The (in)effectiveness of moral appeals

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The effect of moral appeals on meat consumption and the role of moral emotions and moral commitment.

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Abstract

The goal of the study was to examine the effectiveness of moral appeals about meat consumption. This study explores the effect of moral appeals based on purity and harm foundations on attitude and intention to eat less meat, the role of emotions in this process and moral foundations' relationship with moral commitments. Findings from an experiment with two different moral appeal messages from 148 participants showed, that although moral appeals did not directly affect attitudes and intentions to eat less meat, the effect was positively mediated by moral emotion disgust. This provides useful practical implications that could be used by social activists as it seems that moral appeals could be an effective way to lower meat consumption in society.

(In)Effectiveness of moral appeals

Rising meat consumption is an issue that has significant negative outcomes on individual (for example health problems) and societal (for example negative impact on the environment) levels (Godfray et al., 2018; Popkin, 2009). People stop eating meat or at least lower their consumption for a lot of reasons, but the two most widely mentioned are health and moral related (Fessler et al., 2003; Fox, &Ward, 2008; Hoffman et al., 2013). Furthermore, people who become vegetarians or vegans due to moral reasons tend to have a more restricted diet and avoid meat consumption for a longer time in comparison with those, who do that because of health reasons (Hoffman et al., 2013). Thus, appealing to morality could be an effective strategy to lower people's meat consumption or to at least change their attitude and intentions more positively towards eating less meat.

Although attitudes can be changed by various appeals, moral communication is highly neglected in empirical research (Wheeler & Laham, 2016). Furthermore, the evidence about the effectiveness of moral appeals is not one-sided: some studies found moral appeals to be effective (Chen et al., 2009; Ferrari & Leippe, 1992), while for example, a recent study showed no effect of moral appeals on attitude change (Gelfand et al., 2022). Thus, it is not fully clear if moral appeals are effective.

One promising way to use moral appeals to persuade people is to focus on moral intuition. According to Wheeler & Laham (2016), Moral Foundation Theory allows for pragmatically organizing moral content and this theory was used in various research as a framework, thus it creates solid ground to use this theoretical approach to create moral appeals.

In addition, it was done in previous studies and showed positive effects in such fields as attitude towards same-sex marriage, and environmental issues (Feinberg & Willer, 2012; Feinberg & Willer, 2015).

There has been a long-lasting debate on how people react to moral information and process it: some say it is a rational process (Kohlberg, 1981), others that it is mostly associated with affect (Haidt, 2001), and some integrate these views and claim there is dual information processing (Green, 2007). It is yet not fully clear what is the role of emotions while seeing a moral appeal, but some authors presume that it might be the underlying process that can at least partly explain how people react to moral appeals and how it motivates them to act morally correct (Haidt, 2003; Huebner et al., 2009). But others state that emotional reactions might play a bigger role for those who evaluate the moral situation on inherent ethical merit (deontologists) than for those who reach moral conclusions from a cost-gain analysis point of view (consequentialists) (Greene, 2007).

Furthermore, there is evidence, that moral commitments, that is committing to an ethical system (for example, deontological or consequentialist), are related to different moral foundations – but the research to our knowledge is limited to only one study (Wheeler & Laham, 2016). So, the connection between moral commitments and moral foundations is still undefined and requires further studies.

All in all, the present study investigates the effectiveness of moral appeals, the mediating role of moral emotions and moral foundations' relationship to different moral commitment groups.

Moral Foundation Theory and Moral Appeals

Moral Foundation Theory (MFT; Haidt & Joseph, 2004) states that moral foundations are psychological systems that give rise to moral intuitions – inner judgment of events or people - that results in a flash feeling of approval or disapproval. All these foundations have their evolutionary history, identified emotions, intuitions, and related social functions across cultures (Haidt & Graham, 2007). The theory is built on four main assumptions: nativism, cultural learning, intuitionism, and pluralism (Graham et al., 2013). The nativism assumption suggests that we have a universal built-in first draft of the moral mind, which then changes and grows depending on the culture which reflects the cultural learning assumption (Graham et al., 2013). The intuitionism assumption will be presented in length later, but in short, it presumes that moral reactions are automatic and effortless (Graham et al., 2013). Lastly, the pluralism assumption presumes, that there exists more than one moral foundation as there are few recurrent social challenges which were more or less stable throughout evolution (Graham et al., 2013).

Throughout extensive research five main moral foundations were found, that meet all the assumptions mentioned before (Haidt & Graham, 2007). One of them is harm/care, which is related to disliking seeing suffering in others, compassion for them, and anger towards the perpetrator (Haidt & Graham, 2007). The second is fairness/reciprocity – a foundation that is based on reciprocal altruism, individual rights, and equality (Haidt & Graham, 2007). The third foundation is ingroup/loyalty, which is attributed to cooperation and trust between in-group members and being wary of out-group members (Haidt & Graham, 2007). The fourth foundation is authority respect, and it is related to the hierarchical structure of our social interactions, that being leadership and followership (Haidt & Graham, 2007). Finally, the purity/sanctity

foundation is mostly about the feeling of disgust, related not only to contamination but also to bodily, and religious activities (Haidt & Graham, 2007).

The moral foundation theory has been used in other research to create effective moral appeals. In most studies, moral appeals are used in a form of a message, which content relates to morality, for example to moral foundations. One of the studies has found that message appeal based on a purity foundation had a positive effect on pro-environmental attitudes for conservatives (Feinberg & Willer, 2012). Another study found that appeal based on a loyalty foundation and used in the form of a message positively changed the attitude towards same-sex marriage (Feinberg & Willer, 2015). Thus, moral foundations have been used to create effective appeals toward various topics, but not all foundations are effective in all situations.

