundred seventeen individuals ($M_{age} = 28.36$ years, $SD = 8.65$; 41% male) from a city in the Northeastern United States

participated in a half-hour study and received \$10 for their participation. The study instructions informed participants that they would complete two unrelated surveys; they would first answer some questions about their emotions and view some images, and then they would make choices in a moral decision-making task.

At the beginning of the experiment, we applied physiological sensors to participants to measure their physiological responses from electrodermal activities throughout the entire study. After we applied sensors to measure skin-conductance levels, we first asked participants to indicate their current emotions. We then showed them 15 neutral images to measure their physiological responses at baseline (T1). Next, we randomly assigned participants to one of three conditions, in which they were asked to employ different emotion-regulation strategies: suppression, reappraisal, or no strategy at all.

Across conditions, participants saw 12 aversive images after viewing the neutral images. Before viewing the images, they received instructions similar to those used in Study 2a and 2b. The images involved graphic scenes of burn, mutilation, and threats, and were designed to induce negative, high-arousal emotions (T2). Both neutral and aversive images have been used in studies of emotion regulation in the past (“picture reappraisal task”; Jackson, Malmstadt, Larson, & Davidson, 2000; Ochsner, Bunge, Gross, & Gabrieli, 2002), and were originally developed by the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1999). All images appeared for 10 s, followed by a three-second resting period. During the resting period, we presented a simple prompt to remind participants to follow our instructions. For all neutral images, participants saw a cue screen “LOOK”. Negative images were followed by either “REAPPRAISE,” or “SUPPRESS,” or “LOOK,” depending on the randomized condition in which participants belonged. All images were presented in a fixed, randomized order.

In an ostensibly separate survey, we asked participants to read four high-conflict, personal moral dilemmas (Greene, 2001; Koehnigs et al., 2007). All of the dilemmas had a similar structure, such that one person would have to personally harm another person to save several others (see Appendix C for details). We intentionally selected dilemmas that are usually contested and for which people feel divided. In previous studies, on average, about 55% of people chose the utilitarian judgment over the non-utilitarian, emotional judgment (Greene et al., 2008). All scenarios were presented in the same order. We asked participants two questions: (1) what decision they would make (utilitarian or non-utilitarian), and (2) how they felt, in order to test whether the images influenced their self-reported negative feelings, including fear and disgust. Then we asked a series of follow-up questions about their emotion-regulation task, followed by demographic questions.

Measures

Autonomic responses. As in Study 2b, we collected skin-conductance levels to measure participants' negative arousal and anxiety induced by the images they viewed.

State emotions. We used the 20-item PANAS (Watson et al., 1988) before the participants' viewing of the images and also after they had made the moral decision. To correctly measure how participants felt during the image-viewing task, we asked them to recall this particular task and to report their emotions. We then created four composite variables: pre-task positive affect ($\alpha = 0.86$), pre-task negative affect ($\alpha = 0.91$), pre-task positive affect ($\alpha = 0.87$), and post-task negative affect ($\alpha = 0.93$).

Post-task questionnaire. As a manipulation check, participants indicated the extent to which they regulated their emotions while

viewing the pictures (on a seven-point scale anchored by 1 = not at all and 7 = very much).

Results

Among 117 participants, nine participants did not want to view images, so the experimenters allowed them to skip this portion of the experiment. Two participants did not follow instructions. These participants were excluded from further analyses, as they did not receive the same stimuli as other participants. In addition, we failed to collect skin-conductance data for nine participants due to measurement issues and treated them as missing in the analysis of the effect of emotion regulation on sympathetic activation.

Table 4 reports the descriptive statistics of the main variables we measured and their zero-order correlations. Table 5 reports the mean and standard deviation of these variables by condition.

Manipulation checks. The extent to which participants regulated their emotions differed across emotion-regulation strategies, $F(2, 103) = 3.35, p = .04, \eta^2 = 0.06$. A planned contrast revealed that participants in the control condition reported significantly less emotion regulation ($M = 4.08, SD = 1.40$) than did those in the suppression condition ($M = 5.06, SD = 1.47; p = .04$), whereas those in the reappraisal condition ($M = 4.43, SD = 1.82$) did not differ significantly from either those in the control condition or those in the suppression condition, $ps > .25$. This suggests that suppressors, but not reappraisers, regulated emotions to a larger extent than controls.

As an additional manipulation check, we asked participants to report their subjective feelings before and after the negative stimuli being presented. We also captured the average skin-conductance levels during the baseline period (during the viewing of 15 neutral images) and during the arousal period (during the viewing of 12 aversive images).

