

# Personality and Social Psychology Bulletin

<http://psp.sagepub.com/>

---

## **Don't Mind Meat? The Denial of Mind to Animals Used for Human Consumption**

Brock Bastian, Steve Loughnan, Nick Haslam and Helena R. M. Radke  
*Pers Soc Psychol Bull* 2012 38: 247 originally published online 6 October 2011  
DOI: 10.1177/0146167211424291

The online version of this article can be found at:  
<http://psp.sagepub.com/content/38/2/247>

---

Published by:



<http://www.sagepublications.com>

On behalf of:



[Society for Personality and Social Psychology](http://www.spsociety.org)

**Additional services and information for *Personality and Social Psychology Bulletin* can be found at:**

**Email Alerts:** <http://psp.sagepub.com/cgi/alerts>

**Subscriptions:** <http://psp.sagepub.com/subscriptions>

**Reprints:** <http://www.sagepub.com/journalsReprints.nav>

**Permissions:** <http://www.sagepub.com/journalsPermissions.nav>

>> [Version of Record](#) - Jan 25, 2012

[OnlineFirst Version of Record](#) - Oct 6, 2011

[What is This?](#)

# Don't Mind Meat? The Denial of Mind to Animals Used for Human Consumption

Brock Bastian<sup>1</sup>, Steve Loughnan<sup>2</sup>, Nick Haslam<sup>3</sup>,  
and Helena R. M. Radke<sup>1</sup>

Personality and Social Psychology Bulletin  
38(2) 247–256  
© 2012 by the Society for Personality  
and Social Psychology, Inc  
Reprints and permission:  
sagepub.com/journalsPermissions.nav  
DOI: 10.1177/0146167211424291  
http://pspb.sagepub.com



## Abstract

Many people like eating meat, but most are reluctant to harm things that have minds. The current three studies show that this dissonance motivates people to deny minds to animals. Study 1 demonstrates that animals considered appropriate for human consumption are ascribed diminished mental capacities. Study 2 shows that meat eaters are motivated to deny minds to food animals when they are reminded of the link between meat and animal suffering. Finally, Study 3 provides direct support for our dissonance hypothesis, showing that expectations regarding the immediate consumption of meat increase mind denial. Moreover, this mind denial in turn reduces negative affect associated with dissonance. The findings highlight the role of dissonance reduction in facilitating the practice of meat eating and protecting cultural commitments.

## Keywords

mind attribution, dementalization, morality, meat, animals

Received February 7, 2010; revision accepted August 26, 2011

Meat is central to most people's diets and a focus of culinary enjoyment (Fiddes, 1991). Yet most people also like animals and are disturbed by harm done to them. This inconsistency between a love for animals and enjoyment of meat creates a "meat paradox" (Loughnan, Haslam, & Bastian, 2010); people's concern for animal welfare conflicts with their culinary behavior. For this reason, people rarely enjoy thinking about where meat comes from, the processes it goes through to get to their tables, or the living qualities of the animals from which it is extracted (Vialles, 1994). We argue that meat eaters go to great lengths to overcome these inconsistencies between their beliefs and behaviors.

Exploring this "meat paradox" is important for three reasons. First, it provides a novel perspective from which to observe basic psychological processes associated with everyday moral action. Meat eating is a morally significant behavior, yet it is rarely conceptualized as a moral choice. An investigation of meat eating has the potential to provide insights into how cognitive and motivational processes may obscure moral responsibility. Second, appetite is a powerful force that shapes much of human behavior and therefore may be a potent source of motivated cognition (Kunda, 1990) within the moral domain. Third, culinary practices are not only sources of pleasure but are also important sources of meaning embedded within culture (Berndsen & van der Pligt, 2004, 2005; Rozin, 1996). People are highly motivated to protect their cultural practices, so an analysis of meat eating

may provide insight into the strategies people use to maintain morally questionable, but cherished, cultural commitments.

In the current research we focus on the processes by which people facilitate their culinary practice of eating meat. People often mentally separate meat from animals (Hoogland, de Boer, & Boersema, 2005), so they can eat pork or beef without thinking about pigs or cows. Mentally disengaging from the origins of meat serves an important function for meat eaters, reducing the dissonance aroused by enjoying meat but disliking the harm that animals suffer to produce it. Another way to make the suffering of food animals less bothersome is to deny that they possess morally relevant qualities (Bilewicz, Imhoff, & Drogosz, 2011; Bratanova, Loughnan, & Bastian, 2011; Loughnan, Haslam, & Bastian, 2010). The possession of mental capacities forms the basis for ascribing moral worth, so denying these capacities, such as the capacity for suffering, should diminish an animal's moral standing. The current research explores the denial of mental capacities to food animals as a psychological process that acts to facilitate

<sup>1</sup>The University of Queensland, Queensland, Australia

<sup>2</sup>University of Kent, Kent, UK

<sup>3</sup>University of Melbourne, Melbourne, Australia

## Corresponding Author:

Brock Bastian, School of Psychology, University of Queensland, St Lucia, QLD, 4072, Australia  
Email: b.bastian@uq.edu.au

effective meat eating behavior and therefore maintain cultural practices.

### *Animal Minds and Moral Concern*

Thinking that animals feel pain when slaughtered, or have the capacity to think about and understand their fate, is threatening to even the most brazen steak lover. In his recent book *Eating Animals*, Jonathan Safran Foer (2009) promotes a vegetarian lifestyle by highlighting the mental agility of many food animals and the fear and pain associated with industrial meat production. Recognizing that the animals we eat have minds makes them similar to us in morally important ways, and this recognition conflicts with our use of animals for food. People are afforded moral rights on the basis that they possess minds (Universal Declaration of Human Rights; see also, e.g., Gray, Gray, & Wegner, 2007; Sapontzis, 1981) and it is this possession of a mind that affords us the right to humane treatment. Being reminded that animals have minds but are killed for food can create a moral conflict for meat eaters.

