Watch What You Eat: The Role of Individual Differences in Determining the Effectiveness of Video Appeals in Reducing Meat Intake

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APPROVAL PAGE

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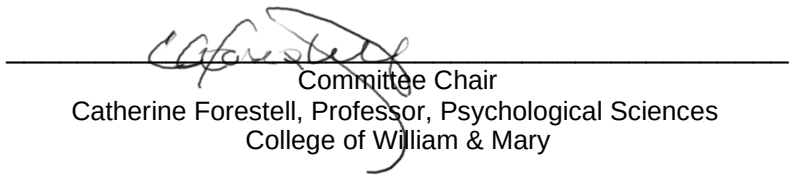

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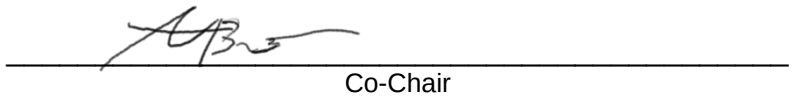

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COMPLIANCE PAGE

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ABSTRACT

Meat production is associated with negative effects on the environment and inhumane treatment of animals. It is also associated with negative health outcomes. Increasing awareness of these negative effects may encourage people to reduce their meat consumption. Previous studies have demonstrated that video interventions that focus on the negative effects of meat production and consumption increase university students' intentions to reduce meat intake and decrease implicit wanting for meat. The current study aimed to extend these findings to determine whether individual differences in personality characteristics and concerns related to the effects of meat consumption would moderate the effect of video interventions on intentions to reduce meat intake and implicit wanting. Additionally, the study aimed to test whether intentions to reduce meat consumption would predict real changes in meat consumption one week post-intervention. Results demonstrated that environmental and animal welfare, but not health-related video appeals, increased intentions to reduce meat intake. In contrast, none of the video appeals decreased implicit wanting of meat. Social Dominance Orientation and Meat Attachment were predictive of intentions to reduce meat intake and implicit wanting but did not moderate the effects of videos. Likewise, climate change worry and speciesism were predictive of intentions and implicit wanting but did not moderate the effect of their respective videos. Finally, intentions to reduce meat intake did not predict reductions in meat consumption. These results suggest that, while video appeals may increase people's intentions to reduce meat, these intentions are not moderated by individual differences related to meat consumption, and they may not translate to behavioral changes in university students.

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ACKNOWLEDGEMENTS

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Watch What You Eat: The Role of Individual Differences in Determining the Effectiveness of Video Appeals in Reducing Meat Intake

Evidence demonstrates that eating red meat, especially processed meat, may be related to a higher risk of a variety of negative health outcomes, including diabetes, heart disease, stroke, and cancer (Wolk, 2017). Beyond this, production of meat on a scale large enough to meet consumer demand often involves inhumane treatment of animals (Mallon, 2005; Perry & Brandt, 2007) and has destructive effects on the environment (Djekic, 2015). Therefore, as a matter of public health and environmental concern, reducing consumption of red and processed meat could have important societal benefits.

Increasing Awareness about the Risks Associated with Meat Consumption

Responsible decision-making relies on access to information about positive or negative outcomes that result from behavior. Because relatively few people are aware of the negative effects related to consuming meat (Grummon et al, 2022a), research has shown that presenting people with information regarding the health, animal welfare, and environmental risks associated with meat consumption may increase motivation to reduce meat consumption. For instance, participants in previous studies have reported lower intentions to eat meat after exposure to information regarding the detrimental effects of meat on the environment (Graham & Abrahamse, 2017). Making people aware of animal welfare concerns may also be related to reduced intentions to consume meat (e.g., Cordts et al., 2014; Palomo-Vélez et al., 2018). In a study by Palomo-Vélez and colleagues (2018), presenting participants with images of animals in

inhumane conditions was related to lower ratings of meat images. Health-focused interventions have also demonstrated efficacy in reducing intentions to eat meat (e.g., Carfora et al., 2019; Cordts et al., 2014). For example, daily information demonstrating the health benefits of reducing meat consumption increased participants' willingness to reduce meat consumption (Carfora et al., 2019). Additionally, Fehrenback (2015) found that watching a video regarding the negative health impact of meat was related to participants' increased intentions to reduce meat consumption.

The methods used to effectively provide information varies from daily text messages (Carfora et al., 2019) to fake newspaper articles (Cordts et al., 2014). In one such study, Grummon and colleagues (2022b) presented participants with messages about how reducing intake of red meat can improve animal welfare, health, or the environment. These messages, which were designed to mimic social media messages, were presented to a national sample of American adults as part of an online study. This study found that relative to controls, environmental and health, but not animal welfare messages, were related to a lower demand for red meat products during a hypothetical restaurant order. In addition to printed messages, documentary-style media that promote meatless diets have been shown to be effective approaches for changing omnivores' attitudes and eating habits (e.g., Connon, 2018; Pabian et al., 2020). Recently, Herchenroeder et al. (2022) found that after watching 10-minute videos that addressed either environmental, animal welfare, or health outcomes associated with meat production, intentions to reduce meat consumption was increased in

the environmental condition and wanting for meat was reduced for all experimental conditions relative to control participants.

Measures of Responses to Food

As in the Grummon et al. (2022b) study, in which participants were asked to order foods from a menu, a popular approach to measuring people's responses to animal-based products is to ask them to explicitly indicate their ratings of meat (e.g., Palomo-Vélez et al., 2018), or future intentions to consume meat (e.g., Carfora et al., 2019; Cordts et al., 2014; Graham & Abrahamse, 2017). These explicit responses to food are the result of conscious deliberation; people are given the opportunity to consciously reflect on their attitudes and feelings about and their preferences for meat. Nevertheless, such conscious deliberations do not necessarily accurately assess attitudes and intentions because they are often biased by social desirability and demand characteristics (Anderson, 2017). This may be especially true in the context of research related to meat reduction, in which participants are indirectly or even directly informed that consuming meat is a harmful (or unethical) behavior. It is possible that they may feel obliged to indicate that they will reduce their meat intake to "save face"; or alternatively, they may feel threatened by this information, which in turn may cause them to react defensively (Shulman et al., 2021).

In contrast, implicit cognitive responses are automatic and unconscious and may therefore be less biased by these processes. Moreover, given that participants may not be consciously aware of their changed attitudes toward meat, implicit responses may provide a means for them to express these

feelings. This has been demonstrated by previous interventions that produced lower implicit wanting for meat, but no changes in explicit wanting (Cerrato & Forestell 2021). Similarly, Herchenroeder et al. (2022) did not find a significant differences in explicit wanting for meat following their documentary intervention, despite the significant differences in implicit wanting.

Individual Differences

Although personal health, animal welfare, and environmental concerns are cited as common motivators for the independent adoption of meatless diets (Clonan et al., 2015; Hopwood et al., 2020; Fox & Ward, 2008) they are not effective motivators for all. This is largely because individual and collective attitudes toward meat are multidimensional and complex. For example, a review by Stoll-Kleemann and Schmidt (2017) identified factors – such as personal values and attitudes and perceptions of social norms – which influence levels of meat consumption.

There are a variety of constructs that have been shown to be associated with people's meat consumption. One such construct is Meat Attachment (MA; Graça et al, 2015) which describes a person's trait attachment to meat and positive bond toward meat consumption. MA is related to participants' willingness to consume alternative proteins, with those higher in MA less willing to try or adopt meat alternatives (Circus & Robinson, 2019). Additionally, those who are more attached to meat may be less likely to view meat consumption as a public health issue (Graça et al, 2015a; Graça et al, 2015b).

Social dominance orientation (SDO; Pratto et al., 1994), which describes people's general support for social hierarchies, has also been shown to be positively associated with meat consumption. SDO specifically addresses relationships between human social groups. However, because eating animals is a form of human-over-animal domination, it is not surprising that those who endorse hierarchical domination in human-to-human relations might also endorse greater human-to-animal domination (Allen et al., 2000). This has been supported in studies that have reported that those with high SDO are less willing to adopt meatless diets (Braunsberger et al., 2021; Dhont & Hudson, 2014), which is likely a result of the belief that human beings are superior to other animals in a moral hierarchy.

