

# Perceived Message Effectiveness of the Meatless Monday Campaign: An Experiment With US Adults

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Given the negative health and environmental impacts of red meat consumption, reducing red meat intake in the United States is important for both human and planetary well-being. To experimentally evaluate the impact of health-focused and environment-focused messages from the Meatless Monday campaign, we conducted an online randomized experiment among US adults aged 18 years or older (n = 1244). Compared with control messages, health-focused and environment-focused Meatless Monday messages led to significantly higher perceived message effectiveness and increased intention to reduce meat consumption. (*Am J Public Health*. 2022;112(5):724–727. <https://doi.org/10.2105/AJPH.2022.306766>)

**E**xcess consumption of red and processed meat is a growing problem in the United States, where the amount of meat consumed is more than three times the global average.<sup>1</sup> Given the association between excess meat intake and negative health and environmental outcomes, decreasing meat consumption in high-income countries such as the United States is important for reducing the global burden of chronic disease and the negative environmental consequences of meat production.<sup>2</sup> Mass media campaigns are a promising but untested population-level strategy for reducing meat intake.

## INTERVENTION

In 2003, the Johns Hopkins Bloomberg School of Public Health launched the Meatless Monday campaign with the goal of reducing meat consumption by 15% to promote human and planetary health.<sup>3</sup> A nationally representative

sample of US adults from 2019 found that 42% of respondents were aware of the Meatless Monday campaign, and 21% had participated in Meatless Monday at some point.<sup>4</sup> The campaign strategy tested in our study consisted of graphics communicating the negative health and environmental impacts of meat consumption. The specific images used were selected on the basis of a combination of (1) image popularity measured by social media shares and (2) diversity of stimuli in terms of different health and environmental outcomes depicted in the messages and design styles represented (Figure A, available as a supplement to the online version of this article at <http://www.ajph.org>).

## TIME AND PLACE

Our randomized experiment consisted of a one-time online survey launched from September 2020 to October 2020 through CloudResearch's Prime Panels.

## PERSON

The study population consisted of 1244 US adults aged 18 years or older who could read, write, and speak English and had consumed red meat at least once per week in the past 30 days (Table A, available as a supplement to the online version of this article at <http://www.ajph.org>). In the overall sample, the mean age was 45 years (SE = 0.48) and 27.6% of participants had an annual household income of less than \$25 000. Most participants self-identified as White (77.9%) and non-Hispanic (89.0%). The largest proportion of participants were male (52.2%), had obtained at least a college degree (49.1%), and self-identified as Democrats (40.3%).

## PURPOSE

Although Meatless Monday is widely recognized, the campaign has not yet been evaluated for perceived message

effectiveness (PME). This measure predicts behavioral change and is often used to vet campaign messages.<sup>5</sup> In addition, it is unclear whether Meatless Monday campaign messages attract attention or lead to negative affect, cognitive elaboration, increased social interactions, and intention to reduce red meat intake. All of these constructs are on the pathway from message exposure to behavioral change according to the University of North Carolina Warnings Impact Model, which has been used to evaluate other health outcomes (e.g., sugar-sweetened beverage consumption and tobacco use).<sup>6,7</sup> Furthermore, it is unclear whether consumers' reactions to Meatless Monday messages vary by their frequency of red meat consumption.

To address these knowledge gaps, our study sought to experimentally evaluate the impact of health-focused and environment-focused messages from the Meatless Monday campaign using constructs predictive of behavioral change through a one-time online survey in a sample of US adults. Additionally, we aimed to understand whether the frequency of red meat consumption moderated the impact of Meatless Monday campaign messages on consumers.

## IMPLEMENTATION

After eligibility screening and providing electronic informed consent, participants proceeded to the experiment survey, which used a between-subjects design. Participants were randomly assigned to one of three trial arms: (1) control messages (which pertained to credit scores), (2) health-focused Meatless Monday messages, or (3) environment-focused Meatless Monday

messages; they viewed four graphics specific to the trial arm displayed in random order (Figure A). Participants then answered a series of questions about the messages they viewed regarding health concern, environmental concern, discouragement, and unpleasantness, which, taken together, constituted our primary outcome measure of PME (Table B, available as a supplement to the online version of this article at <http://www.ajph.org>). Participants were also asked questions regarding attention, negative affect, cognitive elaboration, social interactions, and intention to reduce meat consumption, which were all secondary outcome measures in this study (Table C, available as a supplement to the online version of this article at <http://www.ajph.org>).