The notion that animals have attenuated mental capacities compared to humans is not without support. Animal minds are less complex than human minds (e.g., Penn & Povinelli, 2007; Suddendorf & Whiten, 2001) and lay perceptions of animal minds generally concur (Gray et al., 2007; Haslam, Kashima, Loughnan, Shi, & Suitner, 2008). Philosophers such as St. Augustine, Descartes, and Kant have pointed to these differences in mental capacities to justify animals' lesser moral status (Wennberg, 2003), and viewing animals as lacking minds is a key way in which people justify the use of animals for instrumental purposes (Regan, 1997; Ryder, 1971; Singer, 1990). However, people are relatively inaccurate in their ascription of mental capacities to animals (Mameli & Bortolotti, 2006), and our attribution of minds to animals may depend more on subjective motivations than objective facts (Marcu, Lyons, & Hegarty, 2007). We argue that when people want to reduce the conflict between eating meat and their moral concern for animals, denying them minds is a particularly useful strategy.

### *Motivated Mind Perception*

Mind perception is used as a tool to understand and make sense of the world and is therefore largely motivated by the needs and perspectives of the perceiver (Epley & Waytz, 2009). People deny minds to others to justify their ill treatment (Kozak, Marsh, & Wegner, 2006) and to justify failure to help them (Cuddy, Rock, & Norton, 2007). This denial of mind is most likely to occur when we feel responsible for the harm caused to others (Bandura, 1999; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996; Castano & Giner-Sorolla, 2006), facilitating moral disengagement.

People's perception of animal minds is surprisingly flexible. Animals are often attributed minds so that we can better

understand their behavior, or when we feel in need of companionship (Epley, Waytz, Akalis, & Cacioppo, 2008). We argue that people also deny minds to food animals to protect their meat-eating practices. Denying minds to animals reduces concern for their welfare, justifying the harm caused to them in the process of meat production. According to the action-based model of dissonance (Harmon-Jones & Harmon-Jones, 2002; Harmon-Jones, Harmon-Jones, Fearn, Sigelman, & Johnson, 2008), people are motivated to reduce cognitive conflicts that interfere with effective behavior. Denying food animals minds makes the harm brought to them less bothersome, facilitating meat consumption. Dissonance may therefore be a novel motivational pathway to mind perception (Waytz, Gray, Epley, & Wegner, 2010), providing insight into the processes by which people obscure moral responsibility and maintain their culinary practices.

Dissonance may be increased by a number of factors. When people are reminded of the animal–meat link, dissonance between the consumption of meat and moral concern for animals will be amplified. That is, under these conditions meat eaters feel tension between their meat eating and the harm this culinary behavior brings to animals. Dissonance is also amplified when people expect to engage in behaviors that are inconsistent with their attitudes (Festinger, 1957; Harmon-Jones et al., 2008; Harmon-Jones & Harmon-Jones, 2002, 2007; Harmon-Jones & Mills, 1999). As such, dissonance is likely to be stronger when people expect to actually eat meat in the near future, and in these cases mind denial would be expected to serve as a defense against negative affect associated with dissonance-producing behavior.

Although the experience of dissonance involves negative affective states (Harmon-Jones, 2000; Kiesler, & Pallak, 1976; Newby-Clark, McGregor, & Zanna, 2002; Zanna & Cooper, 1974), this is not the only reason people might experience negative emotions in the context of meat eating. Affect is central not only to our experience of food (Rozin, 1996) but also to our intuitions about morality (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Haidt, 2001). Negative affect associated with eating animals is a strong motivator in moral choices to become vegetarian. For example, people who choose vegetarianism for moral reasons find meat more disgusting than people who choose this diet for health reasons (Beardsworth & Keil, 1992, 1997; Rozin, 2004). In this way disgust is recruited in the process of moralizing culinary preferences into values (Rozin, Markwith, & Stoess, 1997). Similarly, shame and guilt are regularly elicited in the context of perceived moral transgressions (Tangney, Miller, Flicker, & Barlow, 1996), and eating animals that possess morally relevant qualities may trigger these emotional states. Protecting against these negative affective states is important as doing so maintains culinary practices that are not only sources of pleasure but are also important sources of meaning embedded within culture (Berndsen & van der Pligt, 2004, 2005; Rozin, 1996). Denying food animals the capacity for pain, suffering, or understanding may

be a key element in reducing negative affective states associated with their consumption, therefore sustaining enjoyable and culturally significant culinary behavior (see also Plous, 2003; Singer, 1990; Vialles, 1987).

We aim to directly investigate the role of dissonance in the motivated perception of food animals' minds and the role of mind denial in facilitating effective meat-eating behavior. First, we expect that when people are reminded of the harm and suffering their meat-eating behavior brings to food animals, they will deny the animals minds to protect their meat-eating practices. Second, we expect that this dissonance will be particularly evident when people expect to eat meat in the near future. Third, we expect that denying mind to food animals in response to meat-eating expectations will reduce negative affect associated with dissonance-arousing behavior.

### The Current Research

Three studies were conducted to test the hypothesis that people deny mind to food animals to enable meat-eating behavior and to protect culinary practices. The studies test several hypotheses. First, we predict that animals that are considered appropriate for food are viewed as having less mind than animals considered inappropriate and that mind attribution is associated with moral concern for food animals. Second, we predict that being reminded of the origins of meat will increase dissonance for meat eaters because of their behavioral commitments, leading them to deny minds to the animals they eat. Third, we predict that expecting to eat meat in the immediate future will be associated with a motivated denial of mind to food animals consistent with the idea that mind denial facilitates effective meat-eating behavior. Fourth, we predict that denying minds to animals will be associated with reduced negative affect associated with their consumption.

### Study 1

The first study aimed to explore whether perceptions of animals' minds are negatively associated with their edibility, consistent with our argument that people do not like to eat animals with minds. We also examined whether judgments about the immorality of eating certain animals and perceived negative affect associated with this act were related to the attribution of mind. We predicted that mind attribution would be negatively related to an animal's edibility and positively related to moral concern and to negative affect associated with the animal's consumption.