In addition to their general values about social hierarchies and attachment to meat, people's responses to environmental, animal welfare, or health appeals may be influenced by beliefs and attitudes related to these issues. For example, past research indicates that individuals who already have high levels of concern for the environment are more willing to reduce their meat consumption (Cheah et al., 2020). As a result, information about the environmental impacts of meat production may have greater impact on these individuals. Similarly, participants who are more concerned about their own personal health may be more open to meat-reduction appeals related to health (Lai et al., 2020). Conversely, speciesism – which is the belief in human superiority over other animals – is related to higher levels of meat consumption generally (Caviola et al., 2019), and

individuals high in speciesism may therefore be less likely to respond to information regarding animal welfare.

Therefore, a primary goal of the current study was to replicate and extend Herchenroeder et al. (2022) by determining whether individual differences moderate the effectiveness of the documentary-style interventions.

The Intention-Behavior Gap

An additional aspect of changing consumer behaviors involves the gap between intention and behavior. Much of the research discussed in the previous paragraphs regarding meat consumption behaviors is related to measured intentions rather than measured behaviors (e.g., e.g., Carfora et al., 2019; Cordts et al., 2014; Graham & Abrahamse, 2017). In the context of ethical consumer behavior, intentions to reduce behavior do not reliably predict changes in behavior. In a review of literature related to ethical consumption, Hassan and colleagues (2016) highlight a general lack of studies that assess whether intentions lead to action. As a result, their review recommends further research must be conducted to understand *how* intentions do or do not become actions.

Models that address the intention-behavior gap propose that planning plays an important role in the relationship between intention and behavior (Scholz et al., 2008; Wiedemann et al., 2009), though evidence of this is mixed (Hassan et al., 2016). For instance, the Transtheoretical Model proposed by Prochaska and DiClemente (1983) discusses various stages of planning which include Precontemplation, Contemplation, Preparation, Action, and Maintenance as important aspects of behavioral changes. In the specific context of meat

consumption, Wolstenholme and colleagues (2021) examine psychosocial factors associated with intentions to reduce meat with a framework that combines the Transtheoretical Model and the Theory of Planned Behavior; their findings suggest that participants' attitudes toward meat reduction, subjective norms of meat consumption, and meat-eating identities played significant roles on their intentions to reduce meat intake, but these roles varied as participants moved through each stage of planning and action. For example, in the Contemplation stage, attitude and subjective norm predicted intentions, while only attitude predicted intentions in the Preparation stage.

Various factors outside of individual characteristics may motivate or dissuade individuals' meat reduction. Kemper (2020) identified enjoyment of meat and the nutritional benefits associated with meat as barriers against the elimination of meat. In addition, perceptions of benefits related to the reduction of meat and the social norms surrounding meat consumption (e.g., personal attitudes toward meat reducers or perceptions of social support and social pressures) may play a role (Cheah et al., 2020). Given the relationship between income and food accessibility, cost of meat compared to meat substitutes may be an additional factor affecting individuals' changes in meat consumption (Ritchie et al., 2018).

Because Herchenroeder et al. (2022) tested participants' intentions to reduce meat immediately after watching the documentary-style interventions, rather than subsequent behavioral change, it remains unclear whether these intentions led to behavioral reductions in meat intake. Therefore, the efficacy of

documentary-style interventions needs to be further explored by assessing sustained intentions and behavioral change following the interventions (Hassan et al., 2016).

Current Study

The current study had two principal aims. First, we aimed to replicate Herchenroeder et al. (2022) by assessing whether exposure to short videos that provided information about the environmental, animal welfare, or health risks associated with eating meat reduced people's implicit wanting for meat and their explicit intentions to reduce meat among university students. Additionally, we sought to determine whether individual differences in Social Dominance Orientation (SDO), meat attachment (MA), climate change concerns, speciesism, and health concerns moderated the effectiveness of the documentary-style interventions in a sample of university students. Because university students are largely in a transitional period of emerging adulthood, characterized by identity exploration and behavioral changes (Arnett, 2000), theymay be more open to dietary changes. The university setting may additionally provide students with the environment to safely experiment with new foods and dietary habits outside of their family norm. Therefore, university students and young adults may be a key demographic to target for dietary change interventions.

We hypothesized that the environmental, animal welfare, and health video appeals would result in higher intentions to reduce meat intake and less implicit wanting of meat relative to controls. Moreover, in line with Herchenroeder et al. (2022), we hypothesized that those who viewed the environmental video would

have the strongest intentions to reduce meat intake and the lowest implicit wanting of meat.

Further, we hypothesized that individual differences would moderate the effect of the outcome variables (intentions to reduce meat and implicit wanting of meat). That is, we predicted that group differences (i.e., between the experimental groups and the control group) for intentions to reduce meat and implicit wanting of meat would be larger for those who were low on SDO and MA than for those who were high on SDO and MA. In addition, we expected that individual concerns about the environment, speciesism, and concern about one's own health would moderate the effect of the respective video on intentions to reduce meat intake and implicit wanting of meat.

A secondary aim of this study was to determine whether stated intentions to reduce meat intake were sustained and reflected in behavior one-week after the intervention. We expected that those with stronger intentions to reduce meat intake after watching the video appeal would report greater success in reducing their meat intake one week later.

Method

Participants

A sample of 370 undergraduate students participated in this study in partial fulfillment of a class requirement. Participants were invited to participate in the study if they indicated that they did not restrict their intake of meat on a pre-screening survey. Participants were 18 years of age or older and were from a medium-size liberal arts university located in southeastern Virginia. All

procedures in this study were approved by the institutional review board at William & Mary [protocol number: PHSC-2023-02-09-16118] and conducted in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments.

Measures

Predictors and Moderators

Social Dominance Orientation. Social dominance orientation was assessed using the Social Dominance Orientation Scale (Pratto et al., 1994) which measures one's support for social hierarchy. Participants respond to the 14 items measured on a 7-point Likert scale (1 = Very Negative, 7 = Very Positive). Example items include, "Inferior groups should stay in their place" and "To get ahead in life, it is sometimes necessary to step on other groups". Internal reliability was adequate (α = .89).

Meat attachment. Meat attachment was assessed using the Meat Attachment Questionnaire (MAQ; Graça et al., 2015). This questionnaire assesses one's positive affective connection to meat and consists of 16 items, which are measured on a 5-point response scale (1 = Strongly Disagree, 5 = Strongly Agree). Participants were asked "Please indicate to what extent you agree or disagree with the following statements". The MAQ returns various subscores, including *Hedonism* (e.g., "To eat meat is one of the good pleasures in life"), *Affinity* (e.g., "To eat meat is disrespectful towards life and the environment"), *Entitlement* ("To eat meat is an unquestionable right of every person"), and *Dependence* (e.g., "Meat is irreplaceable in my diet"). For the

purposes of the current study, only the global meat attachment score was used. Internal reliability of the global score was high (α = .90).

Climate Change Worry Scale. Participants' worries associated with climate change were assessed with the Climate Change Worry Scale (CCWS; Stewart, 2021). The CCWS consists of 10 statements (e.g., "I worry about climate change more than other people", "I worry about how climate change may affect the people I care about"). Participants indicated the frequency with which each statement was applicable to them on a 5-point Likert scale (1 = Never, 5 = Always). Internal reliability was adequate (α = .77).

Speciesism. Speciesism was assessed using the Speciesism Scale (Caviola et al., 2019) which consists of 6 items (e.g., "Morally, animals always count for less than humans" and "It is morally acceptable to trade animals like possessions"), measured on a 7-point Likert scale (1 = Strongly Disagree, 7 = Strongly Agree). Internal reliability was adequate (α = .76).

