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Unpalatable truths: Commitment to eating meat is associated with strategic ignorance of food-animal minds

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Data curation							
Formal Analysis	✓						
Funding acquisition				✓	✓	✓	✓
Investigation	✓				✓ (sup.)		
Methodology	✓	✓	✓		✓ (sup.)		
Project administration	✓						
Resources	✓		✓				
Software							
Supervision							
Validation							
Visualization	✓						
Writing – original draft	✓						
Writing – review & editing	✓	✓	✓	✓	✓ (sup.)	✓	✓

Note. See https://casrai.org/credit/ for role definitions.

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Abstract

Animal minds are of central importance to debates about their rights and welfare. Remaining ignorant of evidence that animals have minds is therefore likely to facilitate their mistreatment. Studying samples of adults and students from the UK and US we found that, consistent with motivational perspectives on meat consumption, those who were more (vs. less) committed to eating meat were more motivated to avoid exposure to information about food-animals' sentience (Studies 1), showed less interest in exposure to articles about intelligent food animals (Studies 2a and 2b), and were quicker to terminate exposure to internet pop-ups containing information about food-animals' minds (Studies 3a and 3b). At the same time, those who were more (vs. less) committed to eating meat approached information about companion-animals' minds (Studies 2a-3b) and unintelligent food animals (Studies 2a and 2b) in largely the same ways. The findings demonstrate that, within the UK and US, the desire to eat meat is associated with strategies to avoid information that is likely to challenge meat consumption.

Keywords: meat, animals, mind attribution, dissonance, information avoidance

Unpalatable truths: Commitment to eating meat is associated with strategic ignorance of food-animal minds

1. Introduction

Meat consumption and factory farming raise profound moral questions. Under what conditions, if any, is it justifiable to kill animals for human consumption? What minimum standards of living should be mandated for farmed animals? Beliefs about the minds of farmed animals have substantial bearing on these questions (Bentham, 2015; Mill, 1861; Singer, 1975, 1980). As such, the legitimacy of our relationships with animals depends on our ability to unbiasedly assess the empirical evidence of their mental capacities. The tendency to remain strategically ignorant of this type of evidence can be considered a roadblock in the way of moral progress--understood in terms of an expansion of our moral circles (Heffernan, 2011; Moody-Adams, 1994; Williams, 2008). Building on motivational accounts of meat consumption (Bastian et al., 2012; Piazza & Loughnan, 2016) and information avoidance (Gigerenzer & Garcia-Retamero, 2017; Golman et al., 2017; Hertwig & Engel, 2016), five studies tested if a commitment to eating meat is associated with the tendency to strategically avoid information about the minds of animals reared for food (henceforth referred to as 'food animals').

1.1. Motivated perceptions of food-animal minds

Minds play an important role in social and moral cognition. People possess rich linguistic faculties that help them make sense of the social world in terms of mental states, such as goals and desires (Epley et al., 2007; Heider & Simmel, 1944; Schweitzer & Waytz, 2020). They are also generally interested in minds, including those possessed by non-human animals (Amiot & Bastian, 2015; Wilson, 1984). This is evident in the wide-spread appeal of literature and media documenting animals' cognitive capacities (e.g., Berlowitz et al., 2016; de Waal, 2016; Herzog, 2010). Crucially, this type of information bears on moral beliefs that define our relationships with animals. For example, beliefs about how much an animal can think and feel are tightly linked to judgements about whether it is acceptable to harm and eat them (Feinberg et al., 2019; H. M. Gray et al., 2007; Leach et al.,

2021; Piazza et al., 2014; Piazza & Loughnan, 2016; Possidónio et al., 2019; Sytsma & Machery, 2012). This means, all else being equal, that people are both interested in, and sensitive to the moral implications of, information about animal minds.

The 'meat paradox' describes the fact that most people care about animals but are paradoxically committed to a behaviour (eating meat) that results in their suffering and death (Bastian & Loughnan, 2017; Loughnan & Davies, 2020). This inconsistency is thought to be aversive and to motivate people to downplay the moral issues surrounding meat eating (Bastian & Loughnan, 2017; Loughnan & Davies, 2020; Rothgerber, 2020). For example, people who are more committed to eating meat tend to believe that it is more 'necessary', 'natural', 'normal', and 'nice' to do so (Piazza et al., 2015). They also consider factory farms to be less of a problem for zoonotic diseases (e.g., COVID-19) and express more scepticism that sanctioning these farms might prevent further diseases (Dhont et al., 2021). These data suggest that those who have a strong desire to eat meat are motivated to justify eating animals and diminish the moral issues surrounding factory farming.

Beliefs about food-animal minds can, in a similar fashion, minimize the moral issues surrounding meat eating by diminishing the harms associated with it (Bastian & Loughnan, 2017; Loughnan & Davies, 2020). For example, people perceive cows as having less sophisticated minds when the links between eating meat and animal farming are made salient (Bastian et al., 2012). Moreover, Piazza and Loughnan (2016) showed that people's meat eating was associated with a reluctance to utilize information about food-animals' minds in moral judgement (see also Tian et al., 2021). In this work, participants were asked to consider an animal they eat (e.g., pigs) or an animal they do not eat (but that is eaten in other cultures; e.g., tapirs), as intelligent and inquisitive or lacking these traits. Considering these animals as intelligent, compared to unintelligent, affected attributions of mind to both animals, but only affected judgements about the perceived permissibility of farming and eating the animal that participants' did not eat. The perceived permissibility of farming and eating pigs--an animal participants' eat--remained unaffected (Piazza & Loughnan, 2016). These findings suggest that people's moral judgements failed to be influenced by

the information about animals' minds when it conflicted with their dietary commitments. This work suggests that an appetite for meat is associated with strategic biases in how people process information about food-animal minds.

