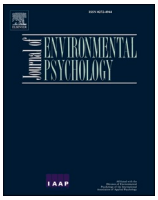
Journal of Environmental Psychology 83 (2022) 101871

Contents lists available at ScienceDirect

Journal of Environmental Psychology

journal homepage: www.elsevier.com/locate/jep



"Do you consider animal welfare to be important?" activating cognitive dissonance via value activation can promote vegetarian choices

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ARTICLE INFO

Handling editor: W. Schultz

Keywords:
Cognitive dissonance
Value activation
Animal welfare
Vegetarian meal

ABSTRACT

Reducing global meat consumption can improve animal welfare, environmental and health issues. Although many people recognize this, they also continue eating meat. When people become aware of their conflicting cognitions regarding meat consumption, such as finding both animal welfare and eating meat important, it can result in aversive feelings, known as cognitive dissonance. We add to the literature by exploring whether cognitive dissonance can be used to support desired behavioral choices. More specifically, we examine whether activating peoples' pre-existing animal welfare values, by stimulating them to reflect on whether they consider animal welfare to be important, can trigger cognitive dissonance and in turn promote the choice for vegetarian meals. An online study showed that our value activation strategy indeed increased the amount of cognitive dissonance people experience when thinking of consuming meat, which in turn increased their intention to eat a vegetarian meal, especially among those with a strong pro-environmental self-identity. A subsequent field study in a restaurant showed that our value activation strategy (almost) doubled the percentage of vegetarian burgers ordered. Our findings show that stimulating people to reflect on whether they consider animal welfare to be important can force people to face their inner conflict regarding meat consumption and channel that into choosing a vegetarian meal.

1. Introduction

There is a need to reduce global meat consumption, as the current high levels of meat consumption have major negative effects on animal welfare, the environment and health (Bonnet et al., 2020; Campbell, 2017; Godfray et al., 2018; Willett et al., 2019). Many people recognize the negative effects of meat consumption (Kunst & Hohle, 2016; Loughnan et al., 2014), and it is therefore not surprising that meat consumption can go hand in hand with feelings of uneasiness as a result of conflicting thoughts, also known as cognitive dissonance (Bastian & Loughnan, 2017; Festinger, 1957; Harmon-Jones et al., 2015; Rothgerber, 2020). People experience more dissonance depending on the importance of the cognitions, and as most people aim to maintain a moral self-image, they experience most dissonance when they reflect on the moral implications of meat consumption; i.e. eating meat harms animal welfare (i.e. May & Kumar, 2022; Reczek et al., 2018; Souza & O'Dwyer, 2022; Zane et al., 2016). Many meat-eaters care about animal welfare, but they also enjoy eating meat, and these conflicting cognitions imply different actions (i.e. eating meat vs. not eating meat). Such discrepant cognitions can lead to dissonance, which motivates people to reduce this dissonance (Harmon-Jones et al., 2015; Kunst & Hohle, 2016; Loughnan et al., 2014). Thus, reminding people of the fact that eating meat is in conflict with animal welfare is potentially a powerful source of triggering dissonance (Rothgerber, 2020).

Cognitive dissonance can potentially act as fuel for change (Brouwer et al., 2022; Onwezen & van der Weele, 2016), and the fact that meat consumption harms animals is common knowledge. Yet, meat consumption is not declining (Verain et al., 2022). Thus, although people care about animals, they still engage in eating meat (i.e. the meat paradox, Loughnan et al., 2010; Loughnan et al., 2014). This paradox can continue to exist because people engage in adaptive strategies to continue their meat consumption without experiencing dissonance, such as actively avoid thinking about the moral implications of consuming meat, a process known as strategic ignorance (Ehrich & Irwin, 2005; Rothgerber, 2020), or convincing themselves that meat-eating can go hand-in-hand with being a good person, also referred to as motivated reasoning (Bryant et al., 2022). These strategies allow people to deny liability and continue engaging in morally troublesome practices

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https://doi.org/10.1016/j.jenvp.2022.101871
Received 13 April 2022; Received in revised form 10 August 2022; Accepted 9 September 2022
Available online 15 September 2022

without compromising their moral self-image (Reczek et al., 2018; Zane et al., 2016). Thus, a main challenge in guiding people towards meat reduction is to trigger cognitive dissonance by activating the cognition that will most likely translate into meat reduction, namely their animal welfare values.

Past studies show that informing people about animal welfare issues due to meat consumption has the potential to trigger cognitive dissonance and translate into behavior change (e.g. Kunst & Haugestad, 2018; Kunst & Hohle, 2016; Ruby & Heine, 2012; Wang & Basso, 2019). However, we argue that simply informing people that meat consumption harms animal welfare does not guarantee to be effective in stimulating behavior change – it can merely remind people of knowledge they already possess and have learned to avoid thinking about while consuming meat (Buttlar et al., 2021; May & Kumar, 2022; Rothgerber, 2020). Moreover, such appeals for behavior change can be perceived as direct attempts to persuade or manipulate, and consequently trigger reactance instead of behavior change (Lemmen et al., 2020; Sparkman et al., 2021). Reactance is a motivational state that occurs when someone's freedom is threatened (Brehm, 1966; Brehm & Brehm, 1981) and can even motivate people to do the opposite of what is communicated in an appeal (Rains, 2013). Building on these previous findings, we explore an alternative strategy. We propose that by stimulating people to reflect on whether they find animal welfare important themselves, instead of telling people that animal welfare is important, their pre-existing values regarding animal welfare come into sharp focus without triggering reactance. As a result cognitive dissonance will more likely be channeled into behavior change.

1.1. Channeling cognitive dissonance into the preference for a vegetarian meal

To channel cognitive dissonance into choosing vegetarian meals, it first has to be triggered. Cognitive dissonance most likely occurs when people experience high levels of psychological conflict, and although meat consumption is at odds with various values that people have (e.g. environment, health, animal welfare), the psychological conflict is most pronounced for the moral issue of animal welfare (Loughnan et al., 2014; Ruby & Heine, 2012). The harm that meat consumption causes to animals is often perceived as a moral issue. The basic moral argument against meat consumption involves animal harm, stating that 1) "Supporting a practice that inflicts *severe* and *unnecessary* harm to animals is typically wrong", 2) "Eating meat supports a practice that inflicts *severe* and *unnecessary* harm to factory-farmed animals", and therefore 3) "Eating meat from factory farms is typically wrong" (p. 4, May & Kumar, 2022). Previous work also shows that raising animal welfare issues can lead people to experience moral emotions regarding meat consumption (e.g. guilt, shame, disgust, outrage) and to connect animal welfare issues with their own moral principles (moral piggybacking; Feinberg et al., 2019). Thus, in accordance with previous studies we focus on the moral issue of animal welfare to trigger cognitive dissonance.