Health concerns. Participants' concerns about personal health were assessed using one of two scales from Dutta-Bergman (2004); their study separately measured health consciousness and healthy activities, but our analyses included only questions related to health consciousness. Health consciousness is measured by five items (e.g., "living life in the best possible health is very important to me", "I do everything I can to stay healthy"), which participants rate the degree to which they agree with each statement on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Internal reliability of these questions was adequate (α = .80).

Outcome Measures

Intentions to reduce meat intake (IRMI). Participants responded to four statements on a 7-point Likert scale (1 = Disagree Strongly, 7 = Agree Strongly) based on a paper by De Groeve et al. (2019). The four statements were as follows: “I am willing to eat meat less often per

Implicit wanting. Implicit wanting for meat (IWM) was assessed using an adapted version of the Leeds Food Preference Questionnaire (LFPQ: Finlayson et al., 2008) created in PsyToolkit (Stoet, 2010, 2017) during the initial and follow-up sessions. Participants were presented with two food images; one of which depicted meat and the other nonmeat. They are asked to respond to the prompt, “Which food do you most want to eat now?” as quickly as possible, and all trials were presented in a randomized order. Stimuli remain on the screen for 5000 ms or until the participant makes their choice; each trial was separated by an intertrial interval of 500 ms. To improve reliability, participants complete four test trials before completing the task trials.

Food Images*.* Food images were taken from the food pics database (Blechert et al., 2014). The meat images included the following foods: grilled chicken, grilled pork, roasted chicken, hamburger, salmon, and T-bone steak. The non-meat images included the following foods: cashews, peanut butter, cheese, broccoli, carrots, and peas. Each picture was shown on a white background and all photos were resized to 350 x 263. All images were presented in cooked or prepared form.

Meat intake. Participants' meat intake was determined through a measure adapted from De Backer et al. (2020). Participants were asked how many times in a month they eat meat for breakfast, lunch, dinner, and as a snack, on a scale ranging from "Never" to "Daily". Participants responded separately for each meal and snack. During the follow-up session, participants responded to similar questions that asked them to report their consumption over the week prior to the follow-up.

Stage of Change (SOC). Participants were asked in which stage of behavioral change process they categorize themselves by prompting them to "Select which of the following statements best describes you currently". The four options included "I have never considered reducing my meat consumption" (phase 1); "I've considered reducing my meat consumption, but I haven't yet put this plan into practice" (phase 2); "I make sure I consume less meat occasionally. In the future it is my firm intention to do this on a regular basis" (phase 3); "I take consuming little or no meat for granted" (phase 4). These statements were developed by Weibel et al. (2019), adapting the operationalization of the four behavioral change phases from Bamberg (2013). In this framework, Stage (or phase) 1 corresponds to precontemplation (participants have not thought about changing behavior), Stage 2 corresponds to contemplation (participants have thought about changing the behavior but have not started), Stage 3 corresponds to action and preparation to do more in the future, and Stage 4 corresponds to maintenance of behavior change.

Procedure

Participants were randomly assigned to one of four video appeal groups: environmental (*n* = 74), animal welfare (*n* = 73), personal health (*n* = 75), or a control group (*n* = 74). Participants first responded to a series of questionnaires to measure a variety of trait variables (e.g., social dominance orientation, meat attachment, speciesism, environmental concern, and health concern) as well as relative frequency of meat consumption over the past week and their SOC. Participants from each of the three experimental conditions watched a clip (approximately 10 minutes long) from the documentary film *H.O.P.E. What You Eat Matters* that corresponded to their assigned condition. Those in the control condition watched a clip of approximately equal length from the documentary *Voices of Debt – The Student Loan Crisis: Don't Major in Debt*. Following the video, participants answered a multiple-choice question to indicate the topic of the video just watched, for which the answer was used as an attention check. Participants completed a task to measure their implicit wanting of meat and then rated their willingness to reduce meat consumption.

Immediately after completion of the questionnaires, participants were asked to schedule a follow-up session with a researcher one week after the intervention. In this follow-up session, participants completed the IWM task, and responded to a measure of their relative frequency of meat consumption over the previous week and their SOC.

Statistical Analysis

Prior to analysis, the outcome variables were assessed and were determined to satisfy the assumption of normality because skew values were

less than 1 and kurtosis values were less than 2 (Garson, 2012). Furthermore, data from the implicit wanting task were processed to ensure only valid trials were included. Practice trials were discarded, along with any trials in which responses were faster than 200ms (83 trials) or longer than 4720ms (three standard deviations above the mean; 180 trials). This resulted in a total of 2.4% of the trials being discarded. Implicit wanting scores were calculated following the procedure outlined by Oustric et al. (2020). First, the trials in which a meat was chosen relative to nonmeat items were determined, and mean reaction times were calculated for each participant. The measure of IWM or nonmeat items was calculated with a frequency-weighted algorithm, which accounts for speed and frequency of choosing or not choosing meat items relative to nonmeat items. Thus, a positive score indicates implicit wanting for meat items and a negative score reflects implicit wanting for nonmeat items, while the absolute value of the score indicates the level of preference for each category.

To determine whether the current study replicated Herchenroeder et al., (2022), we conducted a series of univariate ANOVAs with condition as the categorical independent variable and IRMI and IWM as continuous dependent variables. For statistically significant differences, post-hoc analyses were conducted to determine differences between groups.

We subsequently performed moderation analyses using hierarchical linear regression, wherein we entered condition and mean-centered moderator variables as predictors in Step 1, and the interaction terms in Step 2. Condition was dummy-coded and the control group was used as the reference variable. All

three experimental conditions were examined relative to the control when SDO and MA were tested as moderators. In the case of condition-specific moderators (e.g., climate concern, speciesism, and health values), the appropriate condition was examined separately against the control condition.

Prior to analysis of behavioral change, we calculated estimated weekly meat consumption. For follow-up data, estimates of meat consumption were simply added given that participants were only asked to estimate meat consumption of the week prior to the follow-up session. We used a repeated-measures ANOVA with condition as a between-subjects variable to determine whether changes in meat consumption varied by condition. To analyze behavioral changes, we ran simple linear regression analyses to test whether participants' IRMI during the initial portion of our study predicted changes in meat consumption between the two sessions, treating aggregate intentions as the predictor and the difference in weekly estimates (pre-video – follow-up) as the outcome variable.

We ran additional exploratory analyses, wherein we used a repeated-measures ANOVA to determine whether participants' Stage of Change changed significantly over time and by condition.

Results

Participant characteristics

Of the 370 participants, 74 were omitted from analyses because they did not complete the task (n = 61), indicated that they were vegetarian or vegan (n = 3), or failed an attention check (incorrectly indicating the topic of the video they were

shown; n = 10). The final sample of 296 participants consisted of 68.6% White, 12.8% Asian, 5.7% Black or African American, and 7.4% mixed race; of these, 9.8% were Hispanic or Latino. As shown in Table 1, there were no differences between experimental groups in participants' age ($F(3,289) = 0.45$, $p = 0.716$), BMI ($F(3,285) = 0.83$, $p = 0.478$), or in the gender distribution across groups ($\chi^2(3) = 1.21$, $p = 0.750$). Additionally, no differences were found across groups in their levels of average weekly meat consumption ($F(3,279) = 0.55$, $p = 0.646$), SDO ($F(3,291) = 0.42$, $p = 0.738$), MA ($F(3,291) = 0.15$, $p = 0.930$) and all its subscales (all p values > 0.200), climate change worry ($F(3,291) = 0.15$, $p = 0.928$), speciesism ($F(3,292) = 0.64$, $p = 0.590$), or health concerns ($F(3,292) = 0.15$, $p = 0.928$). Finally, no significant differences in initial SOC were found across conditions; $F(3,291) = 0.36$, $p = 0.781$.