1.2. Motivated avoidance of information about food-animal minds

We submit that a commitment to eating meat may relate to how people *expose* themselves to information about food-animal minds. Those who are more strongly committed to eating meat may be more likely to avoid information that suggests food animals have minds compared to those who are less committed to eating meat. This perspective moves beyond biases in how people *perceive* the minds of animals (e.g., Bastian et al., 2012; Piazza & Loughnan, 2016) to biases in how they *search* for relevant information. It broadens the set of phenomena underlying the 'meat-motivated mind' (Piazza, 2020) by suggesting that the desire to eat meat may be implicated in preemptive, as well as reactionary, dissonance-avoidance phenomena. By avoiding information about food-animal minds, those who are committed to eating meat may be able to preemptively insulate a cherished dietary commitment from the potential moral demands imposed by information about animal minds (Bastian & Loughnan, 2017).

This perspective is more generally informed by work on how people expose themselves to information (Gigerenzer & Garcia-Retamero, 2017; Golman et al., 2017; Hertwig & Engel, 2016). Work on this topic suggests that people can sometimes be motivated to avoid information (Hart et al., 2009; Harvey et al., 2017; Jonas et al., 2001). For example, they can be motivated to avoid information about their performance (Northcraft & Ashford, 1990), economic prospects (Karlsson et al., 2009), and physical health (Emanuel et al., 2015; Howell & Shepperd, 2013). In some cases this is driven by how conducive the information is to their goals. This can be seen, for example, in studies that show how remaining ignorant of the consequences of one's actions can make it easier to pursue selfish goals at the expense of others (Dana et al., 2007). There is also evidence that people neglect to request morally-relevant information about consumer products (e.g., if the product was made using wood from an endangered rainforest) and are prone to forget such information (Ehrich &

Irwin, 2005; Reczek et al., 2018)--perhaps because it is inconsistent with a desire to purchase the product. Such findings are often framed in terms of cognitive dissonance, whereby information that is inconsistent with one's goals, attitudes, or behaviours evokes an aversive state that motivates people to avoid said information (Festinger, 1957). This work highlights how people can be motivated to avoid dissonant information because of its potential to undermine their goals.

Taking work on information avoidance (Gigerenzer & Garcia-Retamero, 2017; Golman et al., 2017; Hertwig & Engel, 2016) together with motivated accounts of meat eating (Bastian et al., 2012; Piazza & Loughnan, 2016), we posit that avoiding information about food-animal minds presents a natural opportunity for those who are committed to eating meat to protect a cherished dietary commitment from the potential moral demands imposed by information about animal minds (Bastian & Loughnan, 2017).

1.3. Present research

The goal of the present research was to test the relationship between individual differences in the commitment to eating meat and the tendency to avoid information about food-animal minds. It was also to test if this avoidance is *strategic.* We understand strategic avoidance in this context as minimizing exposure to information that challenges meat eating (e.g., evidence of food-animal minds) together with not minimizing exposure to similar information that does not challenge meat eating (e.g., evidence of non-food-animal minds). Note, we make no assumptions about whether this type of avoidance is deliberate or non-deliberate. Strategic ignorance of this sort poses a barrier in the way of an unbiased, empirically-informed assessment of food animals' mental capacities. Because mental capacities are grounds for moral status (Bentham, 2015; Mill, 1861; Singer, 1975, 1980), ignorance of mental capacities threatens to undermine the moral legitimacy of our relationships with food animals. If a commitment to eating meat is associated with a strategic avoidance of information about food-animal minds, this would therefore represent a mechanism that is likely undermining food-animals' moral status and perpetuating a commitment to consuming meat. It would also represent a critical roadblock for those interested in improving the welfare of

animals and reducing meat consumption by communicating information about their sentience and suffering.

We tested this idea in five studies by examining the relationship between individual differences in meat commitment--the desire to eat meals that contain meat and reluctance to replace meat with plant-based substitutes (Piazza et al., 2015)--and the tendency to avoid information about food-animal minds. Study 1 tested this by asking participants about their desire to avoid information about food animal sentience. Studies 2a and 2b unpacked this effect by examining the motivation to expose oneself to information that suggests food and companion animals are intelligent and information that suggests they are unintelligent. Studies 3a and 3b extended the work by presenting participants with information about food and companion-animal minds and examining avoidance behaviours in an ecologically-valid context (browsing an online website). In these studies we captured avoidance by measuring the time participants took to terminate exposure by closing a webpage that contained information about animal minds. The addition of companion animals in these latter studies allowed us to test if similar effects arose in response to information about a comparable animal that has little bearing on participants' dietary commitments. The raw data, research materials, and analysis scripts are available via *Open Science Framework* (https://osf.io/jc8xq/?view_only=7e1be27dbbb64524a7dfc7135de40863).

2. Study 1

Study 1 presents an initial examination of the relationship between people's commitment to eating meat and their tendency to avoid information about food-animal minds. We capitalized on a recent advancement in the psychology of information avoidance: the development of an adaptable self-report scale capturing people's preferences for certain types of information (Howell & Shepperd, 2016). This scale allowed us to examine meat-eaters' self-reported motivation to avoid information about food animals' minds. We predicted that meat commitment would be positively associated with a motivation to avoid information about food-animal sentience.

