Dealing With the Meat Paradox:

Threat Leads to Moral Disengagement From Meat Consumption

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Abstract

Meat consumption is conflicted, because meat provides pleasure to many people, but it also causes animals to suffer. This so-called meat paradox elicits discomfort in meat-eaters and they try to reduce their discomfort, for example, by means of moral disengagement. In the present investigation, we tried to scrutinize this process and examine the boundary conditions that increase moral disengagement. We assumed that, due to a domain general action-oriented state, people tend to resolve the meat paradox via moral disengagement, even if inconsistency is elicited in a different, not food-related domain. Two experiments were conducted, in which we assessed people's moral disengagement efforts via ambivalence measures after we induced inconsistency using different threats in meat-unrelated domains. Supporting our assumptions, people showed reduced ambivalence towards food in affective priming (Experiment 1) and Mouse-Tracker tasks (Experiment 2) after experiencing inconsistency. In fact, plant-based dishes became more positive and meat dishes more negative after inconsistency was induced, indicating that people disguise their endorsement of meat. This provides first convergent evidence that an inconsistency induced action-oriented state may influence cognitions regarding the meat paradox.

Key Words: meat paradox, dissonance, ambivalence, inconsistency, moral disengagement

Introduction

Meat consumption is a complex phenomenon. From an environmental perspective, meat production is an inefficient process, exemplified by the fact that 70 per cent of global farmland is used for animal agriculture but only 17 per cent of the calories being consumed worldwide are derived from this food sector (Steinfeld et al., 2006). Animal agriculture, thus, contributes more to anthropogenic climate change than the global transportation system (Tilman & Clark, 2014). Regarding health, it has been shown that high meat intake is associated with an enhanced risk to get cancer or diabetes (Tilman & Clark, 2014). Considering the moral implications, it is common sense that animals[1] have to be killed to produce meat, causing the slaughtering of millions of animals per year (Joy, 2010). This shows that meat consumption is highly conflicted, constituting the basis for a moral conflict called the *meat paradox* (Loughnan, Haslam, & Bastian, 2010): On the one hand, people do not like the suffering and killing of animals because it violates their moral self-perception (Bastian & Loughnan, 2017); on the other hand, people enjoy eating meat for many reasons, like sensory pleasure or traditions (Leroy & Praet, 2015).

This perceived inconsistency between an action (i.e., eating meat) and a cognition (i.e., animals suffer) results in an aversive state according to dissonance theory (Festinger, 1957; Harmon-Jones, Amodio, & Harmon-Jones, 2009). If the meat paradox becomes salient, omnivores, therefore, have to reduce dissonance to avoid their discomfort (Bastian & Loughnan, 2017). Importantly, as assumed in the action-based model of dissonance (Harmon-Jones et al., 2009), people try to cope with inconsistent cognitions in a way that allows them to act efficiently upon their decisions. For example, after making a difficult decision people change the evaluations of the options, resulting in a preference for the chosen option relative to the non-chosen option (Harmon-Jones & Harmon-Jones, 2002). However, in some cases this dissonance solving process

might be difficult because the cognitions that oppose a decision or a commitment are highly resistant to change (e.g., it contradicts a positive self-perception). In such cases dissonance must be resolved in a different way: People could either actually change their behavior, or they could find other strategies to disengage from their behavior, while upholding their commitment. Referring to the meat paradox, this implies that conflicted omnivores may either stop eating meat if they acknowledge that their actions are unethical, or they could use strategies that suggest that their behavior is not unethical, helping them to maintain their meat-based diets.

The strategies, that omnivores use to resolve dissonance but maintain their diets, can be described best as moral disengagement strategies (e.g., Graça, Calheiros, & Oliveira, 2014). In fact, people usually rather justify their behavior and thereby maintain their positive moral self-perception instead of changing their unethical behavior (Shalvi, Gino, Barkan & Ayal, 2015; for an overview of typical justification strategies of meat consumption, see Rothgerber, 2013). As a consequence, omnivores create consistency regarding their diet by disengaging morally if the meat paradox becomes salient (Bastian & Loughnan, 2017). Such moral disengagement strategies include the denial of inflicted harm, the diffusion of responsibility, and the protection of identity by disguising the contribution to the harmful practice (Bastian & Loughnan, 2017). People who ate meat or believed to eat meat, for example, deny inflicted harm by attributing less emotions and mental capacities to animals compared to control groups (Bastian, Loughnan, Haslam, & Radke, 2012; Loughnan et al., 2010); similarly, omnivores who are confronted with a vegetarian diffuse their responsibility by rationalizing meat consumption, or they disguise their endorsement of meat by reporting less meat consumption compared to a control group (Rothgerber, 2014).

In their motivational account on this process, Bastian and Loughnan (2017) argue that dissonance reduction may be achieved sufficiently via one moral disengagement strategy, and, if

successful, this reduces the need to endorse other moral disengagement strategies. For example, if omnivores resolve the meat paradox by disguising their endorsement of meat, they do not have to deny inflicted harm or diffuse their responsibility. This reasoning is supported by an investigation by Buttlar and Walther (2018), in which they demonstrated that, without being reminded of the meat paradox, omnivores experience a varying degree of conflict regarding meat (i.e., ambivalence): Highly ambivalent omnivores—experiencing positive and negative aspects of meat simultaneously—strongly denied inflicted harm; less ambivalent omnivores—experiencing mostly negative or positive aspects of meat—denied the inflicted harm to a smaller degree. This indicates that less conflicted omnivores feel consistent towards meat, which they may achieve by disguising their endorsement of meat (reporting mostly negative attitudes) or by the ritualization and institutionalization of their diets (creating mostly positive attitudes). Thus, these omnivores do not have to endorse additional moral disengagement strategies (Bastian & Loughnan, 2017)

