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Short Communication

Health, environmental, and animal rights motives among omnivores, vegetarians, and vegans and the associations with meat, dairy, and egg commitment

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ABSTRACT

Dietary groups differ from each other in how much they value health, environmental, and animal rights motives to reduce or quit meat consumption. In an online survey study, we investigated whether omnivores (N = 237), vegetarians (N = 151), and vegans (N = 377) not only differ in their motives for meat reduction or meat-free diets (vegetarian eating motives) but also in their motives for dairy and egg reduction or the adoption of a fully plant-based diet (vegan eating motives), and how strongly these motives are associated with lower commitment to eating meat, dairy, and egg products. The results showed that omnivores rated health as the most important motive for both meat and dairy/egg reduction. However, among omnivores, only environmental and animal rights motives, and not health, were associated with reduced meat and dairy commitment, while environmental motives were also associated with reduced egg commitment. Vegetarians and vegans were more strongly motivated by environmental and animal rights concerns for meat and dairy/egg reduction compared with omnivores, yet vegetarians were less strongly motivated by animal rights than vegans, especially for dairy/egg reduction. However, among vegetarians, only animal rights motives, and not environmental and health motives, were associated with lower dairy and egg commitment. These findings provide new insights into the relative importance of dietary motives for reducing meat, dairy, and egg commitment among different dietary groups and highlight the importance of environmental and animal rights motives for reducing animal product commitment among omnivores and of animal rights motives for reducing dairy and egg commitment among vegetarians.

1. Introduction

With the increased consumer sensitivity to animal welfare, environmental, and health concerns, the popularity of meat-free and plant-based foods and diets is growing steadily (Corrin & Papadopoulos, 2017; Ruby, 2012). A global shift towards plant-based foods help tackle considerable sustainability and health challenges posed by animal-sourced diets and food systems (Hayek, 2022; Krattenmacher et al., 2023; Scarborough et al., 2023) as well as ethical concerns about the treatment of animals (Deckers, 2016; Dhont & Hodson, 2020). Therefore, it is critical to understand the motives for reducing or ceasing animal product consumption and which motives are most strongly associated with reduced commitment to eating animal products (Hopwood et al., 2020; Rosenfeld & Burrow, 2017). While recent research has provided valuable insights into the roles of animal rights, environmental, and health motives for meat reduction and meat-free diets (vegetarian eating motives, e.g., Hopwood et al., 2020; 2021), concerns about the impact of animal agriculture on animals, the environment, and global health (e.g., disease risk) are not limited to the consumption and production of meat but are also relevant for the consumption and production of dairy and egg products (e.g., Deckers, 2016; Hayek, 2022; Scarborough et al., 2023). It is, however, unclear to what extent consumers perceive these motives as important for dairy and egg reduction, and how strongly these motives are associated with decreased commitment to eating meat, dairy, and egg products.

The current research addresses these gaps and investigates motives for meat and dairy/egg reduction in omnivores (those who do not exclude meat and other animal products such as eggs and dairy from

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their diet), vegetarians (those who do not eat meat, but still consume other animal products such as dairy and eggs), and vegans (those who do not eat any animal products). This is important for efforts to promote plant-based diets because if people's perceived importance of dietary motives vary between meat or dairy/egg products, differential advocacy approaches might be needed for promoting meat reduction versus dairy/egg reduction, or meat-free versus fully plant-based diet.

1.1. Dietary motivations for meat-free and plant-based diets

Both meat-eaters and meat-abstainers (e.g., vegetarians and vegans) rely on a similar set of motives for reducing or quitting meat consumption: health, environmental, and animal rights motives (Fox & Ward, 2008; Hopwood et al., 2020, 2021; Rosenfeld & Burrow, 2017). However, dietary groups differ from each other in how much they value these motives. Hopwood et al. (2021) found that omnivores valued health motives more than environmental and animal rights motives, whereas vegetarians valued environmental and animal rights motives more than health motives, and more than omnivores. Health motives were valued similarly by vegetarians compared to omnivores (Hopwood et al., 2021). The relatively few studies that have investigated dietary motives of vegans as a distinct dietary group, suggest that vegans, just like vegetarians, tend to acknowledge the potential health benefits of their diet, but find environmental, and especially animal rights motives, more important than health motives (Dhont & Ioannidou, 2024; Janssen et al., 2016; North et al., 2021; Rosenfeld, 2019).