2.1. Method

2.1.1. Participants and Design

Three hundred and eighteen adults from the United Kingdom participated online via *Prolific* (Palan & Schitter, 2018; Peer et al., 2017) in exchange for compensation at or above the minimum hourly rate (£5.00/hr). Participants were pre-screened to have no dietary restrictions via *Prolific's* internal filters ("I do not follow any diet"), however, seven participants nevertheless indicated they do not eat meat (*n* = 1; "I do not eat meat"), only eat fish (*n* = 3; "I eat fish, but not other meat"), or do not eat any animal products (*n* = 3; "I do not eat meat or animal products'') and were therefore excluded. The final sample consisted of 311 meat-eaters (179 female; M_{age} = 35.86, SD_{age} = 14.24). A sensitivity power analysis conducted via the *pwr* package for R (Champely, 2020) suggested that the final sample (*n* = 311) afforded 80% power (α = .050, two-tailed) to detect: *r* = .16.

2.1.2. Procedure and Materials

Participants completed the 8-item Information Avoidance Scale (Howell & Shepperd, 2016) adapted for information about food-animal sentience (α = .90; e.g., "I would rather not know about food-animals' sentience"). This scale was intentionally designed to be adapted to different types of information (e.g., physical attractiveness, health, romantic relationships) and has been validated accordingly (Howell & Shepperd, 2016). Prior to responding, participants were provided with additional instruction, describing food animals as "for example: pigs, cows, and chickens that are reared and slaughtered to produce meat for human consumption", and sentience as "animals' capacity to think, feel, and experience pain and suffering". Participants also completed the 7-item Meat Commitment Scale (α = .91; e.g., "I don't want to eat meals without meat."; Piazza et al., 2015). The order of these scales was counterbalanced. Items from both scales were anchored from 1 (strongly disagree) to 7 (strongly agree).

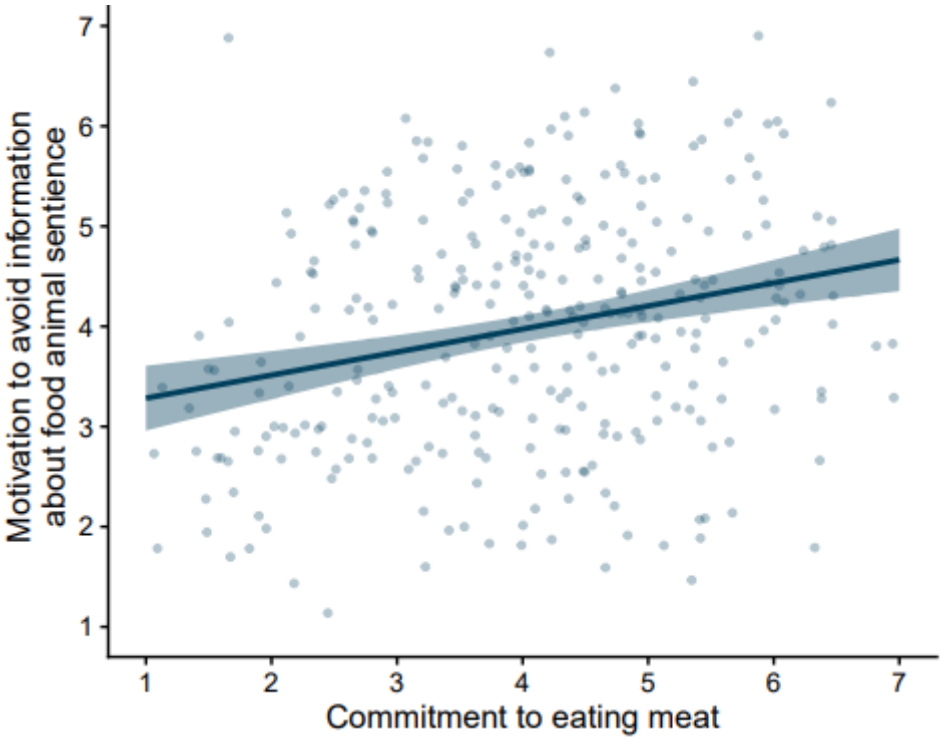
2.2. Results and Discussion

As can be seen in Figure 1, those who were more (vs. less) committed to eating meat were more likely to want to avoid information about food-animals' sentience, *r*(309) = .26, 95% CI [.15,

.36], $p < .001$. This result provides initial support for the idea that the desire to eat meat is associated with a motivation to avoid information about food-animal minds.

Figure 1

The relationship between the motivation to avoid information about food-animal sentience and commitment to eating meat.



Note. Figure represents jittered data points (points) and line of best fit with 95% confidence interval (line, shaded bars).

3. Studies 2a and 2b

Studies 2a and 2b extended the work in two important ways. First, they examined people's exposure-motivation for information about pigs and about dogs (i.e., an animal that is typically treated as a companion), thereby allowing us to test whether meat commitment is strategic; in that it might specifically be associated with avoidance of information about animals that challenge their dietary choices. In addition, Studies 2a and 2b tested exposure-motivation for information that

suggests animals are intelligent and information that suggests they are unintelligent. This allowed us to test whether people's commitment to meat is associated with differences in avoidance of information that challenges meat eating (i.e., information that suggests food animals have minds) and/or seeking information that supports meat eating (i.e., information that suggests food animals lack minds). Following Study 1, we predicted that meat commitment would be associated with lower exposure-motivation (i.e., greater motivation to avoid) for information about intelligent pigs. Consistent with the idea that this information avoidance is strategic, we predicted that meat commitment would be more strongly associated with exposure-motivation for intelligent pigs compared to intelligent dogs. Finally, and given that we argue this ignorance is driven by information avoidance, we predicted that the association between meat commitment and exposure-motivation towards information about intelligent pigs would be stronger than the association between meat commitment and exposure-motivation towards information about unintelligent pigs.