Some topics are related to one or few moral foundations more than to others. It was found, that when people talk about ethical and unethical food, they use vocabulary that is mainly related to harm and purity foundations (Makiniemi et al., 2012). Furthermore, putting great personal value to harm foundation predicts more positive attitudes toward topics such as animal well-being (Koleva et al., 2012). As meat consumption is highly associated with (un)ethicality and animal well-being it seems that purity and harm foundations create a solid ground for moral appeals concerning lower meat consumption. One study tested the effectiveness of cruelty and purity (only the latter was presented as a moral appeal) appeals on intentions to change people's diet toward more vegetarian (Linkersdörfer, & Peacock, 2020). Although the study found, that cruelty appeal (which resembles harm foundation appeal) can lead to more positive attitudes toward reducing meat consumption, the study contains a lot of methodological and statistical flaws (for example, there was no control group, and the conditions differed in many aspects),

thus the conclusions should be drawn carefully, and replication of the results are needed. All in all, it is hypothesized that:

H1a: A message appeal based on a harm foundation will positively change the attitude toward eating less meat and the intention to eat less meat compared to the control message.
H1b: A message appeal based on a purity foundation will positively change the attitude toward eating less meat and the intention to eat less meat compared to the control message.

The Role of Emotions

One of the moral foundation theory assumptions, intuitionism, states that moral information is processed automatically, without too much effort, and mostly is based on affective, emotional reactions to situations or people (Graham et al., 2013). This assumption disregards the long-lasting view that all our moral reasoning is based on deliberative thinking, which would represent a widely known II system of information processing (Graham et al., 2013).

The intuitionism assumption (and the whole Moral Foundation Theory) is based on Social Intuitionist Model (SIM; Haidt, 2001). In short, the model states that moral judgments and moral information processing are quick, intuitive, and only then followed by slow, post facto moral reasoning (Haidt, 2001). The model is based on theoretical reasoning and vast empirical evidence, showing that a big role in quick moral information processing is related to emotional reactions. For example, Haidt and Hersh (2001) have found that affective reactions are good predictors of moral judgment, whilst the evaluation of harmfulness, which is more rational

reasoning, was not. Thus, following both Moral Foundation Theory and SIM, emotions play an important role in how moral information is processed and have an impact on moral decisions.

Every moral foundation that was presented beforehand is related to emotion (or several emotions) which is a result of the intuitive evaluations of the situations (Graham et al., 2013). Purity foundation is mostly related to the emotion of disgust, and the harm foundation to the emotions of anger and compassion (Graham et al., 2013). This has been supported by studies looking at self-reported emotional reactions (Horberg et al., 2009) and by micro facial expressions (Cannon et al., 2011). Research suggests, that when people read about violations of the harm foundation, they experience higher levels of anger (Kwan, 2015). A similar study has found, that violations of purity foundations have led to high feelings of disgust (Landmann & Hess, 2018). Thus, theoretically, and empirically the relation between specific moral foundations and emotions has been shown.

Moral emotions in general can be seen as a response to a moral violation that also nonetheless leads to motivation to act morally correct (Haidt, 2003; Huebner et al., 2009). Emotions are linked with specific action tendencies, for example, disgust leads to withdrawal from possible sources of contamination (Nabi, 2002) and anger leads to the removal of frustration sources (Haidt, 2003). Thus, seeing a violation of a moral foundation can cause an emotional reaction which then mediates the relationship between attitudes or intentions. As even the authors of SIM and MFT state that it cannot be concluded, that only emotions are responsible for this process (Haidt, 2001; Haidt & Joseph, 2004), it can be only hypothesized that emotions will only partly mediate the relationship, thus:

H2a: Moral disgust and anger will partly mediate the relationship between moral appeals and attitude towards eating less meat.

H2b: Moral disgust and anger will partly mediate the relationship between moral appeals and intentions to eat less meat.

Moral commitments

Greene (2007) suggests that moral information processing, not only depends on affective reactions, but the processing might also differ and depend on moral commitments. Moral commitment is allegiance to some moral or ethical obligations and is related to moral judgments and moral information processing (Smillie et al., 2020). One way to classify moral commitments is a commitment to either consequentialists or deontological moral rules. Consequentialism is a type of moral judgment that is focused on outcomes and tries to maximize groups' well-being while deontologist is a type of moral judgment that ignores outcomes but judges each moral act on its inherent ethical merit (Bostyn & Roets, 2016). In other words, consequentialists base their decision and judgment on cost-benefit analysis, while deontologists more often base it on fundamental moral rules or gut feeling. To present and highlight differences between moral commitments, moral dilemmas are used, for example, the footbridge dilemma. The footbridge dilemma is a hypothetical dilemma, which describes the situation as follows:

You are on a footbridge and there is a train below heading toward five people. You can push another person from the footbridge, to stop the train and save five lives, but that would result in killing the person you pushed.

A consequentialist would say, that pushing a person is the morally best action, as it would save five others. For a deontologist, murdering someone (pushing down the bridge in this case) is just inherently morally wrong and the best action would be not to push the person. However, it has been shown that moral commitments are not always stable in various scenarios and depends on the situation and the person (Lombrozo, 2008). Although it is not a stable individual difference, some moral commitment tendencies can be seen in how people evaluate and process moral information (Tanner et al., 2008), which allows seeing this construct as a continuum rather than two opposing groups.

Greene (2007) stated that consequentialism and deontologist are just two psychological patterns of moral thinking which represent a dual-process model and are not so much a philosophical invention (Greene, 2007). Following this point of view, the deontological moral judgment and reaction are based on their emotions while consequentialists use advanced cognitive processes (Greene, 2007). This assumption has been empirically supported by a study showing that additional cognitive load on people making consequentialist decisions take even more time, while it did not have any impact on those who made deontological decisions (Greene et al., 2008).

At first sight, it may seem that this proposal violates the assumption of intuitionism in Moral Foundation Theory (Graham et al., 2013), but that is not necessarily the case. In the Social Intuition Model, it was presumed that there are cases when reasoning can affect judgment (Haidt, 2001). One of the cases is when a decision is made by pure logic and it overrides moral intuition, another case is when a person reaches a different conclusion when privately reflecting, or the social situation demands to examine all information and thus activates the new moral intuition (Haidt, 2001; Pizarro, & Bloom, 2003). The first exception could resemble what was presented

by Greene (2007) and the way consequentialists process moral information. It might be the case, that although consequentialists' moral intuition rises, it is overridden by their cost-benefit analysis. This statement can be at least partly argued with evidence that those who make consequentialist moral decisions tend to have higher activity in brain parts responsible for cognitive responses compared to those who make deontological decisions (Greene, & Haidt, 2002; Greene et al., 2004). Furthermore, Haidt (2001) suggests that such moral reasoning is more likely to occur in those, who have a higher need for cognition and studies suggest, that there are associations between curiosity, cognitive engagement, and consequentialism (Smillie et al., 2020).