Table 1. Participant Characteristics (*Mean* ± *SE* or %)

	Environment (*n* = 74)	Animal Welfare (*n* = 73)	Personal Health (*n* = 75)	Control (*n* = 74)
Age (y)	19.54 ± 0.16	19.29 ± 0.15	19.34 ± 0.15	19.54 ± 0.20
BMI (m/kg^2)	24.15 ± 0.53	23.42 ± 4.22	24.29 ± 0.74	23.22 ± 0.49
Gender (% Women)	61.64%	61.64%	57.33%	51.35%
Meat Consumption (freq per week)	13.87 ± 0.84	13.42 ± 0.79	14.78 ± 0.82	14.28 ± 0.70
Meat Attachment	3.51 ± 0.09	3.59 ± 0.09	3.54 ± 0.10	3.58 ± 0.07
Hedonism	3.57 ± 0.11	3.79 ± 0.12	3.60 ± 0.12	3.83 ± 0.09
Affinity	3.55 ± 0.10	3.78 ± 0.10	3.72 ± 0.09	3.69 ± 0.09
Entitlement	3.34 ± 0.11	3.44 ± 0.11	3.56 ± 0.12	3.36 ± 0.09
Dependency	3.30 ± 0.12	3.14 ± 0.12	3.10 ± 0.14	3.17 ± 0.11
Social Dominance Orientation	1.87 ± 0.08	2.00 ± 0.10	1.95 ± 0.08	1.90 ± 0.09
Health Concern	4.12 ± 0.07	4.08 ± 0.08	4.14 ± 0.06	4.09 ± 0.08
Speciesism	2.82 ± 0.13	2.97 ± 0.11	3.03 ± 0.13	2.85 ± 0.11
Climate Concern	25.51 ± 1.10	25.64 ± 0.97	25.19 ± 0.90	26.11 ± 0.95
Stage of Change	1.76 ± 0.09	1.79 ± 0.10	1.73 ± 0.09	1.66 ± 0.09

Replication of Herchenroeder et al., 2022

Consistent with Herchenroeder et al. (2022), we found a significant main effect of group on participants' IRMI; $F(3,292) = 3.75$, $p = 0.011$. As shown in Figure 1, post hoc tests showed that IRMI was higher only in the environmental group ($M = 4.89$, $SD = 1.40$) relative to the control ($M = 4.06$, $SD = 1.49$).

Unlike results observed in Herchenroder et al. (2022), IWM was not significantly different across conditions, as seen in Figure 2; $F(3,263) = 1.37$, $p = 0.254$.

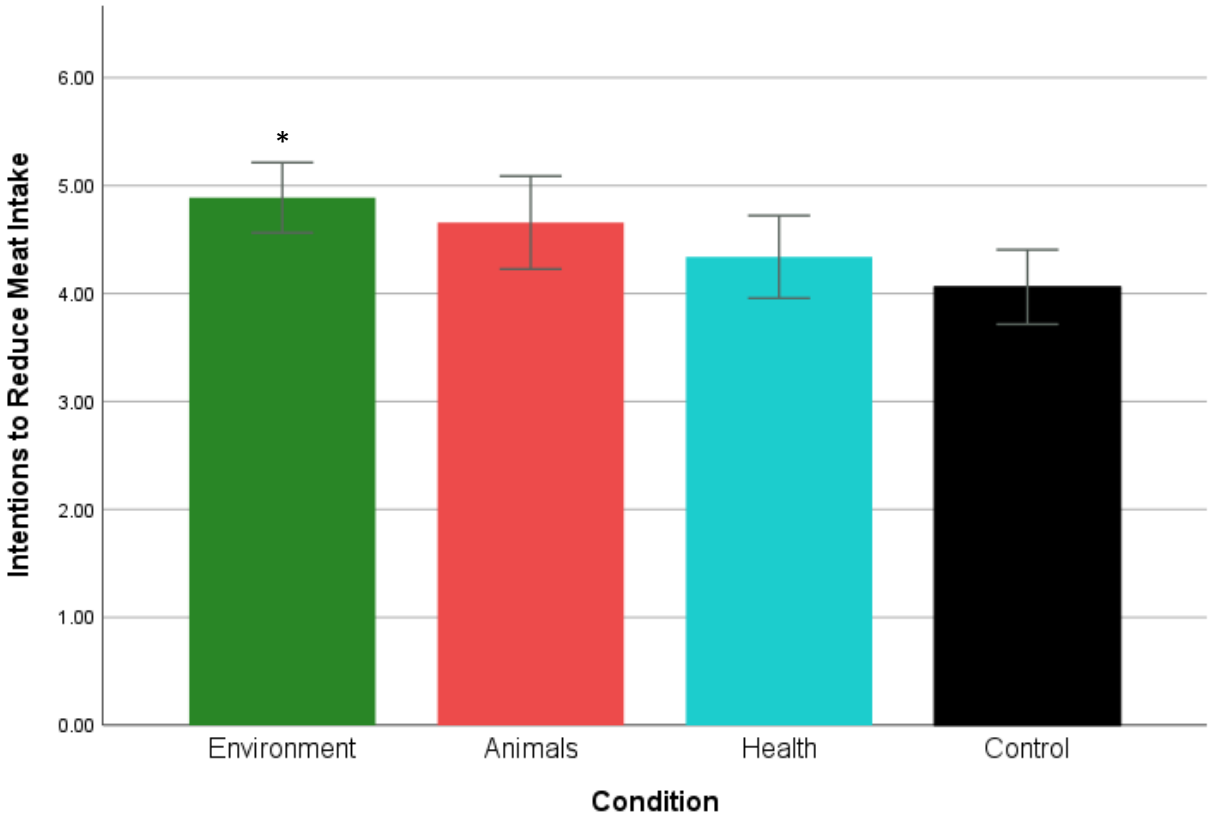

Figure 1. Bar graph of mean IRMI grouped by condition with error bars (95% CI).

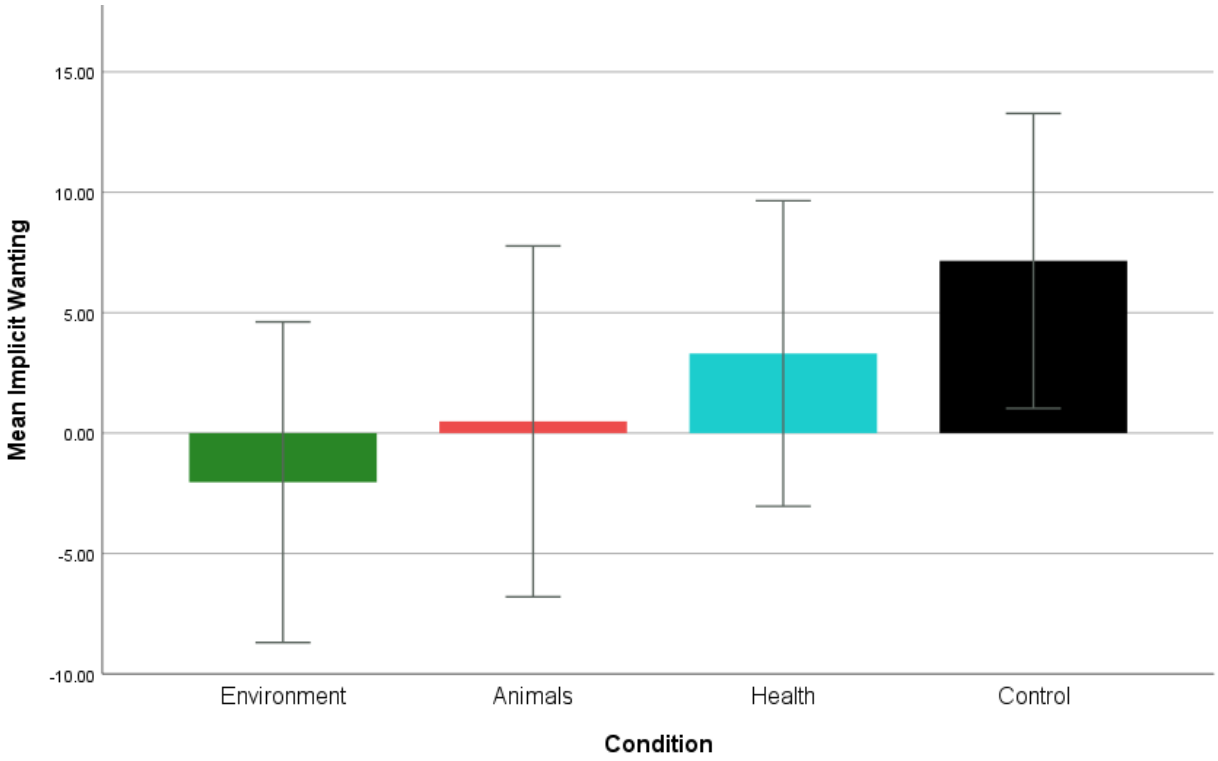

Figure 2. Bar graph of mean implicit wanting toward meat grouped by condition with error bars (95%CI).

