

Food for Thought:
Investigating Communication Strategies to Counteract Moral Disengagement Regarding Meat
Consumption

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Abstract

Eating less meat would benefit environmental sustainability, human health, and animal welfare. Providing information about this, however, does often not lead people to adopt according beliefs, attitudes or behaviors. In fact, dietary changes are often prevented by dissonance reduction (i.e., moral disengagement) if information elicits a conflict regarding meat. In the present investigation we thus aimed to address moral disengagement via a communication strategy that consisted of two stages: In Stage I, we presented information by showing distressing scenes from animal agriculture. In Stage II, we then counteracted moral disengagement in a dialog. Two studies indicate that, following the dialog, people's evaluations of meat changed and their willingness to eat meat decreased; this seemed to result from lowered moral disengagement. By providing an empirically tested communication strategy for addressing moral disengagement on the exemplary conflict regarding meat, we hope to inspire research and interventions that intend to communicate (environmental) issues.

Key Words: intervention, meat consumption, meat paradox, dissonance, moral disengagement

Food for Thought:

Investigating Communication Strategies to Counteract Moral Disengagement Regarding Meat Consumption

Meat consumption is conflicted. On the one hand, eating meat provides positive aspects to many people: People like to eat meat because they learned that the taste is associated with nutritious proteins; they endorse meat as common meals are an expression of community and shared values; and they eat meat to signal their social status or express their personalities (Leroy & Praet, 2015). On the other hand, however, meat consumption is associated with negative aspects because it contributes to environmental, health and animal welfare issues: In fact, animal agriculture is a main driver for environmental issues being accountable for about 14.5-15% of anthropogenic greenhouse gas emissions (Poore & Nemecek, 2018); similarly, livestock production is responsible for 30% of terrestrial biodiversity loss (Westhoek et al., 2011). Meat consumption is also accompanied by health issues, including diabetes (Tilman & Clark, 2014), cancer (Tilman & Clark, 2014), and cardiovascular diseases (Tharrey et al., 2018). Lastly, eating meat is hardly compatible with animal welfare if one considers that billions of non-human animals¹ suffer and die to produce meat (Joy, 2010).²

The Meat Paradox

While it is debatable if people actually know or rather believe that environmental or health issues are associated with meat (Sanchez-Sabate, Badilla-Briones, & Sabaté, 2019; Sanchez-Sabate & Sabaté, 2019), it is unquestionable that animals have to be slaughtered to produce meat. This violates fundamental moral standards which are shared across societies—do not harm or much rather do not kill (Bandura, 1999). Thus, meat eating is a prime example to understand how people maintain harmful behaviors by coping with psychological conflicts

(Bastian & Loughnan, 2017). This conflict was called the *meat paradox* (Loughnan, Haslam, & Bastian, 2010): People like to eat meat, but they do not want animals to suffer. If people become aware of these conflicting cognitions, they experience aversive dissonance (Festinger, 1957; Rothgerber, 2020). Thus, people developed several strategies to passively circumvent or actively resolve the meat paradox (Bastian & Loughnan, 2017). Meat consumption is thus an exemplary conflict by which it is possible to understand how people uphold behavior that may be deemed as unethical (Bastian & Loughnan, 2017).

Passive Dissonance Avoidance. Passive dissonance avoidance helps people to initially prevent the experience of the meat paradox, for instance, by a dissociation of meat from its animal origin. This can be achieved by consuming processed meat or by using euphemistic labels for meat (Benningstad & Kunst, 2020). Thus, depicting meat without obvious signs of its origin (e.g., a beheaded pig instead of with its head) or labeling a dish as pork/beef instead of pig/cow meat, leads to less disgust towards meat and empathy towards the killed animal, so that omnivores are less inclined to eat a vegetarian alternative (Kunst & Hohle, 2016). In fact, a recent literature review across 33 studies outlines that explicit and even implicit cues may interrupt this dissociation (Benningstad & Kunst, 2020). While there are some moderating variables (e.g., sex age, and cultural background), it seems to be a rather universal effect that establishing a link between animals and meat dissolves passive dissonance avoidance; and due to the resulting dissonance, people decrease their willingness to eat meat (Benningstad & Kunst, 2020).

This reasoning is also supported by research of Berndsen and Van der Pligt (2004), who examined people's conflict about meat by measuring ambivalence—the state that arises from simultaneously present positive and negative evaluations towards the same attitude object. Their results suggested that omnivores associating greater moral, health, or ecological issues with meat

consumption also reported more ambivalence towards meat (e.g., “I feel torn between the two sides of meat consumption.”). These ambivalent omnivores in turn reported increased intentions to reduce their meat consumption compared to less ambivalent omnivores. Interestingly, this investigation suggested that moral considerations about meat were associated with a greater willingness to eschew meat than environmental or health considerations.

Unsurprisingly, media campaigns about meat’s negative sides regarding morality, sustainability, and health have also proven to be successful in increasing people’s willingness to change their meat consumption (for a review see, Bianchi, Dorsel, Garnett, Aveyard, & Jebb, 2018). Once more, however, these findings indicate that informing people about animal welfare issues of meat production evoked the greatest increase of intentions to eschew meat (e.g., Cordts, Nitzko, & Spiller, 2014). Thus, providing information about issues related to meat may indeed help to reduce passive dissonance avoidance and increase people’s willingness to eschew meat.

