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Similarities and differences between vegetarians and vegans in motives for meat-free and plant-based diets

Kristof Dhont [a,*], Maria Ioannidou [b]

[a] School of Psychology, University of Kent, UK
[b] Department of Psychology, University of Bradford, UK

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ABSTRACT

Plant-based diets are quickly gaining popularity for their benefits to animal welfare, the environment, and public health. Compared to meat-eaters, meat-abstainers such as vegetarians and vegans are especially motivated by animal rights and the environment. However, little is known about the motivational and psychological factors that distinguish vegetarians from vegans, and what prevents vegetarians to shift towards a fully plant-based diet. In a sample of vegans (n = 335) and vegetarians (n = 182), we investigated a) motives for reducing or quitting meat consumption and b) motives for reducing or quitting animal product (dairy and egg products) consumption, as well as moral psychological and social-contextual factors that may explain potential differences. Results demonstrate that vegetarians and vegans tend to be similar in their motives to abstain from meat consumption and are most strongly motivated by animal rights. However, vegetarians are less motivated by health, environmental, and especially animal rights for dairy/egg reduction compared to meat reduction and compared to vegans. Lower moral concern for animals, stronger beliefs in human supremacy over animals, and heightened veganism threat among vegetarians (vs. vegans) partly explained why vegetarians were less strongly motivated by animal rights for dairy/egg reduction. Human supremacy beliefs also explained differences between vegetarians and vegans in health and environmental motives for dairy/egg reduction. Furthermore, vegetarians reported significantly less social support for plant-based diets and perceived more practical barriers to plant-based diets than vegans. These findings reveal meaningful differences in the motivational and psychological profiles of vegetarians and vegans and highlight the value of distinguishing between motives for meat-free diets and motives for plant-based diets.

1. Introduction

Over the past several years, the range of plant-based food alternatives for animal-source food products has expanded steadily and plant-based food alternatives have become more readily available (Aschemann-Witzel et al., 2021; Wunsch, 2023). These trends correspond to the increased media and consumer interest in meat-free and plant-based diets (e.g., Corrin & Papadopoulos, 2017; de Boer & Aiking, 2022; Jallinoja et al., 2020; Ruby, 2012). The benefits of shifting towards plant-based diets have been well-documented, as they help in addressing ethical concerns about animal suffering and rights (Dhont & Hodson, 2020; Loughnan & Davies, 2020; Nibert, 2002; Singer, 2020; Vergunst & Savulescu, 2017), the damaging impact of animal agriculture on the environment and climate change (e.g., biodiversity loss, water and air pollution, greenhouse gas emissions) (e.g., Krattenmacher et al., 2023; Scarborough et al., 2023; Springmann et al., 2018; Willett et al., 2019), and health risks associated with meat and animal product consumption and production (e.g., colorectal cancer, cardiovascular disease, infectious diseases) (Bouvard et al., 2015; Godfray et al., 2018; Hayek, 2022; Jones et al., 2013).

These three concerns also represent the main motives for people to eat less or no meat and more plant-based products (Fox & Ward, 2008; Hopwood et al., 2020, 2021a; Janssen et al., 2016; North et al., 2021; Rosenfeld & Burrow, 2017). However, research to date has predominantly focused on the motives for reducing or stopping *meat* consumption and have compared meat-eaters with vegetarians or meat-abstainers. In this approach, the group of meat-abstainers often includes both those who exclude meat and fish from their diet but continue to consume animal-sourced products such as dairy and egg products (vegetarians) and those who exclude all animal and

* Corresponding author.
E-mail address: K.Dhont@Kent.ac.uk (K. Dhont).

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animal-sourced products (vegans), who do not only exclude meat and fish but also products such as dairy and eggs from their diet. Few studies considered the psychological factors underpinning the consumption of animal-sourced foods other than meat (e.g., dairy and egg products) and the motives for choosing a fully plant-based diet (but see Ioannidou et al., 2023a; Ioannidou et al., 2023b; Rosenfeld, 2019b). Therefore, little is known about the possible differences in dietary motives between vegetarians and vegans and about the moral psychological and social-contextual factors that may explain potential differences.

Investigating the motivational similarities and differences between vegetarians and vegans is important as it can provide a more comprehensive understanding of dietary behaviors and novel insights into the factors that prevent vegetarians from adopting a fully plant-based diet. Ethical concerns about animal and environmental exploitation are not limited to the consumption and production of meat but also apply to the consumption and production of other animal products including dairy and egg products (Deckers, 2016; Horta, 2022; Kolbe, 2018; Nibert, 2002; Singer, 2020). The environmental footprint (e.g., greenhouse gas emissions, land and water use) of animal-sourced foods including dairy and egg products and of vegetarian diets tend to be considerably higher compared to plant-based foods and diets (Poore & Nemecek, 2018; Ritchie, 2020; Scarborough et al., 2023). Moreover, several researchers have argued that industrial dairy and egg production tend to be associated with considerably more animal suffering than meat production (Kolbe, 2018; Mandel et al., 2022; Vecerek et al., 2019; Večerková et al., 2019). Therefore, a greater understanding of the motivational similarities and differences between vegetarians and vegans could have practical implications for policy makers and advocacy.

1.1. Dietary motivations of vegetarians and vegans

While there is an extensive body of research on the factors that facilitate meat consumption (e.g., Bastian & Loughnan, 2017; Hopwood, Piazza, et al., 2021; Loughnan et al., 2014; Piazza et al., 2015; Rothgerber, 2020; Trethewey & Jackson, 2019), there is also increased research interest in people's motivations to eat less or no meat and to adopt a plant-based diet (e.g., Fox & Ward, 2008; Janssen et al., 2016; North et al., 2021; Rosenfeld & Burrow, 2017; Rothgerber, 2014). In one of the most systematic and comprehensive efforts to date, Hopwood et al. (2020; Hopwood, Rosenfeld, et al., 2021) developed and validated the Vegetarian Eating Motives Inventory to measure health, environment, and animal rights motives for reducing meat and animal product consumption in large samples of meat-eaters and vegetarians. The results consistently showed that meat-eaters tend to be more motivated by health compared to the environment and animal rights as reasons to eat less meat or animal products. In contrast, vegetarians tend to be more strongly motivated by the environment and animal rights compared to health and find these two motives more important than meat-eaters (Hopwood, Rosenfeld, et al., 2021). These findings are consistent with other studies indicating that, although both vegetarians and vegans value potential health benefits of their diet, the majority cite ethical concerns, and especially animal rights, as the most important motive for their diet (Janssen et al., 2016; North et al., 2021; Rosenfeld, 2018). Such findings suggest that vegetarians and vegans tend to overlap substantially in their dietary motives. Both groups are committed to the ethical principles underpinning their diet and thus oppose harm inflicted to animals and value environmental protection.