On the other hand, the deontological way of thinking about moral violations resembles what Moral Foundation Theory states: people tend to evaluate situations on their own merit, which usually happens as something that could be described as a gut feeling (Bostyn & Roets, 2016). As MFT states, the feeling could be based mostly on emotions (Graham et al., 2013). Thus, there might be different psychological processes while analyzing moral appeals which are based on moral foundations – as for those, who follow deontological thinking, emotions could be more salient as a reaction to moral appeal than for those who are consequentialists.

H3: Moral commitment will moderate the mediation by emotions between moral appeals and intentions and attitudes towards eating less meat.

Moral Foundations and Moral Commitment

Moral foundation theory suggests that every person uses moral foundations – but for different people, different moral foundations could be more important, thus information based on

one appeal might work for some group of people but not the other. For example, research shows that those who have liberal political views tend to care about information that is based on harm and fairness foundations, while conservatives use all five foundations (Haidt, & Graham, 2007). Thus, there are differences in how moral appeals are perceived by different groups and it is possible that these differences appear not only between political parties, which are mostly researched but could also exist between moral commitments.

A study by Wheeler and Laham (2016), shows that there are different relationships between moral foundations and moral commitments – the deontological perspective is mostly related to the purity foundation, while consequentialists were mostly related to care and fairness foundations. This study empirically shows the connection between moral commitments and moral foundations, but conclusions need to be made carefully as it is the only study, to our knowledge, that investigated the connection between moral commitments and moral foundations empirically. Furthermore, in their study, moral commitments were used as a theoretical background for creating a message with a moral appeal and the importance of different moral foundations to a person was measured, while in the present study moral foundations of harm and purity are used to appeal to morality and moral commitments were measured, which allows the investigation of the connection between two constructs from opposite directions.

Harm foundation is related to inflicting suffering and damage to others. Unnecessary harm to others could be deemed morally wrong by consequentialists and deontologists, thus both groups. The deontological perspective disproves harm and violence towards others as it is just inherently morally wrong to cause harm, even if it brings bigger good (Greene, 2007). For consequentialists, unnecessary harm might be seen as a big cost, for almost no gain, thus morally wrong as well. A lot of horrible, harm-inflicting methods toward animals that are used in the

meat industry could be seen as unnecessary, thus equally morally wrong for both moral commitment groups.

On the other hand, the purity foundation can be seen differently by people with different moral commitments. Purity foundation is related not only to cleanliness and diseases, but also to taboo ideas and religiousness (Haidt, & Joseph, 2004). While such factors as spreading diseases on purpose (for example individuals who are infected still go out to public places) can be deemed morally wrong by both consequentialists and deontologists, it will not be the case for all other purity-related actions. For example, masturbation (or even to provide a more extreme example, masturbation with a dead animal carcass, taken from Haidt, 2001) will be deemed morally wrong by those who follow deontological moral theory as it is inherently wrong, but that will not be the case for consequentialists as the benefits are bigger than the costs. To be more specific, in the provided example the action itself provides no harm or wrongdoing to anyone, thus the well-being can only count on one person – which, most likely, does the action as it makes him feel better. A similar result can be reached talking about the meat industry: if the impure conditions that animals are living in is a must to produce the needed amount of food, the cost is worth having for the gain of all the people having the food. As this is a conclusion that can be reached with cost-gain analysis, which is usual for consequentialists (Bostyn & Roets, 2016), the purity appeal is less likely to have the same effect for consequentialists as it does on deontologists, as the latter group's judgment would be mostly based on emotional reaction.

H4a: The effect of a harm appeal on attitude and intentions to eat less meat is similar for deontologists and consequentialists.

H4b: The effect of a purity message on attitude and intention to eat less meat will be stronger for deontologists than for consequentialists.

Method

Participants

Before the start of the study, a power analysis was conducted based on an effect size of 0.25 (low-medium); alpha error probability = .05; power = .80; df = 2; number of groups 3. The results of the analysis showed that the sample should include 158 participants, minimally.

In total 150 people participated in the study, but as two participants did not finish the survey, the sample was N = 148. All participants indicated that they eat meat at least once a week. On average people indicated that they eat meat 4.20 days per week (SD = 1.79). Seventy participants were male, 76 were female and 2 identified as non-binary or other. The average age of the participants was 27.94 years old (SD = 8.83). Forty-seven people stated that their highest completed education was high school, 65 it was bachelor's degree, followed by 30 of whom had completed their master's degree, five participants have their PhD, and one person completed trade school.

Participants could have chosen multiple answers talking about their employment status. There were 51 participants who indicated to work full-time, 36 work part-time, three do various mini-jobs and seven are pursuing job opportunities at the given moment, four people were unemployed, and three prefer not to state their employment status. Out of all the participants, 64 participants indicated that they are students. The majority of participants (51.4%) yearly income is less than 25 thousand per year, followed by those (25.7%) who earn between 25 000 euros and 50 000 euros. An income of 50 000 and 100 000 euros in a year is gained by 15,5% of the participants, with only one participant earning more than that. Ten participants preferred not to state their yearly income.

Participants were recruited through Prolific (www.prolific.co) with the requirements that they would be from The Netherlands and that they did not have any special diet, but in the final sample of this study 35 participants indicated that for the longest time they have not lived in the Netherlands, although they live in it now. This requirement was added as one of the messages used in the study address meat consumption quantities in The Netherlands. Participants were paid for their participation (£1.25).

Design

This study was a part of a larger research project that used a 3 (moral appeals) x 2 (personal responsibility) between-subject design. For the present study, a between-subject design was used with three conditions: (1) control, (2) moral appeal based on a harm foundation, and (3) moral appeal based on a purity foundation. All three conditions were used when personal responsibility manipulation was not used. This was an online experiment, with participants being randomly assigned to one of the three appeal groups.

Procedure

This online experiment was created in the *Qualtrics* program and distributed using *Prolific*. First, participants were informed about the study, conditions of compensation, confidentiality, information about how to withdraw their data, and contact information was provided as well for any questions that may occur. The goal that was presented to the participants was to hear their opinions about the meat industry – the true objective of the study was not given, so the participants would not provide answers that are wanted by the researchers. Then participants had to give their consent to participate.