Moderation Analyses

Social Dominance Orientation

As shown in Table 2, the hierarchical linear regression model explained 15.0% of the variance among IRMI and was significant; $F(4,290) = 12.79$ $p < 0.001$). The environmental ($\beta = 0.21$, $p = 0.002$) and animal welfare ($\beta = 0.16$, $p = 0.015$) conditions, in addition to SDO ($\beta = -0.34$, $p < 0.001$) independently predicted IRMI. However, the addition of interaction terms (SDO × *condition*) did not significantly predict IRMI; $R^2 = .15$, $F(3,287) = 0.39$, $p = 0.759$. As demonstrated in Figure 3, the strength of the relationship between SDO and IRMI did not significantly differ between conditions.

A similar hierarchical linear regression model was conducted with implicit wanting as the outcome variable. Overall, this analyses explained 6% of variance in implicit wanting, and was significant; $F(4,261) = 3.88$, $p = 0.004$. While none of the experimental conditions significantly predicted IWM, the environmental condition was marginally significant ($\beta = -0.14$, $p = 0.055$). Additionally, SDO significantly predicted implicit wanting ($\beta = 0.20$, $p < 0.001$). The addition of interaction terms did not account for a significant additional variance in implicit wanting; $R^2 = .06$, $F(3,258) = 0.14$, $p = 0.934$.

Table 2. Linear hierarchical regression models, with IRMI or implicit wanting as outcome variables, condition as a predictor, and SDO as a moderator.

		B	***SE B***	***β***	**R^2**	**F for ΔR^2**
Intentions to Reduce Meat Intake with SDO as a moderator						
1.	(Intercept)	4.04	0.18		.15	12.79***
	Environment	0.78**	0.25**	0.21**		
	Animal Welfare	0.61*	0.25*	0.16*		
	Health	0.38	0.25	0.10		
	SDO	-0.77***	0.12***	-0.34***		
2.	(Intercept)	4.04	0.18		.15	0.39
	SDO × Environment	-0.26	0.35	-0.06		
	SDO × Animal Welfare	-0.07	0.33	-0.02		
	SDO × Personal Health	0.12	0.35	0.03		
		B	***SE B***	***β***	**R^2**	**F for ΔR^2**
Implicit Wanting for meat with SDO as a moderator						
1.	(Intercept)	7.29	3.35		.06	3.88**
	Environment	-9.09	4.71	-0.14		
	Animal Welfare	-5.12	4.67	-0.10		
	Health	-4.83	4.61	-0.08		
	SDO	7.67***	2.29***	0.20***		
2.	(Intercept)	7.25	3.37		.06	0.14
	SDO × Environment	3.21	6.73	0.04		
	SDO × Animal Welfare	3.87	6.33	0.06		
	SDO × Personal Health	1.70	6.61	0.02		

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

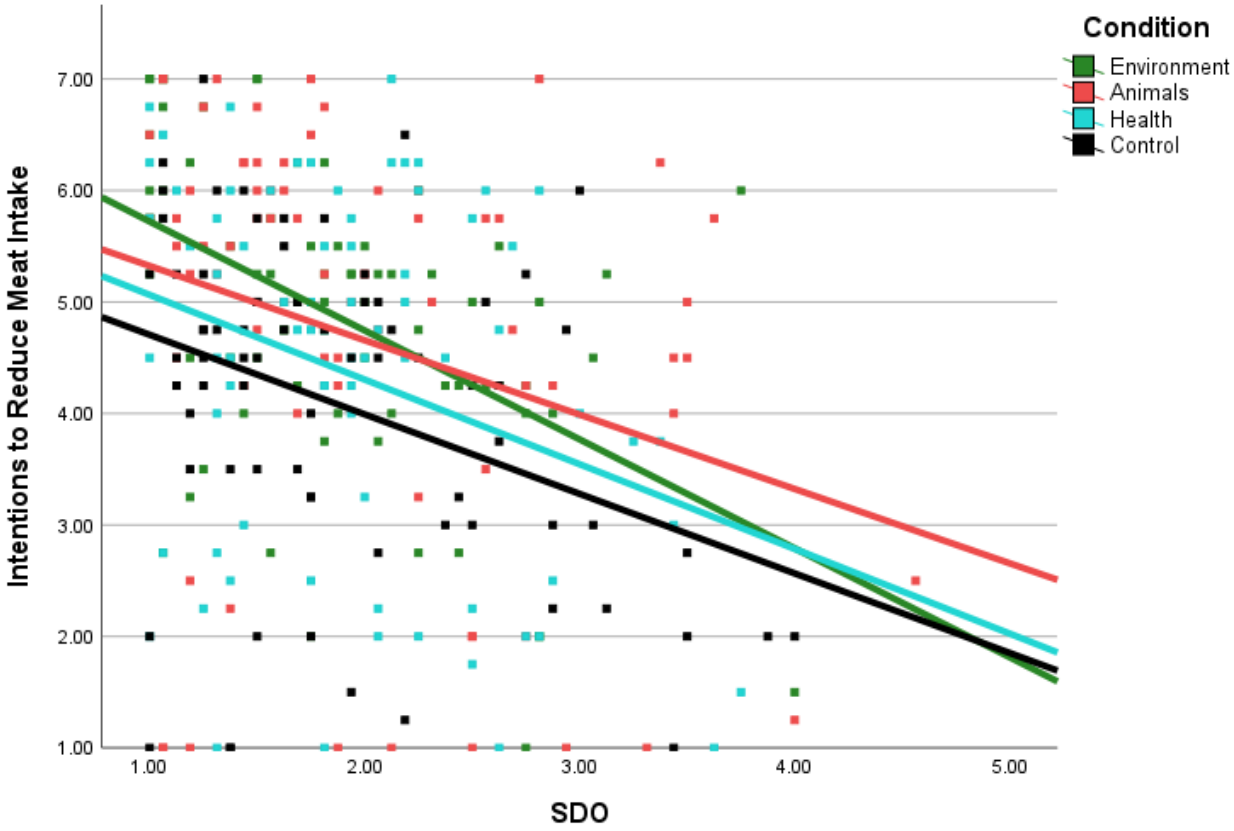

Figure 3. Plot demonstrating the interaction between SDO and Condition.

Meat Attachment

As shown in Table 3, a similar pattern was observed when MA was entered into the regression as a moderator for the relationship between condition and IRMI. The model explained 38% of the variance and was significant; $F(4,291) = 44.88$, $p < 0.001$. Environmental ($\beta = 0.20$, $p < 0.001$) and animal welfare ($\beta = 0.15$, $p = 0.009$) conditions, as well as MA ($\beta = -0.59$, $p < 0.001$) independently predicted IRMI. As observed in Figure 4, once the interaction terms were added in Step 2, no significant additional variance was attributed to this change, and the interaction terms did not significantly predict IRMI; $R^2 = .39$, $F(3,288) = 1.10$, $p = 0.349$.

Additional hierarchical linear regression analyses demonstrate that condition and MA explained 36% of variance in IWM, and this model was significant; $F(4,262) = 36.30$, $p < 0.001$. In this model, the environmental condition was a significant predictor ($\beta = -0.14$, $p = 0.021$), while other conditions were not. Additionally, MA significantly predicted implicit wanting ($\beta = 0.59$, $p < 0.001$). The addition of interaction terms did not account for a significant additional variance in implicit wanting; $R^2 = .36$, $F(3,259) = 0.77$, $p = 0.510$.

