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What Lies Beneath? Examining the Explicit and Implicit Attitudes of Omnivores towards Vegetarians

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APPROVAL PAGE

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COMPLIANCE PAGE

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ABSTRACT

Vegetarians are a unique social minority group because they fail to engage in dominant social norms with respect to meat consumption. Research has revealed that vegetarians reported lower self-esteem, lower psychological adjustment, less meaning in life, more negative moods, and more negative social experiences than omnivores. These experiences may be the result of experiencing ostracism, exclusion, disrespect, and derogation from omnivores. Although previous research has shown that omnivores report relatively positive explicit attitudes toward vegetarians, these reports can be susceptible to social desirability biases and may undermine the degree of negativity of omnivores' attitudes toward vegetarians. To understand the nature of attitudes towards vegetarians, the current study examined both the explicit and implicit attitudes of omnivores towards vegetarians. To assess explicit attitudes, we used the Attitude Toward Vegetarians Scale (ATVS) and a feeling thermometer. To assess implicit attitudes, we used a modified version of the Implicit Association Test. We also assessed social dominance orientation (SDO), human supremacy beliefs, and meat attachment as potential predictors of attitudes. Results from 275 college students who self-identified as omnivores and flexitarians revealed that while participants had positive explicit attitudes towards vegetarians, their implicit attitudes were neither positive nor negative. Further, there were sex differences such that men had negative implicit attitudes, while women had neutral implicit attitudes towards vegetarians. Finally, we found that SDO and meat dependence predicted explicit attitudes, while dietary habits uniquely predicted implicit attitudes towards vegetarians. The findings from the current study contribute to our understanding of attitudes towards vegetarians and may explain why vegetarians report negative social experiences with their omnivore peers.

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This M.S. Psychology Thesis project is dedicated to my dearest Amma and Appa for teaching me the values of higher education…

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What Lies Beneath? Examining the Explicit and Implicit Attitudes of Omnivores Toward Vegetarians

Vegetarianism is generally defined as the voluntary practice of abstaining from meat consumption. This dietary practice is typically adopted due to a variety of potentially overlapping reasons including a concern for personal health, animal welfare, or the environment (Beardsworth & Keil, 1992; Hopwood et al., 2020). In Western society, vegetarians typically comprise less than 5% of the population (Gallup, 2018), and are therefore considered part of a minority group. Nevertheless, they are distinct from other target minority groups in psychological research, because for vegetarians who live in Western countries, group membership is typically based on a personal choice. Moreover, they are not considered to be structurally disadvantaged, and may even be favored over other minority groups in certain scenarios (MacInnis & Hodson, 2017).

Because food is often considered an important social medium and meat reduction is becoming a popular trend throughout Western society (Wunsch, 2020), it is important to understand the nature of attitudes that omnivores hold toward vegetarians. Evidence suggests that people in Western societies not only view plant-based dietary habits negatively (Bryant, 2019; Corrin & Papadopoulos, 2017; Markowski & Roxburgh, 2019), but also experience feelings of anger and discomfort towards vegetarians and their associated lifestyle (Bresnahan et al., 2016). Moreover, there seem to be defined sex differences in social perceptions of vegetarians, such that omnivore men hold more negative biases towards vegetarians than women (Judge &

Wilson, 2019; Modlinska et al., 2020). Perhaps due to this ongoing phenomenon, known as “vegaphobia” (Cole & Morgan, 2011), vegetarians may experience more frequent negative social interactions (LeRette, 2014; Nezlek et al., 2018), more strain in their relationships with family and peers (Chuter, 2018), and higher levels of depression, anxiety, and neuroticism (Baines et al., 2007; Forestell & Nezlek, 2018) relative to their meat-eating peers. Further, there is empirical evidence to suggest that the negativity experienced by vegetarians is akin to the negativity shown towards other historically targeted groups of bias such as those in the African American and LGBT+ communities (MacInnis & Hodson, 2017).

In order to examine the prejudicial attitudes of omnivores towards vegetarians, several researchers have turned to classical and contemporary theories of prejudice and discrimination. From this exploration, recent literature points to some personal factors that could drive the prejudicial attitudes towards vegetarians.