### Method

**Participants.** Seventy-one 1st-year psychology students at a large Australian university (59 female) participated in the research. They were recruited for a study of "perceiving

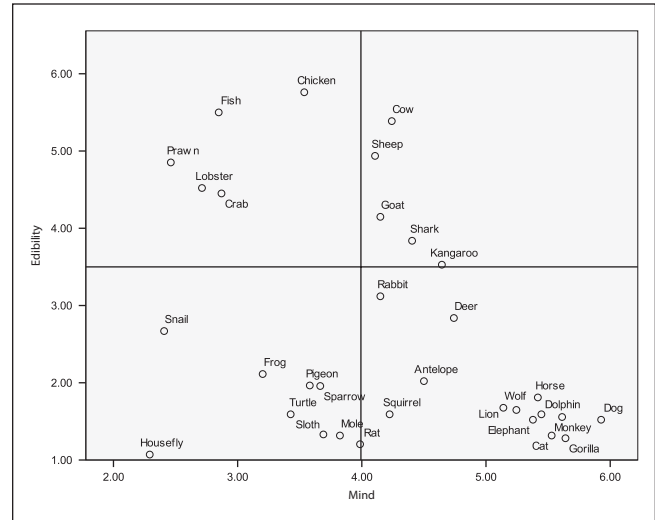


Figure 1. Scatterplot of mind and edibility ratings, Study 1

animals' mental states" and no mention was made of meat in recruitment materials. Their ages ranged from 17 to 29 years ( $M = 19.13$ ).

**Materials.** Participants completed a questionnaire that required them to rate 32 animals sampled from previous research (Gray et al., 2007; Laham, 2009; Morewedge, Preston, & Wegner, 2007; see Figure 1). Selection of animals was designed to cover a range of wild and domestic animals that varied in the extent to which they were readily eaten. We focused primarily on mammals ( $n = 20$ ) given that they are generally considered the most similar to humans in mental capacities; however, we also included some common examples from other animal groups (birds,  $n = 3$ ; fish,  $n = 2$ ; crustaceans,  $n = 3$ ; amphibians,  $n = 1$ ; reptiles,  $n = 1$ ; mollusks,  $n = 1$ ; insects,  $n = 1$ ). Participants rated the degree to which each animal possessed 10 mental capacities using a 7-point scale (1 = *definitely does not possess*, 7 = *definitely does possess*). We drew mental capacities from Gray et al.'s (2007) work on mind perception. These included the five highest loading experience-related capacities (hunger, fear, pleasure, pain, rage) and agency-related capacities (self-control, morality, memory, emotion recognition, planning). Participants then indicated the edibility of each animal (2 items: "Would you choose to eat this animal" and "Would you eat this animal if asked to?"; 1 = *definitely would not*, 7 = *definitely would*; across animals  $\alpha = .99$ ) as well as how bad they would feel if they ate each animal and how morally wrong it would be to eat each animal (1 = *not at all*, 7 = *extremely*). Finally, they indicated whether they were vegetarian (indicating either *yes* or *no*). Participants completed the questionnaire in a laboratory space in groups of 5 to 10. The task took approximately 25 min to complete.

### Results and Discussion

Eight participants indicated that they were vegetarian and were excluded from further analyses. Principal components

analyses of the 10 capacities, conducted separately for each animal, revealed that all mental capacities tended to load onto one factor that explained 29% to 48% of the variance. On this basis the capacities were combined into a single mind attribution scale. As predicted, perceived mind was negatively associated with the animal's edibility ( $r = -.42$ ,  $p < .001$ ; see Figure 1) and positively with feeling bad about eating the animal ( $r = .77$ ,  $p < .001$ ) and with how morally wrong it would be to eat the animal ( $r = .80$ ,  $p < .001$ ).

Study 1 supported our hypotheses. Animals considered appropriate for consumption were rated as having less mind than animals considered inappropriate. In addition, the extent to which an animal was thought to possess mind was associated with how deserving of moral treatment it was considered to be and how bad people would feel if they ate the animal. It is worth noting that the observed correlations may have been inflated because participants completed the measures within the same session; however, it is unlikely this could account for the overall observed pattern of associations. Animals that have minds are considered inappropriate for human consumption, and people believe that eating them is morally wrong and would have negative affective consequences.

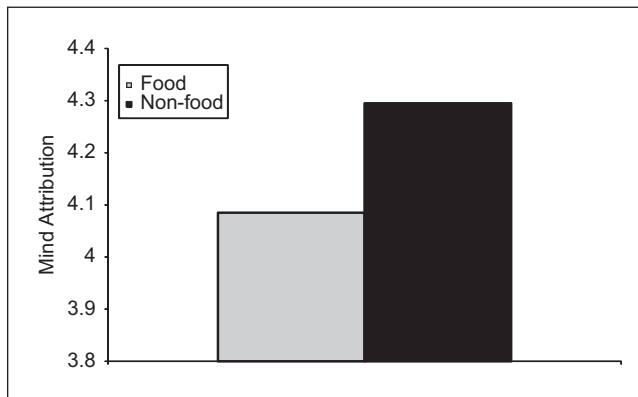
## Study 2

Study 1 provided evidence that the extent to which an animal is considered appropriate for food is associated with how much mind it is thought to possess. However, we argue that the denial of mind to food animals is in part a motivated process that reduces dissonance arising from the act of eating meat but disliking the harm it causes animals. Study 2 tested the hypothesis that meat eaters would be more inclined to deny mind to animals they eat when animal suffering associated with the production of meat is made salient. If found, this effect would support the notion that denying minds to food animals is motivated by dissonance reduction. That is, concern for animal suffering arouses dissonance for meat eaters because it conflicts with their meat-eating behavior.

## Method

**Participants.** Sixty-six meat-eating students (43 female) at a large Australian university participated in the research. Their ages ranged from 17 to 52 years ( $M = 19.23$ ). As in Study 1, meat eaters were identified by self-report.

**Materials.** Participants completed a questionnaire that required them to look at a picture of a cow and a sheep surrounded by grass. Preceding each picture was a description of the animal. Two versions of the questionnaire were used with either the cow or sheep on the first page and the other on the last page. When either the cow or sheep was presented first, it was described as living on a farm, including the description: "This lamb/cow will be moved to other paddocks, and will spend most of its time eating grass with other lambs/cows"



**Figure 2.** Graphed means for mental capacity ratings of food and nonfood animals, Study 2

(control condition). When the cow or sheep was presented last, it was described as being bred for meat consumption, including the following description: "This lamb/cow will be taken to an abattoir, killed, butchered, and sent to supermarkets as meat products for humans" (food condition). Both the animals were pictured surrounded only by grass, and participants completed an unrelated task that took approximately 5 min between each rating.

