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‘Meating’ the animal and moral emotions: Exploring animal caring and cruelty appeals for dietary change

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ABSTRACT

In modern Western societies, consumers are often disconnected from the animal origins of meat, which facilitates meat consumption by reducing empathy towards animals, and feelings of disgust and guilt. Conversely, animal advocates may appeal to meat’s animal origins to evoke moral emotions that discourage meat consumption. This preregistered study investigated the effectiveness of such meat-animal reminders among 421 meat-eating participants from the UK, recruited via Prolific. Participants were randomly exposed to one of three images: a pork chop without animal reminder (control condition), a pork chop paired with a human petting a pig (animal caring appeal) or paired with a human stunning a pig before slaughter (animal cruelty appeal). Based on harm-based accounts of moral judgment, we measured moral emotions oriented to the pig victim (e.g., empathy, sadness), the human perpetrator (e.g., anger, disgust) and the self (e.g., guilt, shame), and examined their effects on participants’ willingness to change pork chop consumption and tendency to justify pork-eating. ANOVA analysis revealed that both animal appeals (vs. control) increased moral emotions, while mediation analyses indicated that these emotions indirectly decreased pork-eating justification and increased willingness for dietary change. The animal cruelty appeal seemed particularly effective by evoking perpetrator- and victim-oriented emotions. However, we also found evidence of counteractive effects on pork-eating justification and willingness for dietary change once moral emotions were controlled for, suggesting moral disengagement. Hedonic motivations to eat meat remain a significant barrier. Future research should further explore interventions that enable consumers to translate moral concerns into lasting dietary change.

1. Introduction

Eating meat remains an ingrained norm in Western society, despite plant-based diets being more sustainable, environmentally friendly and less harmful to farmed animals (Chai et al., 2019; Fiddes, 1992; Hallström et al., 2015). Paradoxically, many people enjoy eating meat, while simultaneously condemning animal cruelty (Hartmann & Siegrist, 2020; Loughnan et al., 2010). One explanation for this so-called ‘meat paradox’ is that consumers in the Western world are disconnected from farmed animals and the suffering they endure in conventional “factory” farming (such as routine mutilations, transport, confinement, slaughter, etc.) (Benningstad & Kunst, 2020; Lemos Teixeira et al., 2018; McConnachie et al., 2019). The physical and emotional separation between consumers and farmed animals can be linked with a low consumer awareness about the suffering of farmed animals (Fonseca & Sanchez-Sabate, 2022), as it renders them invisible and absent from the lives of most omnivores (Adams, 2003). Consumers’ tendency to dissociate meat from its animal origins limits moral concern for farmed animals and their willingness for dietary changes (Benningstad & Kunst, 2020; Hartmann et al., 2018; Kunst & Hohle, 2016; Kupsala, 2018; Plous, 1993). This detachment is further supported by the hegemonic ideology that normalizes and neutralizes the consumption of animal products (Joy, 2009; Rogers, 2009), for example by denying animal sentience (Bastian, Costello, et al., 2012; Rothgerber, 2014; Tian et al., 2016) and justifying meat-eating as a natural, nutritional and hedonic necessity (Piazza et al., 2015; Rothgerber, 2013). As such, contemporary sociocultural representations play a major role in reducing cognitive dissonance stemming from the meat paradox (Loughnan et al., 2010), and reinforcing the emotional distancing from animals who are used for food (Benningstad & Kunst, 2020a).

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Several experiments have shown, however, that simple reminders of meat's animal origins generally reduces consumers' willingness to eat meat (Cordts et al., 2014; Johnson et al., 2021; Tian et al., 2016; Zickfeld et al., 2018) by eliciting moral emotions in the form of empathy towards the farmed animals, disgust towards meat, and feelings of guilt (Earle et al., 2019; Kunst & Hohle, 2016). Especially exposures to cute or baby/infant animals (Piazza et al., 2018; Zickfeld et al., 2018) and anthropomorphized animals (Niemyjska et al., 2018) seem effective in inducing animal empathy and reducing willingness to eat meat, while other research has explored how empathy and dietary change can be induced by shedding light on animal suffering in particular (Herrewijn et al., 2021; Silva Souza et al., 2022; Tian et al., 2016). Although meat-animal reminders may also give rise to meat-eating justifications (Herrewijn et al., 2021; Rothgerber, 2020; Silva Souza et al., 2022), moral emotions such as empathy, guilt and disgust are negatively correlated with them (Earle et al., 2019; Herrewijn et al., 2021; Piazza et al., 2015), suggesting that meat-animal reminders are a potent strategy to make meat-eating less appealing and appetizing (Earle et al., 2019; Kunst & Hohle, 2016; Piazza et al., 2018).

The objective of the current study is to examine how meat-animal reminders affect omnivores' willingness for dietary change via their influence on moral emotions. We thereby aim to extend existing research in two crucial ways. First, based on existing theory on moral judgment and emotions, we aim to broaden the range and classification of moral emotions to be considered. Second, though meat-animal reminders may take various forms, research has yet to explore how people respond to meat-animal reminders using visual appeals that communicate animal cruelty (i.e., an animal treated cruelly by a human) and animal caring (i.e., an animal being cared for by a human). Besides being of theoretical interest, the results of our exploration may inform communication interventions to promote dietary change. In the following sections, we will develop our hypotheses regarding the effects of meat-animal reminders on willingness for dietary change via moral emotions (§1.1), considering both animal caring and cruelty appeals (§1.2). Then we formulate our hypotheses within the context of the present study (§1.3).

1.1. Moral emotions, meat-animal reminders and willingness for dietary change

In general, emotions can be described as psycho-physiological, affective states that arise in response to external or internal stimuli and differ in terms of valence (positive vs. negative) and arousal (high vs. low) (Gray & Wegner, 2011). Moral emotions are a subset of emotions that are specifically related to moral judgments and behaviors (Tangney et al., 2007); they may exert a strong and immediate influence on moral judgments and motivate moral actions and abstention from immoral ones without involving conscious deliberation (Cushman et al., 2006; Ellemers et al., 2019; Greene, 2011; Haidt, 2001; Herzog & Golden, 2009; Pizarro, 2000). Although conventional norms, cultural values and cooperative relationships may inform people's conception of what is "moral" (Curry et al., 2019; Graham et al., 2013; Schein & Gray, 2018), harm-centric approaches suggest that moral emotions specifically arise in response to perceived harm violations and helpful actions (Gray & Wegner, 2011; Schein & Gray, 2018) and, likewise, moral emotions have been consistently studied in relation to perpetrated harm (Ellemers et al., 2019).

According to the Theory of Dyadic Morality, harm lies at the core of moral judgment processes and is perceived intuitively and dyadically, involving an intentional agent (i.e., perpetrator) causing damage (physical, psychological, and/or emotional) to a vulnerable patient (i.e., victim) (Schein & Gray, 2018). Exposure to harmful and helpful acts can elicit a broad range of moral emotions that may inform moral judgments involving both humans (Algoe & Haidt, 2009; Gray & Wegner, 2011; Jones, 2007; Rozin et al., 1999; Tangney et al., 2007) and other animals (Gray & Wegner, 2011; Hartmann et al., 2018; Kunst & Haugestad, 2018; Rozin et al., 1999; Ruby & Heine, 2012; Tangney et al., 2007). These emotions include positive ones, such as empathy, gratitude, admiration and elevation, as well as negative ones, such as disgust, contempt, anger, shame and embarrassment. This is also evident in research on meat-animal reminders, which has primarily focused on empathy, disgust and guilt (Earle et al., 2019; Kunst & Hohle, 2016; Piazza et al., 2015), but has included a wider range of moral emotions more recently (Feinberg et al., 2019; Kranzbühler & Schifferstein, 2023; Silva Souza et al., 2022).

From a theoretical perspective, it is relevant to consider that these various moral emotions can be classified into more general types of emotions oriented towards others and the self. Some moral emotions involve perceptions of helpful agents or heroes (i.e., gratitude, admiration), while others involve helped victims or beneficiaries (i.e., relief, happiness) (Gray & Wegner, 2011). By contrast, the harm-related emotions of focal interest in meat-animal reminder studies – empathy, disgust and guilt – can be classified more generally as *victim-oriented, perpetrator-oriented* and *self-oriented* (aka self-conscious) emotions, respectively (Gray & Wegner, 2011; Tangney et al., 2007). *Victim--oriented emotions* typically arise when humans are exposed to victims of harm (Gray & Wegner, 2011), such as animals that are victimized in factory farms and slaughterhouses to produce meat. Examples of *victim-oriented emotions* include sympathy, compassion (Feinberg et al., 2019; Gray & Wegner, 2011), empathy, pity and sadness (Gray & Wegner, 2011; Kunst & Hohle, 2016), and may also arise when humans are confronted with victimized animals (Feinberg et al., 2019; Kunst & Hohle, 2016). *Perpetrator-oriented emotions* are elicited by perceived perpetrators of harm and include experiences of disgust, anger (Burke et al., 2021; Wagner et al., 2015) and moral outrage (Feinberg et al., 2019). These emotions may also arise when people witness humans causing harm to animals. Besides moral emotions oriented towards victims and perpetrators, which are oriented towards *others* as per the Theory of Dyadic Morality, there are also moral emotions oriented towards the *self* (Ellemers et al., 2019; Tangney et al., 2007). *Self-oriented emotions* arise when individuals hold themselves responsible for a negative situation and its consequences (Greene et al., 2007), and include guilt (Kranzbühler & Schifferstein, 2023; Piazza et al., 2015), shame, embarrassment (Kranzbühler & Schifferstein, 2023; Tangney et al., 2007) and feelings of disgust or anger directed at oneself (Watson & Clark, 1994). Because meat consumers are indirectly responsible for the death and suffering of farmed animals, they may experience such self-oriented moral emotions (Rothgerber, 2020). Research on the meat paradox is premised on the idea that people may experience *cognitive dissonance* when they become aware that their consumption of meat contradicts care for animals. Cognitive dissonance is typically construed as a state of negative arousal that involves guilt (Rothgerber, 2020), and can be construed more broadly to include other discomforting self-oriented emotions (Silva Souza et al., 2022), in line with the self and responsibility-based revisions of dissonance theory (Rothgerber, 2020).

Earlier research has shown that meat-animal reminders may increase feelings of empathy, disgust and guilt, consequently reducing people's willingness to eat meat (Earle et al., 2019; Kunst & Hohle, 2016; Rothgerber, 2020). We extend this research by considering a broader range of emotions, hypothesizing that meat-animal reminders may evoke victim-oriented emotions towards the animal used to produce meat, perpetrator-oriented emotions towards humans involved in meat production, and self-oriented emotions related to one's own felt responsibility in harming animals by eating meat. Likewise, we hypothesize that each of these emotions predict an increased willingness to change meat consumption (e.g., being more willing to eat less or no meat) (Bastian, Loughnan, et al., 2012; Earle et al., 2019; Fonseca & Sanchez-Sabate, 2022; Plous, 1993; Rothgerber, 2020; Ruby & Heine, 2012).

1.2. Type of meat-animal reminder: Animal cruelty and caring as visual appeals

In current research on meat-animal reminders, researchers typically expose meat consumers to either a meat-only image or an image of meat together with the living animal from which the meat came (Earle et al., 2019; Kunst & Hohle, 2016). These animal reminders allow people to make the connection between meat-eating and animal victims, and seem sufficient to evoke moral emotions. However, the victimhood of the animals in this experimental set-up is rather implicit; it obscures the suffering animals experience in meat production and the active role of humans in converting animals into meat. To discourage meat-eating, some scholars defend the "pedagogy of visual disturbance" (Fernández, 2021) or "moral shock" (Jasper & Poulsen, 1995; Rowe, 2011), where consumers' ought to access and be aware of the violent practices animals are subjected to during their lives in husbandry and when they are slaughtered (Fiber-Ostrow & Lovell, 2016, pp. 230–249). Likewise, animal advocates often use explicit imagery of animals in emotionally and physically painful situations (e.g., undergoing mutilations, slaughter, etc.) to directly affect audiences, raise awareness, challenge the speciesist status quo and encourage dietary change (Aaltola, 2014; Cronin & Kramer, 2018; Fernández, 2021). Indeed, some studies find that animal cruelty may increase willingness to change one's diet (Feinberg et al., 2019) and that it might be a more compelling motive compared to health or environmental motives (Herchenroeder et al., 2022; Palomo-Vélez et al., 2018). Based on our theorizing and the evidence provided above, animal cruelty appeals may increase willingness for dietary change by increasing harm-based emotions. We therefore decided to examine the effect of a meat image paired with an animal cruelty appeal relative to a meat-only image.