However, if vegetarians and vegans share the same concerns about animal rights and the environment, why are not more vegetarians turning vegan? Even though concerns about animal and environmental exploitation also apply to other animal products such as dairy and egg products (Deckers, 2016; Horta, 2022; Kolbe, 2018; Nibert, 2002), dairy and egg consumers may not immediately link dairy and egg consumption to the killing of animals and believe that there is less animal suffering in the dairy and egg industry than in the meat industry (Ioannidou et al., 2023b; Kolbe, 2018). This could mean that vegetarians consider their dietary motives and values as more important for meat reduction as compared to dairy and egg reduction. Vegans, on the other hand, seem to apply ethical motives and values more consistently across consumption domains and thus to all animal-sourced foods (and to other consumption or lifestyle domains such as clothing). Therefore, while vegetarians and vegans likely show considerable similarities in motives to reduce or quit meat consumption, they may show meaningful differences in motives to reduce or quit dairy and egg product consumption.

Potential differences between vegetarians and vegans may have gone unnoticed in previous research because of the dominant focus on people's perceptions of meat consumption and vegetarian motives (meat reduction motives), whereas studies on motives to reduce or quit dairy and egg consumption are still lacking. Furthermore, only few psychological studies have compared relatively large samples of vegetarians and vegans as distinct dietary groups, using samples well-exceeding 100 respondents per group (e.g., Ioannidou et al., 2023a; Ioannidou et al., 2023b; Kirsten et al., 2020). These studies have shown for instance, that compared to vegans, vegetarians tend to identify less strongly with their dietary group (e.g., Kirsten et al., 2020), feel less morally obligated to follow their diet (e.g., Kirsten et al., 2020), feel less guilt and disgust when thinking about dairy or egg consumption (Ioannidou et al., 2023a), and are more likely to deny the suffering of animals in the egg and dairy industry (Ioannidou 2023a; 2023b). However, little is known about the psychological motives that distinguish vegetarians from vegans. The first goal of the current study was to investigate the similarities and differences between vegetarians and vegans in health, environmental, and animal rights motives for reducing or quitting meat consumption (meat reduction/vegetarian motives) and for reducing or quitting dairy/egg consumption (animal product reduction/vegan motives).

1.2. Moral and social psychological differences between vegetarians and vegans

The second goal was to compare moral and social psychological factors associated with dietary motives between vegetarians and vegans, and whether these factors explain potential differences in dietary motives between the two groups. Given the key role of ethical values in vegetarians' and vegans' dietary motives, we were particularly interested in moral views of animals and general beliefs about human-animal relations. The few studies that have investigated dietary group differences in attitudes and values indicated that, compared to meat-eaters, vegetarians and vegans hold more positive attitudes towards animals, show greater concern for animals, and recognize greater similarities between humans and non-human animals in terms of their emotional experiences and mental capacities (Bilewicz et al., 2011; Ioannidou et al., 2023a; Rothgerber, 2014, 2015; Trethewey & Jackson, 2019). However, these pro-animal views and values tend to be stronger among vegans compared to vegetarians (Ioannidou et al., 2023a; Lund et al., 2016; Rothgerber, 2017; Trethewey & Jackson, 2019). Vegans also tend to show stronger opposition to beliefs in human superiority over animals and the exploitation of animals for human benefit (e.g., consumption, entertainment, cosmetic tests) compared to vegetarians (Ioannidou et al., 2023a; Rosenfeld, 2019a; Rothgerber, 2015). Given that moral concern for animals and human supremacy beliefs are associated with

dietary motives and preferences, they likely play a key role in explaining potential differences in dietary motives between vegetarians and vegans.

Besides moral concern for animals and human supremacy beliefs, we also considered another social psychological factor that may be associated with motivations to reduce or quit meat and dairy/egg consumption. Specifically, meat and animal product consumption are part of normative practices, entrenched in valued cultural traditions, and the dominant belief system prescribing that it is acceptable to use and kill animals for human consumption (Dhont et al., 2016; Dhont & Hodson, 2014; Monteiro et al., 2017). By deviating from the status quo and advocating for alternative values and beliefs, both vegetarians and vegans challenge the central role of meat in society, inducing a sense of threat from vegetarianism among meat-eaters (Dhont & Hodson, 2014; Dhont & Stoeber, 2021; MacInnis & Hodson, 2017; Stanley, 2022). However, some vegetarians may strongly value cultural practices and traditions surrounding dairy and egg dishes (e.g., scrambled eggs, cheese; Docherty & Jasper, 2023) and therefore, perceive veganism as a threat to dietary norms and customs. Based on this reasoning, we tested whether higher levels of perceived veganism threat among vegetarians (vs vegans) would be associated with weaker motives to reduce or quit dairy/egg consumption, especially when considering animal rights motives.

1.3. Social-contextual differences between vegetarians and vegans

Vegetarians may not only differ from vegans in moral and social psychological factors but may also differ in their perceptions and experiences of social and contextual factors that could pose a barrier to adopting a vegan diet. Findings from qualitative studies suggest vegetarians and vegans often mention the importance of being supported by their social environment for maintaining and adhering to their diet (Docherty & Jasper, 2023; North et al., 2021; see also Arévalo & Anderson, 2023). While vegetarians may experience social rejection because of their diet, vegetarianism is more widely accepted than veganism (Bryant, 2019; MacInnis & Hodson, 2017) and anti-vegan prejudice appears to be strong and common (De Groeve et al., 2021; Gregson et al., 2024; Leach & Dhont, 2023), and thus social support for plant-based diets might be lower than for vegetarian diets. At the same time, compared to vegans, vegetarians may perceive a greater number of practical barriers to a vegan diet such as higher costs, the inconvenience of preparing vegan meals or limited availability of vegan food when eating out (Docherty & Jasper, 2023). A lack of social support and more practical barriers such as cost and inconvenience are also often cited by former vegetarians and vegans as key issues for maintaining their diet (Arévalo & Anderson, 2023). Such negative perceptions and experiences are likely demotivating and might decrease the perceived importance of dietary motives (health, environment, and animal rights). For this reason, the third goal of the study was to investigate whether vegetarians and vegans differed in their perceptions of social support for plant-based diets and practical barriers to plant-based diets.