Active Dissonance Reduction. Although this shows the importance of dissolving people’s passive dissonance avoidance, the awareness about issues related to meat does not necessarily incite dietary change (Bianchi et al., 2018); instead, it is suggested that omnivores employ active dissonance reduction to cope with the meat paradox, and thereby maintain their diets (Bastian & Loughnan, 2017). In fact, according to the action-based model of dissonance (Harmon-Jones, Amodio, & Harmon-Jones, 2009), people tend to reduce dissonance in a way that allows them to act efficiently on their decisions. Omnivores, therefore, often rather resolve the meat paradox by denying inflicted harm, diffusing responsibility, or bolstering identity—without changing their diets (Bastian & Loughnan, 2017).

Buttlar and Walther (2018), for example, showed that conflicted omnivores (i.e., those who experienced higher levels of ambivalence) denied inflicted harm on animals as they attribute

fewer emotional and mental capacities to animals. This observation supports Rothgerber's notion (2014) indicating that omnivores deny animals these capacities when the meat paradox was made salient (i.e., confrontation with a vegetarian). In a similar vein, when being confronted with a vegetarian, omnivores diffuse their responsibility by justifying meat consumption, and they bolster their positive identity by reporting less meat consumption (Rothgerber, 2014). This indicates that omnivores resolve the meat paradox regularly by disengaging morally (Bandura, 1999; Graça, Calheiros, & Oliveira, 2014) instead of changing their diets if passive dissonance avoidance fails.

The Present Investigation

This analysis on the meat paradox and moral disengagement strategies illustrates how difficult it is to successfully communicate science-based information to a broader audience. In fact, the outlined dissonance reduction processes align with a growing critique on the knowledge deficit model that assumes that communicating scientific issues leads people to adopt congruent attitudes, beliefs, and behaviors (Simis, Madden, Cacciatore, & Yeo, 2016). Contrary to this assumption, however, a meta-analysis across 171 studies demonstrated that higher knowledge about climate change does not lead people to believe in climate change (Hornsey, Harris, Bain, & Fielding, 2016). Instead, people are motivated to reason against scientific evidence if this allows them to uphold their beliefs (Hart & Nisbet, 2012). This holds also true for meat consumption—be it regarding information on environmental (Olausson, 2018) or animal welfare issues (Rothgerber, 2020). Thus, moral disengagement can be understood as motivated moral reasoning, allowing people to maintain potentially harmful behaviors (Bastian & Loughnan, 2017). To make matters worse, information about scientific evidence might thereby even lead to a boomerang effect—resulting in increased behavioral commitment (Bastian & Loughnan, 2017; Hart &

Nisbet, 2012). It is therefore argued that scientists should not just pass knowledge to the public, but engage in a dialog—taking people’s perspectives and reservations on scientific issues in account (Nisbet & Scheufele, 2007).

In the present investigation, we therefore aimed at testing a communication strategy being designed to counteract moral disengagement by engaging with the public. That is, we adopted a well-established but not yet studied two-stage intervention strategy (cube of truth; Anonymous for the Voiceless, 2019). To do so, we cooperated with a local animal rights activist group and refined their intervention strategy on the basis of scientific knowledge and arguments on meat consumption. The activists first provided information on animal welfare issues by showcasing videos that depicted distressing scenes from animal agriculture, for instance, the slaughter of cows or the enclosure of injured pigs in small housings. In this first stage, we aimed at dissolving people’s passive dissonance avoidance (see Rothgerber, 2020). Subsequently, the activists engaged with the public by talking to interested pedestrians to motivate them to change their meat-based diets by addressing their reservations. In this second stage, we assumed that the dialog would help to counteract active dissonance reduction by addressing moral disengagement.

Consequently, we hypothesized in two studies that people’s ambivalence towards meat would increase if they spoke with the activists, and that this would heighten their willingness to reduce their meat consumption. Furthermore, we tested in Study 1 whether people would be more open to change their meat consumption if they experience stronger emotions elicited by the videos. Lastly, we supposed in Study 2 that people are more willing to reduce meat consumption when the activists successfully counteracted their moral disengagement strategies. Both studies were conducted in accordance with the ethical guidelines by the American Psychological

Association. In the following, we report all measures, manipulations, and exclusions, and we made materials, data, and analysis scripts available on <https://osf.io/vw9sr/>.

Method

Participants and Design. Both studies were realized in a one-factor (Intervention [pre dialog, post dialog]) between participants design, and participants were randomly distributed to the conditions. In Study 1, we sampled 80 omnivorous adults³ as participants of the study (41 women, 39 men $M_{\text{age}} = 41.65$, age range = 18-81) between April of 2018 and August of 2018. Notably, demographics were similar in both conditions (pre dialog: 21 women, 19 men, $M_{\text{age}} = 47.50$, age range = 18-81; post dialog: 20 women, 20 men, $M_{\text{age}} = 39.80$, age range = 18-79). Because there is no prior literature on an expected effect size, we aimed at recruiting $N = 80$ participants. We achieved this sample, and all data analyses were conducted after reaching the final sample. In Study 2, we sampled 100 omnivores (48 women, 52 men $M_{\text{age}} = 38.94$, age range = 18-81) between November of 2018 and April of 2019. Again, demographics were distributed similarly in both conditions (pre dialog: 24 women, 27 men, $M_{\text{age}} = 36.37$, age range = 18-70; post dialog: 24 women, 25 men, $M_{\text{age}} = 41.68$, age range = 19-81). To increase the power of our design, we aimed at sampling $N = 100$ participants.⁴ We achieved this sample and all data analyses were conducted afterwards. In these studies, the samples had a power of $1 - \beta = .80$ to detect a one-tailed main effect of $\eta^2 = .072$ (Study 1) $\eta^2 = .059$ (Study 2) or larger at $\alpha = .05$. Thus, we had an 80% chance or higher to rightfully reject the null hypothesis (i.e., that there was no difference between the conditions) in case a significant effect would equal or exceed these effect sizes.