First, we conducted mixed ANOVAs in which participants' self-reported positive and negative affect served as dependent variables, time (baseline vs. post-decision period) served as a within-subjects factor, and condition (emotion-regulation strategies) served as a between-subjects factor. Positive affect significantly decreased over time, $F(1, 103) = 84.08, p < .001, \eta_p^2 = 0.45$, but did not differ across conditions, $F(2, 103) = 1.02, p = .36$. We found no significant interaction between time and condition, $F(2, 103) = 2.43, p = .09$. Negative affect increased significantly over time, $F(2, 102) = 35.69, p < .001, \eta_p^2 = 0.26$. Again, the main effect of condition was not significant, $F(2, 102) = 1.84, p = .16$, nor was the condition \times time interaction, $F(2, 102) = 0.49, p = .62$.

For physiological arousal, we conducted a mixed ANOVA in which participants' physiological arousal served as the dependent variable, time (baseline vs. arousal period) served as a within-subjects factor, and condition (emotion-regulation strategies) served as a between-subjects factor. This analysis revealed a significant increase of skin-conductance levels over time, $F(1, 95) = 23.42, p < .001, \eta_p^2 = 0.20$, but no significant difference across conditions, $F(2, 95) = 0.19, p = .83$, nor an interaction between time and condition, $F(2, 95) = 0.52, p = .60$. This confirms that the aversive images successfully induced both self-reported negative affect and physiological arousal.

Emotion regulation and utilitarian decisions. We predicted that an individual's attempt to conceal emotional expressions carries over to unrelated moral decision-making and thus increases the frequency of making utilitarian decisions. We used a Poisson regression to model for count data. Incidental suppression increased the number of utilitarian choices, $B = 0.33, SE = 0.17, p = .04$, whereas incidental reappraisal did not, $B = 0.25, SE = 0.16, p = .11$. The effect of being female on the frequency of making utilitarian decisions was negative but not statistically significant ($B = -0.21$,

Table 4

Zero-order correlations among utilitarian decisions, emotion-regulation conditions, self-reported emotions, and skin-conductance levels, Study 3.

Variables	Mean (SD)	1	2	3	4	5	6	7	8	9
1. Utilitarian Decision	1.78 (1.19)									
2. Suppression Dummy	0.32 (0.47)	0.14								
3. Reappraisal Dummy	0.35 (0.48)	0.05	−0.50***							
4. Positive Affect T1	4.61 (1.08)	−0.19*	0.13	−0.10						
5. Positive Affect T2	3.88 (1.25)	−0.12	0.12	0.03	0.75***					
6. Negative Affect T1	2.03 (1.07)	−0.06	0.17 [^]	−0.07	−0.24 [^]	−0.05				
7. Negative Affect T2	2.70 (1.35)	−0.10	0.16	−0.14	0.08	−0.24*	−0.57***			
8. Skin Conductance T1	8.31 (6.08)	−0.02	−0.05	0.01	0.16	0.20 [^]	−0.04	−0.18 [^]		
9. Skin Conductance T2	9.19 (6.56)	0.01	−0.06	−0.01	0.13	0.17 [^]	−0.01	−0.13	0.96***	
10. Sex (1 = male, 2 = female)	1.58 (0.49)	−0.15	0	0.01	0.01	−0.15	−0.12	0.14	−0.24 [^]	−0.24 [^]

Note. Number of utilitarian choices was between 0 and 4.

** $p < .01$.

[^] $p < .10$.

* $p < .05$.

*** $p < .001$.

Table 5

Means and standard deviations by condition, Study 3.

Conditions	Frequency of Utilitarian Decision	Positive Affect at T1	Positive Affect at T2	Negative Affect at T1	Negative Affect at T2	SCL at T1	SCL at T2
Control	1.46 (1.09)	4.57 (1.07)	3.61 (1.20)	1.89 (0.86)	2.67 (1.32)	8.67 (5.34)	9.79 (5.61)
Suppression	2.03 (1.34)	4.82 (1.02)	4.10 (1.19)	2.29 (1.11)	3.01 (1.34)	7.88 (6.19)	8.66 (7.28)
Reappraisal	1.86 (1.08)	4.47 (1.15)	3.93 (1.34)	1.93 (1.18)	2.45 (1.36)	8.37 (6.82)	9.08 (6.89)

Note. Number of utilitarian choices was between 0 and 4.

$SE = 0.12$, $p = .09$).² This result suggests that regulating emotional reactions unrelated to moral decision-making increases the frequency with which participants make utilitarian choices.