However, the perceived importance of these reduction motives may vary for different animal-sourced products and differences between dietary groups may vary between meat reduction and dairy/egg reduction motives. Although some consistency could be expected since stable personality traits and values likely shape health, environmental, and animal rights motives consistently across products (Dhont & Ioannidou, 2024; Hopwood et al., 2020; Ruby, 2012), public awareness about the concerns associated with the meat industry might be higher than the issues associated with the dairy and egg industries. For instance, dairy and egg consumers may believe that animals in the dairy and egg industry suffer less than animals in the meat industry (Ioannidou et al., 2023a). Therefore, consumers may consider certain dietary motives as more important for meat reduction than for dairy and egg reduction. For instance, recent findings indicated that both vegetarians and vegans strongly value environmental and animal rights motives to abstain from meat consumption, yet vegetarians tend to find these motives, and especially animal rights, less important for dairy and egg reduction compared to meat reduction (Dhont & Ioannidou, 2024). This might explain why some people reduce or quit meat consumption but continue the consumption of dairy and eggs. It is yet unclear whether omnivores would also show differences in meat and dairy/egg reduction motives. The first goal of the current study was to replicate and extend previous findings by investigating dietary group differences between omnivores, vegetarians, and vegans in their motives for meat and dairy/egg reduction.

1.2. Meat, dairy, and egg commitment

It is not only important to test whether dietary groups differ in their motives for meat and dairy/egg reduction, but also to investigate to what extent these motives are effectively associated with decreased *meat, dairy, and egg commitment*—the general desire to eat meat, dairy, or eggs in most meals and a reluctance to replace them with plant-based substitutes (Piazza et al., 2015). While animal rights and environmental concerns are likely key reasons for why people quit meat consumption (vegetarians and vegans) or quit dairy/egg consumption (vegans), as these factors distinguish meat-abstainers from meat-eaters (Hopwood et al., 2021) and vegans from vegetarians (Dhont & Ioannidou, 2024), the role of health motives seems less clear. On the one hand, health concerns might be a key motive for omnivores to reduce meat commitment, given that omnivores find health motives more important than environmental and animal rights motives. On the other hand, recent findings have casted doubt on the relevance of health motives for meat reduction. Specifically, Hopwood et al. (2020) found that people who were primarily motivated by health concerns for reducing meat consumption were not particularly responsive to vegetarian advocacy, not even when the advocacy materials focused on the health benefits of plant-based diets. People who were more strongly motivated by environmental reasons, however, responded more positively to advocacy materials that focused on the environment as well as to advocacy materials that focused on health, while those who were more strongly motivated by animal rights, responded more positively to advocacy materials that focused on animal rights.

Hence, previous findings suggest that environmental and animal rights, but not health motives may be particularly important for reducing meat commitment. However, a direct test of the associations between dietary motives and meat commitment is currently lacking. Therefore, the second goal of the current research was to test whether health, environmental, and animal rights motives for meat reduction would be associated with decreased meat commitment among omnivores. Extending the research scope, we also tested whether dietary motives for dairy/egg consumption would be associated with decreased dairy and egg commitment among omnivores and vegetarians.

1.3. The present study

The goal of the present study was two-fold. Firstly, we investigated dietary group differences in health, environmental, and animal rights motives for meat reduction as well as for dairy/egg reduction in samples of omnivores, vegetarians, and vegans. Secondly, we tested the extent to which these dietary motives were associated with decreased meat, dairy, and egg commitment among groups who consume these or some animal products (omnivores and vegetarians).