Procedure. We conducted the study in cooperation with an animal rights activist group that meets every Saturday from 15 to 18 o'clock in different spots in the pedestrian area of a mid-

sized German city. Every member of the group wears black or dark clothing⁵, and four to eight activists stand in a square formation, one or two on each side. While standing there, they are holding laptops in their hands, showing scenes from animal agriculture, such as baby chickens that are ground up alive, cows that are slaughtered, and pigs in small enclosures with injuries (see example videos on <https://www.youtube.com/channel/UCihWowx198t9CECAtn-RIQ>; SOKO Tierschutz, n.d.).

In Stage I, the activists waited in this formation for pedestrians to stop and watch the videos. Usually, if pedestrians seemed to be interested, one activist, who does not carry a laptop, approached them and started a dialog in Stage II. In regard to our investigation, however, two procedures were possible if a pedestrian was interested: In the pre-dialog condition, an investigator approached the interested pedestrians first and they were asked to give informed consent and to fill out a survey before they talked to an activist; in the post-dialog condition, the pedestrians talked to an activist first before they were approached by an investigator who invited them to participate in the study, i.e., give informed consent and fill out the same survey.

In Stage II, the dialog was conducted by experienced activists in a semi-standardized way. The activists usually started a dialog with three specific questions: First off, they asked whether the participants had seen such footage before; second, they asked what the bystanders felt when viewing the videos; lastly, they asked whether they knew a solution for these issues. Following the questions, the dialog roamed freely, typically addressing people's reservations about reducing their meat consumption, i.e., moral disengagement strategies (e.g., "eating meat is part of a healthy diet", "meat tastes so good, I could never give it up"; see Piazza et al., 2015).

To engage in these dialogs, activists are trained to talk to pedestrians, and identify and counteract moral disengagement strategies (see supplemental materials for a catalog providing

scientific arguments to counteract specific moral disengagement strategies, which was assembled prior to Study 2). That is, prior to reaching out to the pedestrians, new activists are informed about the intervention techniques and arguments to counter reservations. Subsequently, they have to observe experienced activists during the dialog (e.g., while presenting videos). If they engage in their first dialogs, experienced activists will supervise them. Later on, there also exists the possibility to get supervision, and there is an online forum in which the activists give advice to each other.

Materials. The complete survey for participants⁶ consisted of visual analogous scales and participants were asked to make a cross on a 100 mm long line to indicate their approval of the different statements; thus, all scales ranged from 0 to 100.

Ambivalence. First, we assessed objective ambivalence (OA), which refers to a structural existence of conflicting evaluations regarding one attitude object (van Harreveld, Nohlen, & Schneider, 2015), by asking participants to indicate how positive (P) meat consumption is for them, and how negative (N) meat consumption is for them on two separate scales; a unified OA score can be computed from these two scales using the formula $(P + N)/2 - |P - N|$ (Povey, Wellens, & Connor, 2001). Following, we assessed subjective ambivalence (SA), which refers to the actual experience of the conflicting evaluations (van Harreveld et al., 2015), by asking for agreement on the following statement “I feel torn about the two sides of eating meat” (Berndsen & Van der Pligt, 2004); in Study 2 we added a second item (“I am uncertain if I should eat meat, because I can’t decide between one side and the other”), and computed a mean SA score out of both items (Berndsen & Van der Pligt, 2004).

Willingness for Dietary Change. Subsequently, we assessed whether participants were willing to change their diets via four statements: “Instead of eating a dish containing meat, I

would choose a vegetarian (vegan) dish” (Kunst & Hohle, 2016), as well as “I could imagine to adopt a vegetarian (vegan) diet in the future” (adopted from Berndsen & Van der Pligt, 2004). Out of these statements, we computed a mean score ($\alpha = .73$), indicating participants’ willingness to change their diets.

Emotions (Only Study 1). In the following, we asked participants about certain emotions aroused by the slaughtering for meat production, and they indicated their agreement on the following statements “When I think of the animals that were killed for our consumption, I feel compassion (anger, indifference, disgust, dismay)”.

Moral Disengagement (Only Study 2). Instead of asking for emotions, we added two questionnaires on specific moral disengagement strategies. At first, we asked people if they believe that animals would possess certain mental (i.e., self-control, morality, memory, and planning, $\alpha = .67$) and emotional (i.e., happiness, melancholy, excitement, guilt, and panic; $\alpha = .72$) capacities (Rothgerber, 2014); and their agreement with different statements rationalizing meat consumption as nice, necessary, normal and natural ($\alpha = .85$; Piazza et al., 2015). These questionnaires were inserted into the survey prior to the ambivalence measures.

Demographics. Finally, we assessed demographic variables (age, sex, profession, consumption of meat and fish, and consumption of other animal products), and we asked participants whether they had a pet (and if so, which pet).

Results

All analyses were conducted with SPSS for Windows (Version 25); mediation and moderation analyses were calculated via PROCESS macro 3.3 by Andrew Hayes (2018), which is a modeling tool for different statistical moderation and mediation models. As some participants did not complete every single item in the survey, they were excluded from analyses including

these items if no mean score could be computed (Study 1: One participant did not complete the evaluations for OA. Study 2: Two participants did not complete the evaluations for OA from which one participant did also not complete the SA and willingness to change items; two participants did not fill out the questionnaire on mind and emotion attribution).