Mediation analysis. We also ran mediation analyses to test whether physiological arousal mediates the relationship between emotion regulation and utilitarian decision-making. First, we entered the suppression indicator as an independent variable, utilitarian decision making as a dependent variable, and changes in physiological arousal (difference between arousal period and baseline) as a mediating variable, while controlling for the reappraisal indicator and gender as covariates. Similar to Study 2b, the 95% bias-corrected confidence interval for the indirect effect did not exclude zero (−0.25, 0.02). Second, we repeated the same mediation analysis for reappraisal as an independent variable, but the confidence interval did not exclude zero (−0.29, 0.03). As before, changes in physiological arousal did not significantly predict utilitarian decision-making, $B = 0.07$, $SE = 0.07$, $p = .28$.

Discussion

Both self-reported negative affect and physiological arousal increased as a result of viewing the aversive images, but we could not confirm that the emotion-regulation strategies influenced emotions differently. As in Study 2b, it is possible that making decisions in the moral dilemmas may have wiped out the differential effect, if it existed, of emotion-regulation strategies. Unlike Study 2b, however, the use of emotion-regulation strategies did not differentiate the effect of aversive images on physiological arousal. There are a few possible explanations. One is that the images may have not been aversive and emotionally engaging enough to influence the physiological component of one's response to disgust, as compared to the video clip from *Vertical Limit*. Also, given that nine participants opted out of watching all images, it

is also possible that more physiologically reactive participants chose not to participate, leaving less reactive participants in the study.

Replicating the findings of Study 2, the results of Study 3 indicate that even when the target of one's suppression strategy consists of unrelated negative stimuli and not the emotions that arise from the moral dilemma one is facing, the mere effort to suppress emotions carries over to the subsequent moral domain and increases the likelihood of utilitarian choices. Similar to Study 2b, however, the effect of reappraisal on utilitarian decision making was not as robust as that of suppression.

Study 4

In Study 2 and 3, we found that regulation of emotional reactions in moral dilemmas leads to more utilitarian decision-making. Because we asked participants to endorse either a utilitarian decision or a deontological decision, their preference for the utilitarian decision can be interpreted as either an increase in utilitarian inclinations or a decrease in deontological inclinations. To reduce this uncertainty in interpreting the effect of emotion-regulation strategies on moral decision making, in Study 4, we used a process-dissociation approach (Jacoby, 1991) to independently quantify and delineate the contributions of utilitarian and deontological inclinations to moral judgments (Conway & Gawronski, 2013). We randomly assigned participants to one of three conditions, in which we asked them first to employ different emotion-regulation strategies, similar to Studies 2 and 3 (Shiota & Levenson, 2009): suppression, reappraisal, or no strategy at all (control), and then to judge the appropriateness of the utilitarian actions described in the moral dilemmas.

Method

Participants and design

One hundred twenty-eight individuals recruited through Amazon Mechanical Turk ($M_{age} = 34.18$ years, $SD = 11.97$; 44% male)

² We repeated the same analysis using the OLS regression, and the direction and significance of the relationships did not change ($B = 0.58$, $p = .04$ for suppression, $B = 0.42$, $p = .12$ for reappraisal, $B = -0.38$, $p = .09$).

participated in an online study for \$0.50. After reading the emotion-regulation instructions, participants read six pairs of moral dilemma scenarios that included both congruent and incongruent dilemmas (see Appendix D for all scenarios; Conway & Gawronski, 2013), and judged whether the agent's action would be morally appropriate or not. Incongruent dilemmas pit deontological inclinations against utilitarian inclinations; that is, benefits associated with the utilitarian action outweigh the harms, but it violates deontological moral principles. For example, in the medical director scenario we used in Study 1, it is acceptable to save 200 patients' lives in the future over one patient's life according to the utilitarian principle, but it is not acceptable to let Ravi die according to the deontological principle. However, pairs of congruent dilemmas describe almost identical actions, except that the benefits from the utilitarian action do not outweigh the harms, thus aligning utilitarian inclinations with deontological ones. For example, if the medical director is facing a choice between spending funds to either save Ravi's life or to improve the hospital's landscaping, then the decision not to save Ravi's life violates both deontological and utilitarian inclinations. We followed the same method (Conway & Gawronski, 2013) to calculate the process-dissociation scores (PD scores) of utilitarian and deontological inclinations; we calculated the probability of rejecting harm in congruent and incongruent dilemmas, and then derived the utilitarian (U) and deontological (D) parameters.³

Results

Among incongruent dilemmas across three experimental conditions, harmful action was judged as acceptable 66% of the time ($SD = 30\%$). It was judged as acceptable 27% of the time ($SD = 24\%$) for the congruent dilemmas. Incongruent dilemmas ($M = 4.41$, $SD = 1.44$) were deemed more acceptable than congruent dilemmas ($M = 2.44$, $SD = 1.59$), $t(121) = 12.40$, $p < .001$, $d = 1.13$, consistent with previous findings (Conway & Gawronski, 2013).