Other studies in which consumers saw footage of animal suffering in factory farming (Hartmann & Siegrist, 2020; Herrewijn et al., 2021) and in slaughterhouses (Herchenroeder et al., 2022; Herrewijn et al., 2021) reported mixed results in terms of willingness for dietary change. Within animal rights movements, a wide variety of imagery is used and the effectiveness of different stimuli is strongly debated (Fernández, 2020). Some arguments against the use of animal cruelty appeals or "moral shocks" include the risk of normalizing violence towards animals, inducing paralysis or compassion fatigue, and activating psychological defense mechanisms that promote inaction or even backfiring by an audience offended by intrusive moralization (Fernández, 2020). Although evidence of backfiring is scant for animal appeals in general (Mathur et al., 2021) there is some evidence that animal cruelty appeals may activate psychological defenses, such as evoking justifications (Silva Souza et al., 2022) and increasing speciesist attitudes on a short term (Herrewijn et al., 2021). Therefore, we decided to examine the effect of a meat image paired with an animal appeal that is less intrusive by displaying care for animals. Examples of animal caring appeals that are used in animal advocacy include imagery of animal sanctuaries or depictions of humans petting animals.

We expect that both animal caring and cruelty appeals, compared to a meat-only image, will increase willingness for dietary change because of stronger moral emotions. In addition, because an image of meat together with an animal cruelty appeal in which an animal (victim) is harmed by a human (perpetrator) resembles the dyadic template of moral judgment more strongly, we expect that animal cruelty appeals will increase moral emotions oriented towards the victim, the perpetrator and the self more strongly than an animal caring appeal. Put differently, animal caring appeals communicate less harm, so moral emotions and, subsequently, willingness to change meat consumption are expected to be less strong. The fact that "humane" farming is sometimes used as a justification for eating meat (Francione, 2020; Hartmann & Siegrist, 2020; Rothgerber, 2020) also supports our hypothesis that animal caring (vs. cruelty) appeals are less likely to arouse moral emotions and willingness for dietary change.

1.3. The present study and hypotheses

The main objective of this study is to examine how meat-animal reminders – in particular animal caring and cruelty appeals – affect omnivores' moral emotions and their willingness for dietary change. In our experiment, omnivorous participants were exposed to one of three conditions (see Table 2). In the *animal caring condition*, participants were exposed to an image of a *pork chop* paired with an image of *a human petting a pig*. In the *animal cruelty condition*, the same *pork chop* image is paired with an image of a *human stunning a pig*. In the *control condition*, we show an image of a *pork chop* without any animal reminders. Extending research by Kunst and Hohle (2016), we compare the effectiveness of different visual appeals (i.e., caring *versus* cruelty) that serve as reminders of meat's animal origins, thereby undoing psychological dissociation.

Pigs were selected for the present study because they are the most commonly consumed mammal and have been examined in prior meat-animal reminder studies (Earle et al., 2019; Kunst & Hohle, 2016). Despite being recognized as highly intelligent sentient beings with social emotions and signs of self-awareness (Marino & Colvin, 2016), pigs are subjected to intensive and harsh farming conditions and slaughtered in large numbers (Nordquist et al., 2017). In 2022, approximately 1.5 billion pigs were slaughtered globally, while over 11.4 million were slaughtered in the UK using CO_2 or electrical stunning (Mace & Knight, 2025). Although a majority (68 %) of UK people describe themselves as animal lovers (RSPCA - Royal Society for the Prevention of Cruelty to Animals, 2024), fewer than 1 % of pigs (35.000) were reared organically in 2022 (DEFRA - Department for Environment Food & Rural Affairs, 2023). Animal welfare problems (e.g., indoor confinement, physical and mental distress) remain widespread in UK pig production and slaughtering facilities (World Animal Protection, 2023), with pigs being routinely processed into products like ham, bacon, and pork chops. While global pork consumption continues to rise, per capita pork consumption in the UK has been relatively stable at around 24–27 kg/year over the past few decades (Helgi Library, 2023), with a slight decline in recent years that is being countered by marketing activities such as the Love Pork campaign in 2025 (AHDB, 2025).

Based on our review of relevant literature, we hypothesize that meat-animal (i.e., pork-pig) reminders increase participants' victim-oriented moral emotions (e.g., empathy, sadness) towards pigs involved in producing pork chops (H1a), perpetrator-oriented emotions (e.g., anger, disgust) towards humans handling pigs in pork production (H2a) and self-oriented emotions (e.g., guilt, shame) (H3a), and positively influence their willingness to change pork chop consumption (H4a). An animal cruelty (vs. caring) appeal should increase willingness to change pork chop consumption (H4b) because it communicates more harm and increases moral emotions oriented towards (pig) victims (H1b), (human) perpetrators (H2b) and the self (H3b). For both comparisons, we expect that the appeals predict willingness to change pork chop consumption indirectly via moral emotions (H1c, H2c, H3c). We also measured people's tendency to justify pork-eating to explore any potential psychological defense mechanisms, as well as a range of other exploratory variables that may affect emotional processing. Our hypotheses are depicted in Fig. 1 and were preregistered on AsPredicted and OSF: https://osf.io/ykwma?view_only=4a035eb0961e4d94983c2f35ee37175d.

2. Method

2.1. Sample

Using the software program G*Power 3.1.9.7, a power-sensitivity analysis for a one-way ANOVA indicated that a total sample size of 300 (100 per condition) allows to detect a small-medium effect size f of 0.18 for a power of 0.80 at a standard 0.05 alpha error probability. To further improve the power of our analysis and to accommodate for

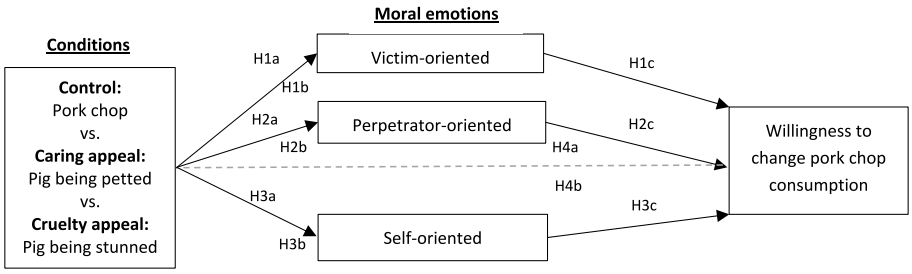

Fig. 1. Conceptual overview of the study hypotheses.
Note: In our preregistration we used the broader term "willingness to change diet" to refer to "willingness to change pork chop consumption".

potential dropout, we decided to gather a sample of 432 participants (144 per condition), increasing the power to 0.92. We recruited participants from the United Kingdom via the crowdsourcing platform Prolific. Given that our inclusion criteria specified adult men and women (≥18 years) who consume meat, we excluded 2 participants identified as vegan, 7 participants that indicated that they did *not* consume meat, poultry or seafood, and 2 participants who generally do not eat red meat, poultry, fish and seafood, dairy, egg.

The final sample consisted of 421 meat-eating participants, with a nearly equal gender distribution, a diverse range of ages (M_{age} = 44.7 years, SD_{age} = 14.7 years) and varied education levels (see Table 1).

2.2. Procedure, design and stimuli

To test our hypotheses we developed a questionnaire, which was preregistered on OSF: https://osf.io/q769f.

Participants were informed before their participation that this study aimed to examine beliefs and preferences related to food consumption. After providing the informed consent, participants were asked demographic questions (i.e., gender, age and education) and were then randomly assigned to one of three conditions shown in Table 2. In the *control condition* participants were exposed to an image of a pork chop ("0"). In the *animal caring condition* participants were exposed to the same image of a pork chop, paired with a human petting a pig ("1"). In the *animal cruelty condition* participants were exposed to the same image of a pork chop, paired with a human stunning a pig before slaughter ("2").

After being allocated to one of three conditions, all participants completed confirmatory measures to test our hypotheses. In a random order, we measured participants' *victim-oriented moral emotions, perpetrator-oriented moral emotions and self-oriented moral emotions*. Next, we measured *willingness to change pork chop consumption*. After measuring confirmatory variables, we asked questions to measure exploratory variables and to check the effectiveness of our manipulation. Finally, participants were debriefed before returning to Prolific for payment.

This study received ethical approval from the IRB of Iscte-IUL (University Institute of Lisbon, reference 24/2023).

Table 1
Sample demographics (N = 421).

Variable	Category	n	% of sample
Gender	Man	210	49.9 %
	Woman	206	48.9 %
	Prefer not to say	1	0.2 %
	Prefer to self-describe (e.g., non-binary)	4	1.0 %
Age	18–29 years	66	15.7 %
	30–39 years	94	22.3 %
	40–49 years	78	18.5 %
	50–59 years	72	17.1 %
	60+ years	111	26.4 %
Education	No formal qualifications	3	0.7 %
	Primary education	3	0.7 %
	Secondary education	70	16.6 %
	Further education	102	24.2 %
	Undergraduate degree (BA/BSc)	160	38.0 %
	Graduate degree (MA/MSc/MPhil)	74	17.6 %
	Doctorate degree (PhD)	9	2.1 %

2.3. Measures

Table 3 provides an overview of the variables measured in our study, including items, scale sources and Cronbach's α reliability scores. Our measures are described in more detail below.

2.3.1. Moral emotions

To measure participants' victim-, perpetrator- and self-oriented moral emotions, items were selected from publish literature. Answer options ranged from "not at all" (1) to "moderately" (4) to "extremely" (7), so higher scores indicated stronger moral emotions felt by participants.

Victim-oriented - To assess participants' *victim-oriented moral emotions*, we prompted them to think about pigs involved in producing pork chops and asked them to indicate the extent to which the image evoked the following emotions: *sympathy*, *compassion, empathy, pity* and *sadness.*

Perpetrator-oriented - To assess participants' *perpetrator-oriented moral emotions*, we prompted them to think about how pigs are treated by humans for producing pork chops and asked them to indicate the extent the image elicited the following emotions: *hostile, disgusted, angry, repulsed* and *outraged*. These items correspond to the five highest loading items of the hostility scale from Watson and Clark (1994). We replaced *loathing* by *repulsed* and *scornful* by *outraged* to improve understanding of the items.

Self-oriented - To assess participants' *self-oriented moral emotions,* we asked participants to indicate the extent to which the image made them feel six emotions: *guilty, ashamed, blameworthy, angry at self, disgusted by self* and *dissatisfied with self*, based on the guilt scale of Watson and Clark (1994).

An exploratory factor analysis that was fixed to produce three factors (extraction method: principal axis; rotation method: direct oblimin) revealed that the scale items of the three categories of moral emotions loaded highest on their predicted factors without any cross-loading items being observed between factors. All items loaded strongly and distinctively on their predicted factor (0.76-0.97), suggesting that each moral emotion is well-represented by the selected items (Costello & Osborne, 2005). The scree plot and a parallel analysis also suggested an extraction of three factors corresponding to the intended constructs.

2.3.2. Willingness to change pork chop consumption

To address our secondary aim of predicting participants' willingness to change pork chop consumption, we asked them to rate their willingness to *eat pork chops (r)*, *eat less pork chops*, *stop eating pork chops*, and to *follow a plant-based diet* on a scale with response options ranging from *very unwilling* (1) to *very willing* (7). This scale was adapted from Graça et al. (2015) (Study 2), who measured willingness to substitute "meat",

Table 2
Study conditions and stimuli.