Next, participants saw one of the three messages that were randomly chosen on their screen (one out of two moral appeals or one control message). To make sure that participants

would read the message, they could only proceed to the next section after 20 seconds. Directly after reading the message, the emotions were measured, followed by manipulation checks. The manipulation check questions were not asked directly after the messages so that people would provide more accurate evaluations of their emotional states.

Next, participants were asked about their attitude toward eating less meat and about their intentions to eat less meat. This was followed by a moral commitment questionnaire, in which the order of questions (situations) was randomized. Afterwards, participants were asked a few demographic questions about their age, education, income, place of living, employment status, and how usually they eat meat. Finally, participants were fully debriefed and presented with the true goal of the study.

The study was ethically approved by Leiden University Psychology Research Ethics Committee.

Stimulus Materials

To manipulate moral appeals, three messages were created. Two of them were based on different moral foundations, using words and the main ideas related to these foundations (Haidt & Graham, 2007). For example, in the purity condition, such phrases as “far from natural” were used, while in the harm condition words like “killed” and “physical abuse” were used (see Appendix A). In addition control appeal was used, which provided statistical information about meat consumption (see Appendix A). To choose the messages that represent the needed moral appeals (harm and purity) and a message for a control group, a pilot study was conducted. In the pilot, participants ($N = 34$) were asked to evaluate the valence of the messages, message appeal to morality in general (from 1 to 5), and to what moral foundation the messages resemble the most (forced answer multiple-choice questions). The results from the pilot study showed that

there was no difference in valence between purity and harm messages (Bonferroni post hoc was used $p = .135$). The same applies to the general application of respondents' morality talking about harm and purity messages (Bonferroni post hoc was used $p = .481$). Furthermore, the harm condition was seen as harm by (94.1%) in comparison to control (14,7%) and purity conditions (52.9%). The purity condition was seen as most purity-related (38,2%) in comparison to control (5.9%) and harm conditions (0%). The control condition was mostly seen as unrelated to any of the moral appeals (67.6%).

Measures

Intentions to Eat Less Meat

To measure intentions to eat less meat three items were used, based on Krispenz and Bertrams (2020): "In the future, I intend to eat meat at least one day less per week", with answers ranging from 1 (*extremely unlikely*) to 7 (*extremely likely*). The second item was: "In the future, I will try to eat meat at least one day less per week", with answers ranging from 1 (*definitely true*) to 7 (*definitely untrue*). Finally, the last item was "In the future, I plan to eat meat at least one day less per week", with answers ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The second item is reversed. The final score is provided by averaging answers to all questions, with high scores indicating a higher intention to eat less meat. Additionally, the same questions were asked about intentions to lower meat consumption by half. For example, the first item was "In the future, I intend to eat meat at least by half less as I eat now*"*. Other questions were reformulated accordingly. As final scores of both scales correlated highly ($r = .71$, $p < .001$), one final score was given by averaging all items. Cronbach alpha for the combined scale was .87, which shows that the scale is reliable. In the original Kirspenz and Bertrams study, the Cronbach alpha was .85 and in the second study .86.

Attitude Towards Eating Less Meat

Attitude toward eating less meat was assessed using five items, taken from Kirspenz and Bertrams (2020). The general question was provided: "For me, in the future, eating meat at least one day less a week would be..," followed by five scales ranging from 1 to 7: (1) 1– *Harmful*; 7 – *Beneficial*, (2) 1 – *Worthless*; 7 – *Valuable*, (3) 1 – *Pleasant*; 7 – *Unpleasant*, (4) 1 – *Enjoyable*; 7 – *Unenjoyable*, (5) 1 – *Good*; 7 – *Bad*.

The first two items are related to the instrumental aspects of eating less meat, the third and fourth to experiential, and the last item related to the overall evaluation. Items 3-5 items were reversed. The mean is calculated with high scores showing a positive attitude towards eating less meat (Kirspenz & Bertrams, 2020).

To get more information, additionally, the same questions were asked about the attitude to lower meat consumption not by once a week, but by half of all consumption. The general question was as follows: "For me, eating half the amount of meat per week (as I do now), would be... *"*. The five scales provided afterwards were the same as previously. As final scores to these scales correlated highly ($r = .80$, $p < .001$_), one final score was given by averaging all items. Cronbach alpha for the combined scale was .92 which shows that the scale is reliable. In the original Kirspenz and Bertrams (2020) study, the Cronbach alpha was .82 and in the second study .88.

Anger and Disgust

To measure anger and disgust, the Discrete Emotions Questionnaire (DEQ) was used (Harmon-Jones et al., 2016). Anger was measured with four items: "anger", "rage*"*, "mad*"*, and "pissed off*"*. The disgust scale contained items of "grossed out*"*, "nausea*"*, "sickened*"*, and "revulsion*"*. In addition, a scale of desire was added as a filler to counter the negativity of the

scale and it contained items such as "wanting", "desire", "craving", and "longing". Participants were asked to indicate their answer from 1 (*not at all*) to 7 (*very strongly),* for every item. All items were preceded by the following question: "People can experience certain feelings or emotions when reading messages about various topics. To what extent did you experience the following emotions when you were reading the text just now?".

The final score was gotten by getting the average mean for all scales separately with a higher mean showing higher feelings of emotion. Cronbach alpha for anger scale was .94, for desire it was .85 and finally, for disgust, it was .90. In the original Harmon-Jones et al. (2016) study the reliability of the scales was 0.94, 0.93, and 0.92, respectively. Thus, all the scales from this questionnaire had high internal reliability and were similar to the original study.

Moral Commitment

To measure moral commitment, a questionnaire from Vega et al. (2020) was used (to see an example, see Appendix B). The questionnaire had six high-conflict moral dilemmas to which fixed, *yes* or *no* answers were provided. Answer *yes* is counted as a consequentialist response and evaluated with a score of 1, while answer *no* was counted as 0. The final result was gotten by adding scores from all items, with the higher score showing more consequentialist tendencies.

Internal reliability for dichotomous items can be calculated with KR20 or Cronbach alpha, as they provide the same results (Anselmi et al., 2019). Cronbach alpha for this scale is relatively low (.55), showing poor internal reliability, thus the results from this scale should be interpreted with caution.