Moral decision-making analysis. We first calculated the proportion of appropriate responses on incongruent moral dilemmas. Controlling for the gender effect (being female was associated with finding the utilitarian action more inappropriate; $B = 0.55$, $SE = 0.26$, $p = .035$), the suppression indicator predicted the greater likelihood of judging the utilitarian action to be more acceptable as compared to the controls, $B = 0.70$, $SE = 0.32$, $p = .03$. Similarly, the reappraisal indicator was associated with more utilitarian judgment than controls, $B = 0.76$, $SE = 0.31$, $p = .015$ (see Fig. 2).

Process-dissociation analysis. We first calculated the probability of rejecting harm in both the congruent and incongruent dilemmas, and then calculated the process-dissociation (PD) parameters based on the procedures in Conway and Gawronski (2013). PD utilitarianism and deontology thus indicate the strength of inclinations for each principle within an individual, and were standardized. We ran a mixed-model ANOVA with PD parameters as a within-subject factor and emotion-regulation strategy as a between-subjects factor (see Fig. 3). A marginally significant interaction between PD parameters and emotion-regulation strategy was found, $F(2, 116) = 2.68$, $p = .07$, $\eta_p^2 = 0.04$. Post-hoc comparisons suggested that deontological inclinations were significantly higher in the control condition ($M = 0.45$, $SD = 1.08$) than in the reappraisal ($M = -0.13$, $SD = 0.96$) and suppression ($M = -0.16$, $SD = 0.83$) conditions, $ps < .02$. There was no difference between the suppression and reappraisal conditions, $p = .99$. On the other

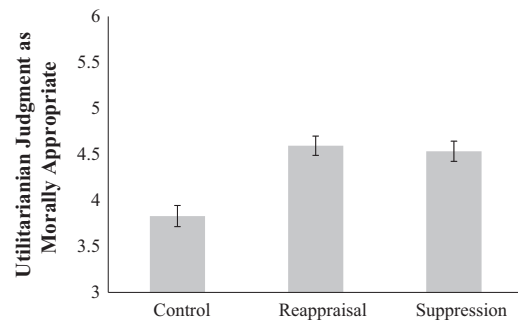


Fig. 2. Results for the traditional utilitarian judgment as a function of the emotion-regulation strategies. Error bars represent standard errors (Study 4).

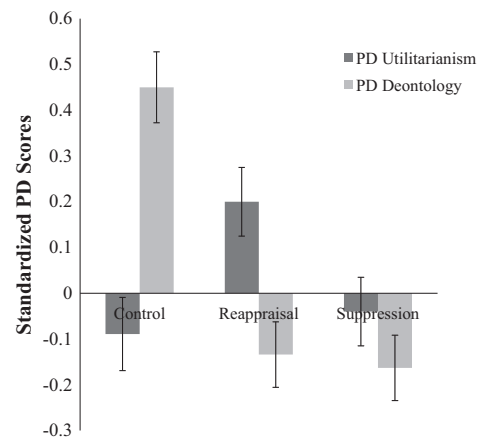


Fig. 3. Results for the process dissociation deontology and utilitarian scores as a function of the emotion-regulation strategies. Error bars represent standard errors (Study 4).

hand, utilitarian inclinations did not differ significantly across different conditions, $ps > .49$. Lastly, gender did not have a significant effect in this model, $p = .57$.

Discussion

Our findings suggest that both emotion-regulation strategies selectively decreased deontological inclinations while leaving utilitarian inclinations relatively unaffected. This result is consistent with Conway and Gawronski's (2013) finding that increased empathy toward the victims selectively increased deontological inclinations. While our data from Study 2b and 3 suggest that one's emotional reactions to the moral dilemma, in terms of physiological arousal, did not mediate the relationship between employing emotion-regulation strategies and utilitarian decision making, this study demonstrates that these strategies still reduce one's deontological inclinations related to causing harm.