Personal Factors Associated with Biases Towards Vegetarians

Attitudes of Dominance and Superiority

People engage in the process of social categorization to not only make sense of the world, but to also boost their own social identities and self-esteem. According to Social Categorization Theory (SCT; Turner et al., 1987) as people engage in social categorization, they often use personal attributes such as one’s race, gender, and age, to distinguish people from one another. Further when people learn of marked differences between their in-group values, beliefs, and norms compared to other social groups, they form relatively stable attitudes towards members of these social groups

that later guide future social interactions with these groups. When these attitudes reflect strong negative feelings toward individuals based on their group membership (Allport, 1954; Brown, 1995), they are considered to be prejudicial. Through the lens of theoretical frameworks such as Social Identity Theory (SIT; Tajfel & Turner, 1979) and SCT, research has demonstrated that negative attitudes towards out-groups are commonly grounded on the factors of race (Hoffman et al., 2019), gender and sexual orientation (Horn, 2018), age (Voss et al., 2018), citizenship and immigration status (Esses, 2021), and religion (Makashvili et al., 2018). Moreover, people tend to favor their in-group over out-groups, even when presented with countervailing evidence (Dovidio & Gaertner, 2010).

Researchers have investigated a vast range of personal factors that contribute to the degree to which people hold prejudicial attitudes towards out-groups. This work has shown that Social Dominance Orientation (SDO) is intertwined with prejudicial attitudes. SDO includes a set of traits that reflect an individual's support for social hierarchies and favors group-based dominance and inequality (Pratto et al., 1994), and has been shown to be a unique predictor of intergroup prejudice, endorsing institutions that maintain the asymmetries of power between dominant and subordinate groups, and engaging in discriminatory practices related to racial, ethnic, and sexual prejudice (De Oliveira et al., 2012; Hoyt & Simon, 2016; Jetten & Iyer, 2010; Kteily et al., 2011; Poteat & Mereish, 2012).

Research shows that omnivores who more strongly endorse SDO are more likely to view vegetarians negatively (Judge & Wilson, 2019; MacInnis & Hodson, 2017). Given

that vegetarianism is a lifestyle by choice for many in Western societies, it appears that plant-based diets are viewed as an alternative lifestyle that directly challenges majority beliefs and ways of life associated with the consumption of meat. Consequently, vegetarians as a social minority group may become targets of prejudicial behaviors because of SDO.

Endorsing ideologies of dominance and power over other social groups is also inclusive of attitudes toward non-human species. With an increase in global dialogues about the ethical treatment of animals (Festing & Wilkinson, 2007), promoting activism around protecting animal rights (Crimston et al., 2016), and the dire environmental consequences of the current animal husbandry industry (Godfray et al., 2018), there has been a spike in research examining human-animal relations. To a large extent, people's attitudes towards animals as a social group are dependent on their perceptions of self and the degree to which they affiliate with animals in a process of humanizing and social identification (Dhont & Hodson, 2019). In the field of philosophy, the term "speciesism" denotes the assignment of inherent moral status based on species membership. Coupled with a process of social categorization, humans rank animals in a hierarchy of moral status, where some animals are deemed as more human-like than others. For example, dogs and cats are considered to be "house-pets" and are extended a higher moral status than farm animals, such as cows and pigs. Such a categorization results in discriminatory treatment of certain animals- e.g. it is considered normative in Western societies to consume beef and pork, but not meat from dogs and cats (Leite et al., 2019). Overall, people believe that engaging in a process of social categorization with animals is

morally justifiable because of the common belief that human beings are inherently more valuable, intelligent, and generally superior compared to non-human species (Caviola et al., 2019; Mendl et al., 2010). People are less likely to have biased and demoralizing attitudes towards animals when they strongly believe in equal rights for both humans and animals, are against practices of animal exploitation, and express empathy towards animals (Caviola et al., 2019; Dhont & Hodson, 2014).

Just as endorsement of SDO-based ideologies help maintain structural inequalities between dominant and subordinate social groups of humans, speciesism may serve to enforce and maintain meat-eating practices as the majority practice in Western societies. Because of their voluntary decision to abstain from eating meat, vegetarians may be perceived as challenging the legitimizing myth of human dominance over animals (Higgs et al., 2020; Rosenfeld et al., 2019). Thus, the act of following a vegetarian lifestyle could be viewed as a way of undermining the omnivores' way of life, valued ideologies, and their beliefs regarding dominance over non-human species.