1.4. The present research

The first goal of this study was to investigate the dietary motives (health, environment, and animal rights) for reducing or quitting a) meat consumption and b) dairy/egg consumption among vegetarians and vegans. The second goal was to test for differences between vegetarians and vegans in moral and social psychological factors that are associated with dietary motives and preferences. Specifically, we focused on moral concern for animals, human supremacy beliefs, perceived veganism threat, and investigated whether these factors can explain differences in meat reduction and dairy/egg reduction motives between vegetarians and vegans. The third goal was to explore differences between vegetarians and vegans in two important social-contextual factors—perceived social support for plant-based diets and barriers to plant-based diets.

We expected that vegetarians and vegans would be motivated the most by animal rights and the least by health motives for both meat reduction and dairy/egg reduction. However, we expected that, among vegetarians, dairy/egg reduction motives would be weaker compared to meat reduction motives (Hypothesis 1a). Furthermore, whereas we did not expect that vegetarians and vegans would show substantial differences in meat reduction motives, we expected group differences in dairy/egg reduction motives, and particularly in ethical motives to reduce dairy/egg consumption, such that dairy/egg reduction motives would be stronger among vegans than among vegetarians (Hypothesis 1b).

Furthermore, we expected that vegetarians would express lower levels of moral concern for animals, higher levels human supremacy beliefs and higher levels of veganism threat compared to vegans (Hypothesis 2a), and that these factors would partly explain (statistically mediate) differences between vegetarians and vegans in their dairy/egg reduction motives, particularly when considering animal rights motives (Hypothesis 2b).

Finally, we also expected that vegetarians would perceive less social support for plant-based diets and perceive more practical barriers to plant-based diets compared to vegans (Hypothesis 3). Given the importance of social support and practical barriers (two social-contextual variables) for dietary choices, we took these variables into account when testing the role of the moral and social psychological variables (moral concern for animals, human supremacy beliefs, and veganism threat) in explaining (statistically mediating) motivational differences between vegetarians and vegans.[1]

2. Method

2.1. Participants and Procedure

The study was advertised through several social media platforms (e.g., Facebook, Twitter), using English-speaking social media groups and networks with predominantly users from North America and Western Europe (e.g., British Facebook groups). We asked for volunteers to complete an online survey on dietary motivations and social attitudes of vegetarians and vegans. Only vegetarians and vegans who were aged 18 years or older and had no diagnosis of an eating disorder were asked to participate.

Six hundred seventy respondents completed the full survey. To ensure we only included vegetarians (i.e., no meat or fish consumption) and vegans (i.e., no animal product consumption) in the analyses, self-identified vegetarians who indicated they had eaten meat or fish products in the past three months (n = 27) and self-identified vegans who indicated they had eaten meat, fish, dairy, or egg products in the past three months (n = 79) were excluded from the analyses.[2] Participants who did not self-identify as vegetarian or vegan were also excluded (n = 47). The final sample (N = 517; 339 women, 151 men, 16 non-binary/agender/gender fluid, 10 prefer to self-describe or not to say) included 182 vegetarians and 335 vegans, aged 18–75 years (Mage = 36.21 years, SDage = 11.85 years).

The demographic characteristics of the subsamples of vegetarians and vegans were similar in terms of age (vegetarians: M_{age} = 34.82, SDage = 10.73; vegans: M_{age} = 36.96, SDage = 12.37) and representation from different gender groups (vegetarians: 65% women, 30% men, 3% non-binary/agender/gender fluid, 2% prefer not to say or self-describe; vegans: 66% women, 29% men, 3% non-binary/agender/

[1] While hypotheses were specified prior to data collection, they were not pre-registered on the OSF.

[2] Animal product consumption was assessed with a food frequency scale, asking participants to indicate how often they ate a range of products (e.g., beef, pork, fish, dairy, eggs) in the past three months.

gender fluid, 2% prefer not to say or self-describe). The number of men and women did not significantly differ between vegetarians and vegans, X^2 (1, 490) = 0.08, p = .778, and the groups did not significantly differ in terms of age, t(515) = 1.97, p = .050.

Sensitivity analyses with G*Power (Faul et al., 2009) indicated that the sample size allowed us to detect small effect sizes with α = 0.05 and power = .80 ($f \geq 0.08$ for Hypothesis 1a; $f^2 \geq 0.02$ for Hypotheses 1b, 2a and 3). The achieved power was >.99 for the hypothesised effects.[3] The sample size also exceeded recommended sample sizes to detect mediation effects (Hypothesis 2b) using bootstrap analyses assuming small effect sizes for the a-paths and b-paths ($\beta s \geq .14$) (Fritz & MacKinnon, 2007). Similarly, a sensitivity analysis for the regression models including all predictors, indicated that the sample size allowed us to detect small effect sizes with α = 0.05 and power = .80 ($f^2 \geq 0.02$).

After providing informed consent, participants were asked to complete a survey including the measures listed below. At the end of the survey, they were asked to self-identify their dietary group (omnivore: I eat meat and other animal products, like dairy and/or eggs; flexitarian: primarily vegetarian but sometimes I eat meat of fish; pescatarian: I eat fish and/or seafood, as well as dairy products and eggs, but no other meat; vegetarian: I eat dairy products and/or eggs, but no meat or fish; vegan: I eat no animal products, including dairy, eggs, honey, gelatin, etc.; other) and to provide demographic information. The study was approved by the ethics research board at the first author's institution.

2.2. Measures

All study materials and the data file used for the study are available via the Open Science Framework: https://osf.io/rcfhj/. Means, standard deviations and zero-order correlations of all variables are reported in Table 1.

2.2.1. Motives for meat-free diets (Vegetarian motives) and dairy/egg-free diets (vegan motives)

Participants completed adapted versions of the Vegetarian Motives Inventory (Hopwood et al., 2020). Nine items measured health (3 items, e.g., "Meat-free diets are better for my health"), environmental (3 items, e.g., "Meat-free diets are more sustainable"), and animal rights (3 items, e.g., "It does not seem right to exploit animals for meat") motives for not eating meat. Parallel to the vegetarian motives, eleven items assessed health (3 items, e.g., "Plant-based diets are better for my health"), environmental (3 items, e.g., "Plant-based diets are more sustainable") and animal rights (5 items, e.g., "It does not seem right to exploit animals for dairy products") motives for dairy/egg reduction and plant-based diets.

All items were completed on 7-point scales (1 = *not important*; 7 = *very important*) and averaged into single scores for each type of motive (health, environment, animal rights) and separately for meat reduction and dairy/egg reduction motives (all αs > 0.90). Higher scores indicated stronger motivation.