General discussion

In five studies, we examined the relationship between regulating emotions and utilitarian decisions in moral dilemmas. We also investigated the psychological mechanism explaining why the use of emotion-regulation strategies leads to greater utilitarian preferences and found that decreased deontological inclinations explained this relationship. Across our studies, we found support for both our hypotheses using multiple methods to manipulate emotion-regulation strategies and test its effects on moral decision making. Not only did integral emotion regulation on emotions

³ U and D were calculated as follows. $U = p(\text{unacceptable} | \text{congruent}) - p(\text{unacceptable} | \text{incongruent})$, $D = p(\text{unacceptable} | \text{incongruent}) / (1 - U)$. Please see the technical description of this method in Conway and Gawronski (2013) for more detailed information.

rooted in moral dilemmas have a carryover effect on one's utilitarian preference (Study 2 and Study 4), but incidental emotion regulation did as well (Study 3). To ensure the generalizability of our findings, we used different types of moral dilemmas across our studies. In addition to studying responses to written scenarios resembling the well-known ethical dilemma known as the trolley problem, we used a video in Study 2b that portrays a similar moral dilemma visually, a format that may have produced stronger emotional reactions.

Thus, we argue that because emotion plays a critical role in determining whether or not people make a moral choice, regulation of such emotion is predictive of choices when facing moral dilemmas.

Theoretical contributions

Our paper contributes to the literature in several ways. First, by clearly delineating the contributions of utilitarian vs. deontological inclinations to moral decision-making, our research provides empirical evidence that emotion-regulation strategies selectively reduce the decision maker's deontological inclinations, thus allowing them to choose a more utilitarian option. This suggests that our deontological inclinations are not only rooted in our judgments of right vs. wrong, but also are grounded in our emotional reactions related to conducting harmful actions. The current study thus supports the previous work that has demonstrated the role of "gut feelings" in thwarting utilitarian decisions (Greene, 2001), and shows that such aversive responses can be regulated by employing emotion-regulation strategies.

Second, our work extends previous research (Feinberg et al., 2012; Margolis & Molinsky, 2008; Molinsky & Margolis, 2005) by focusing on moral dilemmas that have conflicting moral principles. We theorized that the nature of our moral dilemmas would be more emotionally charged and conflicting due to the inevitability of harm, and therefore induce more strong aversive emotional reactions than those used in the previous study (Feinberg et al., 2012). Our work is the first to empirically show how individuals make moral decisions when facing strong aversive emotions from endorsing harmful actions; not only do individuals who engage in the necessary evil of doing harm detach themselves emotionally from the event (Margolis & Molinsky, 2008; Molinsky & Margolis, 2005), but those who regulate their emotions also tend to prefer harmful actions that maximizes overall well-being.

Third, while Feinberg et al. (2012) demonstrate the relevance and efficacy of the reappraisal strategy in reducing moral intuitions, our research brings back the relevance of suppression in moral decision making. We showed in Study 1 that participants who made the utilitarian decision predicted experiencing more negative emotions than did those who made the deontological decision, and they also were more likely to suppress their facial expressions. Supporting the Facial Feedback Hypothesis (Tomkins, 1963), reducing emotional expressions during the highly conflicting moral dilemma led to a preference for utilitarian choice. This work also builds on the emotion-regulation choice literature (Sheppes, Scheibe, Suri, & Gross, 2011; Sheppes et al., 2014), as Study 1 allowed the decision makers to report on their willingness to engage in reappraisal and suppression strategies instead of imposing only one strategy to be used.

Limitations and venues for future research

We see several directions for future research that build on the limitations of our current work. First, although the effect of suppression on moral decision making was consistent across all studies, the effect of reappraisal was less evident, a result that seems inconsistent with prior research findings (Feinberg et al., 2012).

We conjecture that the lack of a statistically significant effect of reappraisal might be explained by the intensity of emotions and the extent to which the self is involved. Previous research suggested that high-intensity emotional situations render the reappraisal strategy ineffective and costly (Sheppes, Catran, & Meiran, 2009; Sheppes & Meiran, 2007, 2008). Our moral dilemmas involve inevitable harms, which might have made it difficult to reappraise the situation to feel less negative, while the idea of suppressing such emotions might have been easier to implement. Also, reappraisal was not as effective as suppression (although the result was not statistically different) when individuals were asked to make a hypothetical decision for themselves, as in Studies 2b and 3, instead of judging an agent's actions, as in Studies 2a and 4. These results provide an alternative explanation that reappraisal is more effective when one is judging another agent's *fait accompli*, but not as effective when one is making a difficult decision for oneself. Building on previous work suggesting the dissociation between moral judgment and choice of action (Tassy, Oullier, Mancini, & Wicker, 2013), future research could investigate whether individuals choose different emotion-regulation strategies when they are told to make moral judgments vs. when they are told to make a choice of action for themselves.