Manipulation Checks

There were two manipulation checks used in this study. One was used to check participants' comprehension of the messages used in the study. They were asked, "The piece of

information you read earlier about the meat industry was about". Four answers were provided, with one correct for each condition and the fourth one was not related to any of the situations (see Appendix C).

The second manipulation check was used to see how messages were related to purity and harm foundations. Participants were asked "How much the information that was read before about the meat industry was about the harm done to animals" and "How much the information that was read before about the meat industry was about the impurity of animals in the meat industry". Answers to these questions ranged from 1 to 5, 1 being *not at all* and 5 standing for *very much*.

Statistical Analysis

Data analysis was conducted using *SPSS Statistics 27.* To test how different appeals affected intentions and attitudes to eating less meat, a MANOVA with planned comparison was conducted as the relations were established a priori.

To test if emotions mediate the relationship between message appeals and both dependent variables, a bias-corrected bootstrapping procedure with 5000 resamples, using PROCESS V4.0, model 4 was used (Hayes, 2022). As there are three appeal groups, dummies were used in the analysis with the control group as a reference group.

To check if moral commitments moderate the relation between moral appeals and emotions (mediation) a bias-corrected bootstrapping procedure with 5000 resamples, using PROCESS V4.0, model 7 was used (Hayes, 2022). As there are three appeal groups, dummies were used in the analysis with the control group as a reference group.

To test if the final hypothesis is correct, which was to see if moral commitments moderate the relationship between moral appeals and intentions and attitudes toward eating less meat a bias-corrected bootstrapping procedure with 5000 resamples using PROCESS V4.0, model 1 was used (Hayes, 2022). As there are three appeal groups, dummies were used in the analysis with the control group as a reference group.

Results

Manipulation Checks

The comprehension check showed that mostly the messages were understood clearly as only 15 people answered the manipulation check wrong.

Participants were also asked how the message they saw represented harm and impurity. One-way ANOVA shows there is an effect of condition on perceived harm, $F(2, 145) = 257.88$, $p < .001$, $\eta^2_p = .78$. LSD post-hoc shows that message based on harm foundation was seen as most related to harm ($M = 4.42$, $SD = 0.64$), and more so compared to the purity condition ($M = 3.49$, $SD = 0.92$, $p < .001$) and the control condition ($M = 1.22$, $SD = 0.55$, $p < .001$). The latter two conditions also differed significantly ($p < .001$). A second ANOVA showed also an effect of condition on perceived purity, $F(2, 145) = 133.75$, $p < .001$, $\eta^2_p = .65$. LSD post-hoc shows that message based on purity foundation was seen as most related to purity ($M = 3.84$, $SD = 1.03$) in comparison to harm condition ($M = 1.98$, $SD = 1.04$, $p < .001$) and control condition ($M = 1.04$, $SD = 0.29$, $p < .001$). Harm condition and control condition differed statistically significantly as well ($p < .001$). These results indicate that manipulation of both moral appeals was successful.

Hypotheses

Normality tests for dependents variables show that attitude towards eating less meat resembles the normal distribution (K-S (148) = .067, $p = .099$), but intentions towards eating less meat does not (K-S (148) = .076, $p = .037$). But as the sample is relatively big, the normality assumption can be interpreted more liberally – it also could be proved by the fact, that histogram resembles a bell curve and there are no extreme outliers.

The first hypothesis predicted that appeal based on harm and purity foundations would positively change attitudes and intentions to eat less meat in comparison to control appeal. A MANOVA was used to test these predictions with conditions as independent variables and attitudes and intentions to eat less meat as dependent variables. The results show that there are no main effect of condition on attitude towards eating less meat, $F(2, 145) = 0.29$, $p = .750$, $\eta^2 = .004$, between purity ($M = 4.76$, $SD = 1.05$), harm ($M = 4.93$, $SD = 1.15$) and control ($M = 4.92$, $SD = 1.40$) conditions. The results also implicates that there is no main effect of condition on intention to eat less meat, $F(2, 145) = 1.10$, $p = .336$, $\eta^2 = .015$, between purity ($M = 3.83$, $SD = 1.46$), harm ($M = 4.27$, $SD = 1.34$) and control ($M = 4.16$, $SD = 1.79$) conditions. Thus, the first hypothesis was not supported.

Mediation Analyses

To check the assumptions for all the HAYES PROCESS analysis linear regression was conducted, where anger, disgust (mediators), moral commitments (moderator), and message appeals (dummies) were used as independent variables, whilst intentions to eat less meat and attitude toward eating less meat were used as dependent variables. Analysis showed the assumptions of linearity and homoscedasticity have been met.

The first part of the second hypothesis predicted that moral emotions, anger and disgust, will mediate the relationship between moral appeals and attitudes towards eating less meat. Bias-corrected bootstrap analyses using PROCESS (Hayes, 2022) were used, with 5000 iterations. Conditions were entered as an independent variable, anger and disgust were simultaneously entered as possible mediations and attitude towards eating less meat was entered as the dependent variable. Conditions were dummy coded, so the control condition was taken as a

reference group and coded as 0. As Table 1 shows, both harm and purity conditions evoked more disgust and anger compared to the control condition. When the two dummies and both emotions were entered together, disgust positively and significantly predicted attitude (see Table 1). The difference between the harm condition and the control condition negatively predicted attitudes towards eating less meat, $b = -0.54$, $SE = 0.26$, 95% CI [-1.06, -0.03], $p = .039$. A negative relation was also found for the difference between the purity and the control condition (see Table 1). The relation between anger and attitude was not significant (see Table 1). The whole model is statistically significant and explains 14.52% of the attitude towards eating less meat variance, $F(4, 143) = 6.07$, $p < .001$. These findings suggest mediation by the disgust of the effects of both moral appeals on attitude. Indeed, further analysis shows that the indirect effect of harm through disgust on attitudes towards eating less meat was significant, $b = 0.54$, $SE = 0.18$, 95% CI [0.20, 0.90], and indirect effect of purity through disgust was also significant, $b = 0.47$, $SE = 0.15$, 95% CI [0.17, 0.78]. These results partly support Hypothesis 2a, showing that disgust mediated the relationship between moral appeals and attitude towards eating less meat, but anger did not.