We tested the following hypotheses: We expected that vegetarians and vegans would rate environmental and animal rights motives as more important than health motives for both meat reduction and dairy/egg reduction (Hypothesis 1a), and as more important than omnivores (Hypothesis 1b). Omnivores were expected to rate health motives more important than environmental and animal rights motives (Hypothesis 2). We also expected differences between vegetarians and vegans particularly for motives for dairy/egg reduction, such that vegans would find motives for dairy/egg reduction, and particularly animal rights motives, more important compared with vegetarians (Hypothesis 3).

Furthermore, we expected that motives for meat reduction would be associated with decreased meat commitment among omnivores (meat consumers), and motives for dairy/egg reduction would be associated with decreased dairy and egg commitment among omnivores and vegetarians (dairy and egg consumers). However, while we expected to find significant associations between environmental and animal rights motives and reduced commitment to animal product consumption (meat, dairy, and egg commitment), we tentatively expected that the associations between health motives and animal product commitment would be weaker or not significant (Hypothesis 4). While hypotheses were informed by previous findings and specified prior to data collection, the hypotheses were not preregistered on the project page of the Open Science Framework.

2. Method

2.1. Participants and procedure

Respondents were recruited via several social media platforms using English-speaking social media groups and networks with predominantly users from North America and Western Europe (e.g., British Facebook groups) and through Prolific. Participants were invited to complete an online survey on dietary choices and social attitudes. Only omnivores,

vegetarians, and vegans, who were aged 18 years or older and had no diagnosis of an eating disorder were asked to participate. On Prolific, we used the pre-screen function to advertise the study only to people who fit the diet criterion.

The aim was to recruit a minimum of 150 participants of each dietary group of interest (omnivores, vegetarians, vegans), based on power analyses with G*Power (Faul et al., 2009) indicating that this sample size would allow us to detect small to medium effect sizes with $\alpha = .05$ and power = .80 ($d \geq .23$ and $d \geq .33$ for comparisons within and between dietary groups, respectively, and $f^2 \geq .053$ for regression analyses with three predictors).

The full survey was completed by 986 respondents. Given the purpose of the study to compare omnivores with vegetarians (i.e., no meat or fish consumption) and vegans (i.e., no animal product consumption), self-identified vegetarians who indicated they had eaten meat products in the past three months (n = 22), self-identified vegans who indicated they had eaten meat, dairy, or egg products in the past three months (n = 56), and participants who did not self-identify as meat lover, omnivore, vegetarian, or vegan (n = 143) were excluded from the analyses. 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 (for details: https://osf.io/a2ms3/). We collapsed the subsamples of participants who self-identified as meat lover (n = 38) and as omnivore (n = 199) into one omnivore group. The final sample (N = 765) included 237 omnivores, 151 vegetarians, and 377 vegans, aged 18 to 86 years (Mage = 32.45 years, SDage = 12.97 years; 424 women, 292 men, 25 non-binary/agender/gender fluid, 15 prefer not to say or self-describe).

After providing informed consent, participants were asked to complete a survey including measures on dietary motives and animal product commitment. At the end of the survey, they were asked to self-identify their dietary group (meat lover: I prefer to have meat in all or most of my meals; 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. Upon completion they were thanked and debriefed. The study was approved by the ethics research board at the first author's institution.

2.2. Measures

The materials and data file used for the study are available via the Open Science Framework: https://osf.io/a2ms3/.

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; see also Dhont & Ioannidou, 2024). 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 to eat less or no meat.* In a similar way, 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 to drink/eat less or no dairy or egg products and more plant-based products.* 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 (αs > .90). Higher scores indicated stronger motivation.