2.2.2. Human supremacy beliefs

Participants completed the 6-item Human Supremacy Beliefs Scale (Dhont & Hodson, 2014), on 7-point scales (1 = *strongly disagree*; 7 = *strongly agree*) e.g., *"The life of an animal is just not of equal value as the life of a human being"*. Scores on reverse-keyed items were recoded, and item scores were averaged with higher scores indicating higher human supremacy beliefs (α = 0.79).

2.2.3. Moral concern for animals

To assess moral concern for different types of animals, participants were presented with a list of nineteen animals (e.g., pig, sheep, horse, cat, bear) and asked to indicate to what extent (1 = *not at all* to 7 = *to a very great extent*) they feel morally obligated to show concern for these animals (Krings et al., 2021; Leite et al., 2019). Higher scores indicated greater moral concern (α = 0.98).

2.2.4. Veganism threat

The eight-item Vegetarianism Threat Scale (Dhont & Hodson, 2014) was adapted to assess threat from veganism (1 = *strongly disagree*; 7 = *strongly agree*): "Eating dairy or egg products is part of our cultural habits and identity and some people should be more respectful to that" and "The rise of veganism poses a threat to our country's cultural customs". After averaging, higher scores indicated heightened veganism threat (α = 0.84).

2.2.5. Social support for plant-based diets

We measured social support for plant-based diets with two items (based on Asher et al., 2014): "I think that the important people in my life are supportive of a vegan diet" and "I know several vegans in my wider circle of friends and extended findings". Items were completed on 7-point scales (1 = *strongly disagree*; 7 = *strongly agree*), and averaged into a single score, with higher scores indicating more social support (α = 0.64).

2.2.6. Barriers to plant-based diets

To assess perceived barriers to plant-based diets, we used four items tapping into the perceived inconvenience and costs of a plant-based diet (Asher et al., 2014): "I find it complicated to prepare vegan meals", "I have trouble finding restaurants where vegan food is being served or finding vegan food I could grab on the go", "I find it time consuming to prepare vegan meals", and "The cost of following a vegan diet is too high compared to the cost of following a vegetarian diet". Items were completed on 7-point scales (1 = *strongly disagree*; 7 = *strongly agree*), and averaged into a single score, with higher scores indicating heightened perceived barriers (α = 0.71).

3. Results

3.1. Differences between vegetarians and vegans in dietary motives

First, we tested for dietary group differences in (a) meat reduction motives and (b) dairy/egg reduction motives. We conducted a mixed multivariate analysis of variance (MANOVA) with dietary group (vegetarians vs vegans) as between-subject factor, and with motive type (health, environment, and animal rights) and animal product type (meat and dairy/egg) as within-subject factors. We followed up with pairwise comparisons and applied Bonferroni corrections to account for multiple comparisons, reporting Bonferroni-adjusted p-values.

We found significant multivariate main effects of dietary group, F(1, 515) = 25.81, p < .001, η_p^2 = 0.05), motive type, F(2, 514) = 248.50, p < .001, η_p^2 = 0.49, and animal product type, F(1, 515) = 95.66, p < .001, η_p^2 = 0.16, significant multivariate interactions between dietary group and motive type, F(2, 514) = 11.40, p < .001, η_p^2 = 0.04, between dietary group and product type, F(1, 515) = 108.75, p < .001, η_p^2 = 0.17, and between motive type and product type, F(2, 514) = 29.49, p < .001, η_p^2 = 0.10, as well as a significant three-way interaction between dietary group, motive type, and product type, F(2, 514) = 12.98, p < .001, η_p^2 = 0.05. These findings indicate that dietary groups differed in their meat and dairy/egg reduction motives, yet this dietary group difference depended on motive type and type of animal product (see Fig. 1).

3.1.1. Differences between meat reduction and dairy/egg reduction motives among vegetarians and vegans (Hypothesis 1a)

To interpret and decompose the three-way interaction effect, and to

[3] For the MANOVA testing the interaction effect of dietary group (between-subjects), motive type (within-subjects) and animal product type (within-subjects) on dietary motives, the achieved power was >.99 for all multivariate main and interaction effects.

Table 1
Descriptive Statistics and correlations between variables.

	M	*SD*	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Moral Concern for Animals	6.29	1.08	–									
2. Human Supremacy Beliefs	2.00	1.09	−.54***	–								
3. Veganism Threat	1.55	0.82	−.31***	.36***	–							
4. Social Support for Plant-based Diets	4.59	1.75	.07	−.05	−.15***	–						
5. Barriers to Plant-based Diets	3.00	1.33	−.24***	.24***	.35***	−.27***	–					
6. Meat Reduction: Health	4.56	1.75	.06	−.10*	.17***	.04	−.02	–				
7. Meat Reduction: Environment	5.78	1.31	.10*	−.12**	−.08	.10*	−.06	.44***	–			
8. Meat Reduction: Animal Rights	6.63	0.89	.48***	−.42***	−.36***	.12**	−.17***	.15***	.29***	–		
9. Dairy/Egg Reduction: Health	4.51	1.79	.13**	−.19***	.06	.05	−.09*	.90***	.41***	.21***	–	
10. Dairy/Egg Reduction: Environment	5.60	1.44	.22***	−.24***	−.20***	.15***	−.14**	.41***	.82***	.37***	.51***	–
11. Dairy/Egg Reduction: Animal Rights	6.33	1.24	.48***	−.42***	−.40***	.16***	−.29***	.08	.24***	.79***	.23***	.46***

Note. *$p < .05$, **$p < .01$, ***$p < .001$.