Attachment to Meat

People appear to form different relationships with meat. For the majority, meat is considered a means to an end, a way to maintain human sustenance, and to meet critical nutritional needs (Leroy & Praet, 2015). For others, meat is more than just the bulk of a hearty meal, but a symbol of entitlement, affluence, and power over others, especially towards animals (Adams, 2015). Finally, for others, meat is a representation of death and human cruelty towards non-human species (Twigg, 1983). Regardless of the personal significance that meat holds, in many ways its consumption often serves a

social function such as increasing social affiliation and maintaining one's self-image (Higgs, 2015).

Research in the fields of environmental conservation and human-animal relations is currently focused on examining ways in which people's perceptions of meat consumption can be shifted to more sustainable and healthful plant-based alternatives. One major barrier to shifting people's perceptions is the degree to which they consciously attend to the symbolic representation of meat (Cheah et al., 2020). An attachment to meat is described as having a positive bond toward meat consumption, including both the taste and appeal of meat and the degree to which meat is associated with the self-concept (Graça et al., 2015). Given that people have a natural tendency to support the treasured norms of the majority (Dovidio & Gaertner, 2010), it is possible that the representation of meat as a symbol of power and dominance is driving some people to consume more meat than nutritionally required (Fiddes, 1993).

There are marked sex differences in the association between meat and the self-concept. A review of the literature shows that this association has been predominately observed in heterosexual men. First, meat has historically been considered a masculine food, and men who report consuming more meat-centric meals are perceived as more masculine than people who do not consume meat regularly (Rozin et al., 2012). Thus, consuming meat could be viewed as a way to preserve one's masculine image, power and status (Rothgerber, 2013). Second, men report having more positive explicit attitudes towards meat than their female counterparts. To some extent, this difference seems to be rooted in perceptions of meat and the feelings of disgust. While women

commonly indicate that blood and raw meat induce feelings of disgust (Santos & Booth, 1996; Rousset et al., 2005) men do not tend to be disgusted by meat (Kubberød et al., 2002). Additionally, men are more likely to believe that they would not enjoy vegetarian meals (Modlinska et al., 2020; Rosenfeld & Tomiyama, 2020), and are more likely to associate a healthy diet with meat consumption (Beardsworth et al., 2002). These gender differences could explain why men eat more meat and are less open to adopting a vegetarian lifestyle than women.

Research has shown that omnivores who reported having a higher attachment to meat were more likely to express negative attitudes towards vegetarians (Earle & Hodson, 2017; Ruby et al., 2016). Further, amongst omnivores with higher meat attachment, heterosexual males are more likely than female omnivores to discriminate against vegetarians, perhaps due to a close association between meat and traditional values of masculinity and virility (MacInnis & Hodson, 2012; Vandermoere et al., 2019).

In conclusion, the personal factors of SDO, human supremacy beliefs (i.e. speciesism), and meat attachment, influence not only one's relationship with food but also perceptions and attitudes towards different social groups. This is consistent with the idea that the conscious decisions people make about the foods they eat can reflect their core values and their broader life philosophy, which is often linked with one's self-image, social identity, and social connections with family and peers (Nezlek & Forestell, 2020; Rozin, 2005). Given the highlighted link between these imbibed ideologies and the formation of attitudes towards vegetarians, it becomes important to explore the nature of people's current attitudes towards vegetarians as a social group.

Omnivores' Attitudes toward Vegetarians

In general, intergroup attitudes reflect generalized evaluations about a particular social group, that typically fall along a continuum (Kurdi et al., 2019). Given that such attitudes are relatively stable over time (Barlow et al., 2017), researchers have investigated the factors contributing to this stability and ways in which attitudes can be changed. Research has shown that intergroup attitudes are a critical component of prejudicial behaviors and result from an interaction between one's affect toward a social group and aspects of one's social identity (Friske et al., 2002; Smith, 1993). Because this process is often complex, people may form multiple evaluations towards a particular social group.