After reading each statement and looking at the pictures, participants rated the extent to which each animal possessed 15 mental capacities on a 7-point scale (1 = *definitely does not possess*, 7 = *definitely does possess*). These mental capacities were sampled from Haslam et al. (2008) and included a broader range of mental states (pleasure, fear, rage, joy, happiness, desires, wishes, planning, goals, pride, pain, hunger, tasting, seeing, hearing). They formed a reliable measure of mind attribution (Cronbach's  $\alpha$ s = 0.82–0.86 for different animals).

**Design and procedure.** Participants were randomly assigned to one of the questionnaire versions and completed the questionnaire in a laboratory in groups of 10 to 15. The task took 15 min to complete.

## Results

Mean mental capacity ratings were calculated for each animal and each condition. Participants' ratings of sheep and cows did not differ within either condition so we collapsed across versions. This yielded two animal types: food animal and nonfood animal. An independent samples  $t$  test indicated that when reminded that an animal would be used for food, meat eaters denied it mental capacities (food animal:  $M = 4.08$ ,  $SD = .86$ ) compared to when no such reminders were provided (nonfood animal:  $M = 4.30$ ,  $SD = .82$ ),  $t(65) = 3.24$ ,  $p = .002$  (see Figure 2).<sup>1</sup>

## Discussion

The findings of Study 2 supported our expectations. When reminded that an animal was being raised for meat production,

and the suffering associated with this, meat eaters denied it mental capacities compared to when they were not reminded. These findings provide support for our hypothesis that denial of mind to food animals protects behavioral commitments to meat eating. They also highlight that this is especially likely to occur when people are reminded of the link between meat and animal suffering.

### Study 3

Study 2 demonstrated that meat eaters deny mental capacities to animals when they are reminded that those animals will be used for food. Specifically, the study showed that thinking about the animal suffering associated with the production of meat leads meat eaters to deny mind to food animals. We argue that this is a motivated denial, reducing dissonance between meat eaters' behavior and their concern for animal welfare. Specifically, we argue it is meat eaters' commitment to meat-eating behavior, which contributes to animal suffering, that increases dissonance. According to the action-based model of dissonance (Harmon-Jones et al., 2008; Harmon-Jones & Harmon-Jones, 2002, 2007; Harmon-Jones & Mills, 1999), people are motivated to reduce cognitive conflicts that interfere with effective behavior. Specifically, dissonance reduction brings cognitions in line with behavioral commitments, thereby facilitating the execution of effective and unconflicted action. In Study 3 we directly tested the role of behavioral commitment in motivating dissonance. Just as people's commitment to the cultural practice of meat eating increases dissonance and motivates mind denial (Study 2), expecting to eat meat in the immediate future may motivate dissonance reduction in similar ways. Moreover, theories of dissonance predict that people will experience unpleasant affective states when their behavior is inconsistent with their beliefs and that reducing dissonance should reduce this negative affect (Harmon-Jones & Harmon-Jones, 2007; Harmon-Jones & Mills, 1999). In Study 3, we examined whether people who expected to eat meat denied mind to the animal in question, and whether that denial reduced negative affect. Specifically we compared people who expected to eat meat with those who expected to eat something else. In both cases we asked participants to write an essay about the origins of meat, but we predicted that mind denial would be stronger when the expectation of meat consumption was present. In addition, we predicted that denying mind to animals before eating their meat should reduce negative affect associated with this behavior.

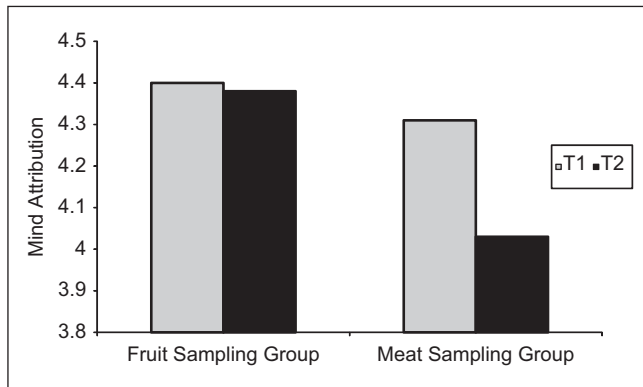
**Participants.** One hundred and twenty-eight students (82 female) at a large Australian university participated in the research for \$10 or course credit. Their ages ranged from 17 to 35 years ( $M = 20.85$ ).

**Materials and procedure.** Participants were informed that the study examined "consumer behavior" with the purpose of understanding whether thinking about the origins of food affected people's experience of consumption. Before beginning

the main experiment, participants were asked to provide some ratings as part of an ostensibly separate pilot study. They were shown either a picture of a cow or a sheep (same as Study 2), described as having been bred on a farm and spending most of its time eating grass. They were again asked to provide ratings of the extent to which they thought the animal possessed a series of mental capacities. We again used the same 15 items used in Study 2 with minor alterations (i.e., adding "choosing" and "thinking," dropping "goals" and "pride," and changing "desires" and "wishes" to "desiring" and "wishing") We also included 3 additional items (i.e., intending, imagining, and reasoning), expanding the measure to include 18 items in total. Reliability remained high ( $\alpha = .81$ ).

Participants were then provided with an unrelated task that took around 20 min to complete. After this they were informed that they would be beginning the main consumer behavior study. Before beginning the survey, participants were given a list of food items they may be asked to consume. A number of these were meat and they were told that continuation in the study would require eating whatever they were asked to. They were informed that if they did not want to continue they would have the option of participating in a study investigating people's capacity to maintain attention, where they would be asked to cross out the letter *e* from a passage for an equivalent amount of time (15 min). This task was designed to be equivalent in length but boring enough that participants would be motivated to choose the consumer behavior task. This manipulation served two distinct purposes. First, it made sure that everyone who continued was willing to eat meat. Second, it ensured that participants felt they were freely choosing to participate and therefore had agreed to the possibility of eating meat.

Participants were then handed a sheet that indicated an essay question they would be required to answer and the food they would be sampling. It was noted that some participants would write about a food product that they would not be sampling. In the meat sampling condition (high dissonance), participants were told they would be writing about where beef/lamb comes from and the processes involved in putting it on our supermarket shelves. They were explicitly instructed to write about the processes involved in raising cattle/sheep on the farm right through to the eventual packaging of meat for human consumption. In this condition participants were also told they would be sampling beef/lamb. In the fruit sampling condition (low dissonance), participants were asked to write the same essay but were told they would be sampling apples. Participants who had been asked to rate a lamb at the beginning of the experiment were told they would be eating beef and had to write about where beef comes from, and participants who were asked to rate a cow were told they would be eating lamb and had to write about where lamb comes from. At this point the experimenter placed a bowl of apples and a plate of appetizingly presented delicatessen roast beef/lamb "infused with rosemary and garlic" on the table. Participants then proceeded to write their essay in full view of the food they were about to sample.