3.1. Method

3.1.1. Participants and Design

One hundred and twenty adults from the United States participated in Study 2a and three hundred and seventy-two adults from the United Kingdom participated in Study 2b. Both samples participated online via *Prolific* in exchange for compensation at or above the minimum hourly rate (£5.00/hr or equivalent). Participants were pre-screened to have no dietary restrictions via *Prolific's* internal filters ("I do not follow any diet"), however, ten participants in Study 2a and six participants in Study 2b indicated they were either lacto- or ovo-vegetarian ($n_{Study2a}$ = 4; $n_{Study2b}$ = 1), strict vegetarian ($n_{Study2a}$ = 1; $n_{Study2b}$ = 0), pescatarian ($n_{Study2a}$ = 2; $n_{Study2b}$ = 2), or vegan ($n_{Study2a}$ = 3; $n_{Study2b}$ = 3) and were therefore excluded. In addition, 25 participants in Study 2a and 35 participants in Study 2b indicated they did not consume pork and were therefore excluded. These exclusion criteria were pre-registered in Study 2b. Study 2a's final sample consisted of 94 meat-eaters (43 female; M_{age} = 34.02, SD_{age} = 11.26). Study 2b's final sample consisted of 335 meat-eaters (217 female; M_{age} = 31.65, SD_{age} = 12.06). A sensitivity power analysis conducted via the *pwr* package for R (Champely, 2020)

suggested that the individual samples afforded 80% power (α = .050, two-tailed) to detect: $r_{Study2a}$ = .28 and $r_{Study2b}$ = .15, respectively. The combined samples (n_{Total} = 429) afforded 80% power (α = .050, two-tailed) to detect: r = .14. In both studies, participants were presented with four conditions in a randomized order following a 2 (article: intelligent vs. unintelligent) X 2 (animal: pig vs. dog) within-participant design. Study 2b's hypotheses, exclusions, transformations, and analytic approach were pre-registered (https://osf.io/9pmbe/?view_only=79ec0cac6128447a9aefbba8edf7bf63). Study 2a's data was collected and analyzed prior to Study 2b's pre-registration; and the cumulative approach, estimating the effects across Studies 2a and 2b, was not pre-registered.

3.1.2. Procedure and Materials

Participants in both studies were presented with background information about pigs and dogs, including that they are slaughtered for food in various parts of the world (pigs in the US and dogs in southern China). We then measured their exposure-motivation by asking about their interest in reading scientific articles about the cognitive abilities of pigs and dogs. Three items measured participants' motivation to read articles about intelligent pigs and dogs (αs > .64; e.g., "Perceptive pigs[dogs]: Pigs learn what a mirror image represents and use it to obtain information"). Similarly, three items measured participants' motivation to read articles about unintelligent pigs and dogs (αs > .71; e.g., "Pigs[Dogs] lack a theory of others' minds"). All items were anchored from 1 (not at all interested) to 4 (moderately interested) to 7 (very interested). The order of the items and measures was counterbalanced. Participants then completed the Meat Commitment Scale (αs > .91; Piazza et al., 2015) and provided basic information about their diets (including whether they eat pork).

3.2. Results and Discussion

We estimated the overall relationship between meat commitment and exposure-motivation by conducting an internal mini-meta analysis. We did so by fitting linear mixed effects models (Barr et al., 2013; Brauer & Curtin, 2018; Judd et al., 2012) to the interest-level data with random effects modelling variations between participants and fixed effects modelling variations between article types (e.g., 0 = intelligent, 1 = unintelligent), animals (e.g., 0 = pig, 1 = dog), and studies (-1 = Study

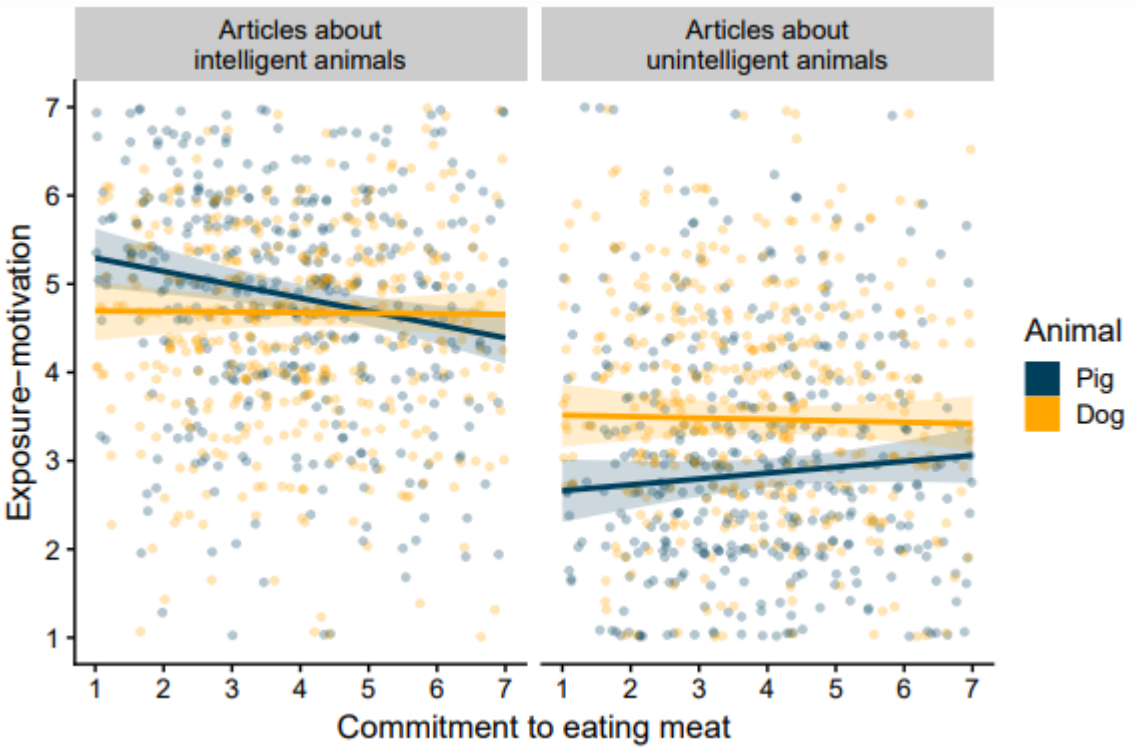
2a, 1 = Study 2b).[1] This approach has several advantages. Of particular note, it allowed us to accurately estimate the central effects (in this case, the relationship between meat commitment and interest in articles about [un]intelligent pigs and dogs), while maintaining the nominal Type I error rate by modelling the non-independence of the data across participants (Raudenbush & Bryk, 2002). All variables were standardized and grand-mean centered prior to model fitting such that coefficients (β) can be interpreted in standardized units (Nezlek, 2012).