Control (0): Pork chop	Animal caring appeal (1): Pork chop + Pig being petted	Animal cruelty appeal (2): Pork chop + Pig being stunned
Text: Please look at the following image of a **pork chop** before proceeding to the next section of the questionnaire. We will ask you some questions related to the image.	Text: Please look at the following image of a pork chop and **a pig being petted** before proceeding to the next section of the questionnaire. We will ask you some questions related to this image.	Text: Please look at the following images of a pork chop and a **pig being stunned** before slaughter before proceeding to the next section of the questionnaire. We will ask you some questions related to this image.
	+ 	+ 

Note: higher resolution stimuli are available on OSF: https://osf.io/str8h?view_only=4a035eb0961e4d94983c2f35ee37175d.

Table 3
Overview of measured variables, scale sources and reliability scores.

Variables	Items	Source	(α)
Victim-oriented ME	sympathy, compassion, empathy, pity, sadness	Feinberg et al. (2019)	0.97
Perpetrator-oriented ME	hostile, disgusted, angry, repulsed, outraged	Watson and Clark (1994)	0.96
Self-oriented ME	guilty, ashamed, blameworthy, angry at self, disgusted by self, dissatisfied with self	Watson and Clark (1994)	0.97
Other-praising ME	praise-worthy, grateful	Algoe and Haidt (2009)	0.71
Willing to change PCC	e.g., stop eating pork chops	Graça et al. (2015)	0.87
Pork eating justification	e.g., eating pork is better for my health	Monteiro et al. (2017)	0.81
Ecological dominance	i.e., slider scale (less to more hierarchical)	Uenal et al. (2022)	n.a.
Animal solidarity	e.g., I feel solidarity toward animals	Auger and Amiot (2019)	0.93
Dietary pattern	i.e., types of animal products eaten (nominal)	Rosenfeld and Burrow (2018)	n.a.
Meat consumption freq.	i.e., days per week eating meat	De Groeve et al. (2022)	n.a.
Hedonic motivation	e.g., I love meals with meat	Graça et al. (2015)	0.93
Omnivore identification	i.e., bipolar scale (omnivore to vegan)	De Groeve et al. (2022)	n.a

Note. ME = moral emotions; PCC = pork chop consumption.

with adjustments made to focus specifically on "pork chops". We added the reverse item *eat pork chops* to provide balance and reflect outcomes studied by Kunst and Hohle (2016).

2.3.3. Exploratory measures

Other-praising emotions - To circumvent a perceived negative bias in the response options for perpetrator-oriented emotions (see above), we added two other-praising emotions, *praise-worthy* and *grateful* as filler items (Algoe & Haidt, 2009). An exploratory factor analysis (extraction method: principal axis; rotation method: direct oblimin) including the items of all moral emotions suggested an extraction of four factors based on parallel analysis, with the two other-praising items forming their own factor next to the other three moral emotions.

Pork eating justification - We adapted a 4-item scale (Monteiro et al., 2017) to measure people's tendency to justify the consumption of pork (e.g., *Eating pork is better for my health*; *The production of pork causes pigs to suffer* [reverse item]) with answer options ranging from *strongly disagree* (1) to *strongly agree* (7).

Animal-related attitudes - We measured two animal-related attitudes: *ecological dominance orientation* (Uenal et al., 2022) and *animal solidarity* (Amiot et al., 2019). To measure ecological dominance, we relied on the pictorial scale (Uenal et al., 2022) which captures people's preference for a more (vs. less) hierarchical relationship between humans, animals and the environment, using a slider scale from *less hierarchical* (0) to *more hierarchical* (100). We used three items (Amiot et al., 2019) to measure people's *animal solidarity* (e.g., *I feel solidarity toward animals.*).

Diet-related variables - We measured four diet-related variables: *dietary pattern, meat consumption frequency, hedonic motivation* and *omnivore (vs. vegan) identification*. To assess the *dietary pattern* of participants, we asked them to select all of the following types of food that they eat at least occasionally (Rosenfeld & Burrow, 2018): *red meat, poultry, fish and seafood, dairy,* and *egg*. If they generally did not eat any of these food types they were asked to select the option *I generally do not eat any of the above*. This measure allowed us to exclude vegetarians and vegans from our analysis (see §2.1). *Meat consumption frequency* was assessed by asking participants how many days a week they eat meat with their main meal (including red meat, poultry, fish and seafood), with answer options ranging from 0 to 7 (De Groeve et al., 2022). We measured participants' *hedonic motivation* to eat meat because it is highly indicative of an emotional attachment to eating meat. We selected the three highest loading items of the hedonism subscale (e.g., *I love meals with meat.*) according to Graça et al. (2015) their factor analysis of their meat attachment questionnaire. To measure *omnivore identification,* we asked participants whether they see themselves as *omnivores*, *vegans* or *something in between* using a bipolar 7-point item ranging from *omnivore* to *vegan* (De Groeve et al., 2022). We used the continuous diet- and animal-related variables to conduct exploratory correlation and covariate analyses.

2.3.4. Manipulation checks

After the confirmatory measures and before the animal- and diet-related exploratory measures, we assessed whether participants from the experimental conditions paid attention and remembered which condition they were exposed to by asking: *Earlier in the survey, you were exposed to an image of a living pig. Which adjective best describes how the pig was treated according to you?* Participants responded on a 7-point bipolar scale ranging from *caring* (1) to *cruel* (7). This manipulation check indicated that our manipulation was effective: Participants exposed to the *caring appeal* were more likely to perceive the treatment of the pig as caring ($M = 2.38$, $SD = 1.59$), whereas participants exposed to the *cruelty appeal* were more likely to perceive it as cruel ($M = 5.81$, $SD = 1.22$), $t(278) = -20.23$, $p < .001$. Additionally, we asked: *Earlier in the survey, you were exposed to an image of a living pig. Which adjective best describes how the pig was treated according to you?* Participants had to choose one of three options: *Petted* (1), *Stunned before slaughter* (2), or *Other* (with a blank space to insert text). This additional check indicated that the great majority of participants (96 %) selected the expected option. All participants in the cruelty condition selected that the pig was stunned before slaughter, except for three participants who selected the

option "other" (two inserted text: "cruelly killed", "held in a clamp by its neck"). Participants in the caring condition selected that the pig was petted, apart from four participants who selected "stunned before slaughter" and three who selected "other" (two inserted text: "held in arms", "in a blanket"). No participants were excluded from analysis based on our manipulation checks. Excluding the four participants in the caring condition who selected "stunned before slaughter" does not substantially affect the results.

2.4. Statistical analyses

2.4.1. Analysis of variance (ANOVA)

To test hypotheses H1a-4a and H1b-4b, we conducted a one-way (3 × 1) ANOVA for each key dependent variable (i.e., *victim-oriented, perpetrator-oriented, self-oriented moral emotions*, and *willingness to change pork chop consumption*). In addition, we explored one-way ANOVAs for other-praising emotions (based on the two filler items) and pork-eating justifications. Levene's tests indicated that the homogeneity assumption was violated for self-oriented, perpetrator-oriented, and other-praising moral emotions, all $Fs(2, 418) \geq 7.763$, $ps \leq 0.001$. However, the homogeneity assumption was met for victim-oriented moral emotions, *willingness to change pork chop consumption* and *pork-eating justification* (all $Fs(2, 418) \leq 1.197$, $ps \geq 0.303$). Although the normality assumption was not met for three variables (based on Shapiro-Wilk tests), ANOVA is robust against violations of normality with larger sample sizes (Ghasemi & Zahediasl, 2012). Accordingly, to assess differences in outcomes across conditions, we used unadjusted *F* tests and post-hoc Tukey HSD tests when the homogeneity assumption was met and Welch's ANOVAs and post-hoc Games-Howell tests when the homogeneity assumption was violated. To express the amount of variance explained, we used partial eta-squared (η_p^2) with the following rules of thumb derived from Cohen (1988): $\eta_p^2 \approx 0.01$ (small), 0.06 (medium) and 0.14 (large). To express the size of the difference between means we used Cohen's *d* (Sawilowsky, 2009) with the following rules of thumb: effect sizes $d =$ 0.20 (small), 0.50 (medium), 0.80 (large), 1.20 (very large), and 2.00 (huge).

As preregistered, we also explored the role of *gender, age* and *education* by adding these demographic variables as covariates to our ANOVAs (i.e., ANCOVAs). Additionally, we performed further ANCOVAs to explore the effects of animal-related attitudes and diet-related variables as covariates.

2.4.2. Multicategorical mediation analysis

To test whether the effect of our experimental conditions on *willingness to change pork chop consumption* is mediated by *victim-oriented, perpetrator-oriented, self-oriented moral emotions* (thereby testing H1c-H3c), we used a multicategorical mediation model with the three types of moral emotions as parallel mediators. Hayes' SPSS macro PROCESS (model 4) allows to calculate this model, including the indirect, direct and total effects of experimental conditions on willingness to change pork chop consumption. Helmert coding was used to compare effects of the experimental conditions vs. the *control condition* (H1a-H3a) and the *animal cruelty* vs. *caring condition* (H1b-H3b). Statistical inference for direct and total effects on *willingness to change pork chop consumption* is based on effect coefficients, *t* and *p* values, and confidence intervals based on ordinary least squares (OLS) regression (with standard 0.05 alpha error probability). For the indirect effects, we used 95 % percentile-based bootstrap confidence intervals (using 10,000 bootstrap samples) (Hayes, 2022). For omnibus tests of the total and direct effects, R^2, *F* and *p* values were used. We performed an exploratory mediation analysis including pork-eating justifications as additional mediator (see §3.3.2). Multicollinearity did not pose a problem in our mediation analyses (i.e., all VIF values are below 2).

All data analyses were conducted using SPSS version 26. All hypotheses and the analysis plan were pre-registered before data collection and analysis. The complete dataset is available on the OSF project page: https://osf.io/u695k/files/osfstorage/67f01969251ead9753cf6d19.

3. Results

3.1. Descriptive correlations

Table 4 shows the correlations between both confirmatory and exploratory study variables. All correlations are significant, but differ in strength. *Victim-*, *perpetrator-* and *self-oriented moral emotions* are very strongly intercorrelated and strongly correlated with *willingness to change pork chop consumption* and inversely correlated with *pork-eating justification*. These moral emotions are also moderately correlated with animal-related attitudes (i.e., *animal solidarity* and *ecological dominance*, which are moderately intercorrelated) and negatively correlated with the diet-related variables: *meat consumption frequency*, *hedonic motivation* and *omnivore identification* (which are all three strongly intercorrelated). *Self-oriented emotions* are generally more weakly correlated with the other variables. *Other-praising moral emotions* show a reverse pattern of correlations; being negatively and less strongly correlated with the other moral emotions and *willingness to change pork chop consumption*, quite strongly correlated with *pork-eating justification*, and weak-to-moderately correlated with animal- and diet-related variables.

Willingness to change pork chop consumption and *pork-eating justification* are very strongly inversely correlated, and both variables are strongly associated with the diet-related variables *hedonic motivation*, *omnivore identification* and *meat consumption frequency*, and to a lesser extent with the animal-related attitudes.