**Figure 3.** Graphed means for mental capacity ratings of mind attribution at Time 1 (T1) and Time 2 (T2) across condition, Study 3

When participants had completed the essay task, the experimenters announced they were going to get some plates and cutlery for sampling the food. As the experimenters were leaving, they asked participants if while they waited they could complete another pilot study rating task. Participants were again provided with a cow/sheep rating task (i.e., the animal that they had not rated at the beginning of the study but that was consistent with the food they were sampling;  $\alpha = .86$ ). This task also included the Diener and Emmons (1984) Daily Mood Scale, measuring both positive and negative affective states (positive:  $\alpha = .92$ ; negative:  $\alpha = .91$ ) followed by demographic questions. When the experimenter returned, participants were debriefed using a funnel debriefing procedure. No participant accurately guessed the purpose of the study.

## Results

Eight people chose not to continue with the consumer behavior study because they did not wish to eat meat, leaving 120 participants in the study. As in Study 3, participants' ratings at Times 1 and 2 (T1 and T2) did not differ by animal type (i.e., cow vs. sheep) and so we collapsed them. This yielded a mental capacity rating for the cow/sheep at T1 and T2. A mixed ANOVA was used to compare mind ratings at T1 and T2 across the two conditions (meat sampling vs. fruit sampling). This revealed a main effect of time,  $F(1, 118) = 10.28$ ,  $p = .002$ ,  $\eta^2 = .08$ , with animals denied more mental capacities at T2 ( $M = 4.20$ ,  $SE = .08$ ) than T1 ( $M = 4.35$ ,  $SE = .07$ ). This was qualified by an interaction between time and condition,  $F(1, 118) = 6.96$ ,  $p = .009$ ,  $\eta^2 = .06$ . Simple contrasts revealed no difference between T1 ( $M = 4.40$ ,  $SE = .10$ ) and T2 ( $M = 4.38$ ,  $SE = .11$ ) for the fruit sampling condition ( $p = .688$ ), but a significant reduction from T1 ( $M = 4.31$ ,  $SE = .10$ ) to T2 ( $M = 4.03$ ,  $SE = .11$ ) for the meat sampling condition ( $p < .001$ ). Contrasts also revealed no significant differences between conditions at T1 ( $p = .499$ ). However, at T2 mind ratings were significantly lower in the meat sampling condition than in the fruit sampling condition ( $p = .033$ ; see Figure 3).

Finally, there was a nonsignificant trend for participants in the meat sampling condition to experience more negative affect ( $M = 2.03$ ,  $SD = 1.12$ ) than participants in the fruit sampling condition ( $M = 1.84$ ,  $SD = 0.96$ ),  $t(119) = 1.01$ ,  $p = .321$ . To determine whether it was related to mind attribution we constructed a measure of change in mind attribution by subtracting mind attribution at T2 from mind attribution at T1 such that positive scores indicated reduced attribution at T2. Change in mind attribution was negatively correlated with negative affect ( $r = -.19$ ,  $p = .035$ ) such that the more people denied mind at T2, the less negative emotion they experienced. Because change in mind attribution significantly differed across conditions and was significantly correlated with negative affect, we tested for indirect effects of condition on negative affect following Preacher and Hayes's (2004) protocols. To establish, the first-step condition (coded 0 = *fruit sampling*, 1 = *meat sampling*) was regressed onto change in mind attribution. This revealed condition to be a significant predictor of change in mind attribution ( $\beta = .24$ ,  $p = .009$ ). To examine the potential indirect effect of condition on negative affect via change in mind attribution, change in mind attribution was entered alongside condition to predict negative affect. This revealed change in mind attribution to be a significant predictor,  $B = -.45$ ,  $\beta = -.23$ ,  $p = .015$ . Drawing on 5,000 samples, a bootstrapped 95% confidence interval did not include zero (0.01, 0.25), indicating that this was a significant indirect effect.

## Discussion

The findings of Study 3 provide direct support to our dissonance hypothesis. Participants denied mind to food animals when they were asked to think about the origins of meat. However, this denial was only significant for participants who were told they were going to sample the food animal's meat. Participants who wrote about the origins of meat but were told they would sample an apple did not deny mind to the same degree, indicating they did not experience the same level of dissonance. As such, we provide evidence for the action-based model of dissonance, showing that by denying minds to animals, people bring their cognitions in line with behavioral commitments, facilitating effective and unconflicted action. We also provide clear evidence for the specific role of behavioral commitment in motivating dissonance reduction. In our study, all participants agreed to potentially eat meat and all participants were reminded of the origins of meat; however, only those who made a behavioral commitment and had the expectation that they would actually eat meat were motivated to reduce their dissonance.

These findings also contrast with those of Study 2, where the salience of animal suffering motivated dissonance reduction and mind denial. In the current study participants who simply wrote about the origins of meat did not deny animals minds. We believe there are two reasons for this difference. First, whereas in Study 2 participants were confronted with words such as *butchered* and *killed*, in writing about the

origins of meat participants were required to think about the instrumental use of animals for food products but were free to avoid such graphic characterizations. Second, whereas in Study 2 participants were left to consider their own meat-eating practices, making salient their own meat-eating behavior, in Study 3 they were given a momentary escape by being told they were *not* in the meat-eating group, which likely reduced dissonance related to meat eating because they were assigned to eat apples.

We found a significant indirect effect of condition on negative affect via mind denial. This indicates that denying minds to animals we are about to eat reduces negative emotions aroused by dissonance between our concern for animals and our meat-eating behavior. It is important to note that we would not expect to find any direct effects in the current design. Participants were provided with the opportunity to deny mind before reporting negative affect. As such, participants in the meat sampling condition who denied mind would not be expected to experience more negative affect than those in the fruit sampling condition, as mind denial reduces dissonance and therefore dissonance-related negative affect. It was only to the extent that participants in the meat sampling condition did not deny mind that they experienced negative affective states—an indirect effect. Finding that denying animals mind reduces negative affect when preparing to eat their meat provides strong support to our hypothesis that mind denial reduces dissonance. That is, not only is mind denial triggered by dissonance, but the act of denying minds reduces negative affect before eating meat, suggesting reduced dissonance and increased capacity for effective and unconflicted action.