2.2.2. Meat, Dairy, and egg commitment

Meat commitment was measured with three items of the meat commitment scale (Piazza et al., 2015) (e.g., 'I cannot imagine substituting meat from a meal'). These three items were adjusted to measure dairy commitment (3 items, e.g., 'I cannot imagine substituting dairy products from a meal') and egg commitment (3 items, e.g., 'I cannot imagine substituting egg products from a meal'). Items were completed on 7-point scales (1 = *strongly disagree;* 7 = *strongly agree*) and averaged for each commitment type, with higher scores indicating stronger commitment (αs > .90).

3. Results

3.1. Differences in dietary motives between dietary groups

First, we investigated whether dietary groups differed in their motives to consume (a) less or no meat and (b) less or no dairy/egg products, testing Hypotheses 1a, 1b, 2, and 3. We conducted a mixed multivariate ANOVA with dietary group (omnivores vs vegetarians vs vegans) as between-subject factor, motive type (health, environment, and animal rights) as within-subject factor and motivation for meat reduction and motives for dairy/egg reduction as the dependent variables. We followed up with pairwise comparisons and applied Bonferroni corrections to account for multiple comparisons, reporting Bonferroni-adjusted p-values.

The findings showed that the effect of dietary group was significant for both for meat reduction and dairy/egg reduction motives, F (2, 762) = 251.50, $p < .001$, $\eta_p^2 = .40$ and $F(2, 762) = 224.36$, $p < .001$, $\eta_p^2 = .37$, respectively, as was the effect of motive type, F (2, 1524) = 128.46, $p < .001$, $\eta_p^2 = .14$, and $F(2, 1524) = 57.13$, $p < .001$, $\eta_p^2 = .07$, respectively. The interaction effects between dietary group and motive type were also significant, for meat reduction motives, F (4, 1524) = 93.54, $p < .001$, $\eta_p^2 = .20$, and for dairy/egg reduction motives, $F(4, 1524) = 109.13$, $p < .001$, $\eta_p^2 = .22$, indicating that differences between motive types depended on dietary group (Fig. 1).

Specifically, as expected (Hypothesis 1a), vegans and vegetarians were more strongly motivated by animal rights and the environment than by health for both meat and dairy/egg reduction ($ps < .001$, Fig. 1). Vegans were also more strongly motivated by animal rights than by the environment for both meat and dairy/egg reduction ($ps < .001$), while vegetarians were more strongly motivated by animal rights than by the environment for meat reduction ($p < .001$). However, vegetarians did not show a significant difference between animal rights and environment motives for dairy/egg reduction ($p = .350$). Vegetarians were also less motivated by animal rights and the environment for dairy/egg reduction than for meat reduction ($ps < .001$).

In contrast to vegetarians and vegans, omnivores were more strongly motivated by health motives than by animal rights and the environment for both meat and dairy/egg reduction ($ps < .001$, Fig. 1), supporting Hypothesis 2. Omnivores showed no significant difference between environmental and animal rights motives for both meat reduction and egg/dairy consumption ($ps > .500$).

Furthermore, vegetarians and vegans did not significantly differ from one another in the importance of health and environmental motives for meat and dairy/egg reduction ($ps > .496$), yet vegans found animal rights motives for meat reduction ($p = .003$) and dairy/egg reduction ($p < .001$) significantly more important compared to vegetarians. Corroborating Hypothesis 3, this difference in animal rights motives between vegetarians and vegans was significantly stronger for dairy/egg reduction than for meat reduction, as indicated by a significant interaction, $F(1, 526) = 193.22$, $p < .001$, $\eta_p^2 = .27$. Omnivores considered all three motives for both meat and dairy/reduction to be of lower importance compared to vegetarians and vegans ($ps < .05$ for health motives, and $ps < .001$ for environmental and animal rights motives).