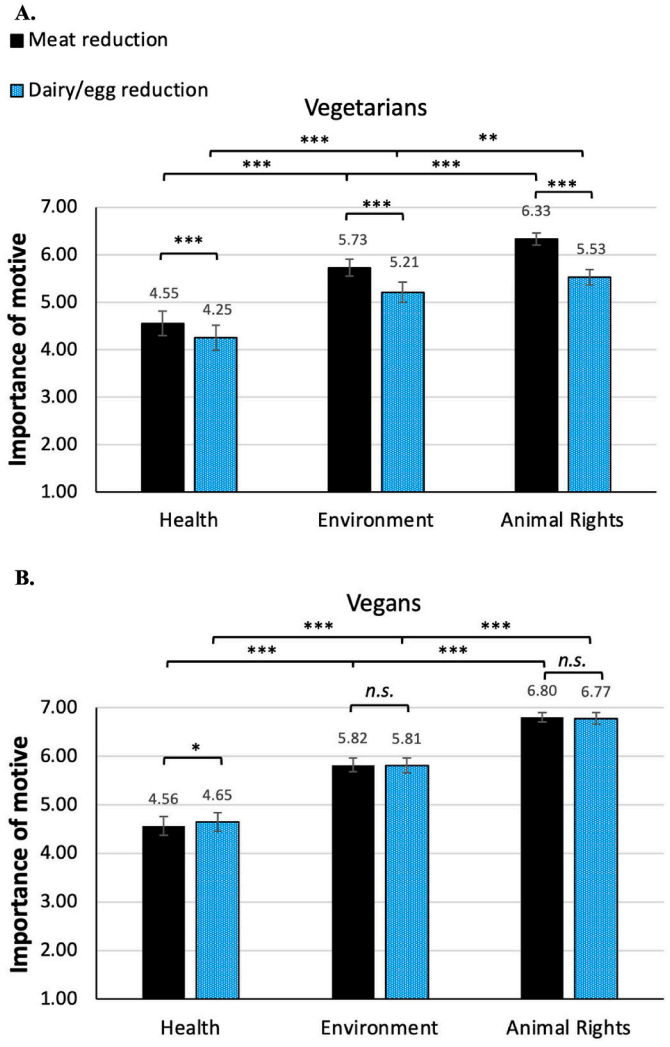

Fig. 1. Dietary motives for meat and dairy/egg reduction by dietary group.
Note. ***$p < .001$; **$p < .01$; *$p < .05$. Error bars represent ± 2 SE.

test Hypotheses 1a stating that vegetarians would show a weaker motivation for dairy/egg reduction compared to meat reduction, we investigated the effects of motive type and product type within each dietary group. Hence, we conducted a MANOVA in the sample of vegetarians to investigate reduction motives as the dependent variable, with motive type (health, environment, and animal rights) and animal product type (meat and dairy/egg) as within-subject factors. Among vegetarians, the main effects of both motive type, $F(2, 180) = 59.34$, $p < .001$, $\eta_p^2 = 0.40$, and food type, $F(1, 180) = 65.65$, $p < .001$, $\eta_p^2 = 0.27$, were significant as well as the interaction between motive type and food type, $F(2, 180) = 16.06$, $p < .001$, $\eta_p^2 = 0.15$. Specifically (Fig. 1A), vegetarians found animal rights more important for both meat reduction and dairy/egg reduction as compared to environment and health motives (all *ps* < .001, except for $p = .005$ for the comparison between environment and animal rights motives for dairy/egg reduction). Environmental motives were considered more important than health motives (*ps* < .001). Critically, supporting Hypothesis 1a, vegetarians considered the three motive types (health, environment, animal rights) less important for dairy/egg reduction compared to meat reduction (*ps* < .001). However, the difference between dairy/egg vs meat reduction motives was more strongly pronounced for animal rights motives as compared to environment and health motives, as indicated by significant interactions, $F(1, 181) = 10.92$, $p = .001$, $\eta_p^2 = 0.06$ and $F(1, 181) = 32.17$, $p < .001$, $\eta_p^2 = 0.15$, respectively.

As per comparison, we conducted the same analysis with the sample of vegans, the main effect of motive type was significant $F(2, 333) = 258.92$, $p < .001$, $\eta_p^2 = 0.61$, but not of animal product type, $F(1, 334) = 1.24$, $p = .267$. The interaction between motive type and animal product type was also significant, $F(2, 333) = 6.21$, $p = .002$, $\eta_p^2 = 0.04$. Like vegetarians, vegans (Fig. 1B) found animal rights more important for both meat reduction and dairy/egg reduction as compared to environment and health motives (*ps* < .001), and they considered environmental motives more important than health motives (*ps* < .001). Different from the pattern for vegetarians, vegans did not show a significant difference between meat reduction and dairy/egg reduction motives in terms of the importance of animal rights and environmental motives ($p = .519$ and $p = .837$). Vegans found health motives slightly more important as dairy/egg reduction motive than as meat reduction motive ($p = .049$).

3.1.2. Differences between vegetarians and vegans in reduction motives (Hypothesis 1b)

In the next analysis, we compared the motives between vegetarians and vegans for each product type to test Hypothesis 1b, stating that dairy/egg reduction motives would be stronger among vegans than among vegetarians, particularly for ethical motives to reduce dairy/egg consumption. Hence, we conducted a MANOVA with dietary group as between-subject factor and motive type as within-subject factor. The effect of dietary group was significant but small for meat reduction, $F(1, 515) = 4.43$, $p = .036$, $\eta_p^2 = 0.01$, while a pronounced difference was found for dairy/egg reduction motives such that vegans were more strongly motivated for dairy/egg reduction than vegetarians, in line with Hypothesis 1b, $F(1, 515) = 54.30$, $p < .001$, $\eta_p^2 = 0.10$. The interaction effects between dietary group and motive type were also significant, indicating that dietary group differences depended on type of motive, for meat reduction motives: $F(2, 1030) = 5.44$, $p = .004$, $\eta_p^2 = 0.01$, and for dairy/egg reduction motives: $F(2, 1030) = 17.50$, $p < .001$, $\eta_p^2 = 0.03$.

Specifically, with respect to meat reduction motives, vegetarians and

Table 2
Means, SDs, and dietary group differences for psychological and contextual factors.

	Dietary group		Group difference			
	Vegetarians M (SD)	Vegans M (SD)	F (1, 515)	B 95 %CI	p	η^2_p
Moral concern for animals	5.79 (1.27)	6.55 (0.85)	66.80	−0.77 [-0.95, −0.58]	<.001	.12
Human supremacy beliefs	2.33 (1.21)	1.82 (0.97)	27.63	0.51 [0.32, 0.70]	<.001	.05
Veganism threat	1.81 (1.12)	1.41 (0.56)	29.09	0.40 [0.32, 0.70]	<.001	.05
Social support for plan-based diets	4.07 (1.77)	4.87 (1.68)	25.49	−0.80 [0.32, 0.70]	<.001	.05
Barriers to plant-based diets	3.83 (1.37)	2.25 (1.05)	140.53	1.28 [1.07, 1.50]	<.001	.21

vegans did not significantly differ in the importance of health and environmental reasons for meat reduction ($p = 950$ and $p = .452$) but vegans (vs vegetarians) found animal rights significantly more important as meat reduction motive ($p < .001$). With respect to dairy/egg reduction motives, vegans significantly differed from vegetarians in all three motives (health: $p = .017$, environment: $p < .001$; animal rights: $p < .001$). However, supporting Hypothesis 1b, this dietary group difference (vegetarians vs vegans) was especially pronounced and significantly larger for animal rights as compared to the dietary group differences for health and environmental motives for dairy/egg reduction, $F(1, 515) = 24.33$, $p < .001$, $\eta^2_p = 0.05$ and $F(1, 515) = 26.56$, $p < .001$, $\eta^2_p = 0.05$.