Table 3. Linear hierarchical regression models, with IRMI and IWM as an outcome variable, condition as a predictor, and MA as a moderator.

		B	***SE B***	***β***	**R^2**	**F for ΔR^2**
Intentions to Reduce Meat Intake with MA as a moderator						
1.	(Intercept)	4.09	0.15		.38	44.88***
	Environment	0.75***	0.21***	0.20***		
	Animal Welfare	0.56**	0.21**	0.15**		
	Health	0.28	0.21	0.08		
	MA	-1.26***	0.10***	-0.59***		
2.	(Intercept)	4.08	0.15		.39	1.10
	MA × Environment	0.02	0.31	0.01		
	MA × Animal Welfare	-0.41	0.31	-0.10		
	MA × Health	-0.02	0.30	-0.01		
		B	***SE B***	***β***	**R^2**	**F for ΔR^2**
Implicit Wanting for meat with MA as a moderator						
1.	(Intercept)	6.79	2.77		0.36	36.30***
	Environment	-8.96*	3.87*	-0.14*		
	Animal Welfare	-7.07	3.88	-0.11		
	Health	-3.33	3.80	-0.05		
	MA	20.96***	1.78***	0.59***		
2.	(Intercept)	6.87	2.77		0.36	0.77
	MA × Environment	3.60	5.57	0.05		
	MA × Animal Welfare	8.45	5.67	0.12		
	MA × Personal Health	4.68	5.36	0.06		

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

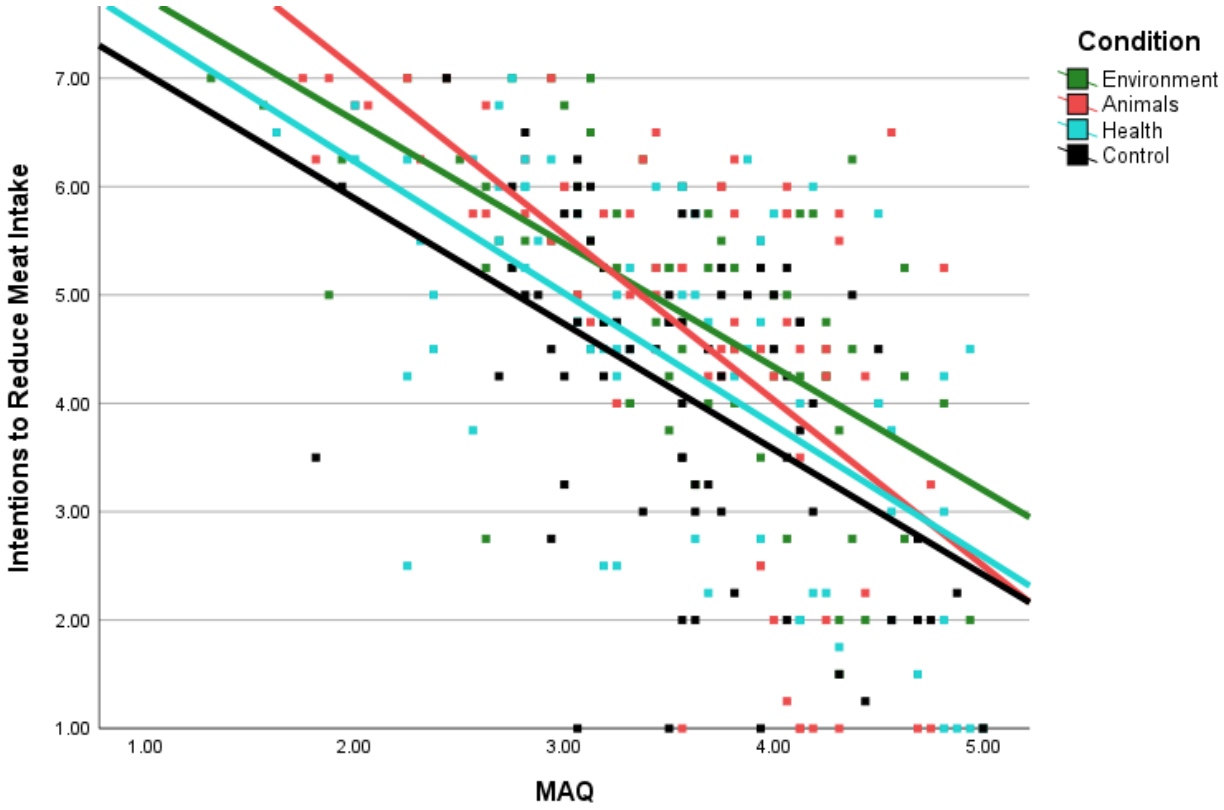

Figure 4. Plot demonstrating the interaction between MA and Condition.

Worry about Climate Change

As shown in Table 4, when worry about climate change worry was examined as a moderator for the relationship between the environmental condition and IRMI, the model predicted 21% of the variance; $F(2,144) = 19.13$, $p < 0.001$. Both the environmental condition ($\beta = 0.28$, $p < 0.001$) and climate change worry ($\beta = 0.37$, $p < 0.001$) separately predicted IRMI. However, the interaction terms did not account for significant additional variance; $F(1,143) = 0.12$, $p = 0.729$.

A similar pattern was observed when IWM was examined as an outcome variable, wherein 9% of the variance was explained; $F(2,125) = 5.89$, $p < 0.004$. The environmental condition ($\beta = -0.20$, $p < 0.021$) and climate change worry ($\beta =$

-0.23, $p < 0.009$) independently predicted IWM. The addition of interaction terms in Step 2 did not account for any additional variance in IWM; $R^2 = .10$, $F(1,124) = 1.29$, $p = 0.241$.

Table 4. Linear hierarchical regression models, with IRMI as an outcome variable, condition as a predictor and climate change worry as a moderator.

	B	***SE B***	***β***	**R^2**	***F* for ΔR^2**
Intentions to Reduce Meat Intake with Climate Worry as a moderator					
1. (Intercept)	4.03	0.16		.21	19.13***
Environment	0.85***	0.22***	0.28***		
Climate Worry	0.06***	0.01***	0.37***		
2. (Intercept)	4.03	0.16		.21	0.12
Climate Worry × Environment	-0.01	0.03	-0.04		
	B	***SE B***	***β***	**R^2**	***F* for ΔR^2**
Implicit Wanting for meat with Climate Worry as a moderator					
1. (Intercept)	7.71	3.18		.09	5.89**
Environment	-10.39*	4.46*	-0.20*		
Climate Worry	-0.67**	0.25**	-0.23**		
2. (Intercept)	7.41	3.18		.10	1.39
Climate Worry × Environment	-0.60	0.51	-0.16		

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

Speciesism

Speciesism was examined as a moderator for the relation between the animal welfare condition and IRMI. As shown in Table 4, the model was significant overall, predicting 12.7% of variance; $F(2,144) = 10.50$, $p < 0.001$. Analyses demonstrate that both the animal welfare condition, relative to the control condition ($\beta = 0.10$, $p = 0.014$), and speciesism ($\beta = -0.31$, $p < 0.001$) separately predicted IRMI. However, the interaction terms did not account for significant additional variance; $R^2 = .13$, $F(1,143) = 0.33$, $p = 0.569$.

Additional hierarchical linear regression analyses demonstrate that the animal welfare condition and speciesism explained 8% of variance in IWM; $F(2,127) = 5.68$, $p < 0.004$. The animal welfare condition ($\beta = -0.14$, $p < 0.094$) and speciesism ($\beta = 0.26$, $p < 0.033$) independently predicted IWM. The addition of interaction terms in Step 2 did not account for any additional variance in IWM; $R^2 = .08$, $F(1,126) = 0.00$, $p = 0.952$.

Table 5. Linear hierarchical regression models, with IRMI as an outcome variable, condition as a predictor and speciesism as a moderator.