We began by testing if a greater commitment to eating meat was related to exposure-motivation towards articles about intelligent food animals. As can be seen in Figure 2, those who were more (vs. less) committed to eating meat were less likely to be interested in articles about intelligent pigs, β = -0.15, SE = 0.05, 95% CI [-0.24, -0.06], p = .001. Next, we tested if meat commitment was associated with a similar exposure-motivation towards information about animals that have no bearing on one's dietary commitments--i.e., dogs. There was no evidence to suggest that meat commitment predicted avoidance of articles about intelligent dogs, β = -0.01, SE = 0.05, 95% CI [-0.10, 0.08], p = .887. Crucially, this effect was significantly different to the one observed for articles about intelligent pigs, β = 0.15, SE = 0.04, 95% CI [0.07, 0.22], p < .001. These findings indicate that participants' commitment to eating meat was associated with a pattern of strategic ignorance focused around precisely the information that is most likely to curtail meat consumption--evidence that food animals have minds.

[1] To remain faithful to our pre-registration, we also analyzed the data via z-tests. These analyses revealed a confirmatory pattern of results. Those who were more (vs. less) committed to eating meat were less likely to be interested in articles about intelligent pigs, r_{meta} = -0.18, Z = -3.73, p < .001; and this effect tended to be significantly more negative compared to the one observed for articles about intelligent dogs, $Z_{Study2a}$ = -2.66, p = .008; $Z_{Study2b}$ = -2.40, p = .016; and to the one observed between meat commitment and interest in articles about unintelligent pigs, $Z_{Study2a}$ = -3.00, p = .003; $Z_{Study2b}$ = -1.78, p = .075.

Figure 2

The relationship between exposure-motivation for articles about (un)intelligent pigs and dogs and commitment to eating meat.



Note. Figure represents jittered data points (points) and predicted scores with 95% confidence intervals (line, shaded bars).

Finally, we tested if participants' commitment to meat was also associated with differences in seeking information that *supports* meat eating (i.e., information that suggests food animals are unintelligent). Those high (vs. low) in meat commitment were no more or less likely to be interested in articles about unintelligent pigs, β = 0.07, SE = 0.05, 95% CI [-0.03, 0.16], p = .180. Importantly, this association was significantly different to the one observed between meat commitment and interest in articles about intelligent pigs, β = 0.22, SE = 0.05, 95% CI [0.13, 0.31], p < .001, suggesting that the commitment to eating meat is primarily associated with avoiding information that challenges meat eating compared to seeking information that supports it. For completeness, we also tested for a three-way interaction, finding that the moderating effect of article type (intelligent vs. unintelligent) on the relationship between meat commitment and exposure-motivation for pigs differed from

dogs, β = 0.23, SE = 0.05, 95% CI [0.13, 0.33], $p < .001$.[2] This interaction suggested that participants' commitment to meat was only associated with a pattern of strategic ignorance (i.e, a greater tendency to avoid information about food animals compared to non-food animals) for information that suggested animals are intelligent, but not for information that suggested animals are unintelligent.

4. Studies 3a and 3b

Studies 2a and 2b suggest that those who are more (vs. less) committed to eating meat have a stronger *desire* to strategically avoid information about food-animals' minds. Studies 3a and 3b extended the work by examining exposure *behaviours*. We captured these by measuring how long it took participants to terminate exposure by closing webpages (pop-ups) that contained information about animal minds and how likely participants were to enhance exposure by following hyperlinks to further information about animal minds. Following Studies 2a and 2b, we included animals typically reared for food (pigs, cows, chickens) and those typically treated as companions (dogs, cats, horses). This again allowed us to test whether people's commitment to eating meat was associated with a strategic avoidance of information about animals that specifically bear on one's dietary commitments. We predicted that those who are more (vs. less) committed to eating meat would be quicker to close pop-ups containing information about food-animal minds and be less likely to follow hyperlinks to further information about food-animal minds. Moreover, consistent with Studies 2a

[2] There was some evidence to suggest that the three-way interaction between meat commitment, article type, and animal on exposure preferences varied across studies, β = 0.12, SE = 0.05, 95% CI [0.02, 0.22], $p = .021$. However, it was present in both studies, $\beta_{Study2a} = -0.35$, SE = 0.09, 95% CI [-0.52, -0.17], $p < .001$; $\beta_{Study2b} = -0.11$, SE = 0.05, 95% CI [-0.21, -0.00], $p = .043$. Breaking this down within studies, we also tended to find support for our hypotheses (although not all effects were significant). Those who were more (vs. less) committed to eating meat were less likely to be interested in articles about intelligent pigs, $\beta_{Study2a} = -0.14$, SE = 0.08, 95% CI [-0.29, 0.02], $p = .090$; $\beta_{Study2b} = -0.29$, SE = 0.04, 95% CI [-0.36, -0.21], $p < .001$; and this effect was significantly more negative compared to the one observed for articles about intelligent dogs, $\beta_{Study2a} = 0.24$, SE = 0.10, 95% CI [0.04, 0.43], $p = .021$; $\beta_{Study2b} = 0.09$, SE = 0.04, 95% CI [0.01, 0.16], $p = .023$; and to the one observed between meat commitment and interest in articles about unintelligent pigs, $\beta_{Study2a} = 0.36$, SE = 0.08, 95% CI [0.20, 0.51], $p < .001$; $\beta_{Study2b} = 0.08$, SE = 0.05, 95% CI [-0.01, 0.17], $p = .088$.

and 2b, we predicted that these relationships would be stronger than those for information about companion-animal minds.