Study 1: Investigating the Role of Emotions

Ambivalence. First, we tested whether people's ambivalence towards meat increases following the dialog by conducting two separate one-way analyses of variance (ANOVA) on SA and OA. An ANOVA allows to detect statistical differences between the means of two or more conditions (see Tabachnick & Fidell, 2013). The results of the ANOVA on SA did not reveal a significant main effect, $F(1, 78) = 0.17, p = .679$. Similarly, the ANOVA using the OA score as the dependent variable did not reveal a significant main effect, $F(1, 77) = 0.02, p = .884$; however, we scrutinized the data for positive and negative evaluations separately and conducted a 2 (Intervention [pre dialog, post dialog]) x 2 (Valence [positive, negative]) within-between ANOVA with repeated measures on the second factor. This two-way ANOVA did not reveal significant main effects for the factors Intervention, $F(1, 77) = 0.08, p = .779$ and Valence, $F(1, 77) = 0.03, p = .854$, but a significant two way interaction, $F(1, 77) = 7.28, p = .009, \eta_p^2 = .09$, 95% confidence interval (CI) = [.01, .22] (see Figure 1). Bonferroni adjusted pairwise comparisons showed that the dialog led to a significant decrease of positive evaluations ($p = .010, d = 0.6, 95\% \text{ CI} = [0.15, 1.04]$; pre dialog: $M = 53.92, SD = 23.63$; post dialog: $M = 39.69, SD = 23.93$) and to a significant increase in negative evaluations ($p = .018, d = 0.55, 95\% \text{ CI} = [0.09, 1.00]$; pre dialog: $M = 38.59, SD = 23.50$; post dialog: $M = 52.13, SD = 26.24$). This suggests, that the dialog successfully changed people's evaluations of meat, going beyond the effects of raising people's awareness of meat's moral implications.

Willingness to Change. Second, we examined whether less favorable evaluations of meat following the dialog would increase people's willingness to reduce their meat consumption. Thus, we computed a composite evaluation score (positive evaluations - negative evaluations; higher values indicate less favorable evaluations) and included it as a mediator in a simple mediation analysis (Model 4; Hayes, 2018). The simple mediation model tests whether a predictor variable affects a single outcome variable (direct effect), and it tests whether the predictor variable affects the outcome variable mediated through a third variable (indirect effect; see Hayes, 2018). Figure 2 depicts the mediation analysis, being based on 10000 bootstrap samples. This analysis indicates that following the dialog, participants' evaluations were less positive and more negative towards meat ($a = -27.77$, 95% CI = [-48.26, -7.28]), and that this change was associated with an increase in their willingness to change ($b = -0.22$, 95% CI = [-0.32, -0.13]). Consequently, the indirect effect ($ab = 6.15$, 95% CI = [1.54, 11.81]) suggests that the change in evaluations, due to the dialog, led to heightened willingness to eschew meat; in fact, independent of the indirect effect, the dialog did not seem to affect people's intentions ($c' = 6.15$, 95% CI = [-3.02, 15.32]). This implies that people were more willing to alter their diet after Stage II because they changed their evaluations of meat.

Emotions. Finally, we assessed whether people who experienced stronger emotions when watching the videos were more likely to be willing to reduce their meat consumption after the dialog. To test this hypothesis, we used moderated mediation analyses (Model 7; Hayes, 2018), which also examine the direct and indirect effects, but they further test whether an indirect effect depends on a moderator variable (see Hayes, 2018). We did not find a significant moderation effect that would indicate that the effectiveness of the dialog is conditional on the experienced emotions of compassion, anger, indifference, disgust, or dismay (all $ps > .128$). On the contrary,

the indirect effect of the dialog on the willingness to change mediated via evaluations of meat remained constant in all of these analyses. Thus, the effectiveness of the intervention was not restricted to people who experienced a higher degree of emotions aroused by the videos.

Study 2: Investigating the Role of Moral Disengagement

Manipulation Check. First, we checked whether the dialog successfully changed participants' use of moral disengagement strategies. Therefore, we screened for outliers on these variables via Mahalanobis distance with $p < .001$; this way, one outlier was identified and thus excluded from subsequent analyses⁷. Looking separately at the moral disengagement strategies via one-way ANOVAs, the dialog had an effect on attributions of animal emotion, $F(1, 95) = 6.43, p = .013, \eta_p^2 = .06, 95\% CI = [.00, .17]$. That is, participants who already underwent Stage II attributed more emotional capacities to animals ($M = 82.06, SD = 11.67$) than participants after Stage I ($M = 75.04, SD = 15.17$). Attributions of animal mind, however, were not altered by the dialog, $F(1, 95) = 1.22, p = .273$, even though the attributions of mind were lower before the dialog ($M = 55.97, SD = 18.65$) than after the dialog ($M = 60.35, SD = 20.44$). Similarly, rationalizations of meat consumption were not significantly affected, $F(1, 97) = 1.49, p = .225$, although people exhibited more rationalizations prior ($M = 41.07, SD = 15.89$) than after the dialog ($M = 37.49, SD = 13.02$). This implies that the argumentation catalog helped—at least partially—to counteract some moral disengagement strategies as people attributed more emotional capacities to animals after they spoke to the activists.