Concerning demographic variables, we find that *gender* shows weak biserial correlations with the study variables: Women (vs. men) generally report feeling slightly more *victim-oriented* ($r = 0.08$, $p = .079$), *perpetrator-oriented* ($r = 0.13$, $p = .006$), *self-oriented* ($r = 0.11$, $p = .025$) and less *other-praising* emotions ($r = -0.13$, $p = .009$), a higher *willingness to change pork chop consumption* ($r = 0.22$, $p < .001$) and less *pork-eating justification* ($r = -0.17$, $p < .001$). Women also report more animal solidarity ($r = 0.16$, $p < .001$), less ecological dominance ($r = -0.22$, $p < .001$), less hedonic motivation ($r = -0.23$, $p < .001$), less omnivore identification ($r = 0.16$, $p < .001$) and a lower meat consumption frequency ($r = -0.11$, $p = .028$). *Age* is only significantly but weakly correlated with *willingness to change pork chop consumption* ($r = -0.10$, $p = .050$), *pork-eating justification* ($r = 0.12$, $p = .011$) and *education* ($r = -0.20$, $p = .001$). A higher *education* is significantly but weakly correlated with a *willingness to change pork chop consumption* ($r = 0.10$, $p = .041$), less *pork-eating justification* ($r = -0.13$, $p = .008$) and less *other-praising* emotions ($r = -0.10$, $p = .049$). See Table S1 in the supplementary materials for an overview of the correlations with the demographic variables.

Lastly, based on our manipulation check, we found that a higher perceived cruelty (vs. care) was positively correlated with *victim-* ($r = 0.37$. $p < 0.001$), *perpetrator-* ($r = 0.47$, $p < 0.001$), and *self-oriented moral emotions* ($r = 0.38$, $p < 0.001$) (see Table S1).

3.2. Between-group analyses (ANOVA)

3.2.1. Confirmatory analyses

One-way ANOVAs revealed significant differences across conditions for all outcome variables (see Fig. 2). The different conditions explained a large amount of variance in *victim-oriented emotions,* $F(2, 418) = 48.10$, $p < .001$, $\eta_p^2 = 0.19$, *perpetrator-oriented emotions,* $F(2, 418) = 33.07$, $p < .001$, $\eta_p^2 = 0.14$, and *self-oriented emotions,* $F(2, 418) = 29.36$, $p < .001$, $\eta_p^2 = 0.12$, and a medium amount of variance in *other-praising emotions,* $F(2, 418) = 11.15$, $p < .001$, $\eta_p^2 = 0.05$. As can be seen in Fig. 2, the average ratings for self-reported moral emotions typically fell in the range between "not at all" (1) and "moderately" (4), suggesting that the stimuli were generally not very emotionally arousing. Nevertheless, Fig. 2 does reveal a general pattern: Self-reported *victim-*, *perpetrator*, and *self-oriented emotions* are more strongly expressed among

Table 4
Means, standard deviations and Pearson correlations for study variables.

#	Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1	Victim-oriented ME	3.90	1.85										
2	Perpetrator-oriented ME	2.86	1.69	0.71									
3	Self-oriented ME	2.52	1.62	0.67	0.69								
4	Other-praising ME	2.40	1.39	-0.28	-0.31	-0.20							
5	Willing to change PCC	3.80	1.61	0.54	0.59	0.50	-0.38						
6	Pork-eating justification	3.54	1.31	-0.50	-0.54	-0.44	0.45	-0.81					
7	Ecological dominance	51.7	26.7	-0.32	-0.32	-0.23	0.26	-0.45	0.41				
8	Animal solidarity	4.84	1.30	0.46	0.39	0.33	-0.15	0.40	-0.34	-0.39			
9	Meat consumption freq.	4.62	1.83	-0.29	-0.39	-0.27	0.26	-0.49	0.44	0.35	-0.26		
10	Hedonic motivation	5.02	1.46	-0.37	-0.46	-0.28	0.33	-0.67	0.64	0.48	-0.35	0.58	
11	Omnivore identification	5.88	1.26	-0.30	-0.39	-0.22	0.21	-0.57	0.49	0.37	-0.25	0.54	0.71

Note. ME = moral emotions; PCC = pork chop consumption; all correlations significant at $p < .001$, except for the correlation between other-praising ME and animal solidarity: $p = .003$.

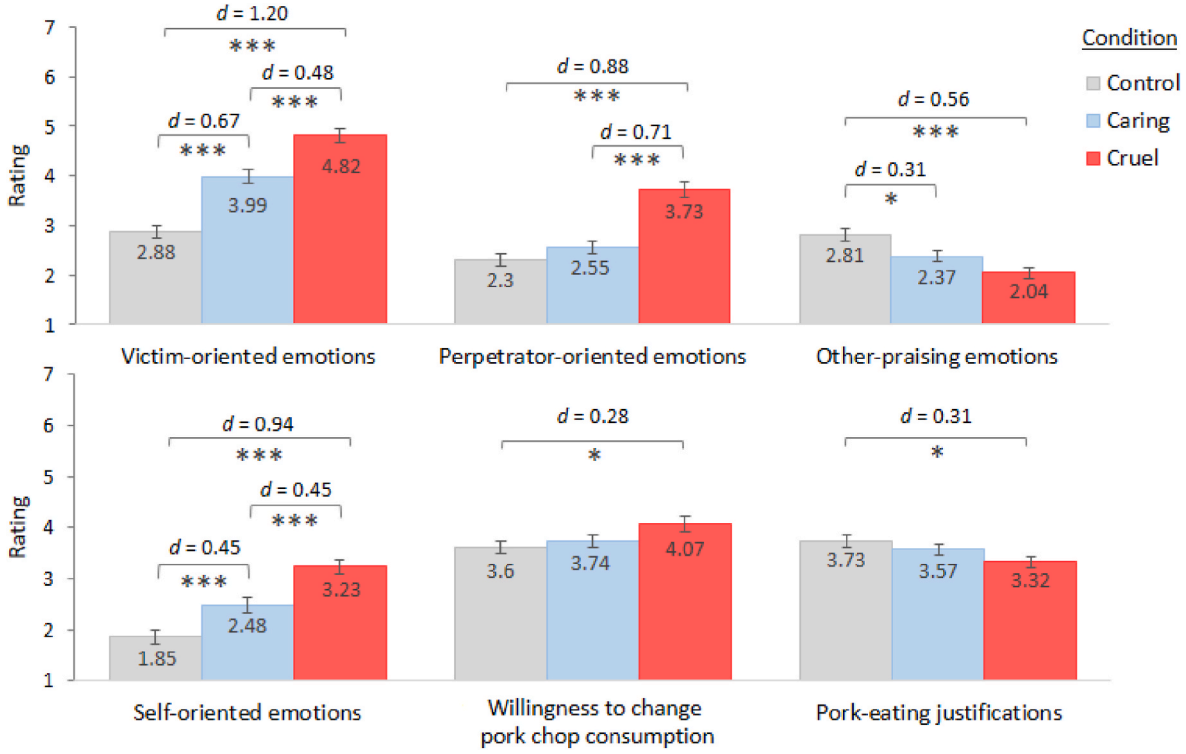

Fig. 2. Effect of conditions on outcome variables.
Note. Mean ± 1 SE and Cohen's *d* are shown; *$p < .05$, **$p < .01$, ***$p < .001$.

participants in the cruelty condition compared to the caring condition, followed by the control condition. A similar pattern can be observed with regards to participants' *willingness to change pork chop consumption*, but the amount of explained variance is relatively small, $F(2, 418) = 3.15$, $p < .001$, $\eta_p^2 = 0.015$. Similarly, the conditions explain a small amount of variance in *pork-eating justification*, $F(2, 418) = 3.63$, $p < .001$, $\eta_p^2 = 0.017$. Below we analyze these differences in more detail, and verify Hypotheses H1a-4a and H1b-4b based on post-hoc between-group analyses.

- *Victim-oriented emotions:* all pairwise comparisons are significant (*ps* < 0.001) with participants exposed to the *cruelty appeal* ($M = 4.82$, $SE = 0.14$) reporting stronger emotions such as compassion and sadness compared to participants in the *caring condition* ($M = 3.99$, $SE = 0.15$) and the *control condition* ($M = 2.88$, $SE = 0.13$). Therefore, both H1a and H1b are supported.
- *Perpetrator-oriented emotions*: participants exposed to the *cruelty appeal* report significantly more emotions such as anger and disgust ($M = 3.73$, $SE = 0.12$) than participants in the *caring condition* ($M = 2.55$, $SE = 0.12$) and the *control condition* ($M = 2.30$, $SE = 0.12$) (*ps* < 0.001). However, the difference between the *caring* and *control condition* is not significant ($p = .31$); many participants in these conditions indicated not feeling any *perpetrator-oriented emotions* at all. Therefore, H2b is supported and H2a is partially supported.
- *Self-oriented emotions*: all pairwise comparisons are significant (*ps* < 0.001). Participants reported feeling more guilt and shame in the *cruelty condition* ($M = 3.23$, $SE = 0.14$) compared to the *caring condition* ($M = 2.48$, $SE = 0.14$), followed by the *control condition* ($M = 1.85$, $SE = 0.10$). In the *control* and *caring conditions*, many participants reported not feeling any *self-oriented emotions* at all. Therefore, both H3a and H3b are supported.
- *Other-praising emotions:* a similar but inverse pattern occurs. Although participants overall do not report feelings of gratitude for

humans, participants self-rated more of these emotions in the *control condition* ($M = 2.81$, $SE = 0.13$), compared to participants exposed to the *cruelty* ($M = 2.04$, $SE = 0.10$) and the *caring appeal* ($M = 2.37$, $SE = 0.11$) ($p < .001$ and $p = .025$ respectively), while the mean difference between both animal appeals is only marginally significant ($p = .077$). These are exploratory findings.

- *Willingness to change pork chop consumption*: participants in the *cruelty condition* ($M = 4.07$, $SE = 0.14$) reported a higher *willingness to change pork chop consumption* compared to those in the *caring condition* ($M = 3.74$, $SE = 0.13$), followed by the *control condition* ($M = 3.60$, $SE = 0.14$), but only the difference between the *control* and *cruelty condition* was significant ($p = .039$). Therefore, H4a is only partially (but not strongly) supported and H4b is not supported.
- *Pork-eating justification:* Likewise, participants in the *cruelty condition* ($M = 3.32$, $SE = 0.11$) overall expressed a lower tendency to *justify pork-eating* than participants in the *caring* ($M = 3.57$, $SE = 0.11$) and *control condition* ($M = 3.73$, $SE = 0.12$), but only the difference between the *control* and *cruelty condition* is significant ($p = .021$). (Further analysis revealed this was mainly due to a stronger agreement with the item *"The production of pork causes pigs to suffer"*, $p = .004$). These are exploratory findings.

3.2.2. Exploratory ANCOVAs: Demographic variables

Exploratory ANCOVA analyses revealed that the differences found in the ANOVAs (§3.2.1) were robust against including the demographic variables *gender* (men vs. women), *age* and *education* as covariates. Moreover, *gender* had a significant effect on all outcome variables ($ps < 0.001$) with mostly medium amounts of variance explained (all $\eta_p^2 = 0.03$–0.08). Across conditions, women (vs. men) were significantly more likely to report emotions oriented towards the (pig) *victim* ($d = 0.37$), (human) *perpetrator* ($d = 0.47$) and the *self* ($d = 0.41$), more *willingness to change pork chop consumption* ($d = 0.58$), less *pork-eating justification* ($d = 0.41$) and less *other-praising emotions* ($d = 0.31$) according to post-hoc analyses ($ps < 0.001$). The amount of variance explained in moral emotions by the conditions was 2.43–5.85 times higher than the variance explained by gender, while *gender* (vs. conditions) explained 1.83 and 3.66 times more variance in *willingness to change pork chop consumption* and *pork-eating justification,* respectively. *Pork-eating justification* was also positively predicted by *age* ($p = .017$) and negatively predicted by *education* ($p = .027$), though the amount of variance explained was rather small ($\eta_p^2 = 0.01$ for both variables), and other variables were not predicted by *age* and *education*.