Table 1

Mediation analysis results with disgust, and anger as mediators and attitude toward eating less meat as the dependent variable

Variable	Coeff	*SE*	*t*	95% CI		*p*
				LL	*UL*	
			Disgust			
Constant	2.09	0.19	10.73	1.70	2.47	<.001
X1[a]	1.63	0.27	5.97	1.09	2.17	**<.001**
X2[b]	1.43	0.28	5.20	0.89	1.97	**<.001**
			Anger			
Constant	1.99	0.20	9.94	1.60	2.39	<.001
X1[a]	1.85	0.28	6.55	1.29	2.41	**<.001**
X2[b]	1.60	0.28	5.63	1.04	2.16	**<.001**
			Attitude towards eating less meat			
Constant	4.21	0.22	19.18	3.78	4.65	<.000
X1[a]	-0.54	0.26	-2.08	-1.06	-0.03	**.039**
X2[b]	-0.64	0.25	-2.52	-1.14	-0.14	**.013**
Disgust	0.33	0.10	3.27	0.13	0.53	**.001**
Anger	0.01	0.10	0.09	-0.18	0.20	.928

[a] 0 = control appeal group, 1 = harm appeal group
[b] 0 control appeal group, 1 = purity appeal group

To test H2b, which predicted that anger and disgust would mediate the relationship between moral appeals and intentions to eat less meat, a bias-corrected bootstrap analysis using PROCESS (Hayes, 2022) was used, with 5000 iterations. Conditions were entered as an independent variable, anger and disgust were entered as possible mediations simultaneously and intentions to eat less meat were entered as the dependent variable. Conditions were dummy coded, so the control condition was taken as a reference group and coded as 0.

As the model provides the same output for anger and disgust as outcome variables as in the previous model (see Table 1) it will not be repeated here and only intentions to eat less meat as an outcome variable will be discussed (see Table 2)

Table 2

Mediation analysis results with disgust, and anger as mediators and intentions to eat less meat as the dependent variable

Variable	Coeff	*SE*	*t*	95% CI		*p*
				LL	*UL*	
Constant	3.36	0.29	11.79	2.80	3.92	<.001
X1[a]	-0.51	0.34	-1.52	-1.18	0.15	.130
X2[b]	-0.88	0.33	-2.67	-1.53	-0.23	**.008**
Disgust	0.35	0.13	2.72	0.10	0.61	**.007**
Anger	0.03	0.13	0.23	-0.22	0.29	.820

[a] 0 = control appeal group, 1 = harm appeal group
[b] 0 control appeal group, 1 = purity appeal group

When the two dummies and both emotions were entered together, disgust positively and significantly predicted intentions (see Table 2). The difference between the purity condition and the control condition statistically, but negatively predicted intentions to eat less meat (see Table 2). Neither anger nor being in a harm condition rather than a control condition did not statistically significantly predict intentions (see Table 2). Thus, feeling more disgust directly and positively affect intentions to eat less meat, but being in a purity condition rather than a control condition negatively and directly predicts intentions. The whole model is statistically significant and explains 12.36% of the attitude towards eating less meat variance, F (4,143) = 5.04; $p <$ .001.

These findings suggest mediation by the disgust of the effects of both moral appeals on intentions. Indeed, further analysis shows that the indirect effect of harm through disgust on intentions to eat less meat was significant $b =$ 0.58, SE = 0.22, 95% CI [0.19, 1.04], and indirect effect of purity through disgust was also significant $b =$ 0.51, SE = 0.20, 95% CI [0.18 0.93].

Differently than with attitudes towards eating less meat, only being in purity rather than control condition had a negative direct effect on intentions to eat less meat, but disgust still was a

statistically significant mediator which mediated indirect positive effects of both being in harm and purity rather than control groups. These results partly support Hypothesis 2b, showing that disgust mediated the relationship between moral appeals and intentions to eat less meat, but anger did not.

Moderated Mediation

The third hypothesis predicted that moral commitments would moderate the mediation between appeals and attitude (H3a), as those who are deontological will have stronger emotional reactions. A Bias-corrected bootstrap analysis using PROCESS (Hayes, 2022) model 7 was conducted, with 5000 iterations. Conditions were entered as an independent variable, anger and disgust were entered as possible mediations simultaneously, moral commitment scale was entered as moderator and attitudes towards eating less meat was entered as the dependent variable. Conditions were dummy coded, so the control condition was taken as a reference group and coded as 0.

The results showed that moral commitment did not moderate the mediation through disgust for the harm vs. control condition, 95% CI [-0.11, 0,14], nor the purity vs. control condition 95% CI [-0.13, 0.17]. Similar results were found with anger as mediator, for harm vs. control condition, 95% [-0.24, 0.05]; and for purity vs. control condition, 95% CI [-0.04, 0.06].

The same analysis was conducted with the intention to eat less meat as the dependent variable. The results of this moderated mediation show that moral commitment did not moderate the mediation through disgust for harm vs. control condition, 95% CI [-0.12, -.15] and purity conditions 95% CI [-0.15, 0.16]. Moral commitments were not a statistically significant moderator with anger as a mediator as well in both, harm 95% [-0.03, 0.07] and purity conditions 95% [-0.06, 0.08].

Thus, the third hypothesis (3a and 3b) was not supported, as moral commitment did not moderate the mediation of both appeals through moral emotions. This was the case with attitudes and intentions to eat less meat as the dependent variables.

Moderation analyses

The fourth hypothesis predicted that the effect of the purity message will be stronger for deontologists than consequentialists on attitude and intention to eat less meat, but there will be no differences talking about the effect of the harm message. A Bias-corrected bootstrap analysis using PROCESS (Hayes, 2022) model 1 was conducted, with 5000 iterations. Conditions were entered as an independent variable, the moral commitment scale was entered as the moderator and attitudes toward eating less meat were entered as the dependent variable. Conditions were dummy coded, so the control condition was taken as a reference group and coded as 0.

The results showed that moral commitments do not moderate the relationship between being in the harm condition rather than the control condition and attitude toward eating less meat (see Table 3). They also do not moderate the relationship between being in the purity condition rather than the control condition and attitude toward eating less meat (see Table 3).