Proponents of such a dual-attitude model suggest that intergroup attitudes include two broad types of evaluations about any given social group: a controllable, more consciously processed component known as explicit attitudes, and an automatically activated component known as implicit attitudes (Dovidio et al., 1997; Wilson et al., 2000). Implicit attitudes toward a target group are activated automatically via unconscious mental processes and are considered an unintentional expression of one's thoughts and feelings, while explicit attitudes rely on several conscious motivational processes and are often influenced by people's thought processes and prevailing societal norms (Greenwald et al., 1998). People often do not know that they have dual attitudes towards a social group, or that they may behave in ways that are inconsistent with their self-reported explicit attitude. For example, people may endorse egalitarian values consciously and truly believe that they are unbiased towards other

social groups (e.g., racial out-groups) but may unconsciously hold negative attitudes towards these groups (for a review, see Dovidio et al., 2017).

Social desirability biases can skew people's expressions of their attitudes which in turn limits the empirical conclusions that can be drawn about explicit attitudes and the degree to which they influence subsequent behavior. To overcome this challenge, researchers have also examined implicit intergroup attitudes, which are driven more by automaticity than conscious thought and are less susceptible to social desirability biases (Dovidio et al., 2018). In exploring implicit intergroup attitudes, researchers have found that the implicit-behavior relationship was significantly stronger than the explicit attitude-behavior relationship across the domains of racial, sexual, and gender prejudice (Greenwald et al., 2009). Further, scholars have argued that implicit attitudes are better predictors of less controllable behaviors, especially among those who are not motivated to avoid bias (Pearson et al., 2009). Such evidence indicates that it is worthwhile to explore implicit attitudes in addition to explicit attitudes toward social groups.

While some researchers have found that omnivores express an overall negative bias towards vegetarians as a social group (Earle & Hodson, 2019; Ruby et al., 2016), others have found that omnivores associate specific negative descriptive words (e.g., self-righteousness and "do-gooders") to vegetarians, and are more open to display discriminatory intentions towards vegetarians (Monin & Minson, 2012; Sadalla & Burroughs, 1981). Further, men are more likely to have negative explicit attitudes toward vegetarians than women (Judge & Wilson, 2019; Walker, 1995), particularly those men who perceive vegetarians as a threat to the status quo based on societal

values around male dominance and superiority (Modlinska et al., 2020). One reason why the display of negativity may be more commonly observed toward vegetarians than toward other groups is that there may be greater societal acceptance for discrimination against vegetarians. For example, it may currently be more acceptable to ostracize one's eating style than to make comments about one's race and sexuality. Because vegetarianism and reduced-meat diets are not yet mainstream lifestyles, the current situation provides a unique opportunity to understand the factors driving the negativity towards vegetarians (Judge & Wilson, 2019).

Even though it may be socially acceptable to express negativity towards vegetarians, it is possible that current self-reports of attitudes toward vegetarians may underestimate the depth of omnivores' negativity toward vegetarians. It is also possible that the documented negative outlook of vegetarians is not consistent across population subgroups. For example, relative to other community members, college students may have different attitudes towards vegetarians because college campuses are conducive to developing alternative ideologies compared to those that their families and communities traditionally endorse. Along these lines, research has found that college environments can stimulate more liberal sociopolitical attitudes (Rauf, 2021), gender egalitarianism (Thijs et al., 2019), pro-environmental attitudes (Meyer, 2016) and interethnic relations (Gareis & Jalayer, 2018), which could in turn influence the perceptions of social out-groups. Further, given that vegetarianism is more common among college students than non-college students (College Pulse, 2019), it could be that these ideals influence college students' perceptions of vegetarians in ways that may

differ from the general public. Thus, the current study will be focused on the attitudes of omnivore college students towards vegetarians.

Current Study

The current study attempted to replicate and extend previous research (Earle & Hodson, 2019; Judge & Wilson, 2019; MacInnis & Hodson, 2017; Rothgerber, 2020; Ruby et al., 2016) by examining college students' explicit and implicit attitudes towards vegetarians. We measured levels of self-reported SDO, attachment to meat and human supremacy beliefs over non-human species.

In addition to using validated self-report measures that examine explicit attitudes (i.e., the Attitudes toward Vegetarians Scale and a feeling thermometer), we used a modified version of the Implicit Association Test (IAT) to measure omnivores' implicit attitudes toward vegetarians. Briefly, the IAT is designed on the assumption that people rely on their implicit attitudes and cognitions when situationally demanded to respond quickly during a categorization task (Greenwald et al., 2009).