3.2.3. Exploratory ANCOVAs: Animal- and diet-related variables

Furthermore, the differences found in the ANOVAs (§3.2.1) were robust against including the animal-related attitudes and diet-related variables as covariates, except that the effect of the conditions on *willingness to change pork chop consumption* became insignificant ($p = .071$, $\eta_p^2 = 0.01$). Moreover, excluding *other-praising emotions, animal solidarity* had a significant effect on all outcome variables ($p \leq .007$), with medium-to-large amounts of variance explained in *moral emotions* ($\eta_p^2 = 0.07$–0.17) and smaller amounts of variance explained in *willingness to change pork chop consumption* ($\eta_p^2 = 0.04$) and *pork-eating justifications* ($\eta_p^2 = 0.02$). *Hedonic motivation* also significantly predicted the outcomes ($ps \leq 0.019$-0.001), except for *self-oriented emotions* ($p = .082$), with small amounts of variance explained in *victim-oriented* ($\eta_p^2 = 0.01$), *perpetrator-oriented* ($\eta_p^2 = 0.03$), and *other-praising emotions* ($\eta_p^2 = 0.03$), and large amounts of variance explained in *willingness to change pork chop consumption* ($\eta_p^2 = 0.12$) and *pork-eating justifications* ($\eta_p^2 = 0.14$). *Meat consumption frequency* only had significant ($ps = 0.033$-0.007), but small effects on *willingness to change pork chop consumption* ($\eta_p^2 = 0.01$), *perpetrator-* ($\eta_p^2 = 0.02$), and *self-oriented emotions* ($\eta_p^2 = .01$). The other covariates also predicted *willingness to change pork chop consumption* ($ps = 0.024$-0.001), but only *hedonic motivation* ($\eta_p^2 = 0.12$) and *animal solidarity* ($\eta_p^2 = 0.04$) explained more variance compared to the conditions ($\eta_p^2 = 0.02$). See Supplementary Table S2 for more details.

Lastly, upon reviewer request, we used ANOVAs to examine the effect of the conditions on animal- and diet-related variables as outcomes (see Fig. S1), which revealed a small effect on *ecological dominance*, $F(2, 418) = 3.42$, $p = .034$. Participants exposed to the cruelty condition ($M = 47.31$, $SE = 2.21$) reported less *ecological dominance* than those exposed to the control condition ($M = 55.54$, $SE = 2.13$), $p = .026$, $d = 0.31$. This analysis needs to be interpreted with caution, because the experimental effects may have been attenuated due to the measurement of the manipulation checks before these exploratory variables.

3.3. Multicategorical mediation analysis

3.3.1. Confirmatory analysis: Willingness to change pork chop consumption

To test whether our experimental conditions indirectly predict *willingness to change pork chop consumption* via *victim-oriented, perpetrator-oriented, self-oriented emotions* (and test H1c-3c), we used a multicategorical mediation model.

Fig. 3 summarizes the output of the model (see Table S3 for a structured overview of direct, total and indirect effects of experimental conditions). We find that an exposure to *animal appeals* (vs. *control*) caused participants to report stronger moral emotions - *victim-oriented*, $a_{v,x1} = 1.53$, $SE = 0.16$, $t(418) = 9.15$, 95 % CI [1.20, 1.86], $p < .001$, *perpetrator-oriented*, $a_{p,x1} = 0.84$, $SE = 0.15$, $t(418) = 5.42$, 95 % CI [0.53, 1.14], $p < .001$, and *self-oriented emotions*, $a_{s,x1} = 1.00$, $SE = 0.14$, $t(418) = 7.16$, 95 % CI [0.73, 1.28], $p < .001$. These results are in line with our ANOVA analyses and H1a-3a; we can infer that the effect of the *animal appeals* (vs. control) on *perpetrator-oriented moral emotions* is largely driven by the effect of the *animal cruelty* appeal. Likewise, when comparing the strength of self-reported moral emotions upon exposure to the *animal cruelty* (vs. *caring*) appeal, we find participants exposed to the *animal cruelty* (vs. *caring*) generally report stronger *victim-oriented*, $a_{v,x2} = 0.83$, $SE = 0.20$, $t(418) = 3.99$, 95 % CI [0.42, 1.23], $p < .001$, *perpetrator-oriented*, $a_{p,x2} = 1.17$, $SE = 0.19$, $t(418) = 5.96$, 95 % CI [0.79, 1.56], $p < .001$, and *self-oriented emotions*, $a_{s,x2} = 0.75$, $SE = 0.20$, $t(418) = 3.77$, 95 % CI [0.36, 1.15], $p < .001$. These results are in line with our ANOVA analyses and H1b-3b.

In line with H1c-H3c, we find that *willingness to change pork chop consumption* is positively predicted by the three moral emotions: *victim-oriented*, $b_v = 0.23$, $SE = 0.06$, $t(415) = 3.93$, 95 % CI [0.11, 0.34] $p < .001$, *perpetrator-oriente*d, $b_p = 0.36$, $SE = 0.06$, $t(415) = 5.69$, 95 % CI [0.24, 0.49], $p < .001$, and *self-oriented emotions*, $b_s = 0.12$, $SE = 0.06$, $t(415) = 1.99$, 95 % CI [0.00, 0.23], $p = .047$.

Consequently, we find that *animal appeals* (vs. *control*) indirectly increase *willingness to change diet* via the three moral emotions: *victim-oriented, IE* $= 0.35$, $SE = 0.10$, 95 % CI [0.17, 0.55], *perpetrator-oriented, IE* $= 0.30$, $SE = 0.08$, 95 % CI [0.17, 0.47], and *self-oriented emotions*, *IE* $= 0.12$, $SE = 0.06$, 95 % CI [0.00, 0.23], and that an exposure to *animal cruelty* (vs. *caring*) increases *willingness to change pork chop consumption* more due to stronger moral emotions: *victim-oriented, IE* $= 0.19$, $SE = 0.07$, 95 % CI [0.07, 0.34], *perpetrator-oriented, IE* $= 0.43$, $SE = 0.10$, 95 % CI [0.24, 0.66], and *self-oriented emotions*, *IE* $= 0.09$, $SE = 0.05$, 95 % CI [0.00, 0.19].

At the same time, however, we find that these positive indirect effects of moral emotions on *willingness to change pork chop consumption* are counteracted: After controlling for the effects of moral emotions, we find that *willingness to change pork chop consumption* is negatively predicted by the exposure to *animal appeals* (vs. *control*), $c'_{x1} = -.46$, $SE = 0.14$, $t(415) = -3.29$, 95 % CI [−0.74, −0.19], $p < .001$, and by the exposure to the *animal cruelty* appeal compared to the *animal caring* appeal, $c'_{x2} = -.38$, $SE = 0.15$, $t(415) = -2.52$, 95 % CI [−0.67, −0.08], $p < .001$.

3.3.2. Exploratory analysis: Pork-eating justification

We performed an exploratory analysis by including *pork-eating justification* as an additional mediator between the moral emotions and *willingness to change pork chop consumption* (using model 80 from Hayes, 2022). This analysis allows us to explore consistency of findings with

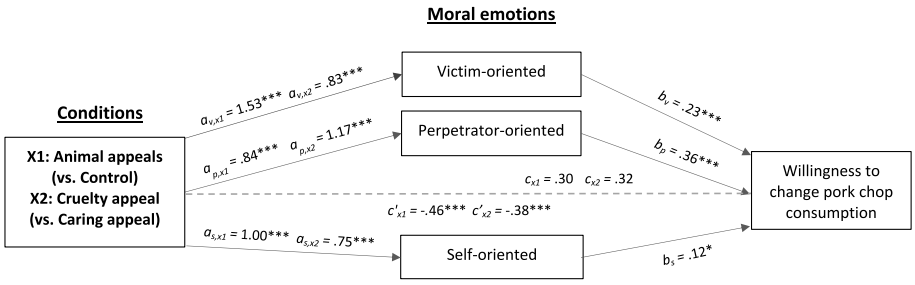

Fig. 3. Mediation model: Relative effects of conditions on *willingness to change pork chop consumption* via moral emotions. *Note.* *$p < .05$, **$p < .01$, ***$p < .001$.

pork-eating justification as alternative outcome of moral emotions (as preregistered). In addition, it allows us to test whether the counter-active effects of animal appeals (vs. control) on *willingness to change pork chop consumption* are mediated by a tendency of people to *justify pork-eating*, while controlling for the effects of moral emotions. The results are shown in Fig. 4 (see Table S4 for a structured overview of direct, total and indirect effects of experimental conditions).

Just like *willingness to change pork chop consumption* is positively predicted by moral emotions, we find that *pork-eating justifications* is negatively predicted by *victim-oriented*, $b_{v,pj}$ = -0.17, $SE = 0.05$, $t(415) = -3.47$, 95 % CI [−0.27, −0.08], $p < .001$, and *perpetrator-oriented emotions*, $b_{p,pj}$ = -0.29, $SE = 0.05$, $t(415) = -5.45$, 95 % CI [−0.39, −0.18], $p < .001$. However, *self-oriented emotions* did not significantly predict *pork-eating justification*, $b_{s,pj}$ = -0.05, $SE = 0.05$, $t(415) = -1.13$, 95 % CI [−0.14, 0.04], $p = .259$. Furthermore, *pork-eating justification* significantly predicts a reduced *willingness to change pork chop consumption* $b_{pj} = -0.81$, $SE = 0.04$, $t(414) = -18.25$, 95 % CI [−0.90, −0.73], $p < .001$, and after controlling for *pork-eating justification, willingness to change pork chop consumption* is still significantly and positively predicted by *victim-oriented emotions*, $b_{v,w} = 0.09$, $SE = 0.05$, $t(414) = 2.08$, 95 % CI [0.05, 0.17], $p < .037$, and *perpetrator-oriented emotions*, $b_{p,w} = 0.13$, $SE = 0.05$, $t(414) = 2.83$, 95 % CI [0.04, 0.22], $p < .004$, but not by *self-oriented emotions*, $b_{s,w} = 0.05$, $SE = 0.05$, $t(414) = 1.55$, 95 % CI [−0.02, 0.17], $p < .120$. Consequently, we find that both experimental conditions indirectly affect *willingness to change pork chop consumption* via *victim-* and *perpetrator-oriented emotions* and these effects are partially mediated by *pork-eating justifications* (Table S4).

It also seems that the counter-active effect of *animal cruelty* (vs. *caring*) condition on *willingness to change pork chop consumption* can be explained by its positive effect on *pork-eating justification* once moral emotions are controlled for. That is, when controlling for moral emotions, *animal cruelty* (vs. *caring*) exposure predicts a lower *willingness to change pork chop consumption* indirectly via *pork-eating justifications*, $IE = -0.22$, $SE = 0.10$, 95 % CI [−0.42, −0.02], but directly as well, $c'_{x1} = -0.24$, $SE = 0.10$, $t(414) = -2.39$, 95 % CI [−0.45, −0.04], $p = .018$, although the coefficient became smaller and the p value increased.

4. Discussion

4.1. Pig appeals decrease willingness to eat pork chop through moral emotions

This study investigated the impact of pig caring and cruelty appeals on meat consumers' moral emotions and their willingness to consider dietary change. Consistent with our hypotheses, we found that showing participants an image of a pig next to a pork chop gives rise to moral emotions that increase willingness to change pork chop consumption. This finding is in line with extant research on the effects of meat-animal reminders on moral emotions and willingness to eat meat (Earle et al., 2019; Feinberg et al., 2019; Herrewijn et al., 2021; Kunst & Haugestad, 2018; Kunst & Hohle, 2016). The current study extends this research by applying a theoretical model that distinguishes between three harm-related moral emotions: those oriented towards victims (e.g., compassion and sadness), perpetrators (e.g., anger and disgust), and the self (e.g., guilt and shame). We confirmed that participants who were exposed to an image of a pig (versus only a pork chop) reported higher levels of victim-oriented, perpetrator-oriented, and self-oriented emotions. These moral emotions each predicted a willingness for dietary change, but to different degrees. Victim-oriented emotions were the strongest driver of the effect of animal appeals on participants' willingness to change diet. This finding aligns with past research on the effectiveness of animal appeals in fostering empathy towards animals (Earle et al., 2019; Kunst & Hohle, 2016; Niemyjska et al., 2018). Adding to this literature, we found that perpetrator-oriented emotions had a similar indirect effect on willingness to change diet, whereas self-oriented emotions were less influential in motivating dietary change.