Second, we examined a specific context in which the decision maker needs to closely attend to the dilemma at hand and process aversive emotions attached to doing harm. Thus, our theory was focused on reappraisal and suppression as key emotion-regulation strategies. Future studies could investigate the role of different types of emotion-regulation strategies. For example, previous research identified disengaging through distraction to be more effective than reappraisal (Sheppes et al., 2011, 2014).

Third, our findings support the view that the ways in which people make moral decisions are not driven simply by one particular emotion (i.e., fear of doing harm). In the medical director scenario we used in Study 1, for example, the utilitarian decision maker may experience sadness, sympathy, and compassion toward the patient who is being scarified as a result of a utilitarian decision. Similarly, the deontological decision maker may experience the same negative feelings for the 200 patients who may be sacrificed to save one patient, but to a lesser degree due to temporal distance. In addition, although the current research is focused on a particular case of moral decision making that involves a conflict between utilitarian and emotional options, both of which result in some form of losses, not all moral decisions are made in the loss domain. That is, we have not studied different types of moral dilemmas in which doing the right thing involves regulating positive emotions associated with rewards (e.g., engaging in unethical behavior for financial gain). Thus, future work could identify the role of different emotions involved in a variety of dilemmas (right vs. right and right vs. wrong) and examine how regulating more specific emotion has similar consequences.

Fourth, our study found that physiological arousal did not explain the relationship between emotion-regulation strategies and utilitarian decision making, although skin-conductance levels accurately reflected the increase of aversive arousal associated with emotional stimuli (i.e., the video depicting a moral dilemma as well as graphic images). This suggests that the regulation of deontological inclinations associated with harmful actions may still be at the conscious level. Thus, future studies could use methods that could capture moment-to-moment changes in emotion and emotion regulation, such as online emotion ratings (Cameron & Payne, 2011; Larsen & Fredrickson, 1999).

Finally, we note that suppression is known to have negative cognitive, emotional, physiological, and interpersonal consequences (Butler et al., 2003; Gross, 2002; Gross & John, 2003; Richards & Gross, 1999; Srivastava, Tamir, McGonigal, John, & Gross, 2009). This raises the possibility that making utilitarian choices when

people suppress their emotions could be harmful to their psychological and physiological health in the long run. However, research has demonstrated that when dealing with extremely adverse situations, such as conjugal bereavement, suppressing the facial expressions of negative affect (e.g., anger) has been found to be beneficial for longer-term recovery of normal functioning (Bonanno & Keltner, 1997). Further research found that individuals' ability to both enhance and suppress emotional expression flexibly based on situational demands predicted successful long-term adaptation and adjustment (e.g., less distress) in the aftermath of the September 11th terrorist attacks (Bonanno, Papa, Lalande, Westphal, & Coifman, 2004). This line of research thus suggests that suppression can aid one's coping with aversive events in spite of its lingering emotional costs. It is not our goal to make normative judgments about whether one should always make reason-based utilitarian decisions and avoid intuitive, emotion-based decisions in the moral domain. Rather, our results indicate the plasticity of how we decide when faced with moral dilemmas, as suppression of emotions predicted utilitarian decision-making.

Conclusion

Across five studies, we demonstrate that regulating emotions has moral consequences in situations in which one needs to intentionally cause harm to another person to achieve a greater good. The moral dilemmas we employed in our studies mirror a common struggle people experience in a wide range of contexts between their deliberative and intuitive decision-making processes. This work shows that emotion regulation offers some benefits in our moral lives by helping us resolve the conflicts between our intuitive impulses and utilitarian preferences.

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Appendix A. Moral dilemma scenario (Study 1)

You are the Chief Medical Director at a charity hospital in Deeg, a poor slum community in the Rajasthan region of India. You are confronted with an important decision regarding how to allocate hospital funds. One of the patients at the hospital is a five year-old little boy named Ravi, who needs a rare and extremely expensive (\$2 million) transplant operation to save his life. The only available funds are the \$2 million that has already been set aside to purchase better equipment over the next five years for the transplant department. In the long run, these purchases will save the lives of 200 future patients from the Rajasthan region.

Presented with the choice, you have to decide whether to use \$2 million to save Ravi's life, or to use it for other hospital needs. The transplant department is knocking your door right now and you need to notify your decision whether or not to approve the transplant request. What is your decision?

- (1) Approve the transplant request.
- (2) Deny the transplant request.