We hypothesized that (i) Overall participants would display positive explicit attitudes towards vegetarians. (ii) Participants would display negative implicit attitudes toward vegetarians (i.e., *D* scores on the IAT will be significantly greater than zero). (iii) There would be a variety of factors that explain individual differences in implicit and explicit attitudes. These include sex (men would express more negative attitudes towards vegetarians than women) and participants with higher SDO, meat attachment and human supremacy beliefs would have more negative attitudes than those who scored low on these scales.

Method

Participants

Participants were 303 young adults between the ages of 18-25 years who resided in the United States. Participants were recruited using the research participant pool of a four-year liberal arts university, and through online flyers and social media posts. Informed consent was obtained from all participants, and they were compensated with either course credit or a $5 gift card upon completion of the study. All study materials were approved by the university's IRB for the Protection of Human Subjects (PHSC-2020-09-28-14548-caforestell). The current study was pre-registered (https://osf.io/ucz28/?view_only=67e7404e2a42457e8ce13bbbe8259ff0).

Materials

Questionnaires

In addition to a variety of demographic characteristics (e.g., age, race, ethnicity and year in college), participants were also asked to complete a variety of measures, as reported below.

General Eating Habits. Participants were asked to identify with one of the following eating habits: *vegan* (a person who eats vegetables, fruits, and grains, but no animal or seafood products)*, lacto-vegetarian* (a person who eats dairy products, fruits, vegetables, and grains)*, lacto-ovo vegetarian* (a person who eats eggs, dairy products, fruits, vegetables, and grains)*, pesco-vegetarian* (a person who eats seafood, eggs, dairy products, fruits, vegetables, and grains)*, flexitarian* (a person who predominantly eats eggs, dairy products, fruits, vegetables, and grains, and occasionally eats meats and

seafood) and *omnivore* (a person who regularly eats all meats, seafoods, eggs, dairy products, fruits, vegetables, and grains). Each of the six categories were defined to help participants accurately report their current eating habits (Forestell et al., 2012).

Frequency of Meat Consumption. Participants were asked the frequency with which they consumed meat and meat-based products during mealtimes and snacks (De Backer et al., 2020). Responses ranged from *never* (1) to *more than 4-6 times a week* (9). The frequency with which each of these categories was chosen by participants was calculated. In addition, mean frequency of meat consumption per month was estimated (e.g., those who indicated they ate meat 4-6 times a week were considered to eat meat 20 times a month because they indicated that they ate meat approximately 5 times per week).

Intentions to reduce meat consumption. Participants were asked to indicate their intentions of reducing meat consumption in the future. Participants could choose one of the following responses: “Yes, I plan on continuing to consume meat.”, “Yes, I will continue to eat meat, but I am considering eating it less frequently.”, and “No, I am considering eliminating meat from my diet.” (De Backer et al., 2020).

Friends’ dietary habits. Participants were asked to list three of their closest friends. They were then asked to indicate each friend’s current dietary habits. The response options for dietary habits were the same categories as the General Eating Habits measure described above.

Social Dominance Orientation (SDO). The 16-item SDO scale assesses one’s inclination for group hierarchies and dominance over social groups (Pratto et al., 1994).

Participants were asked to rate the extent to which each statement made them feel positive or negative, such as “Some groups are simply inferior to other groups” and “All groups should be given an equal chance in life”. Responses ranged from 1 (*very negative*) to 7 (*very positive*), and all ratings were averaged after reverse-scoring the appropriate items. Higher scores indicated greater SDO. In the present study, the scale demonstrated good internal consistency (α = .89).

Human Supremacy Beliefs (HSB). The 6-item scale measures beliefs about the human-animal divide and the extent to which participants believed they were superior to animals (Dhont & Hodson, 2014). Examples of statements on the scale include “The life of an animal is just not of equal value as the life of a human being” and “We should strive for more equality between humans and animals”. Responses ranged from 1 (*strongly disagree*) to 5 (*strongly agree*), and items were averaged after reverse scoring the appropriate items. Higher scores on the scale indicated greater HSB. The scale demonstrated good internal consistency (α = .85).