4.2. The role of perpetrator-oriented emotions upon exposure to pig cruelty

Furthermore, we demonstrate that the *type* of meat-animal reminder makes a difference in terms of participants' emotional expression. We

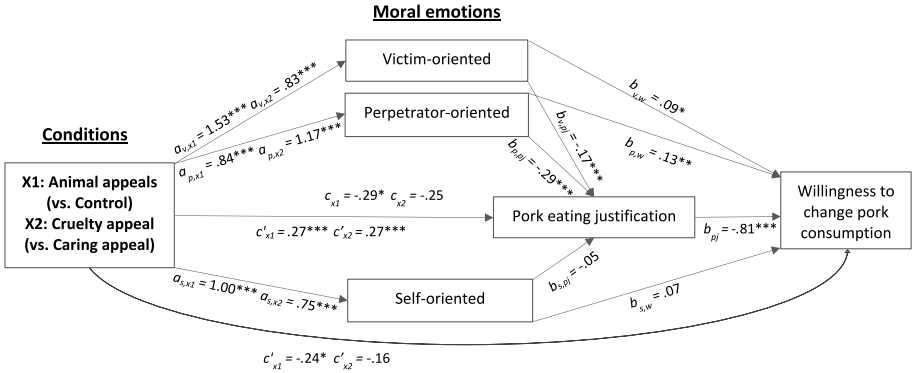

Fig. 4. Mediation model: Relative effects of conditions on pork-eating justification via moral emotions.
Note. *$p < .05$, **$p < .01$, ***$p < .001$.

found that exposure to a pig cruelty appeal, compared to a pig caring appeal, increased the expression of all three moral emotions among participants, consistent with the theory that cruelty appeals fit the dyadic template of moral judgment and perceived harm more strongly (Schein & Gray, 2018). In particular, the expression of perpetrator-oriented emotions was most prominent among participants exposed to the pig cruelty appeal, which in this context had a more negative effect on willingness to change pork chop consumption compared to the other moral emotions. The perception that the pig was treated cruelly by the human agent (the slaughterhouse worker) may have triggered moralization of pork-eating (Feinberg et al., 2019), moral condemnation (Schein & Gray, 2018) and feelings of moral outrage, anger and disgust (Li et al., 2023).

Moral outrage can motivate people to compensate for the unjust treatment of victims they perceive by remediating their behavior (Li et al., 2023), and relatedly, it has been shown to predict activism in favor of vegan lifestyles (Judge et al., 2022). However, previous research has found that meat-eaters may also express moral outrage at a third-party causing animal abuse as a mechanism to displace responsibility, protect their moral identity and alleviate feelings of guilt (Rothgerber et al., 2022). Moral threats may evoke identity-protective mechanisms to preserve meat-eating (Graça et al., 2015; Randers & Thøgersen, 2023), so that moral outrage is directed towards outgroups (non-meat-eaters, vegetarians, activists, etc.) rather than inward, towards the ingroup (Täuber & van Zomeren, 2013).

4.3. The potential role of defensiveness among consumers

Defensiveness might also explain some findings in our study. Although animal caring and cruelty appeals (vs. control) increase willingness to change pork chop consumption via their effect on moral emotions, we also find that these effects are counteracted. Exploratory analysis suggests that this can (partially) be explained by the dual effect of these appeals on participants' tendency to justify pork consumption. On the one hand, moral emotions make pork-eating justifications less likely. Once moral emotions are statistically controlled for, the animal appeals seem to increase pork-eating justification. These findings resemble earlier findings. For example, Herrewijn et al. (2021) found that VR (vs. 2D video) footage of the cruel treatment of pigs in factory farms may increase feelings of the moral emotion empathy, but also simultaneously increase speciesist attitudes, and empathy and speciesism had opposite effects on willingness to eat meat. When people are exposed to evidence of farmed animal suffering this may arouse dissonant feelings that demotivate meat consumption (Souza et al., 2022). However, people may still be motivated to resist or ignore their moral emotions and justify pork consumption, because they conflict with a hedonic motivation to eat meat (Feinberg et al., 2019). Our exploratory analyses showed that hedonic motivation predicted large amounts of variance in pork-eating justification and willingness to change, in contrast to the experimental conditions and animal solidarity, which both predicted considerable variance in the expression of moral emotions. These findings are reminiscent of research on the meat paradox (Rothgerber, 2020). Even though many people may abhor animal cruelty, their love for meat may overshadow moral emotions and cause them to resist change and morally disengage from meat (Rothgerber, 2020), for example by denying or diffusing responsibility to act (Souza et al., 2022), minimizing the moral status of animal victims (Herrewijn et al., 2021) or by "shooting the messenger" (De Groeve et al., 2022). Although we found that pork-eating justification mediates the dual effect of the cruelty (vs. caring) appeal on willingness to change pork chop consumption, the fact that we only included one measure of moral disengagement might explain why the mediation was only partial when comparing the effects of both animal appeals with the control condition.

4.4. Practical implications

Our research may inform communication interventions to promote dietary change through animal advocacy. To summarize, our findings demonstrate that animal appeals can promote willingness for dietary change via moral emotions, mainly those oriented towards animal victims and human perpetrators. Cruelty appeals seem most effective to motivate change by inciting moral outrage, and women seem generally more responsive to animal appeals compared to men. In line with earlier studies, women reported greater willingness to change their pork chop consumption, weaker justifications for eating pork, and stronger moral emotions in response to the animal appeals (Ioannidou et al., 2023). They also expressed more animal solidarity and less hedonic motivation to eat meat – factors that strongly predicted moral emotions and willingness to change, respectively.

Hedonic motivations to eat meat remain a major barrier for change, and can trigger defensive justifications regardless of the moral emotions evoked by animal appeals. To empower consumers, advocates could frame meat avoidance as an opportunity to explore new and enjoyable taste experiences rather than a moral obligation. Rather than assigning blame and explicitly urging dietary change, campaigns should balance moral appeals with practical, non-confrontational solutions to reduce defensiveness (Bastian, 2019). Caring appeals are less provocative and may motivate change by fostering empathy towards animals, but may lack the motivational force needed to confront the harm associated with meat-eating habits. Advocates should weigh the relative strengths and drawbacks of both cruelty and caring appeals to maximize their impact. Without exposure to animal reminders, meat consumers are likely to remain emotionally detached (Benningstad & Kunst, 2020; Kunst & Haugestad, 2018; Kunst & Hohle, 2016; Loughnan et al., 2010) and may continue to view meat production as a valuable industry for bringing food on the plate.

4.5. Strengths, limitations and future research

Noteworthy strengths of our study include its use of preregistration, a theory-based examination of different types of moral emotions in response to animal reminders, and the extension of animal reminder literature by comparing animal caring and cruelty appeals in a highly controlled experimental set-up. Nevertheless, the present study also has its limitations.

First, besides the causal effects imposed by our experimental design, we acknowledge our cross-sectional data and statistical analyses do not conclusively prove the causal relations we deduced theoretically. More research is needed to empirically demonstrate theorized mechanisms. Relatedly, we realize that self-reported measures of dietary motivations and moral emotions over a short term may not fully capture their complexity, as they may be influenced by social desirability biases. Furthermore, it is possible that animal appeals evoke an emotional response that is only short-lived. Even if a pig cruelty appeal may initially demotivate pork consumption, additional reminders may be needed to reinforce dietary change, as consumers may more easily forget information that contradicts their diet (Leach et al., 2023). Longitudinal designs are required to examine the long-term impact of meat-animal reminders after a single or multiple exposures (Benningstad & Kunst, 2020). Although limited research suggests that even imagined contact with commonly devalued animals (e.g., cows) can reduce prejudice and enhance the inclusion of farmed animals in behavioral intentions (Auger & Amiot, 2019), we suspect that more routine and direct contact between humans and animals used for food (e.g., in sanctuaries) could be more effective in fostering empathy and solidarity with animals, and achieving dietary changes (Benningstad & Kunst, 2020).

Second, future research on promoting dietary change should adequately control for participants' baseline consumption. While we collected data on general meat consumption frequency, we did not specifically capture whether participants regularly consume pork or

pork chops. This omission limits the granularity of our findings regarding the starting point of participants' dietary habits and how this might affect their willingness to change pork chop consumption. Conversely, our willingness to change scale referred to pork chops and not to meat in general, so it is not clear whether emotions aroused by the pig appeals affect willingness to eat (less) meat in general. Relatedly, one item in our scale did not refer to pork chops specifically, but to following a plant-based diet more generally. Excluding this item from our scale did not affect overall results, except that the weak indirect effect via self-oriented emotions was no longer significant. While exploratory analyses suggest participants' hedonic motivation to eat meat and their willingness to follow a plant-based diet did not significantly differ across conditions, future research should more rigorously test whether specific meat-animal appeals (e.g., pork chop-pig) can influence broader dietary behaviors.

Third, our experiment exclusively presented pigs as animal targets limiting the generalizability of our findings to other species. It is likely that the emotional impact observed in our study would differ if images of cows, fish, chickens, and other species were shown instead. Future research could explore whether our findings are replicated with other species commonly used for food (Ioannidou et al., 2023). This is particularly relevant given the encultured hierarchy of moral status across species, which suggests that human solidarity with animals varies depending on species membership (Amiot et al., 2019; Ioannidou et al., 2023; Uenal et al., 2022). In addition, emotional responses to animal treatment may depend on perceptions of the animal's intelligence and sentience (Caviola, 2019). More broadly, research is needed to investigate how species-specific perceptions influence moral emotions and behavior. These studies could account for speciesism, which has been shown to weaken people's deontological constraints against harming animals based on their species membership (Caviola, 2019).

Fourth, although our manipulation checks suggest that the stimuli in this study were very effective, future research could explore alternative methods to provide a richer, more immersive experience and enhance participant engagement, such as using video or virtual reality stimuli of animal appeals in a lab setting (Herrewijn et al., 2021). Another potential way to make the stimuli more emotionally compelling is by emphasizing the individuality of animals used for food (cf. identifiable victim effect), for example by reporting their life stories or naming them. Like in other studies (e.g., Kunst & Hohle, 2016), our stimuli did not individualize or name the pigs that were shown and juxtaposed them with an image that was named 'pork chop'. Such objectifying features may inhibit moral emotions (Kunst & Hohle, 2016). Therefore, future research on meat-animal reminders could further assess how moral emotions are influenced by both individualizing and objectifying stimuli. One potential mechanism to increase individualization of and identification with pigs is by comparing them with dogs, which have similar cognitive capacities but are viewed as morally closer to humans. Comparing farmed animals with animal companions also occurs in advocacy contexts and could be scrutinized further. Other meat reduction interventions may include direct contact with animals in sanctuaries, providing information about animal suffering, and encouraging mind attribution to animals (Mathur et al., 2021).

Lastly, although disgust can be construed and measured as a moral emotion oriented towards perpetrators and the self, previous research has shown that people can also experience a heightened sense of disgust towards eating meat after being exposed to animal reminders (Earle et al., 2019; Kunst & Hohle, 2016). A common explanation is that animals may cue associations with death, dirtiness, and disease in the context of meat-eating, evoking feelings of visceral disgust that protect individuals from contamination with pathogens (Kunst & Hohle, 2016). Because our study focused on moral emotions, we did not directly measure this type of disgust. In hindsight, however, it would have been a relevant control variable. Additionally, there is evidence that disgust towards meat may also result from moral beliefs (Fessler et al., 2003). People may experience empathic disgust because they are repulsed by the idea of eating parts of a deceased 'someone'—a victimized animal individual—rather than 'something'—a piece of meat dissociated from its animal origins. Future research could focus on various manifestations of disgust, both visceral and moral, to better understand how they interact and influence meat consumption.