Ambivalence. Second, we assessed whether the dialog increased people's ambivalence towards meat. We conducted two univariate ANOVAs: For SA, we found a significant main effect, $F(1, 96) = 4.97, p = .028, \eta_p^2 = .05, 95\% CI = [.00, .15]$, indicating that participants were less torn between the two sides of eating meat prior to the dialog ($M = 39.06, SD = 30.82$) than

after the dialog: ($M = 51.67, SD = 24.68$). For OA, we found no significant effect $F(1, 95) = 0.46, p = .499$. Similar to Study 1, however, we included the positive and negative evaluations separately into a 2 (Intervention [pre dialog, post dialog]) x 2 (Valence [positive, negative]) within-between ANOVA with repeated measures on the second factor. This ANOVA did not reveal significant main effects for the factors Intervention $F(1, 95) = 0.25, p = .621$ or for the factor Valence $F(1, 95) = 0.34, p = .561$, but a two-way interaction emerged $F(1, 95) = 4.48, p = .037, \eta_p^2 = .05, 95\% CI = [.00, .15]$. We scrutinized this interaction via bonferroni adjusted pairwise comparisons (see Figure 3), showing that negative evaluations increased ($p = .046, d = 0.41, 95\% CI = [0.01, 0.81]$; pre dialog: $M = 37.14, SD = 26.06$; post dialog: $M = 48.04, SD = 27.62$), while positive evaluations stayed similar following the dialog ($p = .143, d = 0.30, 95\% CI = [-0.10, 0.70]$; pre dialog: $M = 49.14, SD = 27.49$; post dialog: $M = 42.13, SD = 25.50$). This again suggests that people's attitudes are affected by the dialog with the activists, however, this time only negative evaluations towards meat increased.

Willingness to Change. Third, we examined whether less favorable evaluations of meat led to a higher willingness to reduce meat consumption. We again computed a simple mediation analysis using the composite evaluation score (positive evaluations - negative evaluations) as a mediator and willingness to change the diet as the outcome variable (Model 4; Hayes, 2018). This mediation analysis replicated the results from Study 1 based on 10000 bootstrap samples (see Figure 4): After the dialog, participants' evaluations towards meat became less positive and more negative ($a = -18.81, 95\% CI = [-36.46, -1.16]$); evaluations were associated with a heightened willingness to change ($b = -0.16, 95\% CI = [-0.27, -0.04]$); and the indirect effect ($ab = 2.96, 95\% CI = [0.15, 6.63]$) suggests that the effect of the dialog on participants' willingness to change is facilitated by participants' change in evaluations of meat. This time, however, the direct

effect indicates that the dialog seemed to affect people's willingness to change even after including the indirect effect into the model ($c' = 11.45$, 95% CI = [1.34, 21.55]). As in Study 1, these results indicate that less favorable evaluations lead to a heightened willingness to reduce meat consumption.

Moral Disengagement. Finally, in order to test our main hypothesis—that the changes in evaluations and willingness to reduce meat consumption subsequent to the dialog result from a decrease in moral disengagement strategies—we calculated a serial mediation analysis (Model 6; Hayes, 2018). A serial mediation analysis works similar to simple mediation analysis, but there is more than one mediator. Thus, by using two mediators, there are three indirect effects: (1) the predictor variable is linked to a single outcome variable through mediator one; (2) the predictor variable is linked to the outcome variable through mediator two; (3) and the predictor variable is linked to the outcome variable through mediator one and mediator two (see Hayes, 2018). Our analysis was based on 10000 bootstrap samples and included dialog as the predictor and willingness to change as the outcome variable, while inserting attributions of animal emotion and evaluations of meat mediators (see Figure 5). In line with our hypothesis, participants reported heightened attributions of animal emotion following the dialog ($a_1 = 6.35$, 95% CI = [0.86, 11.84]), which was associated with a change in evaluation of meat ($d_{21} = -1.35$, 95% CI = [0.86, 11.84]), rendering the effect of the dialog on evaluations of meat non-significant ($a_2 = -10.55$, 95% CI = [-27.49, 6.38]). However, after including attributions of animal emotion into the mediation model, evaluations of meat did not seem to be associated with participants' willingness to change anymore ($b_2 = -0.09$, 95% CI = [-0.22, 0.03]); instead, attributions of animal emotion were directly associated with participants' willingness to change ($b_1 = -0.51$, 95% CI = [0.11, 0.91]). Consequently, the indirect effects suggest that the dialog did not seem to affect

willingness to change via evaluations of meat ($a_2b_2 = 0.99$, 95% CI = [-0.81, 3.50]; $a_1d_2b_2 = 0.82$, 95% CI = [-0.20, 2.68]), but that the effect of the dialog is mediated by attributions of animal emotion ($a_1b_1 = 3.23$ 95% CI = [0.04, 8.29])⁸. Independent of the indirect effects, the dialog did not appear to influence participants' willingness to change ($c' = 8.71$, 95% CI = [-1.39, 18.81]). The findings of the serial mediation analysis thus suggest that participants' heightened willingness to reduce their meat consumption resulted from an increase in attributed emotional capacities to animals.

Discussion

Meat consumption is a driving force behind environmental (Poore & Nemecek, 2018), health (Tharrey et al., 2018; Tilman & Clark, 2014), and animal welfare issues (e.g., Joy, 2010). Nonetheless, people often maintain their meat-based diets even if they become aware of the negative consequences. In fact, instead of eschewing meat, they actively reduce their dissonance elicited by the so-called meat paradox via moral disengagement strategies (Bastian & Loughnan, 2017; Graça et al., 2014). Adopting a two-stage intervention strategy, we found in two studies that counteracting moral disengagement increased participants' willingness to reduce their meat consumption. Thus, our findings highlight the incremental value of counteracting moral disengagement and stress that two-stage intervention strategies are superior to mere information campaigns (e.g., by confronting people with animal welfare issues).