Meat Attachment Questionnaire (MAQ). The 16-item scale assesses positive bonds toward meat consumption (Graça et al., 2015). This includes the taste and appeal of meat, and the extent to which meat is associated to one’s sense of self. Responses ranged from 1 (*strongly* disagree) to 5 (*strongly* agree), and the scores were averaged to form a Global measure of meat attachment as well as four subscales: *Hedonism* (i.e. meat as a source of pleasure), *Affinity* (i.e. a liking towards meat consumption), *Entitlement* (i.e. feelings of entitlement associated with eating meat) and *Dependence* (i.e. feelings of dependence on meat). The scale in the current study demonstrated

adequate internal consistency for the Global measure (α =.89), as well as for the four subscales of Hedonism (α = .78), Affinity (α = .73), Entitlement (α = .71) and Dependence (α = .85).

Feeling Thermometer. Participants indicated their feelings toward 13 different social groups, some of which were known historically as targets of prejudice in Western societies while others were groups who followed limited diets (MacInnis and Hodson, 2017). The following groups were presented in a randomized order: Blacks or African Americans, members of the LGBT community, feminists, White or Caucasians, environmentalists, people who eat gluten-free because of Celiac disease, people who eat gluten-free by choice, atheists, vegetarians, omnivores, heterosexuals, people who are lactose-intolerant and immigrants. Responses were made using a sliding scale ranging from 0 (*cold*) to 100 (*warm*), with a neutral midpoint at 50. Higher scores indicated a more positive evaluation of a social group. The scale demonstrated good internal consistency (α = .93).

Attitudes Towards Vegetarians Scale (ATVS). The 21-item scale is a direct measure of a participant's explicit attitudes towards vegetarians (Chin et al., 2002). Agreement with each statement was indicated on a 5-point Likert scale ranging from *strongly disagree* (1) to *strongly agree* (5), and higher scores indicated more negative attitudes towards vegetarians. The following items were reverse-coded: "Vegetarians should not try to hide their dietary habits", "Vegetarians can eat a balanced diet", "It's not O.K. to tease someone for being a vegetarian", "There are some good reasons not to eat meat", "I would approve if my children turned out to be vegetarians", "It is

acceptable for individuals to refuse to eat meat that they have been served" and "Vegetarians respect the rights of others who choose to eat meat". Using all the items in the scale, a mean score was calculated, with higher scores indicating more negative attitudes towards vegetarians. A reliability analysis revealed that the ATVS of our study demonstrated good internal consistency ($\alpha = .94$).

Implicit Measure

Implicit Association Test. Using Inquisit™ software (www.millisecond.com), participants completed a modified version of the implicit association task (IAT), which was designed based on the original experiment by Greenwald and colleagues (1998). In the IAT, participants were instructed to respond to two sets of words: (i) words that were pilot tested to describe omnivores and vegetarians, and (ii) the standard good and bad words as listed in Greenwald et al.'s (1998) experiment.

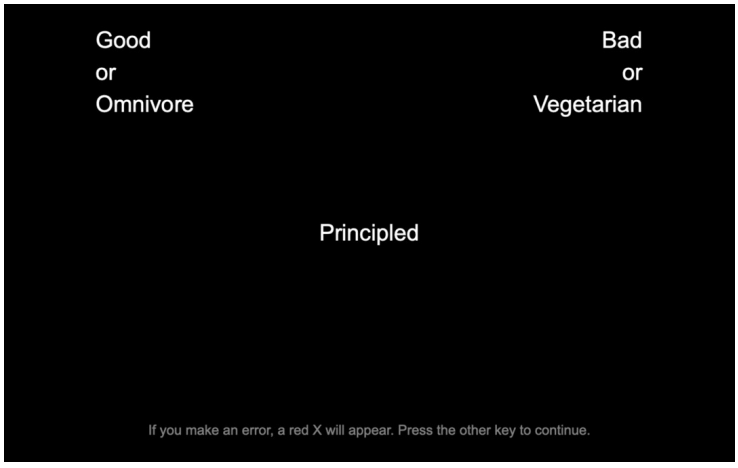
The IAT experiment consisted of 7 blocks and a total of 180 trials. Block 1 and Block 2 consisted of 20 practice trials each, where participants used designated computer keys to categorize words into vegetarian and omnivore categories in the first block, and good and bad categories in the second block. Block 3 consisted of 20 trials where participants were randomly assigned to categorize words into one of the two following combinations of categories: "good-vegetarian" and "bad-omnivore", or "good-omnivore" and "bad-vegetarian". For both conditions, participants used one computer key to categorize omnivore and good words, and another key for vegetarian and bad words. Figure 1 illustrates the IAT task during such a trial. Block 4 followed the same design as Block 3 and consisted of 40 trials. Block 5 consisted of 20 trials but the