The Present Investigation

Going beyond previous research (e.g., Bastian et al., 2012; Loughnan et al., 2010; Rothgerber, 2014), we aimed at examining whether people's endeavors to create consistency regarding the meat paradox may be triggered by inconsistency, which is not related to the meat paradox. Based on the action-based model of dissonance (Harmon-Jones et al., 2009), we assumed that an action-oriented state can be aroused by an inconsistency in one domain, which spreads and affects how people create consistency in another domain, for example, regarding the meat paradox. In fact, Harmon-Jones and Harmon-Jones (2002) demonstrated that thinking about a difficult decision might promote an action-oriented state that elicits a general tendency to create consistency—leading to a stronger preference regarding the chosen option in another dissonance-

evoking decision. This shows that "the effects of the action-oriented mindset can transfer to unrelated actions and cognitions" (p. 717; Harmon-Jones & Harmon-Jones, 2002).

Based on these considerations, we hypothesized that omnivores experiencing an inconsistency unrelated to the meat paradox try to create consistency regarding the meat paradox. In contrast, omnivores experiencing no inconsistency should not strive for consistency in the same way. To test this hypothesis, we assessed the effects of inconsistency inductions derived from the existential threat literature (Arndt, Greenberg, Pyszczynski, & Solomon, 1997; Randles, Proulx, & Heine, 2011; Rosenblatt, Greenberg, Solomon, Pyszczynski, & Lyon, 1989) on ambivalence towards food. Using affective priming (Petty, Tormala, Brinol, & Jarvis, 2006; Experiment 1) and Mouse-Tracker (Freeman & Ambady, 2010; Experiment 2) tasks as ambivalence measures, we assumed that omnivores would report more positive evaluations towards plant-based dishes and less positive evaluations towards meat dishes after a threat induction. Thereby, threatened omnivores could create consistency because they disguise their contribution to the harmful practice; that is, they disengage morally by underreporting their endorsement of meat (e.g., Rothgerber, 2014). In Experiment 1, we additionally tried to shed light on this process and examined if the effect was moderated by sex or trait variables that are related to eating meat. In Experiment 2, we also examined if disguising the endorsement of meat, reduces the use of additional moral disengagement strategies. Thereby, we aimed at providing further evidence for the meat paradox and its underlying processes, and demonstrate how flexible people are when dealing with their discomforting experiences, especially, regarding their conflict towards meat. Please note, that materials, data, and analysis scripts for both studies are available on https://osf.io/wec5h/.

Experiment 1

In Experiment 1, we aimed to investigate whether omnivores experiencing inconsistency in one domain try to resolve their conflict in another domain, i.e., regarding the meat paradox. To induce inconsistency in a domain unrelated to the meat paradox, we used one of the most common threat manipulation protocols (i.e., thinking about one's mortality; Rosenblatt et al., 1989), because literature on existential threat has shown that feeling threatened elicits similar effects to experiencing inconsistencies, like dissonance (Proulx, Inzlicht, & Harmon-Jones, 2012; Randles, Inzlicht, Proulx, Tullet & Heine, 2015). Afterwards, we assessed ambivalence towards food using an affective priming task (Petty et al., 2006) to examine whether omnivores try to create consistency by disguising their endorsement of meat. This would be indicated if threatened participants reduce their ambivalence and reveal more univalent attitudes: plant-based dishes become more positive; meat-based dishes become more negative. In addition, we assessed possible moderators using questionnaires on trait variables associated with meat consumption: Social dominance orientation (Veser, Taylor, & Singer, 2015), speciesism (e.g., Caviola, Everett, & Faber, 2018), and object identification with meat (Allen & Baines, 2002).

Method

Participants and Design. We recruited 92 omnivorous participants (46 women, 46 men, M_{Age} = 22.81, age range = 18–32) at a university campus in Germany, who received course credits or money (8€) for their attendance; to rule out a biased sampling, non-omnivores were recruited but excluded prior to data analysis. Experiment 1 was conducted in a 2 (Threat [threat, control]) x 2 (Dish [plant-based, meat]) x 2 (Valence [positive, negative]) within-between design with repeated measures on the last two factors. An a priori calculation of required sample size for all main effects or interactions via G*Power 3.1 (Faul, Erdfelder, Lang, & Buchner 2007)

revealed a N = 68 to achieve a power of 1-β = .95 while using a correlation of r = .5 for repeated measures, and considering an effect of d = 0.77—the medium effect size for explicit threat manipulations (Burke, Martens, & Faucher, 2010). However, we aimed to recruit a higher number of participants per cell (n = 23; considering the inclusion of sex as a factor in further analyses) to reduce the possibility to obtain false-positive results (Simmons, Nelson, & Simonsohn, 2011). We achieved this sample; all data analyses were conducted afterwards. In the following, we report all measures, manipulations, and exclusions of Experiment 1.

Materials and Procedure

After being welcomed, participants gave informed consent. Subsequently, the experiment was conducted on a computer using E-Prime 2.0 (Psychology Software Tools, Pittsburgh, PA).

Threat Manipulation. To manipulate threat, we administered a standard manipulation of mortality salience (MS; Burke et al., 2010; Rosenblatt et al., 1989). MS is a highly effective induction of inconsistency, as it makes the concept of death salient (Heine, Proulx, & Vohs, 2006). Participants were instructed via the computer to complete a pen-and-paper survey, in which they were asked to "Please briefly describe the emotions that the thought of your own death arouses in you." and to "Jot down, as specifically as you can, what you think will happen to you as you physically die and once you are physically dead.". In the control condition, participants wrote about watching television.