3.2. Testing the roles of psychological and contextual factors

3.2.1. Differences between vegetarians and vegans in psychological and contextual factors (hypotheses 2a, and 3)

In a next set of analyses, we investigated the psychological and contextual factors, which were expected a) to differ between vegetarians and vegans and b) to be related to dietary motives. First, we conducted a MANOVA to test for differences between vegetarians and vegans in moral concern for animals, human supremacy beliefs, perceived veganism threat, social support for plant-based diets, and barriers to plant-based diets (Hypotheses 2a and 3). The multivariate effect of dietary group was significant, $F(5, 511) = 39.42$, $p < .001$, $\eta^2_p = 0.28$. Specifically, the univariate results showed significant differences between vegetarians and vegans for all variables (Table 2). Corroborating Hypothesis 2a, as compared to vegans, vegetarians showed lower levels of moral concern for animals,[4] higher levels of human supremacy beliefs and perceived more veganism threat. Corroborating Hypothesis 3, vegetarians also perceived less social support for plant-based diets and more barriers to plant-based diets as compared to vegans.[5]

3.2.2. The mediating role of psychological and contextual factors (Hypothesis 2b)

Before testing the mediating role of the psychological and contextual factors, we investigated the associations (zero-order correlations) of the psychological and contextual factors with the dietary motives for meat and dairy/egg reduction to investigate whether these factors showed the expected associations with dietary motives. Several significant associations were found (Table 1). Moral concern for animals was positively correlated with animal rights motives for both meat reduction and dairy/egg reduction. Moral concern for animals was also positively associated with environmental motives for dairy/egg reduction, and weakly positively correlated with environmental motives for meat reduction and health motives for dairy/egg reduction.

Human supremacy beliefs were negatively correlated with animal rights and environmental motives for both meat and dairy/egg reduction, with health motives for dairy/egg reduction, and with health motives for meat reduction. Perceived veganism threat was negatively correlated with animal rights motives for meat and dairy/egg reduction, positively correlated with health motives for meat reduction, and negatively correlated with environment motives for dairy/egg reduction. Perceived social support was positively, albeit weakly correlated with environment and animal rights motives for both meat and dairy/egg reduction, while perceived barriers to plant-based diets was negatively correlated with animal rights motives for both meat and dairy/egg reduction, and to a weaker extent with health and environment for dairy/egg reduction.

Given a) the significant differences between vegetarians and vegans in animal rights motives for meat reduction and in the three motive types for dairy/egg reduction, b) the significant differences between vegetarians and vegans in the psychological and contextual factors (Table 2), and c) the significant associations of the psychological and contextual factors with dietary motives (Table 1), we tested whether the psychological and contextual factors can explain (statistically mediate) why vegetarians and vegans differ in their dietary motives. We conducted mediation analyses using four regression models with Process for SPSS (Model 4; Hayes, 2022) with dietary group (vegetarian vs vegan) as the independent variables, moral concern for animals, human supremacy beliefs, veganism threat, social support, and barriers to plant-based diets as parallel mediators, and a) animal rights motives for meat reduction, b) animal rights motives for dairy/egg reduction, c) environment motives for dairy/egg reduction, and d) health motives for dairy/egg reduction, as the dependent variables.[6]

The results (Table 3; Fig. 2) of these models showed that higher moral concern for animals, lower human supremacy beliefs, and lower veganism threat predicted higher scores on animal rights motives for both meat and dairy/egg reduction. Furthermore, dietary group (vegetarians vs vegans) had significant indirect effects on animal rights motives for meat reduction via moral concern for animals ($b = −0.19$, 958%

[4] An additional analysis on separate scores of moral concerns for different types of animals (companion animals, wild appealing animals, farm animals, wild non-appealing animals; see Leite et al., 2019) showed that vegans scored significantly higher on moral concern for all types of animals (see Table S1, in the online supplement).

[5] Although MANOVA is fairly robust against deviations from assumptions, since the data of several variables were not normally distributed, additional analyses were conducted to verify the robustness of our findings. We conducted a series of generalised linear models (GLiM) with gamma (loglink) and Welsh's t-tests, testing for differences between vegetarians and vegans. The results of these analyses were fully in line with the MANOVA results (see Table S2 of the online supplement).

[6] Collinearity tests indicated that multicollinearity was not a concern (Tolerance values > 0.65, VIFs <1.6).

Table 3
Results of Mediation Analyses Testing whether Dietary Group Differences in Psychological and Contextual factors Account for Dietary Group Differences in Dietary Motives.

	Animal Rights Meat Reduction			Animal Rights Dairy/Egg Reduction			Environment Dairy/Egg Reduction			Health Dairy/Egg Reduction		
	b 95%CI	*t*	*p*	*b* 95%CI	*t*	*p*	*b* 95%CI	*t*	*p*	*b* 95%CI	*t*	*p*
Vegetarian *vs* Vegan	−0.16 [-.31, .002]	−1.93	.054	−0.87 [-1.07, −0.67]	−8.41	<.001	−0.32 [-0.61, −0.03]	−2.14	.033	−0.19 [-0.56, 0.18]	−1.00	.312
Moral concern for animals	0.25 [0.18, 0.33]	6.70	<.001	0.25 [0.15, 0.34]	5.15	<.001	0.11 [-0.03, 0.25]	1.60	.111	0.06 [-0.11, 0.24]	0.73	.466
Human supremacy beliefs	−0.14 [-0.22, −0.07]	−3.90	<.001	−0.18 [-0.28, −0.09]	−3.97	<.001	−0.18 [-0.31, −0.04]	−2.64	.009	−0.35 [-0.52, −0.18]	−4.01	<.001
Veganism threat	−0.21 [-0.29, −0.12]	−4.60	<.001	−0.30 [-0.42, −0.19]	−5.26	<.001	−0.16 [-0.32, 0.00]	−1.96	.050	0.40 [0.19, 0.61]	3.84	<.001
Social support for plant-based diets	0.03 [-0.01, 0.07]	1.42	.155	0.03 [-0.02, 0.08]	1.28	.201	0.08 [0.01, 0.15]	2.31	.021	0.04 [-0.05, 0.13]	0.88	.379
Barriers to plant-based diets	0.04 [-0.01, 0.10]	1.42	.134	0.04 [-0.03, 0.11]	1.06	.290	0.021 [-0.09, 0.13]	0.38	.707	−0.08 [-0.22, 0.05]	−1.20	.229