Appendix B. High-conflict, personal moral dilemmas (Study 2a)

1. Euthanasia

You are the leader of a small group of soldiers. You are on your way back from a completed mission deep in enemy territory when one of your men has stepped in a trap that has been set by the enemy and he is badly injured. The trap is connected to a radio device that by now has alerted the enemy to your presence. They will soon be on their way. If the enemy finds your injured man they will torture him and kill him. He begs you not to leave him behind, but if you try to take him with you your entire group will be captured. The only way to prevent this injured soldier from being tortured is to shoot him yourself. Is it appropriate for you to shoot this soldier in order to prevent him from being tortured by the enemy?

2. Vaccine Test

A viral epidemic has spread across the globe killing millions of people. You have developed two substances in your home laboratory. You know that one of them is a vaccine, but you don't know which one. You also know that the other one is deadly. Once you figure out which substance is the vaccine you can use it to save millions of lives. You have with you two people who are under your care, and the only way to identify the vaccine is to inject each of these people with one of the two substances. One person will live, the other will die, and you will be able to start saving lives with your vaccine. Is it appropriate for you to kill one of these people with a deadly injection in order to identify a vaccine that will save millions of lives?

3. Vitamins

You are the leader of a mountaineering expedition that is stranded in the wilderness. Your expedition includes a family of six that has a genetically caused vitamin deficiency. A few people's kidneys contain large amounts of this vitamin. There is one such person in your party. The only way to save the lives of the six members of this family is to remove one of this man's kidneys so that the necessary vitamins may be extracted from it. The man will not die if you do this, but his health will be compromised. The man is opposed to this plan, but you have the power to do as you see fit. Is it appropriate for you to forcibly remove this man's kidney in order to save the lives of the six vitamin-deficient people?

4. Sacrifice

You, your husband, and your four children are crossing a mountain range on your return journey to your homeland. You have inadvertently set up camp on a local clan's sacred burial ground. The leader of the clan says that according to the local laws, you and your family must be put to death. However, he will let yourself, your husband, and your three other children live if you yourself will kill your oldest son. Is it appropriate for you to kill your oldest son in order to save your husband and your other three children?

5. Sophie's Choice

You, your husband, and your four children are crossing a mountain range on your return journey to your homeland. You have inadvertently set up camp on a local clan's sacred burial ground. The leader of the clan says that according to the local laws, you and your family must be put to death. However, he will let yourself, your husband, and your three other children live if you yourself will kill your oldest son. Is it appropriate for you to kill your

oldest son in order to save your husband and your other three children?

Appendix C. High-conflict, personal moral dilemmas (Study 3)

1. Crying Baby

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.

Which option would you choose?

(1) I do not smother my child to death.

(2) I smother my child to death.

2. Sophie's Choice [same as in Study 2]

Which option would you choose?

(1) I refuse to bring one of my children.

(2) I bring one of my children to his laboratory.

3. Euthanasia [same as in Study 2]

Which option would you choose?

(1) I do not shoot him myself.

(2) I shoot him myself.

4. Vitamins [same as in Study 2]

Which option would you choose?

(1) I do not remove this man's kidney.

(2) I remove the man's kidney.

Appendix D. Congruent vs. incongruent moral dilemmas (Study 4; Conway & Gawronski, 2013)

Car Accident	Incongruent	You are driving through a busy city street when all of a sudden a young mother carrying a child trips and falls into the path of your vehicle. You are going too fast to break in time; your only hope is to swerve out of the way. Unfortunately, the only place you can swerve is currently occupied by a little old lady. If you swerve to avoid the young mother and baby, you will seriously injure or kill the old lady	Is it appropriate to swerve and hit the old lady in order to avoid the young mother and child?
Car Accident	Congruent	You are driving through a busy city street when all of a sudden a young mother carrying a child trips and falls into the path of your vehicle. You are going too fast to break in time; your only hope is to swerve out of the way. Unfortunately, the only place you can swerve is currently occupied by a group of children on their way to elementary school. If you swerve to avoid the young mother and baby, you will seriously injure or kill several of them	Is it appropriate to swerve and hit the schoolchildren in order to avoid the young mother and child?
Crying Baby	Incongruent	It is war time. 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. A baby with no parents begins to cry loudly. You cover her mouth to block the sound. If you remove your hand from the baby's mouth her crying will summon the attention of the soldiers who will kill you and the others hiding out in the cellar. To save yourself and the others you must smother the child to death	Is it appropriate for you to smother the child in order to save yourself and the other townspeople from being killed?
Crying Baby	Congruent	It is war time. Enemy soldiers have taken over your village. They have orders to capture all remaining civilians to make them work quarrying stone in a mine. 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. A baby with no parents begins to cry loudly. You cover her mouth to block the sound. If you remove your hand from her mouth the crying will summon the attention of the soldiers who will capture you and the others hiding out in the cellar. To save yourself and the others from laboring in the mine you must smother the child to death	Is it appropriate for you to smother the child in order to save yourself and the other townspeople from being captured?
Abortion	Incongruent	You are a surgeon. A young woman you know becomes pregnant, but her body reacts in an unusual fashion. She	Is it appropriate for you to perform an abortion in order to save the mother's