Delay Tasks. As common for this manipulation, innocuous questionnaires were administered to insert a delay between the manipulation and the dependent variable (Burke et al., 2010). Participants completed the Implicit Positive and Negative Affect Test (IPANAT; Quirin, Kazén, & Kuhl, 2009) before they answered the Positive and Negative Affect Scale (PANAS, Watson, Clark, & Tellegen, 1988). Responses for both questionnaires were assessed on a scale

from -100 to 100. Lastly, a word completion task was administered on creatureliness accessibility (Cox, Goldenberg, Arndt, & Pyszczynski, 2007).[2]

Affective Priming. We assessed implicit ambivalence via an affective priming task (Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Petty et al., 2006). Participants first completed 36 training trials, in which letter combinations (BBB, EEE, FFF) were presented for 100ms. Then one of six positive (compassionate, affectionate, tolerant, helpful, peaceful, humorous) or six negative target words (violent, insulting, malicious, unjust, ruthless, egoistic) was presented. Participants were instructed to indicate the valence of the target as fast as possible by pressing one of two marked keys ("m" and "x") on a QWERTZ keyboard. Thereby, their reaction time (RT) was recorded; there was no RT limit, but participants received a 300ms feedback (error) if the response was incorrect. The assignment of response keys was counterbalanced between participants. Subsequent to the training trials, letter combinations were replaced by pictures of meat or plant-based dishes (i.e., raw steak, raw potatoes, grilled steak, grilled potatoes, meat ball, french fries[3]) selected from the food pics data base (Blechert, Meule, Busch, & Ohla, 2014). Each picture was presented twice in random order with each target word, resulting in 144 trials.

Explicit Ratings, Traits, and Demographics. Although ambivalence is difficult to assess using self-report measures (Schneider et al., 2015), participants were asked to rate each dish concerning valence, palatability, meatiness, and bloodiness by adjusting a slider (scale: -100 to 100). Thereafter, we assessed trait variables related to eating meat, that is, an 8-item scale on social dominance orientation ($\alpha = .88$; Veser et al, 2015) and a 20-item questionnaire on speciesism ($\alpha = .82$; Pielen, Albrecht, & Walther, 2018). In order to agree or disagree with the statements, participants responded via a slider (-100 = *I do not agree* and 100 = *I totally agree*). As a last trait variable, we assessed object identification with meat for fish, white, red, and

overall meat on a 5-point scale by asking "If I were forced to decrease the amount of … meat (fish), I would feel like an important part of who I am had been changed." (α = .90; Allen & Baines, 2002). Lastly, we asked participants for demographics (age, sex, field of study, handedness, diet), how often they eat meat, when they ate the last time in general, and when they ate their last meat dish. Participants were also invited to report current dietary behaviors. Then, participants were debriefed and thanked.

Results

Ambivalence. For the analysis of the affective priming data mean RTs of correctly categorized positive and negative trials, which did not deviate at least 3SD from the mean RT, were computed for meat and plant-based dishes respectively. Further, we screened for outliers in accuracy (+/- 3SD) during the test trials and excluded three participants (accuracy < 77%).

A 2 (Threat [threat, control]) x 2 (Dish [plant-based, meat]) x 2 (Valence [positive, negative]) repeated measure ANOVA[4] was conducted to analyze RTs. This analysis revealed a significant main effect for the factor Dish, $F(1, 87) = 6.19$, $p = .015$, $\eta_p^2 = .07$, 95% confidence interval (CI) = [.01, .16], and a significant two-way interaction for Valence x Dish, $F(1, 87) = 6.33$, $p = .014$, $\eta_p^2 = .07$, 95% CI = [.01, .16]. These effects were qualified by the three-way interaction, $F(1, 87) = 4.42$, $p = .039$, $\eta_p^2 = .05$, 95% CI = [.001, .14]. Pairwise comparisons[5] between positive and negative trials revealed for meat ($p = .957$, $d_Z = 0.01$, 95% CI = [-0.28, 0.30]) and plant-based dishes ($p = .760$, $d_Z = 0.04$, 95% CI = [-0.25, 0.33]) that opposing evaluations were simultaneously present in the control condition—indicating that participants were ambivalent towards both kinds of dishes. Participants in the threat condition, however, seemed to resolve their ambivalence showing more univalent attitudes as indicated by increased differences in RTs, i.e., faster responses for plant-based ($p = .028$, $d_Z = 0.41$, 95% CI = [0.1,

0.71]) and marginally slower responses for meat dishes (p = .079, d_z = 0.28, 95% CI = [-0.03, 0.57]) in positive compared to negative trials (see Figure 1).