## General Discussion

In this research we set out to investigate the link between the perception of animal minds and the use of animals for meat. Specifically, we examined the notion that eating animals conflicts with peoples' concern for their welfare, and denying them mental capacities is one way to reduce the unpleasant state of dissonance that results and facilitates unconflicted meat-eating behavior. Across three studies we provide evidence for these claims. Study 1 showed that the attribution of mind is associated with reduced edibility of an animal, increased perceptions of moral worth, and increased negative affect associated with its consumption. In Study 2 we demonstrated that this is a motivated process and that being reminded of the link between meat and animal suffering leads meat eaters to deny mind to animals they eat. In Study 3 we provide direct evidence for the role of behavioral commitment in producing dissonance, demonstrating that expectations to eat meat motivate mind denial, and this in turn reduces negative affect.

The findings of these studies support our previous work, which demonstrated the role of dissonance in motivating the denial of moral status and the capacity to suffer to food animals (Loughnan, Haslam, & Bastian, 2010). However we

extend on that work by directly investigating the role of mind denial in reducing dissonance and by highlighting factors such as animal suffering and behavioral expectations that increase dissonance. Our work demonstrates that reminders of animal harm and a behavioral commitment to meat consumption lead meat eaters to deny morally relevant qualities (i.e., minds) to food animals, and this in turn reduces dissonance and facilitates their behavior.

Our findings add to a current flurry of work on the various factors contributing to mind attribution (Epley et al., 2008; Epley & Waytz, 2009; Waytz et al., 2010) and links between mind attribution and moral judgment (e.g., Bastian, Laham, Wilson, Haslam, & Koval, 2011; Gray et al., 2007; Gray & Wegner, 2009; Waytz et al., 2010). Moreover, our work aligns with current (Regan, 1997; Ryder, 1971; Singer, 1990) and historical (e.g., St. Augustine and Descartes) scholarship on the ascription of moral rights to animals. However, it goes beyond this work, which demonstrates associations between the possession of mind and the recognition of moral status, to demonstrate that people flexibly attribute mind, and therefore moral status, in accordance with their own motivations. Animals are afforded minds when it suits our interests (Epley et al., 2008), but the inverse is also true; when it does not suit us that animals have mind, we fail to see them. One does not have to look far to find clear examples of this flexible recognition of animal rights. Controversies over the use of whales or dogs for meat are primary examples. Cultures that view these animals as appropriate for food do not afford them high levels of moral worth, whereas such practices are viewed as disgusting and morally corrupt in cultures that view them as inappropriate. Cross-cultural research investigating variations in mind attribution as linked to culinary preferences and cultural commitments to animal consumption would represent an important extension of our findings.

Our findings also point to a novel motivational pathway to mind perception (Waytz et al., 2010). Ascribing minds to others fulfills many functions; however, sometimes others minds provide inconvenient barriers to effective action. Previous work has demonstrated that denying minds to others reestablishes psychological equanimity in the face of past atrocities (Castano & Giner-Sorolla, 2006). Our current findings demonstrate that mind denial also facilitates behaviors to which we are strongly, and currently, committed. People's appetite for meat, as well as the cultural significance of certain meat-eating practices, increases behavioral commitment. To this extent, mind denial facilitates morally questionable, but cherished and culturally valued, practices by bringing cognitions in line with behavior and reducing dissonance. We thus also provide support to the role of behavioral commitment in motivating dissonance reduction (e.g., Harmon-Jones & Harmon-Jones, 2002).

Although we explain our findings at the level of dissonance reduction, we acknowledge that our findings are consistent with work on moral disengagement (e.g., Bandura, 1999; Castano & Giner-Sorolla, 2006). Indeed, as we argue, people demoralize animals to reduce moral concerns over their



harm. However, we prefer to use a model of dissonance as it provides greater insights into the maintenance of socially normative behaviors as opposed to post hoc justifications for socially condemned immoral deeds. By focusing on the “meat paradox” we provide insight into the ways in which cognitive and motivational processes obscure moral responsibility for ongoing action by reducing the extent to which our engagement in those actions are viewed as morally relevant choices. As such, dissonance theory provides a motivational mechanism in a context where inconsistencies between people’s beliefs (e.g., enjoying meat vs. loving animals) are not universally seen as falling within the moral domain. Nevertheless, the phenomena observed in our research are indeed compatible with the literature on moral disengagement, and in this way we use a dissonance-related framework for extending insights into processes of moral disengagement.

One concern regarding the use of dissonance to explain our findings is that rather than arousing dissonance we may simply have caused people to objectify food animals by asking them to focus on the use of their bodies for instrumental purposes (e.g., Loughnan, Haslam, Murnane, et al., 2010). Alternatively, it could be argued that mind denial may occur simply *because* an entity is seen to experience harm (Kozak et al., 2006; but see Bratanova et al., 2011) without necessarily being motivated by dissonance reduction. We believe that these explanations are unsatisfactory. In Study 3 meat eaters who were asked to think about the origins of meat were specifically required to consider the use of animal’s bodies for the instrumental purpose of meat production; however, when their meat-eating practices were obscured by being placed in the nonmeat condition, they did not deny mind to those animals. As we argue, it was meat eaters’ behavioral commitment to meat eating that aroused dissonance and motivated their denial of mind.