4.1. Method

4.1.1. Participants and Design

Two hundred and forty-nine students from a university in the United Kingdom participated in Study 3a in exchange for course credit. Five hundred and fourteen adults from the United Kingdom participated in Study 3b via *Prolific* in exchange for compensation at or above the minimum hourly rate (£5.00/hr). Participants were pre-screen to have no dietary restrictions via *Prolific's* internal filters ("I do not follow any diet"). Thirty-seven participants in Study 3a and nineteen participants in Study 3b indicated they only eat fish ($n_{Study3a}$ = 10; $n_{Study3b}$ = 10), do not eat meat ($n_{Study3a}$ = 16; $n_{Study3b}$ = 5) or do not any animal products ($n_{Study3a}$ = 11; $n_{Study3b}$ = 4) and were therefore excluded. Study 3a's final sample consisted of 212 meat-eaters (160 female; M_{age} = 19.30, SD_{age} = 1.06). Study 3b's final sample consisted of 495 meat-eaters (299 female; M_{age} = 35.48, SD_{age} = 10.41). A sensitivity power analysis conducted via the *pwr* package for R (Champely, 2020) that the individual samples afforded 80% power (α = .050, two-tailed) to detect: $r_{Study3a}$ = .19 and $r_{Study3b}$ = .13, respectively. The combined sample (n_{total} = 707) afforded 80% power to detect: r = .11. In both studies, participants were randomly assigned to one of two conditions in a between-participants design (pop-up: food animals vs. companion animals).

4.1.2. Procedure and Materials

Participants were invited to complete a survey about their impressions of internet websites. At their own pace, they scrolled through a mock but ostensibly real website (a scientific article in Study 3a and an online butchers shop in Study 3b). When proceeding from page to page, participants were confronted with smaller windows (pop-ups) occluding the main website and containing information about a single animals' capacity for agency and/or experience--two dimensions of mind that are central to moral judgements (H. M. Gray et al., 2007; K. Gray et al., 2012; Sytsma & Machery, 2012). This information was taken from prior work and described an animals' capacity to plan and use tools

(agency), form social bonds (agency and experience), or feel pain and emotions (experience; Leach et al., 2021). In Study 3a, participants encountered a single pop-up about either pigs' or dogs' ability to plan and use objects as tools. In Study 3b, participants encountered three pop-ups containing information about either pigs' or dogs' ability to plan and use objects as tools, cows' or cats' capacity to form social bonds, and chickens' or horses' capacity to feel pain and emotions (the exact wording and a depiction of the pop-ups is provided in the Supplemental File). We chose these animals because they are familiar examples of animals reared for food and treated as companions (Leite et al., 2019; Possidónio et al., 2019). Each pop-up contained a hyperlink providing participants with the opportunity to access further information about the animal ("click here to find out more"). We measured the amount of time (in milliseconds) participants took to close the pop-ups and whether they chose to follow the hyperlink. Participants were free to close the pop-up at any time and were not instructed in any way that they were required to read, pay attention to, or remember, any of the information in the pop-up. Finally, participants in both studies completed the Meat Commitment Scale (αs > .92; Piazza et al., 2015).

4.2. Results and Discussion

4.2.1. Data preparation

Exposure times that were greater than 2.5 standard deviations above the mean were winsorized. This procedure resulted in a distribution of exposure times ranging from 2s to 142s. Examining the histograms for exposure time suggested that the data were positively skewed (Zs > 8.38, ps < .001). Because of this, we log-transformed the data to arrive at a distribution that is better approximated by a normal curve.[3] In Study 3b, we computed the average time participants took to close the three pop-ups (α = .88). In addition, and to simplify the main analyses, we computed a

[3] The central findings replicate when analyzing non-log-transformed scores. A commitment to eating meat was associated with lower exposure time to information about food-animal minds, β = -0.14, SE = 0.06, 95% CI [-0.26, -0.02], p = .025, and this relationship was significantly larger than for non-food-animals, β = 0.19, SE = 0.08, 95% CI [0.03, 0.36], p = .024.

binary score for each participant in Study 3b, reflecting whether they followed any of the hyperlinks (1) or none of the hyperlinks (0).[4]