Previous studies demonstrate that cognitive dissonance that is triggered as a result of animal welfare issues has the potential to translate into behavior change. For instance, showing the head of the animal that is killed (Kunst & Haugestad, 2018; Kunst & Hohle, 2016), reminding people of how intelligent animals are (Ruby & Heine, 2012) or how similar they are to humans (Wang & Basso, 2019) can decrease the willingness to eat meat. This is also found in a restaurant setting, where replacing the word "beef" with "cow" or the word "pork" with "pig" on the menu leads to a higher willingness to order a vegetarian dish (Kunst & Hohle, 2016). A recent study indicates that these effects could even be stable over time, as they found that people who are more directly confronted with animal suffering - those who work in the meat industry - avoid meat more than people who do not work in the meat industry (Bryant et al., 2020; Bryant & van der Weele, 2021). Together these findings show that peoples' moral values regarding animal welfare can resurface as a driver of their choices when they are reminded of how animals suffer to enable meat consumption.

However, as noted previously, meat-reducing strategies do not always show to be effective; only providing information has limited effects, and moralizing meat consumption and thereby increasing dissonance can also result in reactance when people feel that their freedom is being threatened (Brehm, 1966; Brehm & Brehm, 1981). The latter is particularly the case among people who are strongly committed to their current meat-eating behaviors (Bastian, 2019; Leach et al., 2022; Rothgerber & Rosenfeld, 2021). Some have argued that dissonance can even lead meat-eaters to become more committed to their current diet and possibly also increase their meat consumption (Bastian, 2019; Rothgerber, 2020). If true, this could explain why on the one hand the availability of plant-based products is increasing, while simultaneously meat consumption is increasing too (Rothgerber & Rosenfeld, 2021). So, how can choosing a vegetarian meal instead of a meal with meat become the preferred dissonance-reducing strategy, instead of other adaptive strategies, such as strategic ignorance and rationalizing meat consumption?

We believe that activating people's animal welfare values will stimulate them to act in accordance with these values, because it limits their moral wiggle room (i.e. the room people allow themselves to continue engaging in morally troublesome practices without compromising their moral self-image; Reczek et al., 2018; Zane et al., 2016). We suggest that this can be achieved with a strategy that stimulates people to personally reflect on the importance of animal welfare. By letting people answer a question about whether they consider animal welfare to be important they generate their own arguments and at the same time unequivocally make clear for themselves that the moral issue of animal welfare is important to them. Thereby they become more committed to their pre-existing values, making it harder to morally justify their meat consumption. Thus, we hypothesize that stimulating people to reflect on whether they consider animal welfare to be important, can be an effective strategy to activate their pre-existing animal welfare values, trigger meat-related cognitive dissonance, and in turn, motivate them to reduce their meat consumption as it leaves less room to justify choosing a meal with meat.

1.2. Current studies

In the current research, an online study and a field study are implemented to test whether our value activation strategy can stimulate vegetarian choices. In the online study (Study 1) we focus on the internal validity of our strategy and test whether activating the moral value animal welfare increases meat-related cognitive dissonance more than activating the less moral value health or activating no value, and whether an increase in cognitive dissonance also leads to an increase in the intention to eat a vegetarian meal. In the field study (Study 2) we focus on the external validity of our strategy by testing whether activating the moral value animal welfare increases the amount of vegetarian burgers ordered in a real-life restaurant-setting.

2. Study 1: an online study investigating the effect of our value activation strategy on the intention to choose a vegetarian meal

2.1. Introduction

In an online study we investigated the internal validity of our value activation strategy. We tested whether stimulating participants to reflect on whether they consider animal welfare to be important, leads to an increased intention to eat a vegetarian meal among meat-eaters and if this effect is mediated by cognitive dissonance.

To investigate whether dissonance is indeed more pronounced when people reflect on the moral implications of meat consumption, we included a condition where a value will be activated that has less of a moral connotation, namely health (Espinosa & Stoop, 2021), and a condition where no value will be activated. Furthermore, we compared a

zoo setting, which can remind people of animal welfare, with a hospital setting, which can remind people of health. We expected that being around zoo animals can remind people that animals are intelligent and in many ways similar to humans (e.g. Ruby & Heine, 2012; Wang & Basso, 2019), and thus make it more difficult for people to mentally decouple their decision to eat meat with their desire to maintain a moral self-image. Thus, we expected our value activation strategy to be particularly effective in a matching context – the zoo.

We additionally explored whether meat-eaters indeed strategically ignore information and how this relates to dissonance and vegetarian choices, and whether people with a strong pro-environmental self-identity are more prone to change their behavior as a reaction to dissonance. Given that actions of people with a strong pro-environmental self-identity are more strongly tied to their values, we suspected they might allow themselves less moral wiggle room and thus would be particularly susceptible to our value activation manipulation (Bryant et al., 2022).

2.2. Method

2.2.1. Design and procedure

An online survey was administered with a 3 (value activation strategy: animal welfare, health, none) x 2 (context: zoo, hospital) between-subjects design. Participants were randomly divided into one of the six conditions. The context manipulation consisted of an image of a hospital or a zoo accompanied by the following text: "Imagine you are in the [zoo/hospital]. You arrived in the morning to [look at different animals, like giraffes, panda's and tigers/visit a family member who is sick because of an unhealthy lifestyle]. During your visit you get hungry and decide to have lunch in the restaurant of the [zoo/hospital]." See Fig. 1 for the images of the context manipulation.

Our value activation strategy consisted of asking people to consider the importance of either animal welfare (i.e. "Do you consider animal welfare to be important?") or health (i.e. "Do you consider health to be important?"). Participants could answer these questions with 'yes' or 'no' and those who filled in 'no' were excluded from the analyses, as we can assume that no value activation took place for them. A third group did not receive a question and served as a control group.