In making a case for the role of mind denial in reducing dissonance, we rely on psychological processes induced within the laboratory context. This allows us to highlight specific causal pathways associated with dissonance processes. However, we also acknowledge that many meat eaters do not experience dissonance every time they eat steak. We demonstrate that reminders of animal harm interact with behavioral commitments to produce dissonance. However, as Festinger (1957) argued, the magnitude of dissonance is determined not just by two specific, if conflicting, cognitions, but by the total number of cognitions involved. Meat eating is often consistent with a variety of other cognitions (e.g., the importance of maintaining cultural traditions) that may reduce the amount of dissonance experienced. Moreover, people may draw on other cognitive strategies, such as trivializing the inconsistency (Simon, Greenberg, & Brehm, 1995), rather than denying mind, to reduce dissonance. Perhaps more commonly, however, is the possibility that people more or less stop experiencing dissonance. It is likely that repeated dissonance experiences across a lifetime change how one chronically construes animals one eats, such

that, absent salient reminders of their capacity for suffering, less and less cognitive dissonance accompanies meat eating across time. On one hand, this suggests that our reported dissonance effects are not always salient for many meat eaters. On the other hand, it highlights the potential downstream effects of initial dissonance experiences. For example, butchers or meat-processing plant workers who are regularly exposed to animal harm may have a chronic tendency to view animals as relatively mindless. The same may be said for farmers who perceive animals more as commodities and are therefore less inclined to consider their mental life. Perceptions that protect against dissonance may become deeply embedded within minds and cultures. This highlights the possibility that not only does dissonance reduction protect cultural practices, but the experience of dissonance itself may shape culturally endorsed beliefs and perceptions.

Whether people experience dissonance when eating meat will also be affected by what kind of meat they are eating. In the current studies we focus on cows and sheep as examples of food animals. As indicated in Study 1, some animals are perceived to have less mind (e.g., chickens, fish, snails, insects) and therefore dissonance related to their consumption may be less evident. For some animals (e.g., prawns), dissonance-related conflicts will be rare. For others (e.g., dogs, cows, dolphins), cultural differences will play an important role.

Although the experience of dissonance may not be a ubiquitous experience for meat eaters, dissonance processes play a central role in resolving meat-eating conflicts. These processes also shed light on factors that shape chronic personal and cultural perceptions that may be responsible for decisions regarding behavior change (e.g., becoming a vegetarian). Understanding the role of dissonance in meat eating also provides insight into the processes through which people manage and maintain a range of culturally endorsed, although morally questionable, practices.

In conclusion, the current work demonstrates that people deny minds to the animals they eat and that this denial diminishes unpleasant affective states associated with its consumption. Meat is pleasing to the palate for many, and although the vegetarian lifestyle is increasingly popular, most people continue to make meat a central component of their diet. Our work demonstrates how people manage to maintain their culinary practices, by denying that the animals they eat have minds. In short, it highlights the fact that although most people do not mind eating meat, they do not like thinking of animals they eat as having possessed minds.

### Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

## Note

1. In Study 2 we also collected a sample of 57 vegetarian students (42 female) recruited from around the university campus. They were identified by first being asked if they are vegetarian. Their ages ranged from 17 to 40 years ( $M = 23.39$ ). Vegetarians completed the questionnaire within the vicinity of a vegetarian restaurant in the student services building on the university campus. Sample differences between our vegetarian sample and meat-eater sample (including the location of data collection and age differences) makes direct comparison difficult; however, we note that effects of our manipulation were not observed in the vegetarian sample (nonfood animal:  $M = 5.06$ ,  $SD = .87$ ; food animal:  $M = 5.07$ ,  $SD = .82$ ),  $t(56) = 0.11$ ,  $p = .914$ . This suggests that denial of mental capacities to food animals serves a dissonance-reducing function for meat eaters that is redundant for vegetarians.

## References

- Bandura, A. (1999). Moral disengagement in the perpetration of inhumanities. *Personality and Social Psychology Review*, *3*, 193-209.
- Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (1996). Mechanisms of moral disengagement in the exercise of moral agency. *Journal of Personality and Social Psychology*, *71*, 364-374.
- Bastian, B., Laham, S., Wilson, S., Haslam, N., & Koval, P. (2011). Blaming, praising and protecting our humanity: The implications of everyday dehumanization for judgments of moral status. *British Journal of Social Psychology*, *50*, 469-483.
- Beardsworth, A., & Keil, T. (1992). The vegetarian option: Varieties, conversions, motives and careers. *Sociological Review*, *40*, 253-293.
- Beardsworth, A., & Keil, T. (1997). *Sociology on the menu: An invitation to the study of food and society*. London: Routledge.
- Berndsen, M., & van der Pligt, J. (2004). Ambivalence towards meat. *Appetite*, *42*, 71-78.
- Berndsen, M., & van der Pligt, J. (2005). Risks of meat: The relative impact of cognitive, affective, and moral concerns. *Appetite*, *44*, 195-205.
- Bilewicz, M., Imhoff, R., & Drogosz, M. (2011). The humanity of what we eat: Conceptions of human uniqueness among vegetarians and omnivores. *European Journal of Social Psychology*, *41*, 201-209.
- Bratanova, B., Loughnan, S., & Bastian, B. (2011). The effect of food categorization on the perceived moral standing of animals. *Appetite*, *57*, 193-196.
- Castano, E., & Giner-Sorolla, R. (2006). Not quite human: Infrahumanization in response to collective responsibility for intergroup killing. *Journal of Personality and Social Psychology*, *90*, 804-818.
- Cuddy, A. J. C., Rock, M. S., & Norton, M. I. (2007). Aid in the aftermath of Hurricane Katrina: Inferences of secondary emotions and intergroup helping behavior. *Group Processes & Intergroup Relations*, *10*, 107-118.
- Diener, E., & Emmons, R. (1984). The independence of positive and negative affect. *Journal of Personality and Social Psychology*, *47*, 1105-1117.
- Epley, N., & Waytz, A. (2009). Mind perception. In S. T. Fiske, D. T. Gilbert, & G. Lindsay (Eds.), *The handbook of social psychology* (5th ed., pp. 498-541). New York, NY: Wiley.
- Epley, N., Waytz, A., Akalis, S., & Cacioppo, J. T. (2008). When we need a human: Motivational determinants of anthropomorphism. *Social Cognition*, *26*, 143-155.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Fiddes, N. (1991). *Meat: A natural symbol*. London, UK: Routledge.
- Foer, J. S. (2009). *Eating animals*. New York, NY: Little, Brown.
- Gray, H. M., Gray, K., & Wegner, D. M. (2007). Dimensions of mind perception. *Science*, *315*, 619-621.
- Gray, K., & Wegner, D. (2009). Moral typecasting: Divergent perceptions of moral agents and moral patients. *Journal of Personality and Social Psychology*, *96*, 505-520.
- Greene, J. D., Sommerville, B. R., Nystrom, L. E., Darley, J. M., & Cohen, J. D. (2001). An fMRI investigation of emotional engagement in moral judgment. *Science*, *293*, 2105-2108.
- Haidt, J. (2001). The emotional dog and its rational tail: A social intuitionist approach to moral judgment. *Psychological Review*, *108*, 814-834.
- Harmon-Jones, E. (2000). Cognitive dissonance and experienced negative affect: Evidence that dissonance increases experienced negative affect even in the absence of aversive consequences. *Personality and Social Psychology Bulletin*, *26*, 1490-1501.
- Harmon-Jones, E., & Harmon-Jones, C. (2002). Testing the action-based model of cognitive dissonance: The effect of action orientation on postdecisional attitudes. *Personality and Social Psychology Bulletin*, *28*, 711-723.
- Harmon-Jones, E., & Harmon-Jones, C. (2007). Cognitive dissonance theory after 50 years of development. *Zeitschrift für Sozialpsychologie*, *38*, 7-16.
- Harmon-Jones, E., Harmon-Jones, C., Fearn, M., Sigelman, J. D., & Johnson, P. (2008). Left frontal cortical activation and spreading of alternatives: Tests of the action-based model of dissonance. *Journal of Personality and Social Psychology*, *94*, 1-15.
- Harmon-Jones, E., & Mills, J. (1999). *Cognitive dissonance: progress on a pivotal theory in social psychology*. Washington, DC: American Psychological Association.
- Haslam, N., Kashima, Y., Loughnan, S., Shi, J., & Suitner, C. (2008). Subhuman, inhuman, and superhuman: Contrasting humans with nonhumans in three cultures. *Social Cognition*, *26*, 248-258.
- Hoogland, C., de Boer, J., & Boersema, J. (2005). Transparency of the meat chain in the light of food culture and history. *Appetite*, *45*, 15-23.
- Kiesler, C. A., & Pallak, M. S. (1976). Arousal properties of dissonance manipulations. *Psychological Bulletin*, *83*, 1014-1025.