4.2.2. Main analyses

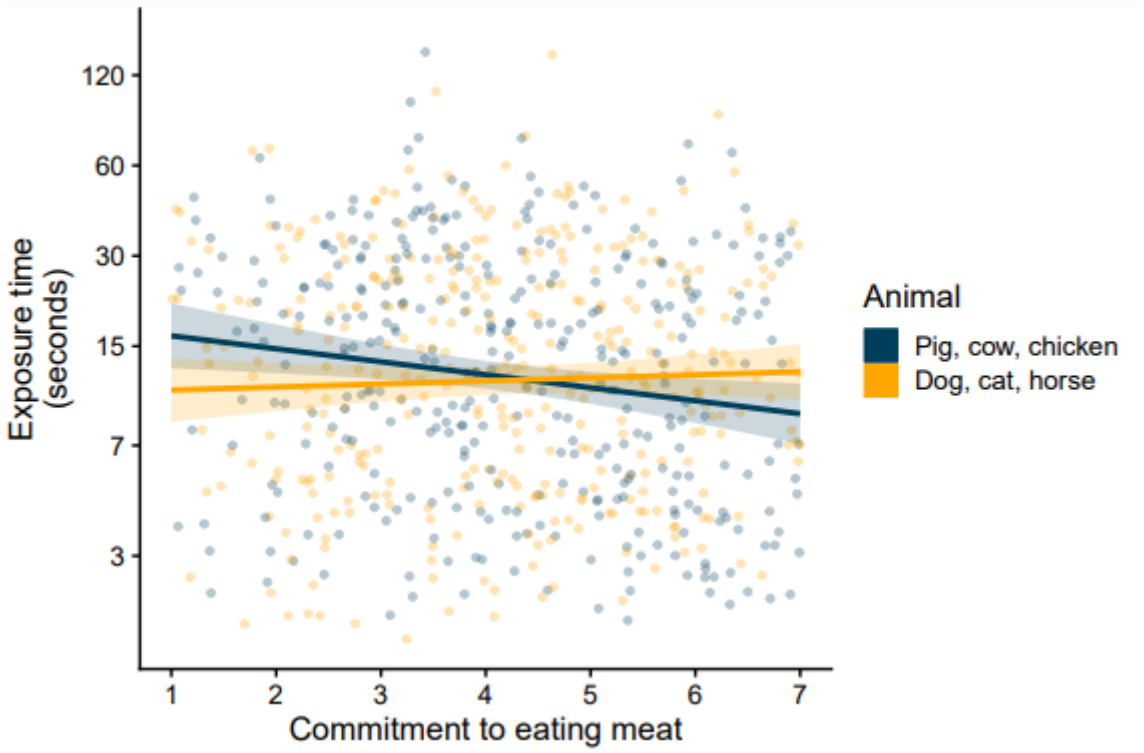
As in Studies 2a and 2b, we estimated the overall effects by conducting an internal mini-meta analysis. We fit linear models to the participant-level data with fixed effects modelling variations across animals (e.g., 0 = pig, 1 = dog) and studies (-1 = Study 3a, 1 = Study 3b). As can be seen in Figure 3, those who were relatively committed to eating meat were faster to terminate exposure by closing pop-ups containing information about food-animal minds compared to those who were relatively uncommitted to eating meat, β = -0.17, SE = 0.06, 95% CI [-0.29, -0.05], p = .007. The same participants were no more or less quick to close pop-ups about companion-animal minds, β = 0.04, SE = 0.06, 95% CI [-0.07, 0.15], p = .494. Importantly, these relationships were significantly different from one another, β = -0.21, SE = 0.08, 95% CI [-0.37, -0.04], p = .014,[5] suggesting that a commitment to eating meat is associated with avoidance behaviours that manifest in a pattern of strategic ignorance of food-animal minds.

[4] A small number of participants chose to follow the hyperlinks in Studies 3a (n = 13) and 3b (n_{First} = 24, n_{Second} = 13, n_{Third} = 6, n_{Any} = 29).

[5] There was no evidence to suggest that the two-way interaction between meat commitment and animal on exposure time varied across studies, β = 0.04, SE = 0.08, 95% CI [-0.13, 0.20], p = .650.

Figure 3

The relationship between exposure time to information about animal minds and commitment to eating meat.



Note. Figure represents jittered data points (points) and predicted scores with 95% confidence intervals (line, shaded bars).

Next, we tested if participants' commitment to meat was also associated with their choices to enhance exposure by following hyperlinks about animal minds. There was no strong indication that meat commitment was associated with a lower probability of following hyperlinks about animal minds, β = -0.31, SE = 0.19, 95% CI [-0.69, 0.05], p = .093. Nor was there any evidence to suggest that this relationship was moderated by the target animal (pig, cow, chicken vs. dog, cat, horse), β = -0.07, SE = 0.19, 95% CI [-0.44, 0.29], p = .692.

5. General Discussion

The failure to recognize or act upon morally-relevant information has been identified as a roadblock in the way of progress (Heffernan, 2011; Moody-Adams, 1994; Williams, 2008). Building on motivational accounts of meat eating and perceptions of food-animal minds (Bastian & Loughnan, 2017; Loughnan & Davies, 2020; Piazza & Loughnan, 2016; Rothgerber, 2020), we conducted five studies testing whether a commitment to eating meat was associated with strategic avoidance of information about food-animal minds.

5.1. Commitment to eating meat is associated with the strategic ignorance of food-animal minds

Our findings demonstrate a pattern of ignorance about food-animal minds. Study 1 showed that participants higher (vs. lower) in meat commitment were more motivated to avoid exposure to information about food-animal sentience. Studies 2a and 2b further showed that they were less interested in exposure to articles about intelligent food animals. Switching to a novel behavioral paradigm, Studies 3a and 3b demonstrated that those higher (vs. lower) in meat commitment were quicker to terminate exposure to internet pop-ups containing evidence of food-animal minds.