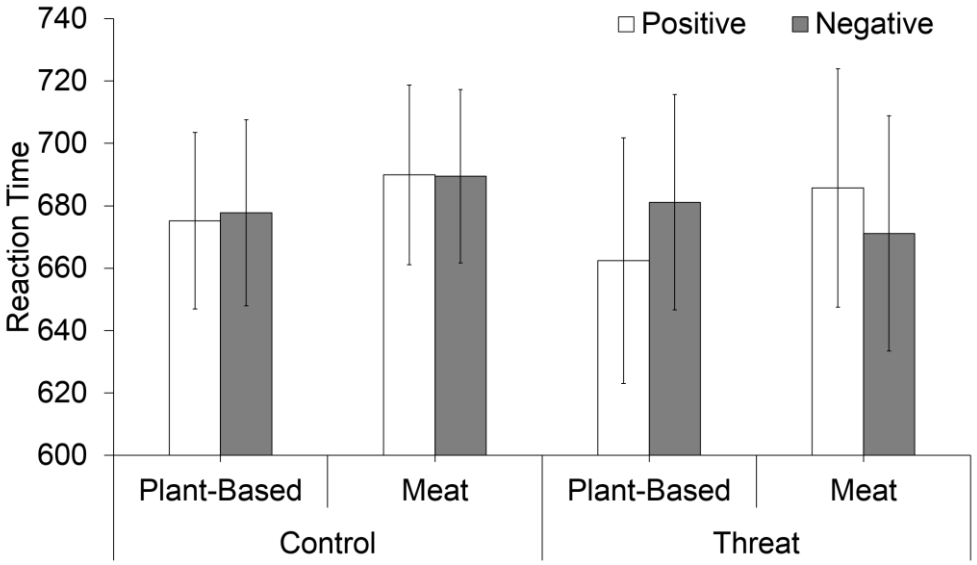

Figure 1. RT in the affective priming task depicted for positive and negative trials across the different levels of the factor Dish und Threat. Error bars denote 95% confidence intervals.

Explicit Ratings. Four separate 2 (Threat [threat, control]) x 2 (Dish [plant-based, meat]) repeated-measures ANOVAs revealed significant main effects of Dish for valence, palatability, meatiness, and bloodiness, all *F*s(1, 87) > 36.18, all *p*s < .001, all η_p^2s > .29, 95% CI = [.17, 41]. Meat dishes differed from plant-based dishes on explicit valence (Meat: *M* = 16.62, *SD* = 44.88, 95% CI = [7.17, 26.08]; plant-based: *M* = 44.04, *SD* = 32.5, 95% CI = [37.19, 50.88), palatability (Meat: *M* = 17.45, *SD* = 45.41, 95% CI = [7.89, 27.02]; plant-based: *M* = 46.08, *SD* = 31.5, 95% CI = [39.44, 52.71), meatiness (Meat: *M* = 79.71, *SD* = 21.9, 95% CI = [75.1, 84.33]; plant-based: *M* = -89.31, *SD* = 23.72, 95% CI = [-94.3, -84.31), and bloodiness (Meat: *M* = 26.91, *SD* = 39.3, 95% CI = [18.63, 35.19]; plant-based: *M* = -93.27, *SD* = 24.36, 95% CI = [-98.41, -88.14). No other main or interaction effects were significant, all *F*s(1, 87) < 1.07, all *p*s > .305.

Moderation Analyses. Positivity scores were computed for plant-based and meat dishes by subtracting the RT in positive from RT in negative trials for the dishes, respectively; to get one variable to be used in moderation analyses, a preference score for vegetarian dishes was computed by subtracting these positivity scores from each other (plant-based – meat). Using this score as a dependent variable, hierarchical regression analyses were conducted using threat and the different trait variables (social dominance orientation, speciesism, and object identification) as predictors. The interactions of these moderation analyses indicated that none of the trait variables did moderate the effect of Threat on dish preference (all Fs < 3.12 all ps > .081).

Discussion

In Experiment 1, we sought to investigate if omnivores create consistency regarding the meat paradox following the experience of an unrelated inconsistency. In support of a domain general action orientation that spreads to different cognitions (Harmon-Jones & Harmon-Jones, 2002), we found that people changed their evaluations of food after they wrote about mortality: plant-based dishes became more positive and meat-based dishes became more negative. For people who wrote about television, the dishes remained ambivalent, that is, positive and negative evaluations were simultaneously present. This change in evaluations indicates that omnivores experiencing inconsistency, indeed, disengage from meat consumption by disguising their contribution to the harmful practice. Notably, the inclusion of sex as a factor into the ANOVA and the moderation analyses on different trait variables demonstrate that these effects did not depend on certain boundary conditions.

Experiment 2

In Experiment 2, we aimed to substantiate these findings and assess online information on how people create consistency, i.e., how does the change in evaluations take place. In fact,

reaction times in the affective priming provide information about ambivalence only after the evaluation is completed (Schneider et al., 2015); therefore, we used the Mouse-Tracker paradigm (Freeman & Ambady, 2010) which allows researchers to measure motoric response conflicts via mouse trajectories in a task in which participants have to evaluate the valence (i.e., positive or negative) of ambivalent objects (Schneider et al., 2015). In this task, behavioral ambivalence (i.e., the motoric response conflict) can be measured independently of the evaluations.

Besides this advancement on our measurement, we also used incongruent word pairs as a second manipulation of inconsistency (meaning threat; MT; Randles et al., 2011) to complement the MS manipulation. Thereby, we wanted to ensure that the shown effects are not restricted to a particular form of threat. That is, although we argue that the MS manipulation is unrelated to the meat paradox, the realization of one's own mortality may remind people of the meat paradox. Thus, by using a second form of threat, we hoped to show similar effects and support the assumption of a generalizable inconsistency-induced action-oriented state.

Lastly, we examined whether omnivores need to endorse additional moral disengagement strategies if they already disguise their endorsement of meat consumption (Buttlar & Walther, 2018). We hypothesized that omnivores would be less conflicted if they underreport their meat endorsement, and that they would, therefore, not need to deny the inflicted harm or diffuse their responsibility. Thus, we administered two questionnaires to assess participants' attributions of animal mind and emotion (Rothgerber, 2014), and their endorsement of rationalizations of meat consumption (Piazza et al. 2015) after examining ambivalence via the Mouse-Tracker paradigm.