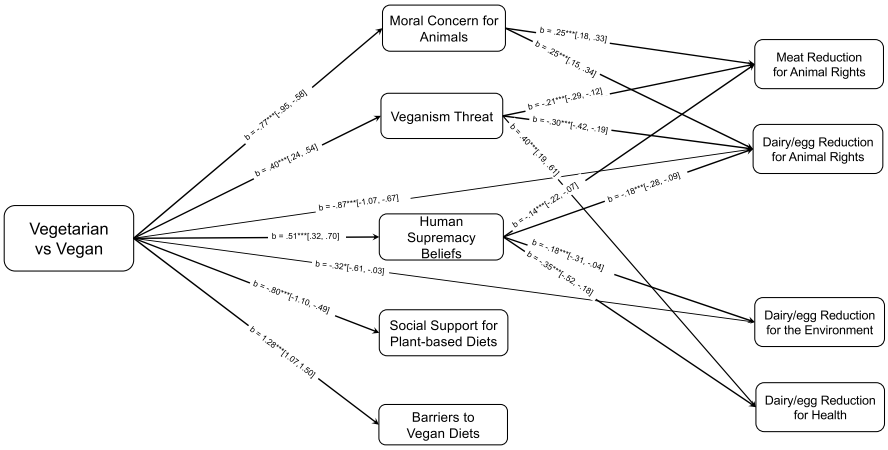

Fig. 2. Results of Mediation Models Testing whether Dietary Group Differences in Psychological and Contextual factors Account for Dietary Group Differences in Dietary Motives.
Note. Only significant paths are shown; *$p < .05$; **$p < .01$; ***$p < .001$. The analyses were conducted separately for each dependent variable (Process, Model 4).

CI [−0.31, −0.10]), human supremacy beliefs ($b = -0.07$, 95%CI [−0.13, −0.03]), and veganism threat ($b = -0.08$, 95%CI [−0.16, −0.03]), as well as on animal rights motives for dairy/egg reduction via moral concern for animals ($b = -0.19$, 95%CI [−0.31, −0.09]), human supremacy beliefs ($b = -0.10$, 95%CI [−0.17, −0.04]), and veganism threat ($b = -0.12$, 95%CI [−0.22, −0.04]). These findings indicate that vegetarians' (vs vegans) lower moral concern for animals, higher human supremacy beliefs, and higher veganism threat partly explained (statistically mediated) vegetarians' lower scores on animal rights motives for meat and dairy/egg reduction, in line with Hypothesis 2b.

Human supremacy beliefs also predicted lower scores on environmental and health motives for dairy/egg reduction (Table 3; Fig. 2), with significant indirect effects of dietary group (vegetarians vs vegans) on environmental and health motives for dairy/egg reduction via human supremacy beliefs, ($b = -0.09$, 95%CI [−0.19, −0.02]) and ($b = -0.18$, 95%CI [−0.31, −0.08]), respectively. Vegetarians' (vs vegans) higher scores on human supremacy beliefs thus partly explained why vegetarians scored lower on environmental and health motives for dairy/egg reduction. Therefore, the mediating role of human supremacy beliefs was also confirmed when considering dietary group differences in environmental and health motives (Hypothesis 2b), while we did not obtain evidence for the mediating role of moral concern and veganism threat to explain dietary group differences in environmental and health motives.[7]

4. Discussion

In recent years, researchers have been increasingly interested in the psychological motives and factors that distinguish meat-eaters from meat-abstainers (Graça et al., 2019; Loughnan & Davies, 2020; Loughnan et al., 2014; Rosenfeld, 2018). The novel focus of our study was on identifying similarities and differences between groups of

[7] Additional analyses testing the same models, but also including age and gender as control variables, showed highly similar results (see Table S3 of the online supplement). All significant associations remained significant. Note that the model results showed that veganism threat was significantly positively associated with health motives for dairy/egg reduction. However, given that the zero-order correlation between these variables was not significant, interpretation of this unexpected, positive association in the regression analysis needs to be done with caution.

meat-abstainers—vegetarians and vegans—and investigating motives to reduce or quit meat consumption and to reduce or quit dairy/egg consumption.

We obtained several noteworthy findings. Firstly, both groups considered health the least important motive and animal rights the most important motive for both meat reduction and dairy/egg reduction, which is consistent with previous research (e.g., Hopwood, Rosenfeld, et al., 2021; Janssen et al., 2016; Rosenfeld, 2019a). However, as expected, vegetarians considered health, environment, and animal rights motives to be less important when considering dairy/egg reduction than when considering meat reduction, whereas this was not the case for vegans. Critically, this difference between meat reduction and dairy/egg motives among vegetarians, was most strongly pronounced for animal rights motives. Furthermore, although vegetarians considered all three dairy/egg reduction motives less important compared to vegans, the most pronounced difference was that vegetarians considered animal rights clearly less important as dairy/egg reduction motive compared to vegans. When considering meat reduction motives, the two groups did not differ significantly from each other (health and environment) or the group difference was smaller (animal rights) than when considering dairy/egg reduction. These findings indicate that both vegetarians and vegans tend to endorse similar motives to abstain from meat consumption and are most strongly motivated by animal rights. However, only vegans tend to apply these same motives consistently to a similar degree to a wider range of animal-sourced products (dairy and egg products).

We also addressed *why* vegetarians and vegans differ in their dietary motives. The findings revealed that lower moral concern for animals, stronger beliefs in human supremacy over animals, and greater perceptions of veganism threat among vegetarians (vs. vegans) partly accounted (i.e., significant mediation effects) for why vegetarians are less motivated by animal rights motives for reducing or quitting meat and egg/dairy consumption. In other words, stronger endorsement of pro-animal morals and stronger opposition to anti-speciesist principles (human supremacy beliefs) among vegans as compared to vegetarians tend to underpin vegans' stronger animal rights motives for quitting meat and egg/dairy consumption. This could indicate that a consistent, strong moral position against the use of animals for human benefits constitutes a necessary (but not sufficient) psychological factor that need to be present for adopting a plant-based diet (Francione & Charlton, 2015; Horta, 2022). Human supremacy beliefs also partly explained the differences between vegetarians and vegans in health and environment motives for dairy/egg reduction. Preferences for dominance and inequality in human-animal relations, therefore, seem to lower people's general motivations for dairy/egg reduction, with a generalised impact that is not restricted to animal rights but also extend to health and environment motives.

In addition to lower levels of pro-animal views, heightened perceived threat from veganism to cultural traditions involving animal products and to the dominant ideological norms that legitimise the use of animals for animal-sourced products, also partly explained why vegetarians were less strongly motivated by animal rights for dairy/egg reduction. This finding indicates that the perceived symbolic threat from veganism cannot only be detected among meat-eaters (Dhont & Hodson, 2014; Gregson et al., 2024; Leite et al., 2019; MacInnis & Hodson, 2017; Stanley, 2022), but also among vegetarians as it conflicts with their dietary behaviors and values. However, it should be noted that the average levels of veganism threat among vegetarians were still rather low and tended to be lower than the mean levels of perceived threat in samples with a majority of meat-eaters (e.g., Leite et al., 2019; Stanley, 2022).