Including gender as additional factor in the MANOVA showed that women scored higher on motives for meat (M = 5.43) and dairy/egg (M

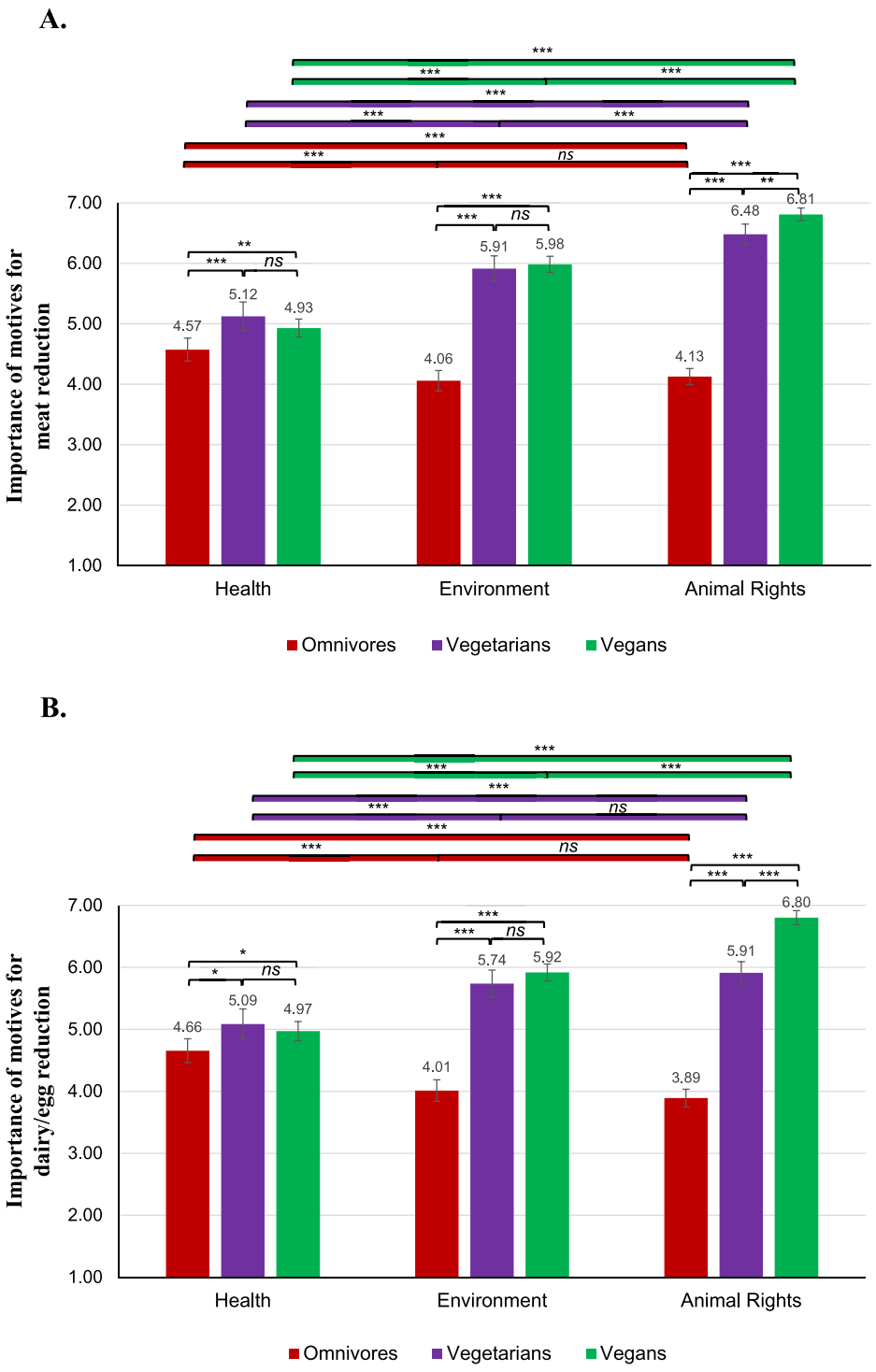

Fig. 1. Dietary Motives for Meat Reduction (1A) and Dairy/Egg Reduction (1B) by Dietary Group. *Note.* ***$p < .001$; **$p < .01$; *$p < .05$; *ns: not significant.* Error bars represent +/- 2 SE.