The following screening criteria applied: participants had to be older than 18 years old and eat meat. The screening question for meat consumption was as follows: 'Do you eat meat (sometimes)?'. This question could be answered with 'yes', 'yes, sometimes' and 'no' and those who answered 'no' were screened out. After the manipulations, participants started to fill in the survey.

All analysis were performed with the statistical program IBM SPSS version 25.

2.2.2. Participants

A representative sample of the Dutch population based on sex, age, education and region was recruited by a professional market research company. Initially, 823 participants started with the online survey, of which 88 participants were screened out because of the following reasons: not eating meat ($n = 63$), not consenting ($n = 8$), being under 18 ($n = 2$) and answering 'no' to the value manipulation question (animal: $n = 14$; health: $n = 1$). This leaves a final sample of 735 participants ($n^{animal\ welfare\ \&\ zoo} = 123$, $n^{animal\ welfare\ \&\ hospital} = 114$, $n^{health\ \&\ zoo} = 129$, $n^{health\ \&\ hospital} = 123$, $n^{none\ \&\ zoo} = 123$; $n^{none\ \&\ hospital} = 123$) of which 53.3% are female and the average age is 48.7 years ($SD = 16$) ranging from 18 to 80 years. Moreover, 20% of the participants had a lower education, 42.2% a medium education and 37.3% a higher education. And finally, 34% lived in the North or East of the Netherlands, 41.4% in the West of the Netherlands and 23.8% in the South of the Netherlands. Demographics of the six conditions can be found in Appendix A .[1]

To determine the minimum needed sample size for every condition, a power analysis was performed using G*Power 3.1.9.7 (Faul et al., 2007) with the following input: statistical test = F-tests, ANOVA: Fixed effects, special, main effects and interactions; effect size f = 0.15; α = 0.05; power (1-β) = 0.8; numerator df: 2; number of groups: 6. The estimated sample size was 432. Informed consent was obtained from all participants and the study was reviewed and approved by the Social Sciences Ethics Committee of Wageningen University & Research.[2]

2.2.3. Measurements

2.2.3.1. Manipulation checks. To check whether participants correctly recalled the context and value activation, we asked 'Earlier on in this study you were asked to think about a specific situation. Which situation did you have to take in mind?' with the following answering options: 'a situation in a zoo' and 'a situation in a hospital', and we asked 'Earlier on in this study you were asked to think about what is important to you in your life. What was this question about?' with the following answering options: 'health', 'animal welfare' and 'I had no question about this'.

To check whether a matching context – a zoo – amplified our value activation strategy, we used a value activation measure ($M = 3.23$; $SD = 1.16$) based on Verplanken and Holland (2002). Participants had to choose between five different lunch options, which all had a range of scores on taste, smell, quantity, familiarity and either animal welfare or health; participants who received our animal welfare value activation strategy had the answering option 'animal welfare' and participants who received our health value activation strategy had the answering option 'health'. Participants who did not receive our value activation strategy did not fill out this question. Scores were – (very unfavorable), - (unfavorable), 0 (reasonable), + (favorable) and ++ (very favorable), which were interpreted as a 5-point scale. This measure shows the extent to which participants take animal welfare (or health) aspects into account when making a lunch choice, thus implicitly measuring the weight participants put on these aspects.

2.2.3.2. Meat-related cognitive dissonance. Feelings of dissonance were measured with three items, based on Elliot and Devine (1994) and Rydell et al. (2008), with a 7-point Likert answering scale from 1 (totally not) to 7 (totally). The scale started with the question 'To which extent do you expect to experience the following emotions when you choose a lunch with meat in the [zoo/hospital]?' and the items were 'uncomfortable', 'uneasy' and 'bothered' ($M = 2.03$; $SD = 1.44$; α = 0.933).

2.2.3.3. Intention to eat a vegetarian lunch. Intention to eat a vegetarian lunch was measured with three items based on Onwezen et al. (2016) with a 7-point Likert answering scale from 1 (totally disagree) to 7 (totally agree). The scale started with the following text: 'The next question is about your choice of lunch in the restaurant of the [zoo, hospital]' and the items were 'I am planning to choose a vegetarian lunch', 'I'm considering to choose a vegetarian lunch' and 'I will absolutely choose a vegetarian lunch' ($M = 2.9$; $SD = 1.76$; α = 0.902).

[1] Chi Square analyses show that there are no significant differences between the conditions regarding gender ($p = .858$), education ($p = .744$) and region ($p = .509$). Moreover, an ANOVA shows that there are also no differences between the conditions regarding age ($p = .443$).

[2] In addition to the measurements described here, we also measured subjective ambivalence, self-efficacy to reduce meat consumption, meat perception, meat attachment and the short food motive scale. To keep our paper focused, we decided not to admit these measures to the main text. More information on these measures can be found in Appendix B.

Fig. 1. The images used in the zoo and hospital context manipulation
Note. The text was translated to English for this manuscript. The original materials were in Dutch.

2.2.3.4. Environmental self-identity. Environmental self-identity was measured with three items based on Van der Werff et al. (2013) with a 7-point Likert answering scale from 1 (totally disagree) to 7 (totally agree). The items were: 'Acting environmentally friendly is an important part of who I am', 'I am the type of person that acts environmentally friendly' and 'I see myself as a environmentally friendly person' (M = 4.41; SD = 1.28; α = 0.920).

2.2.3.5. Strategic ignorance and choice for a vegetarian meal. Strategic ignorance was measured based on Edenbrandt et al. (2021) with the following hypothetical situation: 'At the restaurant counter in [the zoo/the hospital] you see a discount menu as a lunch option with two different choices for a burger, a vegetarian cheeseburger or a beef cheeseburger.' Next, participants were asked the following question 'Would you like more information about these cheeseburgers (vegetarian or beef) from the discount menu?'. Participants could click to obtain more information on health, animal welfare and the producer for both burgers. Participants thus had six information options and they could also choose not to request more information.

Finally, the preference for a vegetarian lunch was measured with the following dichotomous question: 'Which discount menu will you choose as your main course?' with the following two answering categories: 'the discount menu with a beef cheeseburger' and 'the discount menu with a vegetarian cheeseburger'.

2.3. Results

2.3.1. Manipulation checks

First, we checked whether participants correctly recalled which value activation and context they received. Most participants correctly recalled whether they read about a zoo context (94.1%) or a hospital context (98.1%). Moreover, most participants also correctly remembered whether they answered a question about animal welfare (78.5%), health (84.9%) or answered no question (49.6%).[3] See Appendix C for more details. Because most participants had correct recalls, we did not see reason to exclude participants from further analyses.