We used unadjusted linear regression models to compare the differences in the mean value of the primary and secondary outcomes between trial arms. We also examined whether red meat consumption frequency moderated the effect of environmental and health messages on PME. We used a linear regressions model, with trial arm, the moderator, and their interaction as predictors. We probed significant interactions by calculating the marginal effect of environmental and health messages on the outcome at different levels of the moderator. Moderation analyses used a Bonferroni-corrected *P* value to account for multiple comparisons.

## EVALUATION

We found that compared with control messages, both health-focused and environment-focused Meatless Monday campaign messages effectively

increased PME (Table 1). Additionally, both health-focused and environment-focused messages scored significantly higher in all secondary outcome measures, including attention, negative affect, cognitive elaboration, social interactions, and intention to reduce meat consumption. Furthermore, there were no significant differences between health-focused and environmental-focused messages for any of the outcomes. These findings show that relative to control messages, Meatless Monday messages attracted participants' attention more, increased their negative perception of meat consumption, led them to think about the health and environmental harms of consuming meat, and made participants more interested in talking about the Meatless Monday campaign in their social interactions. Given that these constructs are predictive of behavioral change, these results suggest that widespread communication campaigns such as Meatless Monday are promising public health strategies to mitigate the negative health and environmental effects of meat consumption. However, further research would benefit from testing these messages on behavioral outcomes, such as purchases and consumption of red and processed meat. Additionally, given that our sample was predominantly White, future studies should examine whether these findings hold in more diverse samples with respect to race and ethnicity.

Following our analysis of meat consumption frequency as a potential moderator of the effect of Meatless Monday messages on PME, we found that among high-frequency meat consumers (i.e., participants who reported consuming red meat once a day or more), neither the health-focused nor

**TABLE 1— Mean Perceived Message Effectiveness (PME) and Secondary Outcomes by Exposure to Control, Health-Focused, and Environment-Focused Meatless Monday Messages: United States, September 2020–October 2020**

	Control, Mean (SE)	Health-Focused		Environment-Focused		P <sup>b</sup>
		Mean (SE)	P <sup>a</sup>	Mean (SE)	P <sup>a</sup>	
PME	1.7 (0.06)	2.8 (0.06)	<.001	2.9 (0.06)	<.001	>.99
Attention	2.9 (0.06)	3.3 (0.06)	<.001	3.3 (0.06)	<.001	>.99
Negative affect	2.0 (0.06)	2.5 (0.06)	<.001	2.7 (0.06)	<.001	.56
Cognitive elaboration (health)	1.7 (0.06)	3.0 (0.07)	<.001	2.9 (0.06)	<.001	.12
Cognitive elaboration (environment)	1.8 (0.06)	2.7 (0.07)	<.001	3.1 (0.06)	<.001	<.001
Social interactions	2.0 (0.07)	2.6 (0.07)	<.001	2.6 (0.07)	<.001	>.99
Intention to reduce meat consumption	2.3 (0.07)	2.9 (0.07)	<.001	3.0 (0.07)	<.001	>.99

Note. P values were obtained using Bonferroni correction for three comparisons (statistical significance was defined as P < .016).

<sup>a</sup>P value is for the contrast between each Meatless Monday arm message and the control.

<sup>b</sup>P value is for the contrast between the environment-focused arm compared with the health-focused arm.

the environment-focused messages elicited significantly higher PME compared with the control messages (Table 2). These results appear to be driven by higher ratings of the control messages among frequent meat

consumers. It is unclear what drove the higher ratings of the control messages within this group, but further investigations on attitudes and values surrounding meat consumption would be valuable in providing insight into

effective message designs tailored to reach high-frequency meat consumers.

### ADVERSE EFFECTS

No adverse effects were observed.