The same analysis was conducted with the intention to eat less meat as the dependent variable. The results also showed that moral commitments do not moderate the relationship between being in the harm condition rather than the control condition and intentions to eat less meat (see Table 3). They also do not moderate the relationship between being in the purity condition rather than the control condition and intentions to eat less meat (see Table 3).

Table 3

Moderation analysis results with moral commitment as moderator and attitude and intentions to eat less meat as the dependent variables

Variable	Coeff	*SE*	*t*	95% CI		*p*
				LL	*UL*	
Attitude towards eating less meat						
Constant	5.78	0.46	12.47	4.87	6.70	<.001
X1[a]	-0.54	0.70	-0.77	-1.93	0.85	.443
X2[b]	-0.07	0.76	-0.10	-1.58	1.43	.922
Moral Commitment	-0.27	0.13	-2.01	-0.53	-0.004	**.046**
Int_1	0.19	0.18	1.05	-0.17	0.54	.297
Int_2	0.07	0.18	0.41	-0.28	.42	.685
Intentions to eat less meat						
Constant	5.11	0.59	8.67	3.95	6.28	<.000
X1[a]	-0.29	0.90	-0.32	-2.06	1.48	.749
X2[b]	0.14	0.97	0.14	-1.77	2.05	.888
Moral Commitment	-0.29	0.17	-1.74	-0.62	0.04	.084
Int_1	0.16	0.23	0.69	-0.29	0.61	.491
Int_2	0.003	0.23	0.01	-0.44	0.45	.989

Note: Int_1 shows the interaction between moral commitment and being in harm condition (rather than control). Int_2 shows the interaction between moral commitment and being in a purity condition (rather than control). [a] 0 = control appeal group, 1 = harm appeal group [b] 0 control appeal group, 1 = purity appeal group

Thus, the fourth hypothesis was partly supported, as moral commitment did not moderate the relationship between harm and both dependent variables (Hypothesis 4a), but it did not moderate the relationship between purity appeal and both dependent variable, although it was predicted differently (Hypothesis 4b).

Discussion

This study tested if moral appeals could change people's attitudes and intentions toward eating meat and how it is related to moral emotions (disgust and anger) and moral commitments. Specifically, the effectiveness of harm and purity appeals was investigated. The study showed interesting results that although moral appeals did not directly affect the attitudes and intentions to eat less meat, they resulted in causing disgust and anger, but only disgust positively mediated the relationship. The action tendency that is related to disgust is withdrawal from the possible source of contamination (Nabi, 2002) – which in this case could explain lower attitudes and intentions to eat meat as people might see it as a possible contamination source. These findings also add to existing literature, by showing that emotions do play an important role in how people react to moral information as both Moral Foundation Theory and the Social Intuitionist Model assume (Haidt, 2001; Haidt & Joseph, 2004). Furthermore, this provides insights, that moral emotions are not just a reaction to moral information, but also can lead to changes in attitudes and intentions.

One of the unexpected findings in this study was that both moral appeals evoked both moral emotions although only disgust mediated the relationship for both harm and purity appeals. This contradicts to some extent the Moral Foundations Theory, which states that purity foundation is related only to disgust, while harm is related to anger rather than disgust (Graham et al., 2013). However, there are studies, that state that disgust is a broader emotion, that is a response to moral violations in general (Hutcherson & Gross, 2011). So, it might be the case, that only disgust mediated the relationship, as it is an emotion that participants felt in general due to moral violations. Another possible explanation why anger did not mediate the relationship is that

harm foundation, according to some studies, is related not only to anger but to compassion, thus it is possible that the messages provided in this study caused compassionate, but not angry responses (Landmann, & Hess, 2017).

In this study moral appeals did not have a direct effect on attitudes and intentions to eat less meat and even had a negative effect when controlled for moral emotions (in mediation analysis). This could be explained by the suppression effect. When it is not controlled direct relationships can even appear in the opposite sign as happened in this study (Cheung & Lau, 2007). The effect, in general, can be understood when the relationship is suppressed by a mediator(s) (Cheung & Lau, 2007) but suppression is rarely checked or examined in psychological research (Cheung & Lau, 2007).

To some extent, the findings that emotions mediate the effect of moral appeals, together with the results that moral commitments did not moderate the relationship between moral appeals and emotions do not support the dual-process model which was proposed by Greene (2007). One of the explanations why moral commitment did not moderate the relationship could be, that consequentialists' rational reasoning occurs together with the emotional reaction, thus the affective response was equal between moral commitment groups. It is possible as well, that more reasoning (for consequentialists) could occur under specific circumstances, as proposed by Haidt (2001), such as when people tend to persuade others, have time to personally reflect on the moral information, or reason their judgement (which is common only among philosophers). In this study, participants did not have to persuade anyone else and most likely did not highly reflect on the information provided – and thus the situation itself could not allow for consequentialists to use their II system of information processing. But together with the findings of emotional mediation, it could also show, that reaction to moral information, moral judgement,

is related to emotions in its nature as proposed by Moral Foundation Theory and that rational reasoning is only a post-hoc process.

The moderation by moral commitments on the effect of moral appeals to intentions and attitudes towards eating less meat was not shown either. One of the possible explanations for the expected results not appearing could be methodological. It was expected that the purity message would have lower effects on consequentialists because purity appeal could be seen as having a lower cost than gain. To be more precise, having animals living in cramped and unsterile conditions (as mentioned in the message, see Appendix A) could be seen as an understandable cost to meet the demand for meat in the world. But the message contained information about the harsh, conditions in which animals live and that the food they get contains dangerous materials such as plastic. This information can be seen as unnecessary harm which is equally seen as morally wrong by both moral commitment groups. Thus, it might have led to no moderation by moral commitment.

On the other hand, it could be also the case, that differences between how consequentialists and deontologists see moral information appears only when the situation itself prompts to highlight the possibility of cost gain analysis, which then becomes a method of evaluation for some people, in other words for consequentialists. These types of situations were used in this study to measure moral commitments as well as in other studies (for example Vega et al., 2020). This explanation would also go along with Moral Foundation Theory and deontology theories, which state that in most cases our moral reactions and judgements are intuitive, affective and quick. If this presumption is true, then the division between deontologists and consequentialists is to some extent prompted by the small amount of specific moral situations, rather than a tendency to evaluate all moral information in general.