		B	***SE B***	***β***	**R^2**	***F* for ΔR^2**
Intentions to Reduce Meat Intake with Speciesism as a moderator						
1.	(Intercept)	4.02	0.19		.13	10.50***
	Animal Welfare	0.66*	0.26*	0.10*		
	Speciesism	-0.56***	0.14***	-0.31***		
2.	(Intercept)	4.02	0.19		.13	0.33
	Speciesism × Animal Welfare	-0.16	0.28	-0.07		
		B	***SE B***	***B***	**R^2**	***F* for ΔR^2**
Implicit Wanting for meat with Speciesism as a moderator						
1.	(Intercept)	7.51	3.34		.08	5.68**
	Animal Welfare	-7.87	4.66	-0.14		
	Speciesism	7.34**	2.41**	0.26**		
2.	(Intercept)	7.52	3.48	0.27	.08	0.00
	Speciesism × Animal Welfare	-0.29	4.84	-0.01		

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

Health Concerns

Health concerns were examined as a moderator for the relation between the personal health condition and IRMI. As shown in Table 4, overall, the model was not significant; $R^2 = .01$, $F(2,146) = 0.93$, $p = 0.397$. Neither the personal health condition ($\beta = 0.09$, $p = 0.298$) nor health concerns ($\beta = 0.07$, $p = 0.406$)

significantly predicted participants' IRMI. Similarly, the interaction was not a significant predictor; R^2 = .01, F(1,145) = 0.03, p = 0.872.

When IWM was examined as an outcome variable, the model was not significant; R^2 = .01, F(2,131) = 0.80, p = 0.454. Neither the health condition (β = -0.08, p = 0.381) nor health concerns (β = 0.08, p = 0.361) were significant predictors of IWM.

Table 6. Linear hierarchical regression models, with IRMI and IWM as outcome variables and health values as a moderator.

	B	***SE B***	***β***	**R^2**	***F* for ΔR^2**
Intentions to Reduce Meat Intake with Health Concerns as a moderator					
1. (Intercept)	4.06	0.18		.01	0.93
Personal Health	0.27	0.26	0.09		
Health Concern	0.18	0.21	0.07		
2. (Intercept)	4.06	0.18		.01	0.03
Health Concern × Personal Health	-0.07	0.43	-0.02		
	B	***SE B***	***β***	**R^2**	**F for ΔR^2**
Implicit Wanting for meat with health concerns as a moderator					
1. (Intercept)	7.17	3.24		.01	.80
Personal Health	-3.91	4.45	-0.08		
Health Concerns	3.36	3.66	0.08		
2. (Intercept)	7.14	3.22		.03	2.51
Health Concerns × Personal Health	11.98	7.30	0.19		

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

Meat Reduction Behaviors

Repeated measures analyses of average weekly meat consumption by condition revealed that average weekly meat consumption significantly changed over time; F(1,109) = 8.96, p = 0.003. Interestingly, reported meat consumption was lower before the video intervention (M = 13.97, SD = 6.62) compared to after

the video intervention (*M* = 15.64, *SD* = 6.01), which was the opposite of what we expected. Moreover, there was no significant effect of condition; $F(3,109) = 2.68$, $p = 0.051$, nor was there a significant condition × time interaction; $F(3,109) = 1.29$, $p = 0.281$. Moreover, IRMI did not predict lower consumption of meat; $r(113) = 0.09$, $p = 0.324$).

Exploratory Analyses

Stage of Change

We ran additional analyses to determine whether there was a change over time in participants' Stage of Change. Repeated measures analyses revealed that there was an effect of time on Stage of Change, such that Stage of Change increased for participants from before exposure to the video (*M* = 1.76, *SD* = 0.79) to after exposure to the video (*M* = 1.89, *SD* = 0.71); $F(1,136) = 8.02$, $p = 0.005$. However, there was not a significant effect of condition ($F(3,136) = 1.51$, $p = 0.22$), nor was there was a condition x time interaction within subjects between time and condition ($F(3, 136) = 1.00$, $p = 0.396$).

Discussion

Meat production involves destructive effects on the environment (Djekic, 2015) and inhumane treatment of animals (Mallon, 2005). Additionally, eating red and processed meat is related to negative health outcomes (Wolk, 2017). Increasing awareness of these negative outcomes may reduce meat consumption among consumers. Herchenroeder et al. (2022) found that participants increased intentions to reduce meat intake after watching a 10-minute documentary clip addressing either environmental effects of meat.

Moreover, implicit wanting for meat decreased after watching a documentary clip addressing either environmental, animal welfare, or personal health effects of meat, relative to a control condition. The goals of this study were to replicate and extend findings from Herchenroeder et al. (2022) by determining whether individual differences interact with video appeals to affect intentions to reduce meat and implicit wanting of meat and to determine whether individual differences in SDO, MA and other values related to meat consumption interacted with the information presented in the video appeal to predict intentions to reduce meat intake and implicit wanting of meat. We additionally assessed whether initial intentions predicted reductions in meat intake one week after the experimental session.

Intentions to Reduce Meat Intake

Preliminary findings, which utilized a similar analysis to that of Herchenroeder and colleagues (2022) partially replicated this study. IRMI was significantly higher in participants in the environmental condition relative to those in the control condition. As will be further discussed below, subsequent hierarchical analyses consistently showed that the environmental condition predicted IRMI relative to the control, and in some cases the animal welfare condition also reached significance. These findings suggest that exposing undergraduate students to environmental video appeals and to a lesser extent, to animal welfare video appeals was effective in increasing intentions to reduce meat.

Overall, the personal health condition was not effective in increasing intentions to reduce meat intake relative to the control condition. This may be due to our relatively young sample (with a mean age of 19-20 years) being more receptive to messages about sustainability and ethical behaviors and having a low level of concern about health. This is reflected in other research that has shown that food choices among young adults tend to be less motivated by health compared to factors such as convenience, practicality, or novelty (Power et al., 2019). Regardless of the young age of our sample, these findings are consistent with a systematic review by Valli et al. (2019) which suggest that omnivores generally show a low willingness to reduce their meat consumption regardless of knowledge of its undesirable health effects. Additionally, Americans tend to believe that meat is part of a healthy diet (Neff et al., 2018), and thus may be skeptical of information which contradicts that belief.

When we conducted additional regression analyses to determine the role of individual differences on IRMI, we found that Social Dominance Orientation and Meat Attachment were significant predictors of IRMI, such that higher SDO and higher MA each predicted lower IRMI. In contrast, neither SDO nor MA significantly interacted with condition to predict the outcome variables. In other words, SDO and MA were negatively associated with the outcome variables, and the strength of these associations was not affected by the video participants watched. Though the lack of interaction was unexpected based on our hypotheses, our findings are consistent with research that has found lower IRMI

is predicted by higher SDO (Braunsberger et al., 2021) and MA (Graça et al., 2015b).

Similar results were observed with climate change worry and speciesism. Consistent with previous research, while greater climate change worry predicted greater IRMI (Yilmaz & Can, 2020), higher speciesism predicted lower IRMI (Caviola et al., 2019). Nevertheless, condition did not interact with these individual differences to affect these associations. That is, the associations of climate change worry and speciesism with IRMI were similar regardless of the video condition to which participants were exposed.

Overall, these findings suggest that regardless of the strength of people's beliefs and values related to meat consumption, their intentions to shift their meat intake are equally influenced by the video appeals. This was unexpected given that we predicted that those who were low in SDO, MA, speciesism, and high in climate change worry would be responsive to the experimental videos, thereby showing greater IRMI than those in the control group. In contrast we predicted that those who were high in SDO, MA, speciesism, and low in climate change worry would be affected less by the experimental videos and would therefore respond more like those in the control condition. Instead, the results of this study showed that between-group differences in IRMI were consistent regardless of attitudes, beliefs, and values. When considering the use of interventions to reduce meat intake in university students, these results suggest that the video interventions do not need to be specifically tailored to address individual differences in these characteristics. For example, regardless of one's SDO, MA,

or climate change worry, the environmental condition appears to be effective in increasing intentions to reduce meat intake. Likewise, individual differences in these characteristics predicted the outcome measures regardless of the video condition. For example, higher SDO predicted lower IRMI regardless of the type of appeal shown.