**TABLE 2— Mean Perceived Message Effectiveness (PME) by Meat Consumption Frequency for Control, Health-Focused Messages, and Environment-Focused Messages Groups: United States, September 2020–October 2020**

Meat Consumption Frequency	Control, Mean (SE)	Health-Focused		Environment-Focused	
		Mean (SE)	P <sup>a</sup>	Mean (SE)	P <sup>a</sup>
Low meat consumption frequency	1.8 (0.10)	3.0 (0.11)	<.001	3.0 (0.11)	<.001
Moderate meat consumption frequency	1.5 (0.07)	2.8 (0.07)	<.001	2.8 (0.07)	<.001
High meat consumption frequency	2.4 (0.17)	2.9 (0.15)	.07	2.9 (0.14)	.07

Note. Meat consumption frequency was recategorized into a three-level category for statistical analysis: low meat consumption ≤ 1 time a week; moderate meat consumption > 1 time per week but < 1 time per day; high meat consumption ≥ 1 time a day. Means were obtained by combining all four PME categories using linear regression models. P values were obtained using Bonferroni correction for six comparisons (statistical significance was defined as P < .008).

<sup>a</sup>P value is for the contrast between each Meatless Monday arm message and the control within level of meat consumption. P value for Wald test for interaction of arm and frequency of meat consumption < .001.

## SUSTAINABILITY

By focusing only on eliminating meat one day per week, Meatless Monday provides a more feasible way to reduce meat consumption among current meat consumers, compared with complete elimination diets as seen with vegetarianism and veganism. Although real-world evidence of the impact of the Meatless Monday campaign is nascent, many popular fast-food chains (including McDonald's, Subway, and Burger King) already offer plant-based options on their menu, and Starbucks has even launched a campaign to provide customers discounts for meatless options on Monday.<sup>8,9</sup>

## PUBLIC HEALTH SIGNIFICANCE

Our results suggest that the Meatless Monday campaign's health and environmental messages are effective in increasing intention to reduce meat consumption among consumers who are exposed to them. Because previous evidence from behavioral studies has shown that intention to change is one of the strongest predictors of actual behavioral change, national distribution and promotion of the Meatless Monday campaign could have meaningful effects on meat consumption in the United States.<sup>6,10,11</sup> Although this study shows promise with regard to the perceived effectiveness of the messages, it is important to acknowledge that campaign messages can only be effective if they are aired at sufficient weight to be noticed by the majority of the population over a sustained period.<sup>12</sup> Overall, our results suggest that widespread implementation of similar initiatives among other popular food chains and through public policy could prove to be a promising and attainable step

forward in reducing meat consumption in the United States. *AJPH*

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### PUBLICATION INFORMATION

Full Citation: Rayala Hannah-Therese, Rebolledo N, Hall MG, Taillie LS. Perceived message effectiveness of the Meatless Monday campaign: an experiment with US adults. *Am J Public Health*. 2022;112(5):724–727.

Acceptance Date: January 23, 2022.

DOI: <https://doi.org/10.2105/AJPH.2022.306766>

### CONTRIBUTORS

L. S. Taillie conceptualized the study. L. S. Taillie and M. G. Hall acquired funding. H.-T. Rayala analyzed the data, drafted the manuscript, and contributed to data analysis and interpretation. All authors critically reviewed and revised the manuscript.

### ACKNOWLEDGMENTS

This research was funded by Wellcome Trust. M. Hall's time writing the article was supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health (K01HL147713). N. Rebolledo's time writing the article was supported by Becas Chile Doctorado 2017 (#72180546).

We thank Isabella Higgins for her support on project management, Carmen Prestemon for her help with survey development, and Christina Chauvenet for her insights on messages related to the health and environmental harms of red meat. We thank the Meatless Monday campaign, and in particular Dana Smith, campaign manager, for providing us the top downloaded Meatless Monday messages for use in this experiment.

**Note.** The contents are solely the responsibility of the authors and do not necessarily represent the official views of the National Institutes of Health.

### CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

## HUMAN PARTICIPANT PROTECTION

The institutional review board of the University of North Carolina at Chapel Hill approved all study procedures (IRB #20-2552). All participants provided their written informed consent before accessing the main study survey.

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