5. Conclusion

This study confirms that exposure to pig appeals (vs. only pork chop), and in particular a cruelty pig appeal, significantly increases meat consumers' willingness to change pork chop consumption via their effect on moral emotions. Victim- and perpetrator-oriented emotions, evoked by cruelty appeals, were the strongest predictors of willingness for dietary change, while self-oriented emotions were less impactful. Interestingly, animal appeals may decrease justifications for eating pork via moral emotions, but may simultaneously increase justifications once moral emotions are statistically controlled for, so that the overall willingness to change pork chop consumption remains fairly constant. Hedonic motivations to eat meat remain a significant barrier. Although responses to the animal appeals seemed similar across the sexes, women were generally more responsive than men. To better understand moralization mechanisms and interventions influencing dietary change, future research should properly account for baseline consumption and response biases, diversify experimental stimuli across species and modes of presentation, and delve deeper into the interplay of moral and visceral emotions that enable meat-free animal solidarity in response to animal cruelty.

CRediT authorship contribution statement

Rui Pedro Fonseca: Writing – review & editing, Writing – original draft, Methodology, Investigation, Funding acquisition, Formal analysis, Conceptualization. **Ben De Groeve:** Writing – review & editing, Writing – original draft, Validation, Methodology, Investigation, Formal analysis, Conceptualization.

Ethical statement

We, the authors of this manuscript, hereby declare that this research was conducted in accordance with the ethical standards of the relevant institutional and national research committees and with the 1964 Helsinki declaration.

Ethical approval

This study was reviewed and approved by IRB of Iscte-IUL (University Institute of Lisbon, reference 24/2023).

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Declaration of competing interest

The authors have no conflicts of interest to declare.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2025.108018.

Data availability

The dataset generated during the current study is available at OSF project page: https://osf.io/u695k/files/osfstorage.

References

Aaltola, E. (2014). Animal suffering: Representations and the act of looking. *Anthrozoös, 27*(1), 19–31. https://doi.org/10.2752/175303714X13837396326297

AHDB. (2025). New year, new pork campaign. *Agriculture and Horticulture Development Board*. https://ahdb.org.uk/news/new-year-new-pork-campaign.

Algoe, S. B., & Haidt, J. (2009). Witnessing excellence in action: The "other-praising" emotions of elevation, gratitude, and admiration. *The Journal of Positive Psychology, 4*(2), 105–127. https://doi.org/10.1080/17439760802650519

Amiot, C. E., Sukhanova, K., & Bastian, B. (2019). Social identification with animals: Unpacking our psychological connection with other animals. *Journal of Personality and Social Psychology, 118*(5), 991–1017. https://doi.org/10.1037/pspi0000199

Auger, B., & Amiot, C. E. (2019). The impact of imagined contact in the realm of human-animal relations: Investigating a superordinate generalization effect involving both valued and devalued animals. *Journal of Experimental Social Psychology, 85*. https://doi.org/10.1016/j.jesp.2019.103872

Bastian, B. (2019). Changing ethically troublesome behavior: The causes, consequences, and solutions to motivated resistance. *Social Issues and Policy Review, 13*(1), 63–92. https://doi.org/10.1111/sipr.12048.

Bastian, B., Costello, K., Loughnan, S., & Hodson, G. (2012). When closing the human-animal divide expands moral concern: The importance of framing. *Social Psychological and Personality Science, 3*(4), 421–429. https://doi.org/10.1177/1948550611425106

Bastian, B., Loughnan, S., Haslam, N., & Radke, H. R. M. (2012). Don't mind meat? The denial of mind to animals used for human consumption. *Personality and Social Psychology Bulletin, 38*(2), 247–256. https://doi.org/10.1177/0146167211424291

Benningstad, N. C. G., & Kunst, J. R. (2020). Dissociating meat from its animal origins: A systematic literature review. *Appetite, 147*(December 2019), Article 104554. https://doi.org/10.1016/j.appet.2019.104554

Burke, K. C., Peter-Hagene, L. C., Jones, T. M., Bottoms, B. L., Amaravadi, S., Garcia, B., Richardson, K., & Sachdev, K. (2021). Harming cats and dogs: People are as morally outraged, but not as punitive, in animal versus human abuse cases. *The Humanistic Psychologist, 51*(2), 207–217. https://doi.org/10.1037/hum0000247

Caviola, L. (2019). *How we value animals: The psychology of speciesism [PhD Thesis]*. University of Oxford.

Chai, B. C., van der Voort, J. R., Grofelnik, K., Eliasdottir, H. G., Klöss, I., & Perez-Cueto, F. J. A. (2019). Which diet has the least environmental impact on our planet? A systematic review of vegan, vegetarian and omnivorous diets. *Sustainability, 11*(15). https://doi.org/10.3390/su11154110

Cohen, J. (1988). Set correlation and contingency tables. *Applied Psychological Measurement, 12*(4), 425–434. https://doi.org/10.1177/014662168801200410

Cordts, A., Nitzko, S., & Spiller, A. (2014). Consumer response to negative information on meat consumption in Germany. *The International Food and Agribusiness Management Review, 17*.

Costello, A., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation, 10*(7). doi:10.1.1.110.9154.

Cronin, J. K., & Kramer, L. A. (2018). Challenging the iconography of oppression in marketing: Confronting speciesism through art and visual culture. *Journal of Animal Ethics, 8*(1), 80–92. https://doi.org/10.5406/janimalethics.8.1.0080

Curry, O. S., Mullins, D. A., & Whitehouse, H. (2019). Is it good to cooperate?: Testing the theory of morality-as-cooperation in 60 societies. *Current Anthropology, 60*(1), 47–69. https://doi.org/10.1086/701478

Cushman, F., Young, L., & Hauser, M. (2006). The role of conscious reasoning and intuition in moral judgment: Testing three principles of harm. *Psychological Science, 17*(12), 1082–1089. https://doi.org/10.1111/j.1467-9280.2006.01834.x

De Groeve, B., Rosenfeld, D. L., Bleys, B., & Hudders, L. (2022). Moralistic stereotyping of vegans: The role of dietary motivation and advocacy status. *Appetite, 174*(March), Article 106006. https://doi.org/10.1016/j.appet.2022.106006

DEFRA - Department for Environment Food & Rural Affairs, D. (2023). Organic farming statistics United Kingdom. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1159086/organic_farming_2022_stats_notice_25may23.pdf.

Earle, M., Hodson, G., Dhont, K., & MacInnis, C. (2019). Eating with our eyes (closed): Effects of visually associating animals with meat on antivegan/vegetarian attitudes and meat consumption willingness. *Group Processes & Intergroup Relations, 22*(6), 818–835. https://doi.org/10.1177/1368430219861848

Ellemers, N., van der Toorn, J., Paunov, Y., & van Leeuwen, T. (2019). The psychology of morality: A review and analysis of empirical studies published from 1940 through 2017. *Personality and Social Psychology Review, 23*(4), 332–366. https://doi.org/10.1177/1088868318811759

Feinberg, M., Kovacheff, C., Teper, R., & Inbar, Y. (2019). Understanding the process of moralization: How eating meat becomes a moral issue. *Journal of Personality and Social Psychology, 117*(1), 50–72. https://doi.org/10.1037/pspa0000149

Fernández, L. (2020). The emotional politics of images : Moral shock , explicit. *Journal for Critical Animal Studies, 17(4), 53–80*. http://hdl.handle.net/10230/47843.

Fernández, L. (2021). Images that liberate: Moral shock and strategic visual communication in animal liberation activism. *Journal of Communication Inquiry, 45*(2), 138–158. https://doi.org/10.1177/0196859920932881

Fessler, D. M. T., Arguello, A. P., Mekdara, J. M., & Macias, R. (2003). Disgust sensitivity and meat consumption: A test of an emotivist account of moral vegetarianism. *Appetite, 41*(1), 31–41. https://doi.org/10.1016/S0195-6663(03)00037-0

Fiber-Ostrow, P., & Lovell, J. S. (2016). Behind a veil of secrecy animal abuse, factory farms, and Ag-Gag legislation Enhanced Reader.pdf. *Issues in criminal, social, and restorative justice*. https://doi.org/10.1080/10282580.2016.1168257

Fiddes, N. (1992). *Meat: A natural symbol*. Routledge.

Fonseca, R. P., & Sanchez-Sabate, R. (2022). Consumers' attitudes towards animal suffering: A systematic review on awareness, willingness and dietary change. *International Journal of Environmental Research and Public Health, 19*, 1–23. https://doi.org/10.3390/ijerph192316372

Francione, G. L. (2020). Some brief comments on animal rights. *Animal Frontiers, 10*(1), 29–33. https://doi.org/10.1093/af/vfz050

Ghasemi, A., & Zahediasl, S. (2012). Normality tests for statistical analysis: A guide for non-statisticians. *International Journal of Endocrinology and Metabolism, 10*(2), 486–489. https://doi.org/10.5812/ijem.3505

Graça, J., Calheiros, M. M., & Oliveira, A. (2015). Attached to meat? (Un)Willingness and intentions to adopt a more plant-based diet. *Appetite, 95*, 113–125. https://doi.org/10.1016/j.appet.2015.06.024

Graham, J., Haidt, J., Koleva, S., Motyl, M., Iyer, R., Wojcik, S. P., & Ditto, P. H. (2013). Chapter two - moral foundations theory: The pragmatic validity of moral pluralism. *Advances in Experimental Social Psychology, 47*, 55–130. https://doi.org/10.1016/B978-0-12-407236-7.00002-4. Academic Press.

Gray, K., & Wegner, D. M. (2011). Dimensions of moral emotions. *Emotion Review, 3*(3), 258–260. https://doi.org/10.1177/1754073911402388

Greene, J. D. (2011). Emotion and morality: A tasting menu. *Emotion Review, 3*(3), 227–229. https://doi.org/10.1177/1754073911409629

Greene, D. G., Morelli, A. S., Lowenberg, K., Nystrom, L. E., & Cohen, J. D. (2007). Cognitive load selectively interferes with utilitarian moral judgment. *Cognition*, 1144–1154. https://doi.org/10.1016/j.cognition.2007.11.004

Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review, 108*(4), 814–834. https://doi.org/10.1037/0033-295X.108.4.814

Hallström, E., Carlsson-Kanyama, A., & Börjesson, P. (2015). Environmental impact of dietary change: A systematic review. *Journal of Cleaner Production, 91*, 1–11. https://doi.org/10.1016/j.jclepro.2014.12.008. Elsevier Ltd.

Hartmann, C., & Siegrist, M. (2020). Our daily meat: Justification, moral evaluation and willingness to substitute. *Food Quality and Preference, 80*(January 2019), Article 103799. https://doi.org/10.1016/j.foodqual.2019.103799

Hartmann, C., Siegrist, M., Cardoso, C. S., von Keyserlingk, M. A. G., Hötzel, M. J. M. J., Bray, H. J., Ankeny, R. A., Leach, S., Piazza, J., Loughnan, S., Sutton, R. M., Kapantai, I., Dhont, K., Douglas, K. M., Dowsett, E., Semmler, C., Bray, H. J., Ankeny, R. A., Chur-Hansen, A., … Weary, D. M. (2018). When closing the human-animal divide expands moral concern: The importance of framing. *Appetite, 11*(1), 1–18. https://doi.org/10.1186/s13028-020-00522-6

Hayes, A. F. (2022). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach* (Vol. 6). New York: THE Guilford Press. Issue 1.

Herchenroeder, L., Forestell, C. A., & Bravo, A. J. (2022). The effectiveness of animal welfare-, environmental-, and health-focused video appeals on implicit and explicit wanting of meat and intentions to reduce meat consumption. *The Journal of Social Psychology*. https://doi.org/10.1080/00224545.2022.2081529

Herrewijn, L., De Groeve, B., Cauberghe, V., & Hudders, L. (2021). VR outreach and meat reduction advocacy: The role of presence, empathic concern and speciesism in predicting meat reduction intentions. *Appetite, 166*, Article 105455. https://doi.org/10.1016/j.appet.2021.105455

Herzog, H. A., & Golden, L. L. (2009). Moral emotions and social activism: The case of animal rights. *Journal of Social Issues, 65*.