= 5.31) reduction than men ($M = 5.18$ and $M = 5.10$), $F(1, 710) = 8.38$, $p = .004$, $\eta_p^2 = .01$ and $F(1, 710) = 5.27$, $p = .022$, $\eta_p^2 = .01$. However, the interaction effects of gender with dietary group and motive type were not significant (*p*s > .553).

3.2. Dietary motives and meat, dairy, and egg commitment

Before testing the associations between dietary motives and animal product commitment, we first verified whether dietary group differences in meat, dairy, and egg commitment would match the dietary categories. We conducted a MANOVA with dietary group as the between-subject factor and meat, dairy, and egg commitment as the dependent variables. The multivariate effect of dietary group was significant, $F(6, 1520) = 346.17$, $p < .001$, $\eta_p^2 = .58$, and significant univariate effects were found on all three dependent variables (Table 1). As expected, levels of meat commitment were higher among omnivores than among vegetarians and vegans. Also as expected, omnivores and vegetarians scored higher on dairy and egg commitment compared to vegans, yet omnivores were also more strongly committed to eating dairy and egg products than vegetarians. Including gender as additional

Table 1
Dietary Group Differences in Meat, Dairy, and Egg Commitment.

	Dietary group *M (SD)*			Group differences		
	Omnivores	Vegetarians	Vegans	*F* (2, 762)	*p*	η_p^2
Meat	4.75 (1.70)[a]	1.04 (0.26)[b]	1.03 (0.44)[b]	1129.98	<.001	.75
Dairy	4.85 (1.67)[a]	2.59 (1.55)[b]	1.05 (0.47)[c]	727.16	<.001	.66
Egg	4.65 (1.70)[a]	2.36 (1.48)[b]	1.06 (0.47)[c]	652.43	<.001	.63

Note. Means with different superscripts indicate that the dietary groups differed significantly from each other (*ps* < .002).

factor in the MANOVA did not show any significant gender effects or interactions between gender and dietary group on commitment scores (*ps* > .058).

In a final set of analyses, we conducted a series of regression analyses to test Hypothesis 4, addressing the questions a) which dietary motives for meat reduction predict meat commitment among omnivores, and b) which dietary motives for dairy/egg reduction predict dairy and egg commitment among omnivores and vegetarians. Collinearity tests indicated that multicollinearity was not a concern (Tolerance values > .58, VIFs < 1.7).

The results (Table 2) showed that among omnivores, environmental and animal rights motives, but not health motives, for meat reduction significantly predicted lower meat commitment. Environmental motives for dairy/egg reduction significantly predicted lower dairy and egg commitment among omnivores, while animal rights motives for dairy/egg reduction also predicted lower dairy commitment among omnivores. Health motives for dairy/egg reduction did not significantly predict dairy commitment and was even positively associated with egg commitment. Among vegetarians, animal rights motives, but neither health nor environmental motives, for dairy/egg reduction significantly predicted lower dairy and egg commitment.

4. Discussion

Health, environmental concerns, and animal rights are the most common motives to reduce or stop meat consumption among both meat-eaters and meat-abstainers, yet dietary groups differ in how much they value each of these motives (Hopwood et at., 2020; 2021; Rosenfeld, 2018). Corroborating our expectations, omnivores rated health as more important than environmental and animal rights concerns (Hopwood et al., 2020; 2021). Extending previous findings, this pattern was consistently observed for both meat reduction and dairy/egg reduction. Critically however, despite health being rated as the most important motive, stronger health motives for meat and dairy/egg reduction did not significantly predict decreased meat, dairy, and egg commitment. These findings cast further doubts about the value of health motives for the reduction of animal product consumption (Hopwood et al., 2020). Although people may acknowledge the health benefits of reducing animal product consumption, it may not provide a sufficiently convincing reason for transitioning towards or maintaining a meat-free or plant-based diet (Hopwood et al., 2021; Hoffman et al., 2013; Rosenfeld, 2018). Instead, we found that omnivores who were more strongly motivated by environmental and animal rights concerns expressed lower desires for eating meat and found it easier to substitute meat from a meal. Along similar lines, among omnivores, stronger environmental and animal rights motives to reduce dairy/egg consumption were associated with reduced dairy commitment, while stronger environmental motives were also associated with reduced egg commitment.