The independence of condition and individual characteristics in predicting IRMI may call into question the validity of responses to this measure. Indeed, the levels of IRMI were high even for the control condition (Figure 1), which may indicate that some participants are indicating higher intentions due to demand characteristics. One additional consideration is the framing of the questions used to measure IRMI. In line with Herchenroeder et al. (2022), we used a measure created by De Groeve et al. (2019), in which three of the four statements assessed asked about their willingness to change their behavior (e.g., “I am willing to eat meat less often per week” and “I am willing to eat smaller quantities of meat per meal”). The use of the word “willing” may be interpreted by some participants as a hypothetical willingness rather than an explicit intention to reduce meat intake in the future. It is possible that under certain hypothetical conditions, people may be willing to change their meat intake, even though they may not intend on changing their behavior in the near future. This might account for the high levels of IRMI in the control condition.

Implicit Wanting of Meat

Inconsistent with findings from Herchenroeder et al. (2022), video condition did not affect IWM in our preliminary analyses. However, subsequent

regression analyses suggested that the environmental condition predicted lower IWM, relative to the control condition. While the effects of condition were not pronounced, the strong predictive capacity of SDO and, especially, MA – wherein higher SDO and higher MA each predicted higher IWM – suggest that the implicit wanting measure was reliable in its purpose. SDO and MA would be expected to be related to higher wanting for meat, given findings by Dhont and Hodson (2014) and Graça et al. (2015a), which respectively relate SDO and MA to higher levels of meat consumption. However, to our knowledge, no previous work has explored a link between implicit wanting for meat and the two characteristics. In addition, climate change worry predicted lower IWM, while speciesism predicted higher IWM.

The lack of an effect of condition on IWM may be due to methodological differences in the measurement of implicit wanting between this study and Herchenroeder and colleagues (2022), specifically given differences in food images between studies. Our study included two types of nonmeat comparison images during the task: vegetables (e.g., broccoli) and high-protein nonmeat items (e.g., peanut butter on bread). Herchenroeder and colleagues (2022) instead did not include vegetable items and used only non-vegetable nonmeat items, which are more calorically dense and, in some cases, may be associated with meat (e.g., spaghetti, fried egg). The comparison images included in the study by Herchenroeder et al. (2022) may be more palatable to participants than the vegetable items used in the current study, leading to a substantial difference in implicit wanting scores.

Do Intentions Predict Subsequent Meat Intake?

An important aim of this study was to further extend the findings of Herchenreoder et al. (2022) by testing whether IRMI were predictive of changes in meat consumption behavior. Given that intentions to engage in ethical consumption of products (e.g., curbside recycling, use of eco-friendly green products, use of public transortation) do not reliably translate into behavioral changes (Hassan et al., 2016), this was an important aspect to include. Our results are consistent with the idea that intentions do not cleanly map on to behaviors, given that IRMI failed to predict changes in average weekly meat consumption among participants, regardless of condition.

There are a variety of reasons why participants' IRMI did not predict their subsequent meat intake. First, it is important to remember that participants in this study were university students who, while open to change, may have perceived a lack of control over their meals. Most of these participants were on a meal plan and thus were not purchasing and preparing their own meals. Instead, they were limited by the options available in campus cafeterias. Although vegetarian options are available to students on campus, research has shown that university students do not find these healthier options as appealing as the more processed options that contain meat (e.g., Racette et al., 2005). Therefore, although they might have had intentions to reduce their intake, this endeavor may have proved to be challenging within a university context. Second, it is important to remember that the video appeals were only 10 minutes long, and although they might have had an immediate effect on students' intentions, it is likely that these effects were

not long-lasting. Furthermore, it is possible that our approach to measuring meat intake was flawed in that participants initially reported how much meat they eat in *an average* week. In contrast, during the follow-up we asked them to report their meat intake over the previous week. Participants may have found it easier to recall how much meat they ate over the previous week than to estimate the amount eaten in an average week. It is also possible that exposure to the survey and video increased participants' focus on their meat intake, and what appears to be an increase in meat intake may more accurately reflect an increased focus on their meat intake. Finally, responses to measures of IRMI may be influenced by demand characteristics. It is likely that most participants in the experimental conditions guessed what the goals of the experiment were, and it is possible that this biased their responses.

Our exploratory analyses incorporated the operationalization of behavioral stage changes by Bamberg (2012) and its adaptation to meat consumption behaviors by Weibel et al. (2019). We sought to provide evidence for change (or lack thereof) in participants' stage of change (SOC) in this framework. We found that participants' SOC increased between the initial measurement and the one-week follow-up. That said, the changes were slight, increasing from a mean of 1.76 to 1.89 (i.e., approaching Stage 2, which corresponds to contemplation; participants have thought about changing the behavior but have not started). This is consistent with other findings in this study; although some participants indicated intentions to change their behavior, they did not initiate a behavioral change. Nevertheless, it is important to note that these changes did not vary by

condition. Therefore, even those in the control condition may have started contemplating a change in their meat intake simply through exposure of this possibility through questions about meat consumption and reduction in our study.

Strengths and Limitations

This study has some notable strengths. We effectively replicated results from research by Herchenroeder and colleagues (2022) and further extended those findings examining the moderating role of individual characteristics. Furthermore, we contributed to literature related to the intention-behavior gap among unethical consumer behaviors. As discussed, little research has investigated whether intentions to reduce meat translate to behavioral changes, and our study helps address this gap.

Despite strengths, this study also has some limitations. First, the study relied on a convenience sample of university students, which were mostly White (68.6%) and identified as women (58.1%) limiting the generalizability of our findings. Given our limitations due to COVID-19 restrictions which existed at the start of data collection, our measures relied on self-reported information, which may be influenced by demand characteristics. Finally, due to the low turnout of responses to our follow-up (relative to our initial sample), our analyses for Stage of Change lacked power.

Future Directions

Given these limitations, future research may consider expanding on these findings by recruiting a greater number of participants in order to increase statistical power for the follow-up study. Additionally, further research may benefit

from following up at different time intervals to determine whether behavioral change occurs when participants have more time to plan and adjust their eating behaviors. Given that the intervention has an effect on intentions, repeated interventions or a longer exposure to the video appeals ought to be examined for its potential to shift behavior.

According to findings by Siegrist et al. (2015), women may be more likely to perceive meat reduction as beneficial to the environment, which implies potential gender differences in willingness to reduce meat consumption. Indeed, conformity to traditional gender roles among men is associated to higher consumption of beef and chicken, while conformity to traditional gender roles among women is associated to more openness to becoming a vegetarian (Rosenfeld & Tomiyama, 2021). Therefore, future studies should examine gender as a potential moderating factor in the efficacy of meat-reduction interventions.

Future research should examine the efficacy of meat-reduction interventions across different age groups and determine whether age moderates the efficacy of meat-reduction interventions. In addition to the possibility that younger people may not be responsive to health-related messages about meat, they also have less control over food preparation and food access, making it difficult for them to change their dietary behaviors.

Conclusions

The results of this study provide evidence which partially support the findings of Herchenroeder et al. (2022) that participants who watch a video about the environmental impacts of the meat industry will have higher intentions to

reduce their meat intake in the future. While implicit wanting results were not replicated, the effect of the environmental condition on this outcome variable was marginally significant, which reflects expectations based on the findings from Herchenroeder et al. (2022). Although not as effective as information about the effects of meat intake on the environment, information about animal welfare may also be effective at shifting intentions. Furthermore, we expanded on these results, finding that the effectiveness of these video interventions does not vary as a function of individual differences in values and attitudes, such as social dominance orientation and meat attachment. We also found that intentions to reduce meat intake do not predict changes in behavior, providing evidence that research that investigates interventions which seek to change consumer behavior must assess subsequent behavior rather than self-reported intentions. While documentary media may be an effective and accessible form of intervention for the reduction of meat consumption among university students, further research is necessary to determine the extent to which this form of media motivates behavioral change.

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