Ioannidou, M., Lesk, V., Stewart-Knox, B., & Francis, K. B. (2023). Moral emotions and justifying beliefs about meat, fish, dairy and egg consumption: A comparative study of dietary groups. *Appetite, 186*. https://doi.org/10.1016/j.appet.2023.106544

Jasper, J. M., & Poulsen, J. D. (1995). Recruiting strangers and friends: Moral shocks and social networks in animal rights and anti-nuclear protests. *Source: Social Problems, 42*(Issue 4).

Johnson, C., Schreer, G., & Bao, K. J. (2021). Effect of anthropomorphizing food animals on intentions to eat meat. *Anthrozoös, 34*(4), 563–578. https://doi.org/10.1080/08927936.2021.1914442

Jones, D. (2007). Moral psychology: The depths of disgust. *Nature*. https://doi.org/10.1038/447768a

Joy, M. (2009). *Why we love dogs, eat pigs and wear cows: An introduction to carnism*. CA: Conari Press.

Judge, M., Fernando, J. W., & Begeny, C. T. (2022). Dietary behaviour as a form of collective action: A social identity model of vegan activism. *Appetite, 168*. https://doi.org/10.1016/j.appet.2021.105730

Kranzbühler, A. M., & Schifferstein, H. N. J. (2023). The effect of meat-shaming on meat eaters' emotions and intentions to adapt behavior. *Food Quality and Preference, 107*(February), Article 104831. https://doi.org/10.1016/j.foodqual.2023.104831

Kunst, J. R., & Haugestad, P. (2018). The effects of dissociation on willingness to eat meat are moderated by exposure to unprocessed meat: A cross-cultural

demonstration. *Appetite, 120*, 356–366. https://doi.org/10.1016/j.appet.2017.09.016
Kunst, J. R., & Hohle, S. M. (2016). Meat eaters by dissociation: How we present, prepare and talk about meat increases willingness to eat meat by reducing empathy and disgust. *Appetite, 105*, 758–774. https://doi.org/10.1016/j.appet.2016.07.009
Kupsala, S. (2018). Contesting the meat–animal link and the visibility of animals killed for food: A focus group study in Finland. *Food, Culture and Society, 21*(2), 196–213. https://doi.org/10.1080/15528014.2018.1427928
Leach, S., Sutton, R. M., Dhont, K., Douglas, K. M., & Bergström, Z. M. (2023). Are we smart enough to remember how smart animals are? *Journal of Experimental Psychology: General*, 1–22. https://doi.org/10.1037/xge0001401.supp
Lemos Teixeira, D., Larraín, R., Melo, O., & Hö Tzel, M. J. (2018). Public opinion towards castration without anaesthesia and lack of access to pasture in beef cattle production. https://doi.org/10.1371/journal.pone.0190671.
Li, X., Hou, M., He, Y., & Ma, M. (2023). People roar at the sight of injustice: Evidences from moral emotions. *Current Psychology, 42*(34), 29868–29879. https://doi.org/10.1007/s12144-022-04014-w
Loughnan, S., Haslam, N., & Bastian, B. (2010). The role of meat consumption in the denial of moral status and mind to meat animals. *Appetite, 55*(1), 156–159. https://doi.org/10.1016/j.appet.2010.05.043
Mace, J. L., & Knight, A. (2025). Pig welfare and ethical considerations during abattoir stunning: CO_2 vs. alternative methods such as argon gas. *Frontiers in Veterinary Science, 12*, 1542798. https://doi.org/10.3389/fvets.2025.1542798.
Marino, L., & Colvin, C. (2016). *Thinking pigs: Cognition, emotion, and personality*. Mammalogy Collection.
Mathur, M. B., Peacock, J., Reichling, D. B., Nadler, J., Bain, P. A., Gardner, C. D., & Robinson, T. N. (2021). Interventions to reduce meat consumption by appealing to animal welfare: Meta-analysis and evidence-based recommendations. *Appetite, 164*. https://doi.org/10.1016/j.appet.2021.105277. Academic Press.
McConnachie, E., Hötzel, M. J., Robbins, J. A., Shriver, A., Weary, D. M., & Von Keyserlingk, M. A. G. (2019). Public attitudes towards genetically modified polled cattle. *PLoS One, 14*(5), 1–15. https://doi.org/10.1371/journal.pone.0216542
Monteiro, C. A., Pfeiler, T. M., Patterson, M. D., & Milburn, M. A. (2017). The Carnism Inventory: Measuring the ideology of eating animals. *Appetite, 113*, 51–62. https://doi.org/10.1016/j.appet.2017.02.011
Niemyjska, A., Cantarero, K., Byrka, K., & Bilewicz, M. (2018). Too humanlike to increase my appetite: Disposition to anthropomorphize animals relates to decreased meat consumption through empathic concern. *Appetite, 127*, 21–27. https://doi.org/10.1016/j.appet.2018.04.012
Nordquist, R. E., van der Staay, F. J., van Eerdenburg, F. J. C. M., Velkers, F. C., Fijn, L., & Arndt, S. S. (2017). Mutilating procedures, management practices, and housing conditions that may affect the welfare of farm animals: Implications for welfare research. *Animals, 7*(2). https://doi.org/10.3390/ani7020012
Palomo-Vélez, G., Tybur, J. M., & van Vugt, M. (2018). Unsustainable, unhealthy, or disgusting? Comparing different persuasive messages against meat consumption. *Journal of Environmental Psychology, 58*, 63–71. https://doi.org/10.1016/j.jenvp.2018.08.002
Piazza, J., McLatchie, N., & Olesen, C. (2018). Are baby animals less appetizing? Tenderness toward baby animals and appetite for meat. *Anthrozoös, 31*(3), 319–335. https://doi.org/10.1080/08927936.2018.1455456
Piazza, J., Ruby, M. B., Loughnan, S., Luong, M., Kulik, J., Watkins, H. M., & Seigerman, M. (2015). Rationalizing meat consumption. The 4Ns. *Appetite, 91*, 114–128. https://doi.org/10.1016/j.appet.2015.04.011
Pizarro, D. (2000). Nothing more than feelings? The role of emotions in moral judgment. *Journal for the Theory of Social Behaviour, 30*(4), 355–375. https://doi.org/10.1111/1468-5914.00135
Plous, S. (1993). Psychological mechanisms in the human use of animals. *Journal of Social Issues, 49*(1), 11–52. https://doi.org/10.1111/j.1540-4560.1993.tb00907.x
Randers, L., & Thøgersen, J. (2023). Meat, myself, and I: The role of multiple identities in meat consumption. *Appetite, 180*. https://doi.org/10.1016/j.appet.2022.106319
Rogers, R. A. (2009). Beasts , burgers , and hummers : Meat and the crisis of masculinity in contemporary television advertisements beasts , burgers , and hummers : Meat and the crisis of masculinity in contemporary television advertisements. *Environmental Communication, 2*(3). https://doi.org/10.1080/17524030802390250
Rosenfeld, D. L., & Burrow, A. L. (2018). Development and validation of the dietarian identity questionnaire: Assessing self-perceptions of animal-product consumption. *Appetite*. https://doi.org/10.1016/j.appet.2018.05.003
Rothgerber, H. (2013). Real men don't eat (vegetable) quiche: Masculinity and the justification of meat consumption. *Psychology of Men and Masculinity, 14*(4), 363–375. https://doi.org/10.1037/a0030379
Rothgerber, H. (2014). Efforts to overcome vegetarian-induced dissonance among meat eaters. *Appetite, 79*, 32–41. https://doi.org/10.1016/j.appet.2014.04.003
Rothgerber, H. (2020). Meat-related cognitive dissonance: A conceptual framework for understanding how meat eaters reduce negative arousal from eating animals. *Appetite, 146*(May 2019), Article 104511. https://doi.org/10.1016/j.appet.2019.104511
Rothgerber, H., Rosenfeld, D. L., Keiffer, S., Crable, K., Yeske, A., Berger, L., Camp, P., Smith, K., Fischer, O., & Head, A. (2022). Motivated moral outrage among meat-eaters. *Social Psychological and Personality Science, 13*(5), 916–926. https://doi.org/10.1177/19485506211041536
Rowe, B. D. (2011). Understanding animals-becoming-meat: Embracing a disturbing education. *Critical Studies in Education, 2*(7). https://doi.org/10.14288/ce.v2i7.182311
Rozin, P., Lowery, L., Imada, S., & Haidt, J. (1999). The cad triad hypothesis: A mapping between three moral emotions (contempt,... *Journal of Personality and Social Psychology, 76*(4), 574–586.
RSPCA - Royal Society for the Prevention of Cruelty to Animals, R. (2024). Kindness index report 2024. https://www.rspca.org.uk/whatwedo/latest/kindnessindex/annual/report2024.
Ruby, M. B., & Heine, S. J. (2012). Too close to home. Factors predicting meat avoidance. *Appetite, 59*(1), 47–52. https://doi.org/10.1016/j.appet.2012.03.020
Sawilowsky, S. S. (2009). New effect size rules of thumb. *Journal of Modern Applied Statistical Methods, 8*(2), 597–599. https://doi.org/10.22237/jmasm/1257035100
Schein, C., & Gray, K. (2018). The theory of dyadic morality: Reinventing moral judgment by redefining harm. *Personality and Social Psychology Review, 22*(1), 32–70. https://doi.org/10.1177/1088868317698288
Silva Souza, G. L., O'Dwyer, E., Silva Souza, L. G., & O'Dwyer, E. (2022). Animal rights, environment, or health? Effects of argument type and dissonance on the attitudes toward the consumption of animals. *Appetite, 176*(June), Article 106129. https://doi.org/10.1016/j.appet.2022.106129
Tangney, J. P., Stuewig, J., & Mashek, D. J. (2007). Moral emotions and moral behavior. *Annual Review of Psychology, 58*, 345–372. https://doi.org/10.1146/annurev.psych.56.091103.070145
Täuber, S., & van Zomeren, M. (2013). Outrage towards whom? Threats to moral group status impede striving to improve via out-group-directed outrage. *European Journal of Social Psychology, 43*(2), 149–159. https://doi.org/10.1002/ejsp.1930
Tian, Q., Hilton, D., & Becker, M. (2016). Confronting the meat paradox in different cultural contexts: Reactions among Chinese and French participants. *Appetite, 96*, 187–194. https://doi.org/10.1016/j.appet.2015.09.009
Uenal, F., Sidanius, J., Maertens, R., Hudson, S., kiera, T. J., Davis, G., & Ghani, A. (2022). The roots of ecological dominance orientation: Assessing individual preferences for an anthropocentric and hierarchically organized world. *Journal of Environmental Psychology, 81*. https://doi.org/10.1016/j.jenvp.2022.101783
Wagner, M. F., Milner, J. S., Mccarthy, R. J., Crouch, J. L., Mccanne, T. R., & Skowronski, J. J. (2015). Facial emotion recognition accuracy and child physical abuse: An experiment and a meta-analysis. *Psychology of Violence, 5*(2), 154–162. https://doi.org/10.1037/a0036014
Watson, D., & Clark, L. A. (1994). *The PANAS-X: Manual for the positive and negative affect schedule* (Vol. 28). Department of Psychological & Brain Sciences Publications, May. http://ir.uiowa.edu/psychologypubs/11.
World Animal Protection. Confined in cruelty: The stark reality of UK farming. https://www.worldanimalprotection.org.uk/siteassets/reports/confined-in-cruelty-report.pdf.
Zickfeld, J. H., Kunst, J. R., & Hohle, S. M. (2018). Too sweet to eat: Exploring the effects of cuteness on meat consumption. *Appetite, 120*, 181–195. https://doi.org/10.1016/j.appet.2017.08.038