- Kozak, M., Marsh, A., & Wegner, D. (2006). What do I think you're doing? Action identification and mind attribution. *Journal of Personality and Social Psychology, 90*, 543-555.
- Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin, 108*, 480-498.
- Laham, S. (2009). Expanding the moral circle: Inclusion and exclusion mindsets and the circle of moral regard. *Journal of Experimental Social Psychology, 45*, 250-253.
- 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*, 156-159.
- Loughnan, S., Haslam, N., Murnane, T., Vaes, J., Reynolds, C., & Suitner, C. (2010). Objectification leads to depersonalization: The denial of mind and moral concern to objectified others. *European Journal of Social Psychology, 40*, 709-717.
- Mameli, M., & Bortolotti, L. (2006). Animal rights, animal minds, and human mindreading. *Journal of Medical Ethics, 32*, 84-89.
- Marcu, A., Lyons, E., & Hegarty, P. (2007). Dilemmatic human-animal boundaries in Britain and Romania: Post-materialist and materialist dehumanization. *British Journal of Social Psychology, 46*, 875-893.
- Morewedge, C. K., Preston, J., & Wegner, D. M. (2007). Timescale bias in the attribution of mind. *Journal of Personality and Social Psychology, 93*, 1-11.
- Newby-Clark, I. R., McGregor, I., & Zanna, M. P. (2002). Thinking and caring about cognitive inconsistency: When and for whom does attitudinal ambivalence feel uncomfortable? *Journal of Personality and Social Psychology, 82*, 157-166.
- Penn, D. C., & Povinelli, D. J. (2007). Causal cognition in human and nonhuman animals: A comparative, critical review. *Annual Review of Psychology, 58*, 97-118.
- Plous, S. (2003). Is there such a thing as prejudice towards animals? In S. Plous (Ed.), *Understanding prejudice and discrimination* (pp. 509-528). New York, NY: McGraw-Hill.
- Preacher, K., & Hayes, A. (2004). SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behavior Research Methods, Instruments, and Computers, 36*, 717-731.
- Regan, T. (1997). The rights of humans and other animals. *Ethics and Behavior, 7*, 103-111.
- Rozin, P. (1996). Towards a psychology of food and eating: From motivation to module to model to marker, morality, meaning, and metaphor. *Current Directions in Psychological Science, 5*, 18-24.
- Rozin, P. (2004). Meat. In S. Katz (Ed.), *Encyclopedia of food* (pp. 666-671). New York, NY: Scribner.
- Rozin, P., Markwith, M., & Stoess, C. (1997). Moralization and becoming a vegetarian: The transformation of preferences into values and the recruitment of disgust. *Psychological Science, 8*, 67-73.
- Ryder, R. (1971). Experiments on animals. In S. Godlovitch, R. Godlovitch, & J. Harris (Eds.), *Animals, men and morals* (pp. 41-82). New York, NY: Taplinger.
- Sapontzis, S. F. (1981). A critique of personhood. *Ethics, 91*, 607-618.
- Simon, L., Greenberg, J., & Brehm, J. (1995). Trivialization: The forgotten mode of dissonance reduction. *Journal of Personality and Social Psychology, 68*, 247-260.
- Singer, P. (1990). *Animal liberation* (2nd ed.). London, UK: Jonathan Cape.
- Suddendorf, T., & Whiten, A. (2001). Mental evolution and development: Evidence for secondary representation in children, great apes and other animals. *Psychological Bulletin, 5*, 629-650.
- Tangney, J. P., Miller, R. S., Flicker, L., & Barlow, D. H. (1996). Are shame, guilt, and embarrassment distinct emotions? *Journal of Personality and Social Psychology, 70*, 1256-1269.
- Vialles, N. (1994). *Animal to edible* (J. A. Underwood, Trans.). Cambridge, UK: Cambridge University Press.
- Waytz, A., Gray, K., Epley, N., & Wegner, D. M. (2010). Causes and consequences of mind perception. *Trends in Cognitive Science, 14*, 383-388.
- Wennberg, R. N. (2003). *God, humans, and animals: An invitation to enlarge our moral universe*. Grand Rapids, MI: Eerdmans.
- Zanna, M. P., & Cooper, J. (1974). Dissonance and the pill: An attribution approach to studying the arousal properties of dissonance. *Journal of Personality and Social Psychology, 29*, 703-709.