Method

Participants and Design. We sampled 74 omnivorous participants (54 women, 18 men, 2 without indication[6]; M_{Age} = 22.1, age range = 18–46 years) using the same recruitment procedure

as in Experiment 1. Participants received course credits for their participation and were randomly assigned to the different conditions of a 2 (Threat [threat, control]) x 2 (Type of Threat [MS, MT]) x 2 (Dish [plant-based, meat]) within-between participants design with repeated measures on the last factor. An a priori calculation of required sample size for all possible effects via G*Power 3.1 (Faul et al., 2007) resulted in $N = 72$ to achieve a power of $1\text{-}\beta = .95$, while using a correlation of $r = .5$ for repeated measures, and considering an effect of $d = 0.75$—the medium effect for the used subliminal threat induction (Burke et al., 2010). We again tried to collect 23 participants per cell but had to terminate data collection at the end of semester. All data analyses were conducted afterwards. In the following, we report all measures, manipulations, and exclusions of Experiment 2.

Materials and Procedure. At the beginning of the experiment, participants gave informed consent before the computer experiment started.

Threat Manipulations. To parallelize the MT and the MS manipulation, we used a subliminal priming procedure (Arndt et al., 1997; Randles et al., 2011) comprising of the words ‘DEATH’ (MS), ‘PAIN’ (MS control), and incongruent (MT; e.g., ‘CAREFUL-PULLOVER’, ‘JUICY-SEWING’, ‘PINK-RUNNING’) or congruent word pairs (MT control; e.g., ‘PINK-PULLOVER’, ‘CAREFUL-SEWING’, ‘FAST-RUNNING’). The primes were flashed on the computer screen for 30ms prior to a target word in each of the training trials of the evaluation task in the Mouse-Tracker paradigm.

Mouse-Tracker Paradigm. To assess ambivalence in Experiment 2, we used the Mouse-Tracker software (http://www.Mouse-Tracker.org) that allows to measure response conflicts (Freeman & Ambady, 2010). These response conflicts express themselves in geometrical pull towards a non-chosen option in an evaluation task—for instance maximum deviation, i.e., the

maximum distance between mouse trajectories and an idealized response trajectory (going straight from start position to response option). In each trial of the evaluation task participants' mouse trajectories were tracked on the x-axis (scaled from -1 to 1) and y-axis (scaled from 0 to 1.5). A trial started by depicting a 'start' button at the bottom middle (x = 0 and y = 0) of the monitor and response buttons (positive and negative) at the top right (x = 1 and y = 1.5) or top left corner (x = -1 and y = 1.5) of the monitor. Participants were instructed to hit the start button and, thereby, the mouse cursor was set to a fixed spot (x = 0 and y = 0.05); simultaneously, a stimulus appeared in the middle of the monitor. Participants evaluated the stimulus by selecting a response option. Responses were not limited in time, but participants were asked to move faster if they did not initiate a movement after 1000ms. Note that the Mouse-Tracker software normalizes reaction times using linear interpolations to compare mouse trajectories and creates data points for x and y coordinates at 101 points of time.

The evaluation task included 10 training trials with words of neutral objects as stimuli. Subsequently, 144 total test trials were administered during which words were replaced by pictures (Blechert et al., 2014). Test trials were divided into two blocks (B1 and B2) consisting of 24 pictures unrelated to food (e.g. flowers, broom), and 12 pictures of plant-based or meat dishes (i.e., peas, potatoes, rice; salmon, chicken breast, beef steak[7]) which were presented twice in random order. The allocation of response buttons switched after B1; 10 additional training trials were administered before B2 started; allocation order was counterbalanced across participants.

Moral Disengagement. Following the evaluation task, two questionnaires were administered via E-Prime 2.0 (Psychology Software Tools, Pittsburgh, PA) to assess additional moral disengagement strategies; the presentation order was counterbalanced across participants. We assessed the degradation of animals by asking if participants believe that animals do possess

ten different emotions and mental capacities (‘Animals do not possess these emotions/capacities’ to ‘Animals do possess these emotions/capacities’; α = .74; Rothgerber, 2014). Additionally, we assessed rationalizations of meat consumption via a 16-item questionnaire including statements that render meat consumption as nice, natural, necessary, and normal (‘I do not agree’ to ‘I totally agree’; α = .89; Piazza et al., 2015). All answers were recorded on a slider from -100 to 100.

Demographics and Debriefing. At last, we assessed the same demographics and concluding questions as in Experiment 1. Then, participants were thanked and debriefed.

Results

Ambivalence. To assess the effects of threat on ambivalence (MD), we used a 2 (Threat [threat, control]) x 2 (Type of Threat [MS, MT]) x 2 (Dish [plant-based, meat]) x 2 (Block [B1, B2]) ANOVA with repeated measures on the last two factors. This analysis revealed a significant main effect for Dish, $F(1, 70) = 8.29$, $p = .005$, $\eta_p^2 = .11$, 95% CI = [.02, .22], Block, $F(1, 70) = 9.64$, $p = .003$, $\eta_p^2 = .12$, 95% CI = [03, 24], and Threat, $F(1, 70) = 4.36$, $p = .04$, $\eta_p^2 = .06$, 95% CI = [.001, 16]. The last two main effects, however, were qualified by a significant interaction Threat x Block, $F(1, 70) = 5.31$, $p = .024$, $\eta_p^2 = .07$, 95% CI = [.01, 18]. Pairwise comparisons (see Figure 2) reveal that people in the threat condition exhibited less ambivalence in B1 ($p = .005$, $d = 0.69$, 95% CI = [0.21, 1.15]) but not in B2 ($p = .434$, $d = 0.18$, 95% CI = [-0.28, 0.64]). This indicates that participants’ reactions were more consistent towards meat and plant-based dishes in the threat conditions compared to participants in the control conditions.