Animal welfare values were not more salient among participants in the zoo context (M = 3.10, SD = 1.21, n = 123) compared to those in the hospital context (M = 3.18, SD = 1.24, n = 114, F (1,235) = 0.240, p = .625, η^2 = 0.001; adj. R^2 = −0.003). Health values were not more salient among participants in the hospital context (M = 3.33, SD = 1.15, n = 123) compared to those in the zoo context (M = 3.29, SD = 1.03, n = 129, F (1,250) = 0.080, p = .778, η^2 < 0.001; adj. R^2 = −0.004). This indicates that a matching context did not strengthen our value activation strategy and, therefore, we continued our analyses without context as an independent variable.

2.3.2. Mediation model

Consistent with prior literature, we found that most meat-eaters consider animal welfare to be important - 94.4% answers 'yes' to our value activation strategy. To analyze whether our animal welfare value activation strategy increased meat-related cognitive dissonance and, in turn, the intention to eat a vegetarian lunch, we tested for mediation (model 4; 5.000 bootstrapping samples with 95% CI; IBM SPSS PROCESS v3.4; Hayes, 2012; Hayes, 2018). Value activation was dummy coded into contrast X1 (animal welfare = 0, health = 1, none = 0) and contrast X2 (animal welfare = 1, health = 0, none = 0).

Participants who reflected on the importance of animal welfare expressed more meat-related dissonance (M = 2.26, SD = 1.48) than participants who reflected on the importance of health (M = 1.91, SD = 1.41) and participants in the control group (M = 1.94, SD = 1.42; $X1^{health\ vs.\ animal\ welfare\ \&\ control}$: $a1$ = −0.025, t (735) = −0.194, p = .846; $X2^{animal\ welfare\ vs.\ health\ \&\ control}$: $a2$ = 0.323, t (735) = 2.466, p = .014, see Fig. 2). Importantly, participants who experienced stronger meat-related dissonance, in turn, expressed a higher intention to eat a vegetarian lunch (b = 0.612, t (735) = 15.722, p < .001, see Fig. 3).

The test for the indirect effect shows that there is a significant indirect effect for $X2^{animal\ welfare\ vs.\ health\ \&\ control}$ (ab = 0.198, SE = 0.08, 95% CI [0.04, 0.37]), and not for $X1^{health\ vs.\ animal\ welfare\ \&\ control}$ (ab = −0.015, SE = 0.08, 95%CI [-0.17, 0.14]). The direct effect of our value activation strategy for animal welfare (X2) on the intention to eat a vegetarian lunch is not significant ($M\ (SD)^{\text{animal welfare}}$ = 3.11 (1.72); $M\ (SD)^{\text{health}}$ = 2.93 (1.73); $M\ (SD)^{\text{control}}$ = 2.67 (1.8); $c2'$ = 0.243, t (735) = 1.756, p = .08), while the total effect of the model with X2 is significant ($c2$ = 0.441, t (735) = 2.765, p = .006). The direct effect of the model with $X1^{health\ vs.\ animal\ welfare\ \&\ control}$ is significant ($c1'$ = 0.269, t (735) = 1.983, p = .048), however the total effect is insignificant ($c1$ = 0.254, t (735) = 1.618, p = .106). See Fig. 4 for an overview of the mediation model.

In other words, while reflecting on the importance of animal welfare increases dissonance, and in turn intentions to choose a vegetarian meal, the same does not hold for reflecting on the importance of health.

2.3.3. Moderated mediation model

Next, we used a moderated mediation model (model 14; 5.000 bootstrapping samples with 95% CI; IBM SPSS PROCESS v3.4; Hayes, 2012; Hayes, 2018) to explore whether our animal welfare value activation strategy would be even more potent for participants with a strong pro-environmental self-identity. We specifically wanted to look at the contrast between participants who received our animal welfare value activation strategy and those who did not, so we only included dummy X2 (animal welfare vs. health & control) as an independent variable in the model. The continuous variables 'cognitive dissonance' and 'environmental self-identity' were mean centered.

The findings show a significant moderated mediation model (F

[3] Those who received no question but erroneously recalled that they did, mostly recalled a question about animal welfare (vs. health) when they were in the zoo condition (35.8%) and mostly recalled a health question (vs. animal welfare) when they were in the hospital condition (36.6%).

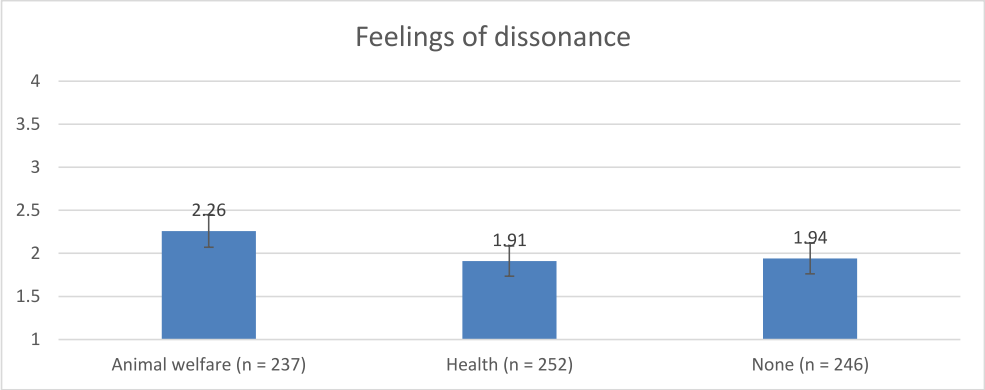

Fig. 2. Average Scores of Meat-related Cognitive Dissonance for the Three Value Activation Conditions
Note. A 7-point Likert answering scale from 1 (totally not) to 7 (totally) was used. The error bars depicted in the table are based on 95% confidence intervals.