These findings align with research that shows that people do not just adapt their attitudes, beliefs and behavior if they are informed about scientific evidence (Hornsey et al. 2016; Hart & Nisbet, 2012). Going beyond mere information, it seems to be necessary to also account for processes of motivated reasoning, for example, in the form of moral disengagement (Bastian & Loughnan, 2017; Hart & Nisbet, 2012). Thus, by providing a two-stage template of how to

address moral disengagement, the current investigation complements many studies that investigate how to inform people about scientific evidence and motivate them to alter their behavior (e.g., Bianchi et al., 2018; de Boer, Schösler, & Boersema, 2013). In fact, our research suggests that it is necessary to discuss information and consider people's perspectives as well as reservations—ideally in a face-to-face setting with an expert (Nisbet & Scheufele, 2007). For this endeavor, we hope that the assembled argumentation catalog may be a starting point for researchers, lay people, and activists who want to study and counteract moral disengagement regarding meat consumption.

Going beyond meat consumption, moral disengagement may also be highly important regarding other harmful behaviors. In fact, moral disengagement seems to play an important role underlying and maintaining many forms of unsustainable actions (Bandura, 2007). Atkinson and Kim (2015) showed, for example, that people diffuse their responsibility and denied harm when purchasing plastic packed products. People argued, for instance, that they had no choice but to buy the product; or they reason that a purchased product is not as detrimental for the environment compared to a worse one. Such statements reflect similarities with reasons people produce to resolve the dissonance resulting from the meat paradox (Bastian & Loughnan, 2017).

The usefulness of our dialogue-based approach is supported by the fact that we gathered representative and heterogeneous samples for an industrialized, western population, including a similar amount of men and women with a wide age range, and a diverse professional background (e.g., students, academics, craftsmen, service providers, and pensioners). This is essential because people in industrialized western countries typically eat a high amount of meat (Tilman & Clark, 2014). Similarly, many environmental issues are mainly driven by these countries (Wei et al., 2016), which makes their inhabitants an important target group for intervention campaigns. For

this target group, our findings suggest that the used intervention strategy is effective, and counteracting moral disengagement therefore should not be restricted to specific demographics. Thus, researchers and activists can confidently target a variety of recipients using this template.

Limitations and Future Studies

It is important to note that the arguments seemed to be mostly effective in increasing emotional capacities that people attribute to animals; in fact, there were only descriptive differences between the conditions regarding attributions of animals' mental capacities and rationalizations towards meat. It may be speculated that the profound effect of the dialog on attributions of animal emotion may result from a synergy between the videos and the strategy of denying harm. In fact, this specific moral disengagement strategy revolves around animals' capacity to suffer. That is, when seeing these animals suffer, people might be more motivated to deny inflicted harm than to diffuse their responsibility. This may have rendered specific arguments during the dialog more effective that revolve around animals' emotional capacities than around rationalizations of meat consumption. Although this does not explain why we did not find an effect on the attributions of animal mental capacities, previous research also showed that providing information on the intelligence of livestock (i.e., pigs) does not increase moral concern towards these animals (Piazza & Loughnan, 2016). Thus, informing about emotional rather than mental capacities of animals seems to be a more promising lever for interventions. Nonetheless, we aimed to improve the catalog, and included additional arguments to address rationalizations of meat consumption more effectively (i.e., grey-colored arguments; see supplemental materials). Future studies should examine the effectiveness of these arguments, and scrutinize whether arguments that intend to counter rationalizations of meat consumption are especially effective after raising people's awareness about environmental or health instead of animal welfare issues.

In addition, it has to be acknowledged that we assessed participants' willingness to change only at one point in time, and that we did not assess actual meat consumption. Although these intentions do not necessarily translate into behavior (Sheeran, 2002), recent research showed that people who intend to reduce their meat consumption after an intervention often achieve this goal (Amiot, Boutros, Sukhanova, & Karelis, 2018). Nonetheless, researchers may aim to overcome this intention-behavior gap by using intervention tools, like mental contrasting and implementation intentions, which have already been used successfully to reduce meat consumption (e.g., Loy, Wieber, Gollwitzer, & Oettingen, 2016; Rees et al., 2018). These tools work by clearly defining individual goals and courses of action to initialize behavior more automatically. This individualized approach could also help to take the different situations of recipients into account, for example, by aiming at realizing meat-free days instead of eating smaller portions of meat or vice versa (de Boer, Schösler, & Aiking, 2014). Future studies may show that combining these tools and simultaneously addressing moral disengagement could improve the effectiveness of intervention strategies that aim at reducing meat consumption. To do so, it would be advisable to conduct longitudinal studies on people's moral disengagement strategies, willingness to reduce their meat consumption, and their dietary behavior to scrutinize if the effects last over time.