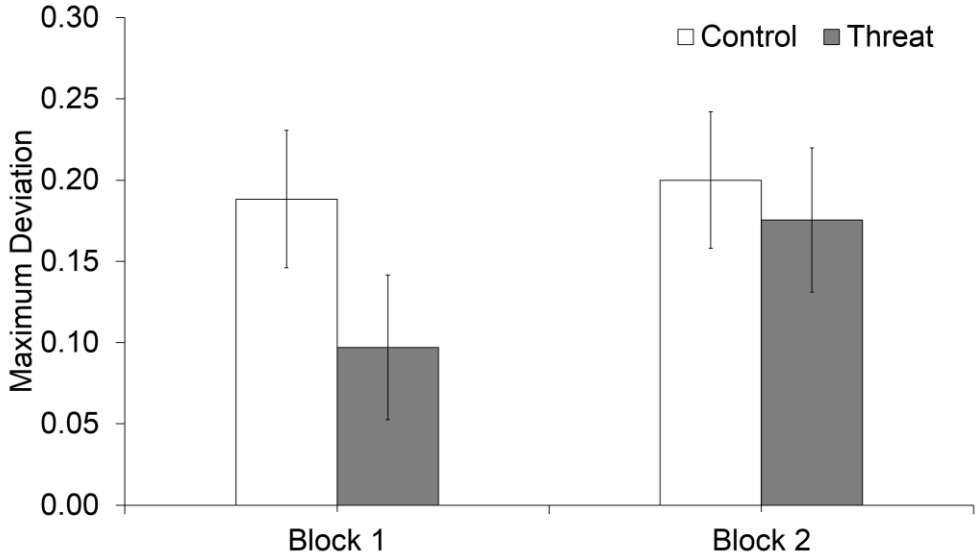

Figure 2. Mean MD depicted for different levels of the factors Dish, Threat, and Block. Error bars denote the 95% confidence interval.

No other effects were significant, all *F*s < 3.11, all *p*s > .082, and the observed effects were, thus, independent of the factors Type of Threat and Dish. See Figure 3 for a visualization of all relevant effects in the Mouse-Tracker paradigm.

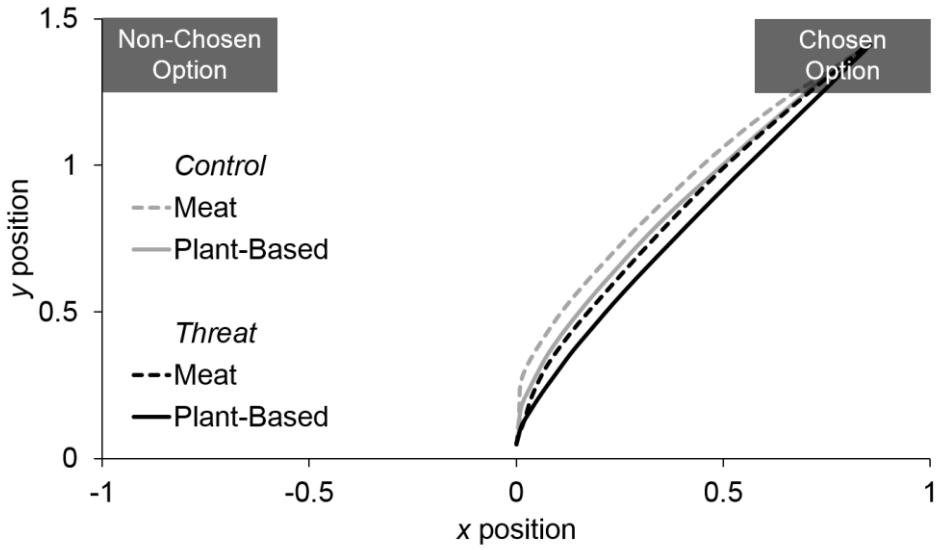

Figure 3. Averaged mouse trajectories presented for the different levels of the factors Dish und Threat in B1. To allow comparison, trajectories to the left option were horizontally remapped.

Responses. To examine if reduced ambivalence was also associated with a change of evaluation regarding the dishes (i.e., percentage of positively evaluated trials), we conducted a 2 (Threat [threat, control]) x 2 (Type of Threat [MS, MT]) x 2 (Dish [plant-based, meat]) x 2 (Block [B1, B2]) ANOVA with repeated measures on the last two factors. In line with the results of Experiment 1, we found a significant interaction Dish x Threat, $F(1, 70) = 4.65$, $p = .035$, $\eta_p^2 = .06$, 95% CI = [.002, 17]. Although pairwise comparisons were not significant (meat: $p = .18$, $d = 0.30$, 95% CI = [-0.16, 0.76]; plant-based: $p = .13$, $d = 0.36$, 95% CI = [-0.10, 0.82]), descriptive statistics show that the overall interaction emerged because participants evaluated plant-based dishes more often positively in the threat ($M = 90.83$, $SD = 15.05$, 95% CI = [85.19, 96.48]) compared to the control condition ($M = 85.83$, $SD = 18.15$, 95% CI = [79.48, 90.18]); to the contrary, they evaluated meat dishes less often positively in the threat ($M = 62.26$, $SD = 35.1$, 95% CI = [51.85, 72.68]) than in the control condition ($M = 71.58$, $SD = 18.15$, 95% CI = [61.71, 81.45]). This two-way interaction was not qualified by any three-way interaction or the four-way interaction, all Fs < 2.84 and ps > .096.[8] This shows that, independent of the type of threat, food attitudes became more univalent, indicating a lowered endorsement of meat.