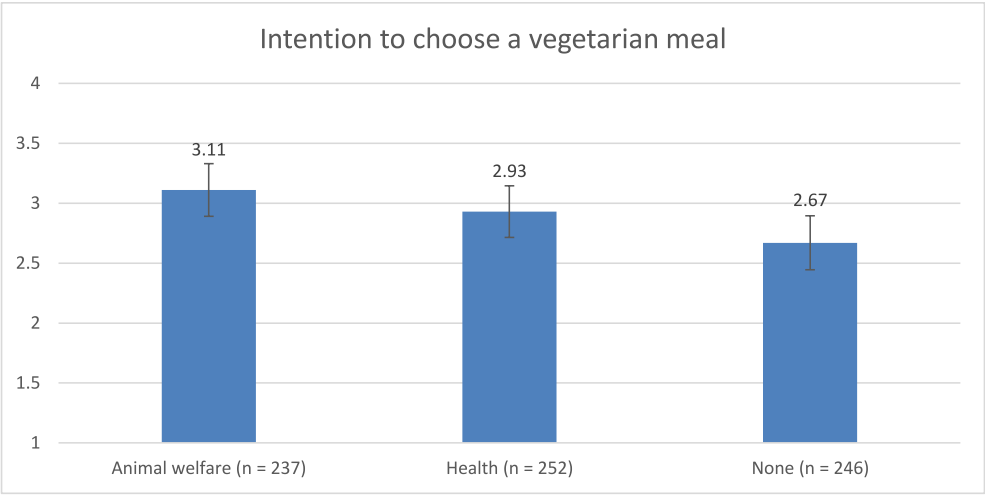

Fig. 3. Average Scores of the Intention to Choose a Vegetarian Meal for the Three Value Activation Conditions
Note. A 7-point Likert answering scale from 1 (totally disagree) to 7 (totally agree) was used. The error bars depicted in the table are based on 95% confidence intervals.

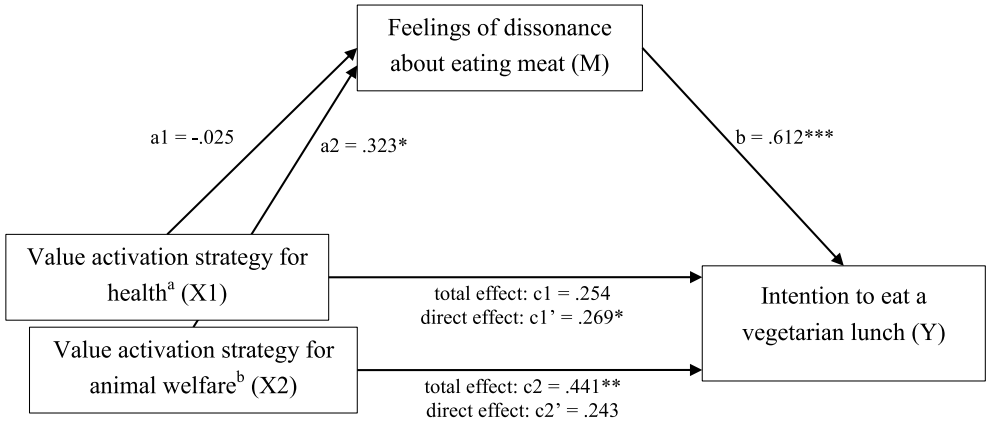

Fig. 4. Mediation Model of the Influence of our Value Activation Strategy on the Intention to eat a Vegetarian lunch through Dissonance About Eating Meat
[a]animal welfare = 0, health = 1, none = 0
[b]animal welfare = 1, health = 0, none = 0
* = $p < .05$. ** = $p < .01$. *** = $p < .001$.

[a]animal welfare = 0, health = 1, none = 0

[b]animal welfare = 1, health = 0, none = 0

* = $p < .05$. ** = $p < .01$. *** = $p < .001$.

(1,730) = 11.28, R^2 = 0.01, moderated mediation index = 0.033; 95%CI [0.007, 0.07]). Specifically, the indirect effect of our animal welfare value activation strategy via feelings of dissonance on the intention to eat a vegetarian lunch was stronger for those who have a high environmental self-identity (+1SD: *ab* = 0.63, *SE* = 0.04, 95%CI [0.54, 0.72]), relative to people with an average self-identity (mean: *ab* = 0.51, *SE* = 0.04, 95%CI [0.43, 0.59]) and people with a low self-identity (-1SD: *ab* = 0.38, *SE* = 0.06, 95%CI [0.25, 0.51]). See Fig. 5 for an overview of the moderated mediation model.

These results are consistent with the notion that dissonance is an even more potent motivator of vegetarian choices among people with a strong environmental identity.

2.3.4. Exploring strategic ignorance among meat-eaters

While triggering dissonance can fuel people to choose vegetarian meals, prior work suggests that dissonance can also fuel strategic ignorance. Our data confirm this pattern. Participants who indicated to eat meat (i.e. those who answered 'yes' to the question if they eat meat; *n* = 600) were less likely to voluntarily look up information about animal welfare (23.3%) than participants who indicated to eat meat occasionally (i.e. those who answered 'yes, sometimes' to the question if they eat meat; *n* = 135; 48.1%; χ^2 (1) = 33.74, *p* < .001, Cramer's *V* = 0.21). Furthermore, participants who did look up information on animal welfare were participants who experienced more dissonance over eating meat (*M* = 2.61; *SD* = 1.65) than participants who did not look up information on animal welfare (*M* = 1.81; *SD* = 1.29; *F* (1,733) = 48.59, *p* < .000, η^2 = 0.06). Finally, participants who did look up information about animal welfare chose the vegetarian burger more often (61.5%) than participants who did not want information about animal welfare (16.2%); (χ^2 (1) = 147.39, *p* < .001, Cramer's *V* = 0.45).

3. Discussion

The online study suggests that prompting people to reflect on the importance of animal welfare can, as proposed fuel the choice for a vegetarian meal via cognitive dissonance. This effect seems to occur independent of context, and was especially strong for those who have a strong environmental self-identity. Moreover, in line with previous work, we find that most meat-eaters care about animal welfare and precisely because they care, they tend to avoid information that makes such animal suffering salient – they engage in strategic ignorance. In sum, the data from study 1 suggests that meat-related dissonance can drive people to *both* engage in strategic ignorance but *also* to change their behavior.

In Study 2 we aim to investigate the external validity of our findings, by testing our value activation strategy on customers of a real-life restaurant: will it increase the percentage of vegetarian burgers ordered?