As expected, both vegetarians and vegans were more strongly motivated by environmental and animal rights motives for meat reduction compared with omnivores (e.g., Hopwood et al., 2021), with animal rights as the strongest motive for both groups of meat-abstainers. Extending previous research, these patterns do not only apply to meat reduction but also to dairy/egg reduction. However, a notable difference between vegetarians and vegans was observed. While vegetarians were less motivated by animal rights than vegans, this difference was particularly pronounced for dairy/egg reduction motives (Dhont & Ioannidou, 2024). In contrast, no significant differences between vegetarians and vegans were observed for health and environmental motives, singling out animal rights as the key motivational difference between these groups for dairy/egg reduction. Moreover, although vegetarians valued environmental and animal rights motives for dairy/egg reduction similarly, only animal rights motives significantly predicted reduced dairy and egg commitment. In other words, vegetarians who were more strongly motivated by animal rights for dairy/egg reduction, expressed lower desires to consume dairy and egg products and found it easier to substitute dairy and egg products from a meal. The extent to which vegetarians were motivated by health or the environment, however, did not seem to matter for their levels of dairy or egg commitment.

Taken together, these findings highlight the importance of environmental and animal rights motives for reducing animal product commitment among omnivores and the importance of animal rights motives for reducing dairy and egg commitment among vegetarians. Therefore, targeting these motives may proof to be the most critical in interventions and strategies to reduce animal product consumption.

It should, however, be noted that our research was limited by using self-report measures and a cross-sectional design. Future research could test whether experimentally manipulating dietary motives causally predict self-reported meat, dairy, or egg consumption, as well as real consumption behavior. Future research could also test whether the findings generalize across cultural contexts and how dietary motives are related to cultural practices of animal product consumption. Finally, research could investigate dietary motives in a wider range of dietary groups for instance, by also including pescatarians and flexitarians (e.g., Ioannidou et al., 2023a; 2023b). Despite these limitations, the findings provide new insights into differences between omnivores, vegetarians, and vegans in the role of health, environmental, and animal rights motives for reducing animal product commitment.

Table 2
Results of Regression Analyses Testing the Associations between Dietary Motives and Animal Product Commitment among Omnivores and Vegetarians.

	Meat Commitment				Dairy Commitment				Egg Commitment			
	b(se)	*β*	*t*	*p*	*b(se)*	*β*	*t*	*p*	*b(se)*	*β*	*t*	*p*
Omnivores												
Health	.01 (.08)	.004	0.06	.954	.05 (.08)	.05	0.65	.516	.17 (.08)	.14	2.05	.041
Environment	−.34 (.08)	−.31	−4.27	<.001	−.28 (.08)	−.27	−3.42	<.001	−.37 (.08)	−.35	−4.44	<.001
Animal rights	−.18 (.08)	−.17	−2.30	.022	−.20 (.08)	−.19	−2.50	.013	−.10 (.08)	−.09	−1.25	.213
Vegetarians												
Health	/	/	/	/	.18 (.10)	.15	1.83	.070	.05 (.09)	.04	0.49	.628
Environment	/	/	/	/	−.17 (.13)	−.12	−1.33	.185	−.10 (.12)	−.07	−0.85	.397
Animal rights	/	/	/	/	−.45 (.10)	−.35	−4.37	<.001	−.50 (.10)	−.40	−5.09	<.001

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CRediT authorship contribution statement

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

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 and the materials used for the study are available via the Open Science Framework: https://osf.io/a2ms3.

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