Lastly, it is important to communicate information serving as pull factors that motivate people to eat plant-based food next to push factors for eschewing meat (de Boer & Aiking, 2017). Thus, the activists provided recipes and point of sale information during the dialog if participants reasoned that meat eating is too nice to quit. These pull factors should frame plant-based food as savory, tasty, and pleasurable (de Boer & Aiking, 2017). For instance, research showed that it may be highlighted that novel culinary experiences may be derived from plant-based dishes of

other cultures being as savory and enjoyable as meat dishes (Schösler, de Boer, & Boersema, 2012). Going beyond mere communication, however, opportunities have to be created so that people make explicit positive sensory experiences with meatless food (de Boer & Aiking, 2017). Therefore, the availability of vegetarian options in everyday life can be increased. Recent studies showed, for instance, that increasing the proportion of vegetarian dishes (i.e., offering 50% instead of 25% of total dishes without meat) leads people to choose more of those dishes without affecting overall sales (Garnett, Balmford, Sandbrook, Pilling, & Marteau, 2019). Similarly, one might encourage restaurants, cafeterias, or hospitals—and individuals—to implement at least one meat-free day per week (Laestadius, Neff, Barry, & Frattaroli, 2013). In this sense, it is promising to see that, for example, the Meatless Monday campaign has been highly successful (Euromonitor International, 2011), being implemented already in 40 countries (Meatless Monday Campaigns, 2020). Nonetheless, more research is necessary to examine how to best communicate information that motivates people to eat plant-based food so that they experience it as positive.

Conclusion

In the face of man-made crises like global warming, the loss of biodiversity, the rise of civilization diseases like cancer or diabetes, and severe animal welfare issues, it is mandatory to understand how people maintain harmful behaviors that contribute to these issues. Drawing on meat consumption as prime example of harmful behavior, we outlined that moral disengagement strategies help people to maintain their behavior. This suggests that merely providing information about problematic behavior is not sufficient to elicit behavioral change (Bastian & Loughnan, 2017). Indeed, our research shows that intervention strategies need to specifically counteract moral disengagement to effectively motivate people to change. We hope that the current

investigation will thereby improve our knowledge about these strategies, and outline courses of action in the domain of meat consumption and other harmful behaviors.

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Foot Notes

¹We use the term animals if we do not refer to human animals.

²Note that other food of animal origin is also linked to environmental, health and animal welfare issues.

³Six adolescents (age 13-16) also wanted to take part in the study; however, due to data privacy protection, we only analyzed the data of adults.

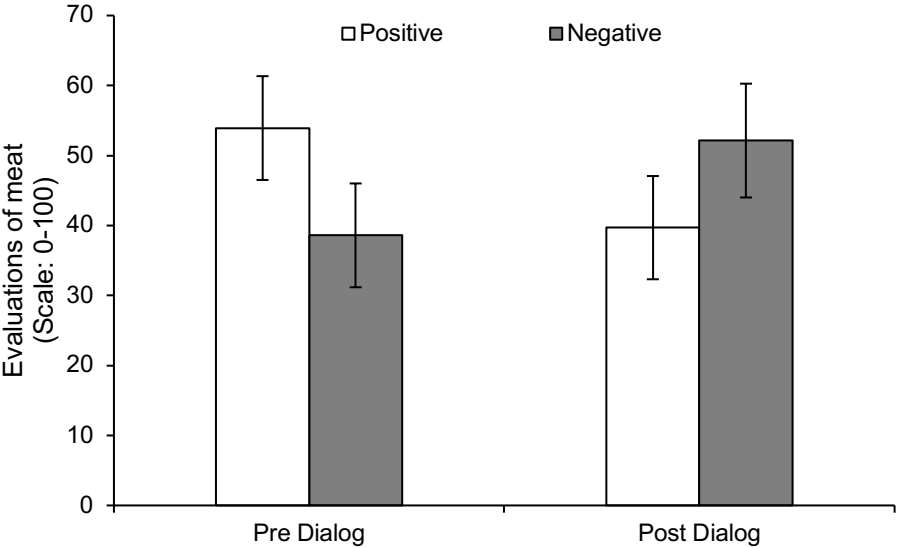
⁴We also conducted an a priori power analysis via G-Power 3.1 (Faul, Erdfelder, Lang, & Buchner, 2007) for Study 2 considering the effect size of the significant two-way interaction in Study 1. This analysis resulted in a total sample size of $N = 18$ (effect size: $\eta_p^2 = .09$; power: $1 - \beta = .95$; correlation for repeated measures: $r = -.781$). Thus, we decided to increase the power based on the feasibility of data collection.

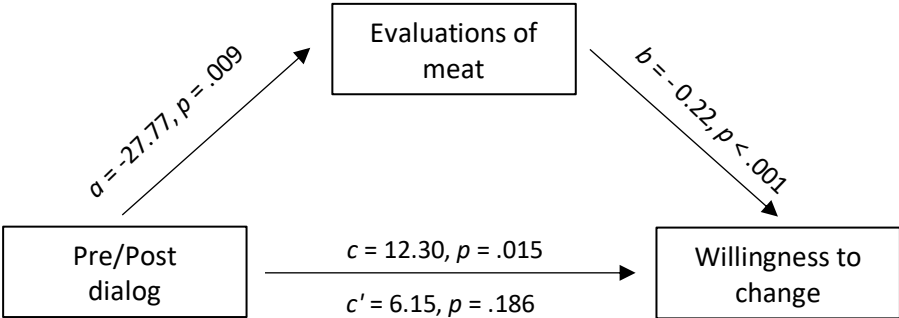
⁵For the majority of Study 1, the activists were associated with the activist group Anonymous for the Voiceless and wore white masks to cover their faces as the protocol for the “cube of truth” (Anonymous for the Voiceless, 2019) suggests. At a certain point, though, the activists separated from Anonymous for the Voiceless and stopped wearing masks. Consequently, the activists wore no masks at all in Study 2. The rest of the procedure stayed the same.