4. Study 2: A real-life study investigating the effect of our value activation strategy on choosing a vegetarian meal

4.1. Introduction

In Study 2 a field study was conducted in a restaurant of the Dutch zoo "Ouwehands Dierenpark". We aimed to investigate the external validity of our value activation strategy by replicating the findings of Study 1 in a real life setting. We developed 3 types of promotion materials (pop-up banners with matching posters), and examined whether 1) the mere presence of the promotion materials and 2) including our value activation in the promotion material would increase the proportion of vegetarian burgers ordered.

4.2. Method

4.2.1. Design and materials

In the field study, the pop-up banner was placed adjacent to the main cash register, while the matching posters were placed in two signings behind the counter, reaching the customers right before they placed their order at the counter (Fig. 6).

Fig. 6. Set-up of materials in the restaurant.

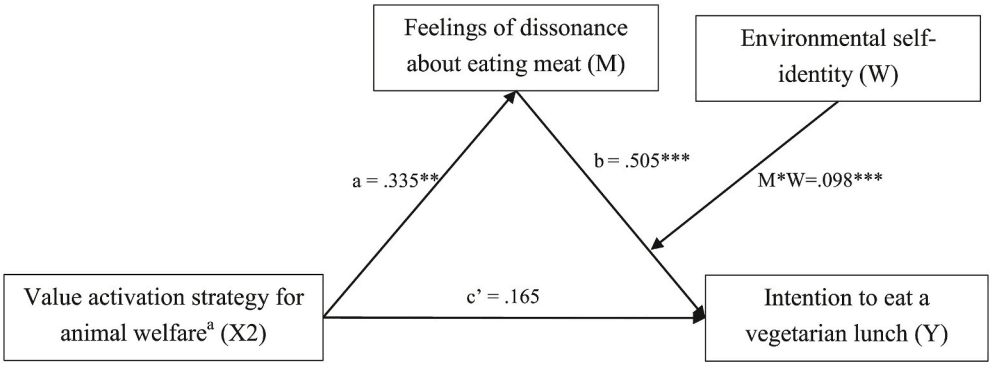

Fig. 5. Moderated mediation Model of the Influence of our Value Activation Strategy for Animal Welfare on the Intention to eat a Vegetarian lunch through Dissonance About Eating Meat with the Conditional effect of Environmental Self-identity.
[a]animal welfare = 1, health = 0, none = 0
* = *p* < .05. ** = *p* < .01. *** = *p* < .001.

[a]animal welfare = 1, health = 0, none = 0

* = *p* < .05. ** = *p* < .01. *** = *p* < .001.

We included four conditions. In the control condition, there were no promotional materials (banners nor posters promoting vegetarian burgers), and we just monitored the proportion of vegetarian burgers sold. The first experimental condition featured our value activation strategy (i.e. "Do you consider animal welfare to be important?"). To exclude that any effects are driven by the mere presence of the promotion material for vegetarian burgers, we included a second condition, in which customers were also reminded of the fact that vegetarian burgers were available, without prompting customers to reflect on whether they considered animal welfare to be important ("Convenient choice: the animal-friendly choice for the same (menu)price"). To complete the design, we included a condition in which a combination of our value activation strategy and the alternative message were communicated on the promotion material. The promotion material was developed in collaboration with the marketing department of the zoo and a graphic designer. See Fig. 7 for the promotion material that we used.

The posters were post-tested in an online study ($N = 2053$; $M^{age} = 51.8$; $SD^{age} = 17.1$; 48.8% female). Participants who saw the poster with the animal welfare value activation ($M = 2.84$, $SD = 1.59$, $n = 653$) or the combined poster ($M = 2.78$, $SD = 1.59$, $n = 737$) experienced more dissonance over eating meat than participants who saw the alternative promotion material ($M = 2.59$, $SD = 1.53$, $n = 663$; $F(2,2050) = 4.25$, $p = .014$, $\eta 2 = 0.004$). This shows that the promotion material triggers meat-related cognitive dissonance more when it includes our value activation strategy.

4.2.2. Participants and procedure

Potential participants were customers that entered the restaurant. The study was reviewed and approved by the Social Sciences Ethics Committee of Wageningen University & Research. To prevent demand effects, we did not administer a survey but only observed the customers' choices. We ran the experiment for a total of 29 days in the period September–October 2021. During this period, the type of promotional material was alternated by one of the researchers every 2–4 days, making sure that each type of the promotional material was present for a total of seven days including a long weekend (Friday-Sunday). Additionally, on eight days during the observation period there was no promotional material in the restaurant, which served as the control group. See Table 1 for an overview.

4.2.3. Measurements

We were interested whether the promotion material that included our value activation strategy would create a shift in the relative percentage of vegetarian burgers bought by customers. We therefore tested to what extent the proportion of vegetarian burgers relative to the total amount of burgers sold (meat-based + vegetarian) differed across the 4 conditions. The category of "vegetarian burgers" included a no-beef burger, a no-beef cheeseburger and a crispy no-chicken burger. The category of "meat-based burgers" included respectively a beef burger, a cheeseburger and a crispy chicken burger. A power analysis was performed using G*Power 3.1.9.7 (Faul et al., 2007), which indicated a minimum needed sample size of 1091. A total of 1883 burgers were sold in the zoo restaurant during the experimental period, indicating sufficient statistical power.

5. Results

The proportion of vegetarian burgers sold (relative to the total amount of burgers sold) significantly differed across 4 conditions: χ^2 (3) = 11.56, $p = .009$, Cramer's $V = 0.078$; (Fig. 8).

Z-tests to compare column proportions indicated that significantly more vegetarian burgers were sold (relative to the total amount of burgers sold) when our value activation strategy was included in the promotion material, either as stand-alone (9.9% of all burgers sold were

Fig. 7. Design of the promotion material for each experimental condition
Note. The experimental posters. The text on the promotion material was translated to English for this manuscript. The original materials were in Dutch.

Table 1
Overview of how the promotional material was alternated during the experiment.

	1. Promotion material with the animal welfare value activation	2. Alternative promotion material	3. Combined promotion material	4. The control period (no promotion material)
Day 1 (Sat) – 5 (Wed)				■
Day 6 (Thur) – 8 (Sat)	■			
Day 9 (Tues) – 11 (Thur)			■	
Day 12 (Fri) – 14 (Sun)		■		
Day 15 (Mon) – 16 (Tues)	■			
Day 17 (Wed) – 18 (Thur)		■		
Day 19 (Fri) – 21 (Sun)			■	
Day 22 (Mon) – 23 (Tues)		■		
Day 24 (Wed) – 25 (Thur)	■			
Day 26 (Fri) – 28 (Sun)				■
Day 29 (Mon)			■	

Note. On two days in the first week that the promotion material was placed, it was moved by employees. Therefore, day 8 is a Saturday and day 9 is a Tuesday.