designated keys were changed, and participants were instructed to categorize words into “vegetarian” and “omnivore” with this new association. Block 6 consisted of 20 trials where participants categorized words into different category groupings like in Block 3. Finally, Block 7 consisted of 40 trials and had the same category groupings as Block 6.

In all trials, the stimulus words appeared in the middle of a black screen with the superordinate categories presented in white letters on the top right and left corners of the screen. The word presented on the screen disappeared when the participants made a response. For each trial, a red ‘X’ appeared in the middle of the screen if the participant made a mistake, and there was a 250 ms interval between each trial within a block. A detailed account of the algorithm used to calculate the d-scores is explained in the statistical analysis section of this paper.

Figure 1

Visual Representation of IAT Task



Stimulus Words for the IAT. The list of stimulus words for the omnivore, vegetarian, good and bad categories used in the IAT is illustrated in Table 1. To select the stimulus words for the omnivore and vegetarian superordinate categories, we conducted two pilot studies over the Summer and Fall 2020 semesters. In the first pilot study, undergraduate college students (*n* = 21) were instructed to generate as many words as they could to describe the two groups, resulting in a total of 127 descriptive words (64 vegetarian words and 63 omnivore words). Words with the highest frequency values to describe omnivores and vegetarians (*n* = 23) were selected for the second pilot study where participants were asked to rate the extent to which they associated each word to omnivores and vegetarians individually (order of presenting words was randomized). Responses from 150 undergraduate college students were recorded on a 7-point scale ranging from 1 (*not at all*) to 7 (a *great deal*). After transforming the raw scores into mean-centered values, words were selected for the IAT if the word (e.g. conservative) had the highest frequency in one group (e.g. omnivore) but the lowest in the other (e.g. vegetarian). From this analysis, a total of 18 words were finalized and used in the IAT as stimulus words (9 words describing vegetarians and omnivores each). The words associated with *good* and *bad* were the standard words used by Greenwald and colleagues (1998).

Table 1
List of Stimulus Words for the Implicit Association Test

Category	Stimulus Words
Omnivores	apathetic, balanced, conservative, conventional, carnivore, easygoing, flexible, masculine, unaware
Vegetarians	activist, empathetic, feminine, health conscious, herbivore liberal, principled, restrictive
Good	beautiful, glorious, joyful, lovely, marvelous, peaceful, pleasure, superb, wonderful
Bad	agony, awful, horrible, humiliate, nasty, painful, terrible, tragic, unfavorable

Note: The list of IAT stimulus words for omnivores, vegetarians, good, and bad categories.

Procedure

All sessions were administered virtually over 30-minute live Zoom™ video sessions. When participants signed up for the study, a researcher contacted them via email to provide guidelines to be mindful about during their session. This helped to control for environmental factors atypical of an in-person lab session. For example, they were asked to not play music or eat during the session, to try to be as far away from others as possible (ideally in a room by themselves), and to silence all electronic devices during the experimental session. Arrangements were made for on-campus participants who did not have ready access to a laptop or desktop computer or a physical space to participate in the study safely.

During each virtual session, a trained researcher was present to provide timely instructions about the study's components and answer any questions participants had about the tasks. Researchers were trained to follow a pre-approved protocol during the session (including debriefing) to control for potential experimenter biases in running the experiment.

After reading and signing the electronic informed consent, participants were instructed to complete the IAT task. Once completed, participants were redirected to a new web browser window where they were instructed to complete a series of questionnaires on Qualtrics that assessed their dietary habits and the traits of social dominance, human supremacy beliefs, meat attachment, and explicit attitudes towards vegetarians (as described above). Once completed, participants were thanked for their participation and debriefed.