Moral Disengagement. Simple mediation analyses were conducted to assess the indirect effect of threat on the other moral disengagement via ambivalence reduction (i.e., mean MD in B1). It was assumed that if people were more consistent regarding the meat paradox, they would not need to cope with the meat paradox in an additional way. Figure 4 shows that the participants decreased ambivalence following threat ($a = -.09$, 95% CI = [-.15, -.03]). Although ambivalence was not significantly associated with the endorsement of rationalizations of meat consumption ($b = 47.12$, 95% CI = [-5.8, 100.04]), the significant indirect effect ($ab = -4.27$, 95% CI = [-10.25, -0.56])—based on 10000 bootstrap samples—indicated that lowering ambivalence in response to

threat led to decreased rationalizations of meat consumption. Independent of the indirect effect, threat did not significantly affect rationalizations of meat consumption (*c*' = -12.58, 95% CI = [-27.41, 2.26]). A mediation analysis of threat on degradation of animals via ambivalence reduction did not indicate that the indirect effect explained a substantial portion of variance, 95% CI = [-4.78, 5.37].

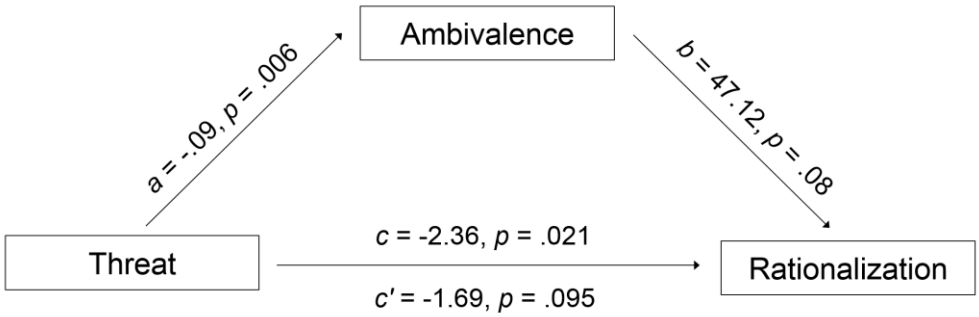

Figure 4. Mediation analysis depicting the indirect effect of threat induction on rationalizations of meat consumption mediated via ambivalence (mean MD in B1).

Discussion

In Experiment 2, we aimed to substantiate the findings of Experiment 1 by using a more refined ambivalence measure and an additional threat manipulation. Independent of the type of threat, we were able to replicate the basic findings of Experiment 1. This supports the assumption of a domain general action orientation that transfers to the domain of the meat paradox. That is, after perceiving food-unrelated inconsistency, participants became more consistent regarding the meat paradox: they reduced their ambivalence and changed their evaluations towards food. This indicates that they disguised their endorsement of meat consumption, because they favored plant-based compared to meat dishes. Going beyond this, the findings of Experiment 2 also support the notion that people who disguise their endorsement of meat consumption used less rationalizations of meat consumption.

General Discussion

How do omnivores cope with the meat paradox? Building on the action-based model of dissonance (Harmon-Jones et al., 2009), we hypothesized that people are motivated to create cognitive consistency regarding the meat paradox if they experience inconsistency. Going beyond previous research (Bastian & Loughnan, 2017), we assumed that people enter a domain general action-oriented state that triggers conflict resolution following the perception of inconsistency. We examined this hypothesis by investigating whether people resolve the meat paradox via moral disengagement after perceiving inconsistency unrelated to the meat paradox. Thereby, we specifically aimed to extend our knowledge regarding the situations in which people use moral disengagement strategies to cope with the meat paradox. By doing so, we hoped to shed light on how generalizable the process is that allows people to alter their representations of food and attain cognitive consistency.

To investigate this process, we conducted two experiments using ambivalence measures examining whether omnivores disguise their endorsement of meat following the perception of inconsistency. In Experiment 1, we used an affective priming task and demonstrated that omnivores were ambivalent towards food in the control condition as indicated by similar RTs in positive and negative trials. If inconsistency was induced, however, participants resolved their ambivalence as indicated by faster reactions in positive compared to negative trials when plant-based dishes were used as primes; in comparison, the reactions were slower in positive compared to negative trials in which meat dishes were primed. This implies that threatened omnivores create consistency by disguising their endorsement of meat. Importantly, these effects did not seem to be moderated by participants' sex, and trait variables that are associated with meat

consumption, like, social dominance orientation (Veser et al., 2015), speciesism (Caviola et al., 2018), and object identification (Allen & Baines, 2002)

In Experiment 2, we substantiated these findings with a different inconsistency induction and assessed ambivalence via the Mouse-Tracker paradigm. Again, the reduction of ambivalence was associated with a less positive evaluation of meat and a more positive evaluation of plant-based dishes. This indicates that people create consistency by disguising their endorsement of meat following the perception of a meat-unrelated inconsistency. Beyond these effects, Experiment 2 also provides first experimental evidence for the assumption that omnivores do not need to use additional moral disengagement strategies if they already created consistency regarding the meat paradox by disguising their endorsement of meat (Bastian & Loughnan, 2017; Buttlar & Walther, 2018). In fact, a mediation analysis showed that the reduction of ambivalence, following inconsistency, lowered the endorsement of rationalizations of meat consumption.