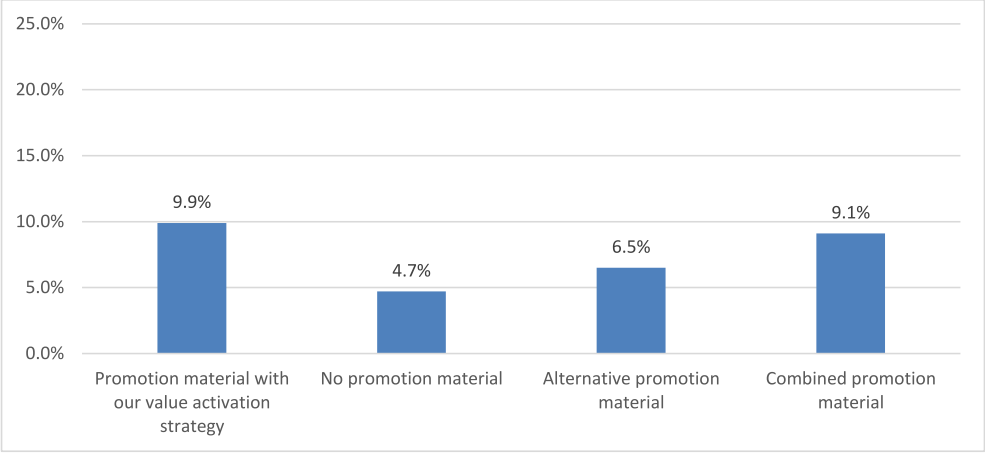

Fig. 8. Percentage of vegetarian burgers ordered per condition.

vegetarian) or combined with an alternative message (9.1%), compared to the control group in which no promotion materials were placed around the counter of the zoo restaurant (4.7%). There was no significant difference between the condition with alternative promotion material (6.5% of all burgers sold were vegetarian), relative to the control group (4.7%).

6. Discussion

The data from our field study suggest that our value activation strategy, which stimulates people to reflect on whether they consider animal welfare to be important, can also be effective in a real-life setting. The percentage of vegetarian burgers ordered (almost) doubles when promotion material is implemented with our value activation strategy then when no promotion material or alternative promotion material are implemented. Moreover, a post-test shows that the promotion material with our value activation strategy increased feelings of meat-related cognitive dissonance. This indicates that the effect of our value activation strategy on the amount of vegetarian burgers ordered, is likely a result of increased feelings of meat-related cognitive dissonance.

7. General discussion

Replicating prior work, we found that most meat-eating participants do consider animal welfare to be important. We add to prior research by unravelling that meat-related dissonance can drive people to change their behavior, instead of applying other adaptive strategies, such as strategic ignorance and rationalizing meat consumption. Specifically, our value activation strategy for animal welfare, which stimulates people to reflect on whether they consider animal welfare to be important, increased the amount of dissonance people experienced when thinking of consuming meat, which in turn increased the intention to order a vegetarian meal (Study 1) and (almost) doubled the percentage of vegetarian burgers ordered in the real-life study (Study 2). This finding adds to the existing literature on meat-related cognitive dissonance, that often portrays cognitive dissonance as something to avoid in animal advocacy (Brouwer et al., 2022; Bryant et al., 2022), by showing the positive potential of triggering and harnessing cognitive dissonance regarding meat reduction. We reveal that cognitive dissonance can translate into meat reduction, provided that people are no longer able to mentally decouple meat consumption from their moral self-image. Together, study 1 and study 2 show that our value activation has good internal and external validity, indicating that it is a promising strategy to trigger meat-related cognitive dissonance, and, in turn, also increase vegetarian choices.

In line with prior work, we also found that strategic ignorance allows people to experience less dissonance over eating meat, and that prompting people to reflect on the animal welfare implications of meat consumption triggers more dissonance than having them reflect on the health implications of meat consumption (May & Kumar, 2022; Reczek et al., 2018; Souza & O'Dwyer, 2022; Zane et al., 2016). Moreover, we found that our value activation strategy also had more impact among

people with a strong environmental self-identity. These additional insight presents new possibilities to increase meat-related cognitive dissonance and thus further reduce meat consumption.

7.1. Implications, limitations and future directions

Our value activation strategy may be suitable to be used by a range of different practitioners (e.g. restaurant owners or retail) who are interested in increasing their vegetarian meal options and by governments that are developing meat reduction campaigns. However, the effectiveness likely varies from context to context. In our online and restaurant setting, it was easy for people to channel any meat-related dissonance into a different choice – choosing a vegetarian burger instead of meat was both easy and costless. It is possible that our strategy is less effective when it is implemented in situations where it is more difficult (e.g. costly) to choose a vegetarian meal or when choosing a vegetarian dish is not an easy option. In the real world, plant-based options are increasingly available and accessible, making our value activation strategy an increasingly viable strategy. But in situations where this is not the case, our value activation strategy might be less effective. In such cases, eliciting dissonance could even backfire (Tertoolen et al., 1998). Future studies should investigate whether our value activation strategy is also effective when the target behavior is difficult to reach due to the radicality of the change or an unsupportive environment.

Another challenge that comes with our value activation strategy is the possibility that it contributes to polarization. Our results show that, even though the overall amount of participants who preferred a vegetarian meal increased because of our strategy, there were still many participants who did not prefer a vegetarian meal, despite of having been prompted to consider the importance of animal welfare. Previous work argues that moralizing meat consumption can potentially backfire, or at least decrease future chances of giving up meat among such people, especially when they are highly committed to meat consumption (Bastian, 2019; Leach et al., 2022). This raises the question how far our value activation strategy can go before it generated a net negative effect. On the other hand, it could be argued that those highly committed to meat consumption will, in time, also come to decrease their meat consumption due to the social pressure of those who do respond to dissonance by changing their behavior. Every time more people decide to reduce their meat consumption, the social norm eventually will shift in favor of those who do not eat meat, which can then influence those who still need to make a change. We thus welcome future research that examines the over-time, network effects of our value activation strategy.