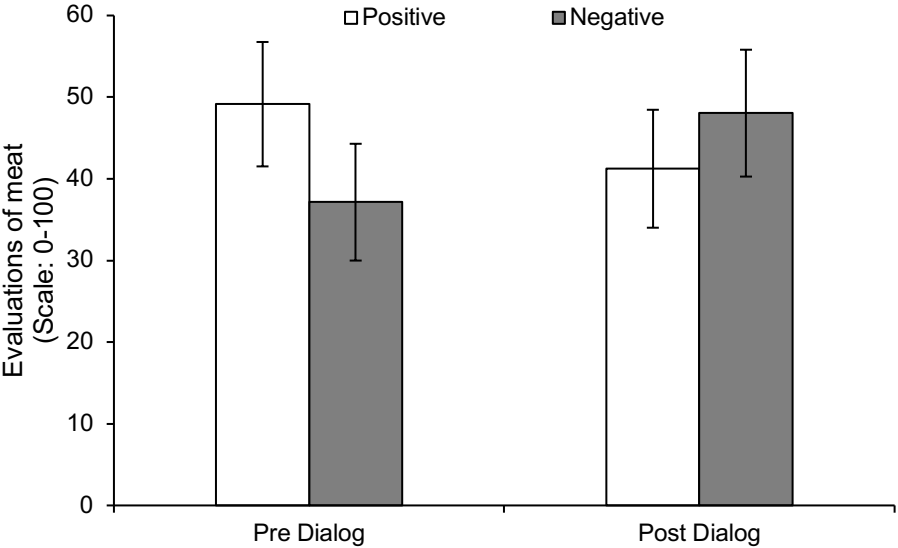
⁶For internal quality control, an additional questionnaire was completed by the activist after the dialog. The activists recorded the answers to the first three questions to start the dialog, estimated the percentage of the dialog that included ethical, ecological, or health aspects of meat consumption, and they tried to predict how likely it is that the participant was going to become vegan or vegetarian in the future or if they were going to continue eating meat. There was also space for additional notes at the end of the questionnaire.

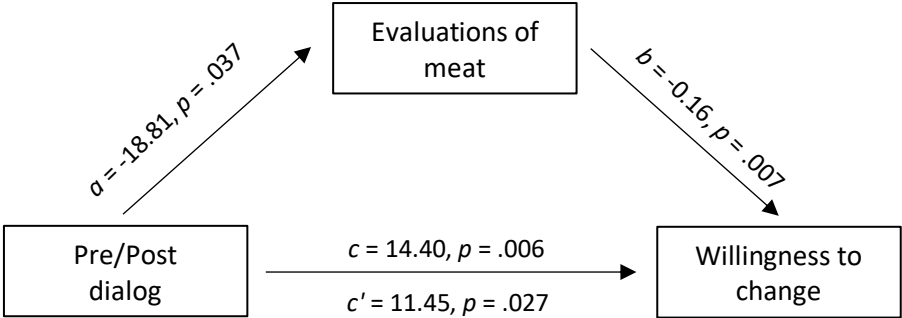
⁷The inclusion of this person did not severely affect the results; however, the one-way ANOVA on attributions of animal emotion failed to reach conventional criteria of significance, $F(1, 96) = 3.05, p = .084$.

⁸Note that the 95% CI does not contain zero for most bootstrapping samples. Due to the nature of bootstrapping, however, the lower level of the 95% CI may fluctuate and become negative in some cases.









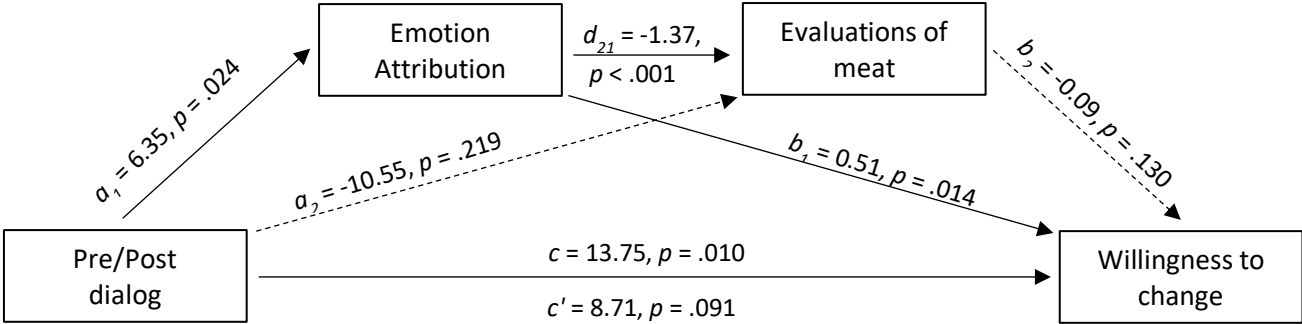


Figure Captions

Figure 1. Positive and negative evaluations of meat prior and after the dialog for Study 1. Error bars denote the 95% confidence interval.

Figure 2. Simple mediation analysis depicting the effect of the dialog (0 = Pre; 1 = Post) on willingness to change via the evaluations of meat in Study 1.

Figure 3. Positive and negative evaluations towards meat prior and after the dialog for Study 2. Error bars denote the 95% confidence interval.

Figure 4. Simple mediation analysis depicting the effect of the dialog (0 = Pre; 1 = Post) on willingness to change via evaluations of meat in Study 2.

Figure 5. Serial mediation analysis depicting the effect of the dialog (0 = Pre; 1 = Post) on willingness to change via attributions of animal emotion and evaluations of meat in Study 2.