Critically, we demonstrated the roles of moral concern for animals, human supremacy beliefs, and veganism threat while controlling for two important social-contextual factors that differed between vegetarians and vegans. Specifically, vegetarians experienced significantly less social support for plant-based diets and perceived more practical barriers to a plant-based diet (higher costs, inconvenience, limited availability) than vegans. Such negative experiences may have a general negative impact on their dietary motives (Arévalo & Anderson, 2023; Docherty & Jasper, 2023), as indicated by significant correlations between these variables in our study. However, social support and perceived barriers did not account for the differences in dietary motives between vegetarians and vegans. This could suggest that these social-contextual factors operate relatively independently from health, environment, and animal rights motives for reducing or quitting animal product consumption. This highlights the importance of taking both psychological motives and social-contextual factors into account when predicting dietary preferences and behaviors.

4.1. Limitations and future directions

Our goal was to investigate differences between vegetarians and vegans, making our comparative design ideal. To be clear, however, by including dietary group as categorial predictor (independent variable) in the analyses, we do not imply that dietary group has a causal effect on dietary motives or on the psychological and social-contextual variables included in the study. For instance, vegetarians and vegans showed the largest difference in animal rights motives for dairy/egg reduction. However, we do not know if this was the key motive that made vegan participants decide to adopt a plant-based diet or whether this motive became stronger after adopting a plant-based diet. Longitudinal panel data with measurement points before and after people adopt a plant-based diet would be able to address this question. However, such research design may pose practical difficulties as only a minority of people turn vegan.

Related to this, the current mediation approach is limited by the cross-sectional nature of the data, which prevents drawing causal inferences about the effects of moral concern for animals, human supremacy beliefs, and veganism threat on dietary motives. Even though we tested the mediating role of these three psychological factors simultaneously, while also controlling for social-contextual factors, the observed effects of the mediators on dietary motives may be overestimated because it is possible that unobserved variables may explain part of the dietary group differences in dietary motives (Bullock & Green, 2021). For instance, compared to vegetarians, vegans tend to identify more strongly with their dietary group (e.g., Kirsten et al., 2020; Rosenfeld, 2019b), and express stronger moral emotions (Ioannidou et al., 2023a). Such differences in identity and emotional factors may be associated with motivational differences between vegetarians and vegans. A comprehensive test of these factors alongside the factors investigated in the current study is needed to determine the unique associations with dietary motivations. Furthermore, future research could also try to manipulate moral concern for animals, human supremacy beliefs, and veganism threat to establish the causal effects of these variables on dietary motives (Bullock & Green, 2021; Spencer et al., 2005).

Replication studies are also needed to test the generalizability of the findings and to investigate whether dietary motives how dietary motives among vegetarians and vegans may differ between cultural and regional contexts. For instance, environmental motives might be particularly strong in regions that are affected the most by climate change. In such contexts, it would also be particularly relevant to measure environmental attitudes and perceived environmentalist threat (Hoffarth & Hodson, 2016) in addition to pro-animal views and veganism threat.

Finally, future research could adopt a multimethod approach by using both self-report and behavioral measures of dietary behavior. Such approach would avoid the limitations of solely relying on self-report measures that might have led to an overestimation of some of the observed associations because of common-method bias and potential biases in self-report measures. The exclusion of self-identified vegetarians who indicated that they had recently eaten meat or fish from the analyses as well as self-identified vegans who indicated that they had recently consumed animal-sourced products, increases the confidence

that participants' dietary behavior matched their self-reported dietary group. Nevertheless, it would be interesting for future research to test the associations between dietary motives and real consumption behavior.

4.2. Implications and conclusion

The current findings highlight the importance of animal rights motives and pro-animal views underpinning plant-based diets. For this reason, it could be argued that advocates for plant-based diets should focus primarily on trying to increase people's concern for animals and animal rights (e.g., Gunther et al., 2023). This is consistent with meta-analytic evidence suggesting that interventions appealing to animal welfare tend to be particularly effective in increasing intentions to reduce meat consumption (Mathur et al., 2021). As people might be less aware of the harm inflicted on dairy cows and layer hens in the dairy and egg industries, making people aware of this would likely help with increasing their willingness to reduce dairy and egg product consumption (Ioannidou, Lesk, Stewart- Knox, & Francis, 2024; Stoeber et al., 2024). However, similar to how meat-eaters often wilfully ignore or deny the suffering or sentience of animals slaughtered for meat (Leach et al., 2022; Loughnan & Davies, 2020; Rothgerber, 2020), recent findings indicated that dairy consumers, including vegetarians may also deny the suffering of animals in the dairy and egg industry (Ioannidou et al., 2023b, Ioannidou, Lesk, Stewart- Knox, & Francis, 2024). To address this issue, future research could investigate simultaneously consumer motives to reduce dairy and egg consumption as well as their use of justification strategies that help alleviate the moral discomfort that arises from dairy and egg consumption.

The current findings uniquely extend existing research on dietary motives by demonstrating meaningful differences between vegetarians and vegans in their dietary motives and key moral psychological and contextual factors that are associated with these motives. Whereas past research has largely focused on motives to reduce or quit meat consumption (vegetarian motives), we moved beyond this approach by also investigating motives to reduce or quit dairy and egg products (vegan motives). The findings highlight the importance of distinguishing between vegetarians and vegans and help with understanding why vegetarians have quit eating meat, but still eat other animal products, as compared to vegans who have quit eating all animal products (see also Ioannidou et al., 2023a; Ioannidou et al., 2023b). This my help with addressing calls from scientists for a global shift toward plant-based diets (Krattenmacher et al., 2023; Scarborough et al., 2023; Willett et al., 2019) as it can inform policy makers and advocates in their efforts to change animal product consumption and the development of education programs.

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Ethical statement

The study was approved by the ethics research board of the School of Psychology at the University of Kent (Ethics ID: 202116259135417243).

CRediT authorship contribution statement

Kristof Dhont: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Resources, Visualization, Writing – original draft, Writing – review & editing. **Maria Ioannidou:** Conceptualization, Investigation, Methodology, Writing – original draft, Writing – review & editing.

Declaration of Competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data file used for the study is available via the Open Science Framework: https://osf.io/rcfhj/

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.appet.2024.107232.

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