8. Conclusion

Current levels of meat consumption pose a major problem for animal welfare, the environment and human health. People often have conflicting feelings and thoughts about the morality of meat consumption, but even so, meat consumption is not (yet) declining. Meat consumption has become something that is vested in our society and it seems like some people are willing to go to great lengths to be able to keep eating meat. Our study shows that simply asking people whether they consider animal welfare to be important can activate the nascent conflicted moral feelings that people already have, resulting in behavior change in terms of meat reduction and an increased consumption of vegetarian meal options. By stimulating people to reflect on whether they consider animal welfare to be important, policy makers may be able to remind people of values they already possess and thereby inspiring them to walk their talk.

CRediT authorship contribution statement

Emily P. Bouwman: Funding acquisition, Conceptualization, Methodology, Investigation, Formal Analysis, Visualization, Data curation, Project administration, Supervision, Writing - original draft, Writing - review & editing. Danny Taufik: Funding acquisition, Conceptualization, Methodology, Investigation, Formal Analysis, Visualization, Data curation, Project administration, Supervision, Writing - original draft, Writing - review & editing. Marleen C. Onwezen: Funding acquisition, Conceptualization, Methodology, Writing - review & editing. Jan Willem Bolderijk: Conceptualization, Methodology, Writing - review & editing.

Funding

This publication is part of the project “Better informed decision making in consumers’ food choice, breeders’ crop design and protein transition” (NWA.1418.20.009) which is financed by the Dutch Research Council (NWO). The funder had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, or in the decision to publish the results.

Declaration of competing interest

None.

Acknowledgement

The authors would especially like to thank José Kok, Jeroen Sark, Micha Huisman, Chantal Verburg and Mike Verhees who helped us with the implementation of the field study in the Dutch zoo “Ouwehands Dierenpark”.

Appendix A

Table A1
Demographics of the six conditions

		Context	
		Zoo	Hospital
Value	Animal welfare	n = 123; 46.7 (16.2) years; 52.8% female; 17.9% low, 44.7% medium, 37.4% high; 35% North/East, 37.4% West, 27.6% South.	n = 114; 49.5 (15.1) years; 54.4% female; 16.7% low, 39.5% medium, 43% high; 36.8% North/East, 43.9% West, 19.3% South.
	Health	n = 129; 49.4 (15.6) years; 53.5% female; 21.7% low, 38% medium, 40.3% high; 31.8% North/East, 37.2% West, 28.7% South.	n = 123; 47.9 (16.3) years; 52% female; 17.9% low, 46.3% medium, 35% high; 31.7% North/East, 44.7% West, 23.6% South.
	None	n = 123; 48.3 (16.7) years; 51.2% female; 23.6% low, 41.5% medium, 33.3% high; 37.4% North/East, 41.5% West, 20.3% South.	n = 123; 50.7 (15.8) years; 56.1% female; 22% low, 43.1% medium, 35% high; 31.7% North/East, 43.9% West, 22.8% South.

Appendix B

Additional measures Study 1

Subjective ambivalence ($M = 2.1$; $SD = 1.42$; $\alpha = 0.971$) was measured with three items based on Berndsen and Van der Pligt (2004) on a 7-point semantic differential scale (absolutely does not give me conflicting feelings – gives me a lot of conflicting feelings; absolutely does not give me an uncomfortable feeling – gives me a very uncomfortable feeling; does not give me mixed feelings – gives me strong mixed feelings).

Self-efficacy to reduce meat consumption ($M = 3.34$; $SD = 1.65$; $\alpha = 0.866$) was measured with four items based on Hunter and Röös (2016) with a 7-point Likert answering scale from 1 (totally disagree) to 7 (totally agree). The scale started with the following text: 'When I consider my lifestyle and habits, I feel capable to:' and the items were 'cut my meals with meat in half', 'cut my portions of meat in half', 'stop eating meat completely' and 'eat twice as much vegetarian dishes as I did today'.

Meat perception was measured with the two items 'bad for animal welfare' ($M = 4.02$; $SD = 1.77$) and 'bad for my health' ($M = 2.94$; $SD = 1.51$), which followed the question: 'eating meat is … ', with a 7-point Likert answering scale from 1 (totally disagree) to 7 (totally agree).

Meat attachment was measured with 16 items, of which 5 were reversed, based on Graça et al. (2015) with a 7-point Likert answering scale from 1 (totally disagree) to 7 (totally agree). The scale measures four types of meat attachment, namely hedonic ($M = 4.85$; $SD = 1.4$; $\alpha = 0.849$; e.g. I love meals with meat), affinity ($M = 5.68$; $SD = 1.27$; $\alpha = 0.846$; e.g. I feel bad when I think about eating meat), entitlement ($M = 4.54$; $SD = 1.48$; $\alpha = 0.803$; e.g. eating meat is natural and self-evident) and dependence ($M = 4.01$; $SD = 1.43$; $\alpha = 0.810$; e.g. meat is irreplaceable in my diet).

The short food motives scale was measured with six items based on Onwezen et al. (2019) with a 7-point Likert answering scale from 1 (Not important at all) to 7 (Very important). The scale started with the following question: 'When I buy food products, I find the following characteristics important:' with the following answering options: 'health' ($M = 5.38$; $SD = 1.18$), 'animal welfare' ($M = 4.78$; $SD = 1.45$), 'price' ($M = 5.27$; $SD = 1.34$), 'environment' ($M = 4.6$; $SD = 1.48$), 'fair production' ($M = 4.99$; $SD = 1.35$) and 'familiarity' ($M = 4.61$; $SD = 1.41$).

Appendix C

Table C1
Answers to the manipulation checks in percentages

	Context		Value		
	Which situation did you have to take in mind?		Where did you receive a question about?		
	Zoo	Hospital	Animal welfare	Health	No question
Zoo & animal welfare	95.1%	4.9%	74.8%	5.7%	19.5%
Zoo & health	93.8%	6.2%	14%	73.6%	12.4%
Zoo & no question	93.5%	6.5%	35.8%	16.3%	48%
Hospital & animal welfare	2.6%	97.4%	82.5%	10.5%	7%
Hospital & health	0.8%	99.2%	1.6%	96.7%	1.6%
Hospital & no question	2.4%	97.6%	12.2%	36.6%	51.2%

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