Regarding methodological implications, these findings are important because they show that ambivalence measures are not only useful in quasi-experimental designs to investigate the meat paradox (e.g., Buttlar & Walther, 2018), but they may also be used to investigate situational influences on the meat paradox and their consequences. In this regard, especially the Mouse-Tracker paradigm (Freeman & Ambady, 2010) seems to be promising as it provides online information of how people create consistency regarding the meat paradox. This way, we were able to demonstrate that people who disguise their endorsement of meat use less additional strategies to cope with the meat paradox. Thus, information about food-related ambivalence may provide valuable insights in future studies on the basic processes underlying the meat paradox.

Equally important, our findings also have practical implications: On the one hand, it can be argued that omnivores who disguise their endorsement of meat after induced inconsistency

would only engage in "perceived behavioral change" (p. 33; Rothgerber, 2014), having no immediate behavioral consequences. On the other hand, our results suggest that the state of reduced ambivalence in favor of a preference for plant-based dishes may serve as a starting point that leads to actual behavioral change: After all, lowering ambivalence strengthens the attitude-intention and attitude-behavior link (van Harreveld, Nohlen, & Schneider, 2015). Omnivores who express lowered ambivalence in favor of plant-based dishes may therefore feel inclined to change their behavior given the opportunity to act consistent with their attitude. This reasoning is supported in Experiment 2, in which people who disguised their endorsement of meat following threat used fewer rationalizations for meat consumption—suggesting that they are more open to eschew meat. Practitioners could take advantage of these considerations and provide alternatives to meat after they incite experiences of inconsistency; that is, intervention campaigns aiming at changing people's diets may, for example, offer plant-based food to omnivores, or at least provide information about it, if omnivores disguise their endorsement of meat. If people actually eat plant-based food alternatives, they may be more willing to implement similar behavior in the future, acting consistent with their prior behavior and not only with an expressed attitude.

Limitations

Although the mouse-tracker data seems to be straightforward, there are also aspects that should be discussed: Ambivalence reduction following threat was stronger in B1 than B2. We assume that this difference between blocks might have occurred because the side of the response keys switched after the first block and participants, thereby, could have been confused about the allocation of the intended response option. This interpretation is supported by response data showing that the effect of threat on chosen responses did not depend on the factor Block.

However, to avoid any ambiguities in future studies, we suggest to counterbalance the allocation of response buttons between and not within participants in the Mouse-Tracker paradigm.

In addition, we want to outline a further limitation of our experiments, that is, the use of student samples. This restriction to student samples might decrease the generalizability of our findings as young people with a high education generally report less meat consumption than other samples (Pfeiler & Egloff, 2018). This may imply that students are more aware of the detrimental effects of meat consumption, and that the effects of inconsistency on moral disengagement might, thus, be smaller in others samples with less awareness. Hence, we consider our investigation as a very first step towards a better understanding of the underlying processes of meat consumption and how people deal with cognitions associated with meat paradox.

Conclusion

The presented findings provide first insights in how people use representations about food to cope with inconsistencies that they encounter in mundane areas different from food. In fact, the results indicate that people who perceive food-unrelated inconsistency try to create consistency regarding the meat paradox. This supports the assumption of an action-oriented state that spreads to other domains as proposed by the action-based model of dissonance (Harmon-Jones et al., 2009). This has important implications for meat consumption because the endorsement of moral disengagement strategies seems to be used as a buffer against the perception of inconsistency in a variety of situations. This indicates that people are really flexible in coping with different forms of inconsistencies and contradictions, and this domain general process might be a part of the explanation why people have difficulties to change their conflicted meat-based diets (Bastian & Loughnan, 2017): In a world full of threats and uncertainties (e.g., occurrence of news related to mortality; Gibson, 2007), the perception of inconsistency may promote moral disengagement,

which could in turn contribute to the persistence of meat-based diets; however, our results also suggest that the perception of inconsistency may serve as a starting point to encourage actual behavioral change if moral disengagement is addressed appropriately.

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Foot Notes

[1]We use the term animals to refer to non-human animals.

[2]We did not find any significant effects of Threat on explicit affect and creatureliness accessibility. However, we found significant main effects of Threat on implicit positive and negative affect, $F(1, 87) = 4.14$, $p = .045$, $\eta^2 = .05$, and $F(1, 87) = 4.48$, $p = .037$, $\eta^2 = .05$, respectively. After controlling for implicit affect in an ANCOVA, effects of Threat on implicit food preferences were unaffected.

[3]Pictures of the dishes can be found in the food pics data base referring to the numbers: 46, 311, 317, 324, 346, and 544.

[4]Although sex has been discussed as a major factor for food preferences (e.g., Kubberød, Ueland, Rødbotten, Westad, & Risvik, 2002), including sex as a factor into the ANOVA did not change the effects of threat on ambivalence.

[5]Troughout the article, all reported pairwise comparisons were bonferroni adjusted.

[6]We had technical issues with E-Prime during the experimental sessions of two participants. For these participants, only Mouse-Tracker data is available.

[7]Pictures of the dishes can be found in the food pics data base referring to the numbers: 236, 301, 307, 317, 329, 346, 417, 424, 541, 544, 563, and 871.

[8]Additionally, significant effects that were independent of the threat effects emerged: a main effect of Threat Type, $F(1, 70) = 4.00$, $p = .049$, $\eta^2 = .05$, which was qualified by an interaction of Threat Type x Dish, $F(1, 70) = 5.04$, $p = .028$, $\eta^2 = .06$, and an interaction between Block and Dish, $F(1, 70) = 4.74$, $p = .033$, $\eta^2 = .06$.