(continued on next page)

		develops a severe case of preeclampsia, a dangerous syndrome that leads to rapid increases in blood pressure. The only treatment is to deliver the baby. Unless the baby is delivered soon, the mother will die. However, the baby is too young to survive on its own. If it is delivered, it will die. So, although it is very difficult for her, the mother asks you to abort the baby	life?
Abortion	Congruent	You are a surgeon. A young woman you know becomes pregnant, but she is not yet ready for children. She has not finished high school, has no income, and was abandoned by the father. If she has the baby now, she will be stuck as a single mother on welfare for the rest of her life. This will make things very hard on her and the baby. She thinks that it would be smarter to wait and have children later. So, although it is very difficult for her, she asks you to abort the baby	Is it appropriate for you to perform an abortion in order to let the mother live a better life?
Torture	Incongruent	You are a police officer, and have recently caught a criminal you have been hunting for some time. He is allegedly responsible for rigging a series of explosive devices: some that have already gone off and some that have yet to detonate. He places explosives outside city cafes and sets them to go off at a time when people are drinking coffee on the patios. In this manner, he has injured many people and might injure many more. Now that the criminal is in custody, you want to know where the unexploded bombs are so you can defuse them. He refuses to talk, so you decide to use “aggressive interrogation techniques” like holding his head under water and beating him	Is it appropriate for you to use “aggressive interrogation techniques” in order to find and defuse the unexploded bombs?
Torture	Congruent	You are a police officer, and have recently caught a criminal you have been hunting for some time. He is allegedly responsible for rigging a series of explosive devices: some that have already gone off and some that have yet to detonate. He places explosives outside city cafes and sets them to go off at a time when no one is around. His explosives are inside paint cans so that they spray nearby objects with paint. In this manner, he has sprayed many cafes with paint and might spray many more. Now that the criminal is in custody, you want to know where the unexploded bombs are so you can defuse them. He refuses to talk, so you decide to use “aggressive interrogation techniques” like holding his head under water and beating him	Is it appropriate for you to use “aggressive interrogation techniques” in order to find and defuse the unexploded bombs?
Vaccine Policy	Incongruent	You are a doctor in a health clinic overrun by patients with a serious disease. You just received a shipment of drugs that can cure the disease but the drugs have their own severe side effects. If you administer the drugs to your patients, a small number will die from the side effects but most will live. If you do not, most will die from the disease	Is it appropriate for you to administer the drug to your patients?
Vaccine Policy	Congruent	You are a doctor in a health clinic overrun by patients with the latest flu virus. You just received a shipment of drugs that can cure the flu but the drugs have their own severe side effects. If you administer the drugs to your patients, a small number will die from the side effects but most will live. If you do not, most will continue to suffer from the effects of the flu virus for some time	Is it appropriate for you to administer the drug to your patients?
Animal Research	Incongruent	You have been hired by a pharmaceutical company to conduct research on their products. Since products must be fit for human use, they are first tried out on animals. Your job is to find out the effects various chemicals have on rats, pigeons, rabbits, and monkeys. Most chemicals have only minor effects on the animals, but some cause them discomfort or even permanent damage. The	Is it appropriate to test these chemicals on animals?

chemicals you are researching are slated to form part of a new AIDS drug cocktail that will give new hope to millions of AIDS victims around the world. You anticipate saving many lives with the chemicals

You have been hired by a pharmaceutical company to conduct research on their products. Since products must be fit for human use, they are first tried out on animals. Your job is to find out the effects various chemicals have on rats, pigeons, rabbits, and monkeys. Most chemicals have only minor effects on the animals, but some cause them discomfort or even permanent damage. The chemicals you are researching are slated to form part of a new acne facial cleanser that will give new hope to people with pimples and greasy skin. You anticipate making many people feel better about their appearance with the chemicals

Animal Research Congruent

Is it appropriate to test these chemicals on animals?

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