Practical implications

This study provides information for important practical implications for social activists or marketers. Moral appeals that cause disgust lead to stronger attitudes and intentions to eat less meat, which could lead to lower meat consumption. Creating moral appeals that are related to purity and harm foundations in this study have been found to positively affect attitudes and intentions to eat less meat through disgust. Social activists should convey messages that would resemble these moral foundations and create an emotional response, especially disgust. Although it is important to mention that this should be thought about thoroughly, as this could lead to ethical problems, as disgust is a negative emotion.

Limitations and Future Research

The first limitation of the present study is that the message that was used in the control condition could have had an unforeseen impact which could have led to limited evidence about the effectiveness of moral appeals. Research suggests unfamiliar information could be more effective than well-known at reducing ambivalence (Sawicki et al., 2013). As people tend to underestimate the amount of meat they consume (Rothgerber, 2018), seeing statistical information on how much meat is consumed on average (control message) could have been less known, thus more effective. Further research could use no message at all as a control condition or try to measure what effect statistical information could have.

Secondly, this study focused only on two moral emotions: anger and disgust, but other moral emotions could play an important role as well, for example, compassion (Landmann, & Hess, 2017). Measuring more emotions could give more indication of how various emotions mediate the relationship of moral appeals based on moral foundations. It would also provide

more information about how specific foundations are related (if they are) to specific emotions. Moreover, finding evidence about positive emotions' (such as compassion) effectiveness could provide useful information for practitioners as well, as inducing positive emotions could cause fewer ethical problems.

More research about the relation between moral commitment and moral foundations could provide more information for practitioners as well. It would allow gathering even more different points of view on how to convey a message. For example, it is possible to create a message that would resemble a purity foundation but in one case it could prompt more deontological information, while in another more consequentialist information. This information could provide more insights about what information should be included in the message to provide the biggest possible impact. Although, for that, the theoretical relationship between moral commitments and moral foundations should be researched first to a bigger extent. In this study, one of the biggest limitations to the results related to moral commitment is that the instrument that was used to evaluate participants' moral commitment showed poor internal consistency, thus the conclusion from this study has to be drawn carefully.

Lastly, in this study, no actual behaviour was measured, but only attitudes and intentions. Also, the messages were only seen once, whilst in real life, it would be more likely that those messages would be seen multiple times (for example on social media, billboards and so on), thus this would add to the ecological validity of the findings. Future research could focus on seeing how long-lasting intervention related to moral appeals effects people's attitudes, intentions or even behaviour that is related to meat consumption.

Conclusion

Reducing meat consumption is important not only for an individual but also on a larger, societal level, as high meat consumption has a negative impact in many different fields as mentioned at the beginning of the paper. Our study clearly shows that appealing to morality which causes emotional (disgust) reactions is a possible way to lower meat consumption.

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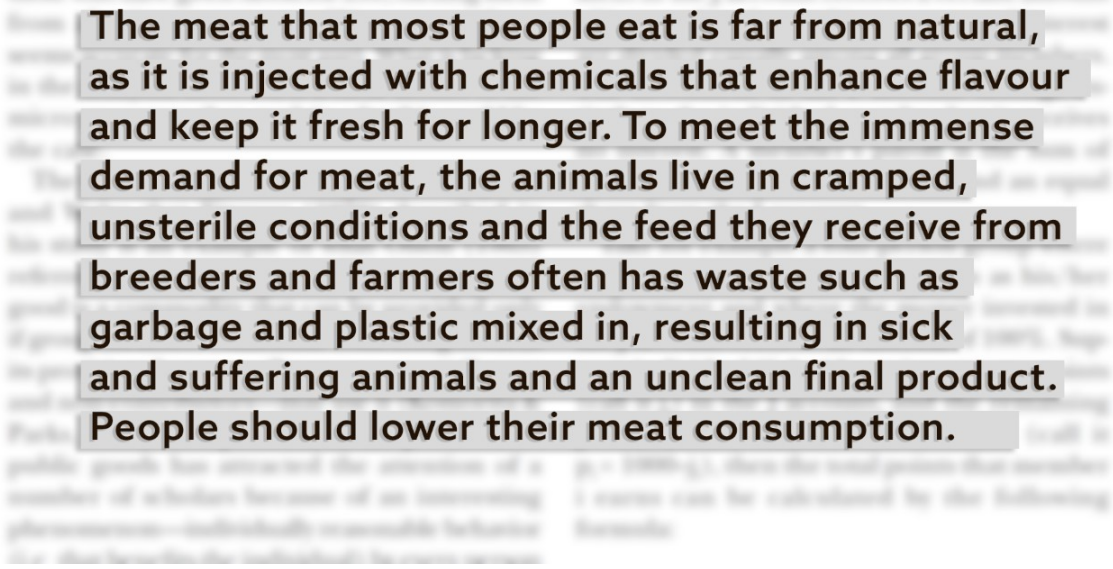
Appendices

Appendix A. Appeals provided to participants (purity, control and harm appeals, respectively)



Around 650 million animals are killed every single year in the Netherlands in a variety of ways with bolt guns and gas being common measures. To meet that immense demand for meat whilst keeping costs low, animals are mistreated in the process of forced impregnation, involving cramped breeding sheds, physical abuse, and often, electric shocks. People should lower their meat consumption.

Appendix B. Example item from Moral Commitment questionnaire

You are driving a small speedboat when you notice five swimmers drowning in the distance. If you do not drive toward them at top speed, you will not arrive in time, and all five will die. In order to drive at top speed, you must lighten the load on your boat. The only way to lighten the load is to push your passenger with your hands, causing the passenger to tumble off the back of the boat. Your passenger cannot swim and will drown. If you push the passenger, your passenger will drown, but you will save the five drowning swimmers. If you do not push the passenger, the passenger will not drown, but the five swimmers will drown.

Is it appropriate for you to push your passenger, drowning him but saving the five swimmers?

Appendix C. Manipulation Checks.

The piece of information you read earlier about the meat industry was about:

a) Statistical information about meat consumption

b) Chemicals to keep meat fresher and impure feed

c) Cruel treatment and slaughter of animals

d) How long animals are alive before reaching slaughter age