These findings are consistent with a body of work showing that meat consumption is implicated in reactionary dissonance-reduction mechanisms, such as perceiving food animals as having relatively unsophisticated minds (Bastian & Loughnan, 2017; Loughnan & Davies, 2020; Rothgerber, 2020) or disregarding the sophistication of their minds (Piazza & Loughnan, 2016). Our results contribute by demonstrating that the desire to eat meat is also implicated in preemptive dissonance-avoidance mechanisms. They speak to a different process than do the results of Piazza and Loughnan (2016)--which document biases in how information about animal minds is utilized once encountered. Our results concern biases in the search for information about animal minds. They suggest that by choosing to avoid information about food-animal minds, those who are committed to eating meat might be able to avoid dissonance and protect themselves from having to encounter or act upon this information. In doing so, they may insulate a cherished dietary commitment from the potential moral demands imposed by information about animal minds

(Bastian & Loughnan, 2017). This insulation may be especially effective, compared to more reactionary mechanisms. When people encounter information that contradicts their beliefs or preferences, and process it but fail to act on it or integrate it into their judgment, it has at least entered their awareness and potentially their memory, and may therefore support longer-term attitudinal and behavioral changes (Dechêne et al., 2010; Kumkale & Albarracín, 2004). When people avoid this information, in contrast, it cannot by definition leave a trace in their memory or exert any influence on them in the future.

The findings further show that meat commitment is associated with a pattern of *strategic avoidance*. Studies 2-3b found no evidence of a relationship between meat commitment and avoidance of information about the minds of animals treated as companions. These results suggest that avoidance behaviour is strategic, since it focuses on the minds of food animals rather than non-food animals. Further, Studies 2a and 2b found no evidence to suggest that participants' commitment to eating meat was related to their exposure-motivation towards articles about unintelligent food animals. These results suggest that meat commitment is related to *avoidance* strategies (i.e., avoiding information about food animals that challenges meat eating) more than it is to *seeking* strategies (i.e., seeking information that supports meat eating). As a whole, the data show that meat commitment is associated with strategic avoidance of precisely the information that is likely to deter meat consumption.

5.2. Strengths and potential limitations

The work has a number of important strengths that are worth discussing. We present converging lines of evidence for the strategic ignorance of food-animal minds. We found evidence of this tendency across multiple measures, finding confirmatory patterns in self-reported exposure preference (Studies 1-2b) and exposure choices (Studies 3a and 3b). We estimated the overall trends across all the available data, thereby providing the most reliable estimates and avoiding pitfalls associated with partial reporting and non-transparent research practices (Aczel et al., 2020; Merton, 1973; Rosenthal, 1979).

The data have some important nuances. It would not be appropriate to conclude, for example, that disseminating information about animal minds is likely to be an entirely ineffective method of shifting sentiments in those that are highly committed to eating meat. Although not the focus of the present work, Figures 1-2 illustrate that people, and even those who are relatively committed to eating meat, are somewhat open to information about food-animal minds. This is evident in the overall mean trends. For example, Figure 2 suggests that participants were more interested in reading about intelligent, compared to unintelligent, pigs and dogs. This result fits nicely with people's general interest in sentient animals (Amiot & Bastian, 2015; Wilson, 1984) and the widespread appeal of literature and media documenting their cognitive capacities (see e.g., Berlowitz et al., 2016; de Waal, 2016; Herzog, 2010). This is important with regards to understanding the likely effectiveness of interventions aimed at curtailing meat consumption on ethical grounds by disseminating information about animal minds. Nevertheless, our central findings suggest that such interventions are likely to be least effective when information is easily avoidable (e.g., pop-ups) and is presented to those who are most committed to meat consumption compared to those who are not particularly attached to meat and who may be considering, or are in the process of, reducing or eliminating meat from their diets.

The work has some potential limitations that are worth considering. Studies 3a and 3b did not unequivocally confirm our expectations about the association between meat commitment and avoidance. Although Studies 3a and 3b found a relationship between participants' meat commitment and the speed with which they terminated exposure to information about food animals, these studies did not find an analogous result in their choices to seek further information about food-animal minds (by following hyperlinks). They found no evidence of an overall relationship between meat-commitment and following hyperlinks. These results could have something to do with the low overall engagement with the hyperlinks, meaning there was little variation in exposure choices. A paradigm in which engagement is incentivized or options are presented as a forced-choice may allow for differences to emerge as a function of participants' commitment to meat (see e.g.,

Harvey et al., 2017). Nonetheless, on the whole, the present findings converge on the conclusion that the desire to eat meat is associated with the strategic avoidance of food-animal minds.

It is important to discuss constraints on the generalizability of our findings. First, we studied adults and students from the US and UK, meaning our findings are likely to generalize to Western populations with similar cultural orientations to meat. This also means that our results may not generalize to cultures with substantially different orientations to meat. Second, we studied avoidance in terms of individuals' preferences and choices. We did not study avoidance in terms of collective and societal decisions about how and when information about food-animal minds is made available (Bastian & Loughnan, 2017; Benningstad & Kunst, 2020; Singer, 1975). Future research should consider how psychological distance about animal minds is created and preserved by societal structures that influence how consumers relate to the animals they eat.

5.3. Conclusion

There is widespread agreement that how we ought to treat animals depends on the quality of their minds. This entails that placing our relationship with animals on a sound moral footing depends, in turn, on an unbiased, empirically-informed assessment of their mental capacity. Conversely, ignoring evidence that animals possess sophisticated minds can lead to factual, and potentially moral, errors. Across five studies, we found that people who are more (vs. less) committed to eating meat were more likely to strategically avoid evidence of food-animal minds. The present findings are broadly consistent with previous results showing that in various ways people minimize and downplay evidence that food animals have mental capacities when it poses a threat to the moral decisions implicit in their dietary practices (Bastian & Loughnan, 2017; Loughnan & Davies, 2020; Piazza & Loughnan, 2016; Rothgerber, 2020). They extend those results by showing that psychological commitments to eating meat is associated with a tendency to avoid exposure to such information in the first place. By identifying biases in how people gather evidence, the results highlight a stumbling block to seeing food animals as they truly are.

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