Statistical Analysis

Mean scores for each of the questionnaires was calculated for each participant as described earlier. Reaction time (RT) responses from the IAT were analyzed using the *D* score algorithm with built-in error penalty, as described by Greenwald and colleagues (2003). This was the recommended *D* score measure to calculate when the IAT task allows participants to correct for error made during trials and if the IAT records latencies to the occurrence of the eventual correct response (Greenwald et al., 2003). Accordingly, we checked the data for trials with RTs greater than 10,000 ms and for participants for whom more than 10% of trials have RTs shorter than 300 ms. Based on these criteria, none of the participants in the current study were excluded. Next, two

inclusive standard deviation scores were calculated, one for the trials in Blocks 3 and 6 and another for trials in Blocks 4 and 7. Then, the mean response latencies were computed for Blocks 3, 4, 6, and 7; and the mean differences for Block 3 from Block 6 and Block 4 from Block 7 were calculated. Finally, the difference scores were divided by their respective standard deviations to provide us with the final *D* scores. In general, the *D* score reflect the average of the ratios between the two sets of blocks, and higher *D* scores indicated stronger association of "vegetarian" and "bad" categories of the IAT. Scores on the IAT range from +2 to -2.

To prepare the data for further analyses, all variables of interest were checked for assumptions of normality. Because ATVS and SDO were positively skewed, we applied a log-transformation of these variables. All further analyses were conducted using the transformed data, and data were back transformed for presentation in the tables.

To examine the explicit (using ATVS) and implicit (using *D* scores) attitudes towards vegetarians, one-sample t-tests were conducted. To understand sex differences in attitudes towards vegetarians, we conducted two independent samples t-test for explicit and implicit attitudes towards vegetarians.

Additionally, for the feeling thermometer, to examine sex differences in the attitudes toward vegetarians in comparison to other target groups of prejudice, we ran a repeated-measures ANOVA. Attitudes towards the 13 social groups was the outcome variable and sex and social groups were independent variables. Bonferroni tests were used to examine significant differences between the attitudes towards groups.

Next, Pearson correlations were calculated between the measures of attitudes towards vegetarians and the personal factors (i.e. SDO, meat attachment, human supremacy beliefs and dietary habits), to understand the relationship between factors. Based on these analyses, we ran exploratory linear regression analyses to understand which combination of factors predicted attitudes towards vegetarians, and if they differentially predicted explicit and implicit attitudes.

Results

Participant Characteristics

Of the 303 participants recruited, 28 participants were excluded because they self-reported following plant-based diets. Of the remaining 275 participants, 213 were omnivores and 62 were flexitarians. Because 11 participants did not complete the IAT due to technical difficulties, there were 264 participants in the current study who completed both the IAT task and the explicit measures.

As shown in Table 2, all participants were between the ages of 18-25 years (M = 19.39, SD = 1.59) and 66.9% were female. Further, the majority (94.5%) were undergraduate students at a four-year liberal arts university. The remaining 5.5% of participants were either current graduate students or alumni. Most participants identified as White or Caucasian (59.6%), followed by Asian (22.2%), Black or African American (8.4%), Mixed race (8.4%) or of another race (1.1%), and 90.5% of participants overall identified as non-Hispanic or Latino. Finally, 35.8% of participants had a family income of more than $150,000. A chi-square test for sex differences in the demographic variables revealed that women reported a higher family income than men, X^2 (10, 275) =

19.51, $p < .05$. Women and men did not significantly differ in any of the other demographic variables ($p > .05$).

With regards to meat eating habits, 35.3% of participants reported consuming meat at least 4-6 times a week, 29.5% reported consuming meat at least 2-3 times a week, and 22.2% reported consuming meat at least once a week. Further, 53.8% of participants indicated that they planned to continue to consume meat, 43.6% indicated that they planned to continue to eat meat, but less frequently, and 2.2% indicated that they planned to eliminate meat from their diets. Further, 44.73% of participants indicated having at least one friend who adopted a plant-based diet, and 29.09% of participants indicated having at least one relative who adopted a plant-based diet. A chi-square test revealed several sex differences: men consumed more meat than women, X^2 (7, 275) = 19.19, $p < .01$, more women expressed intentions to reduce meat consumption in the future than men, X^2 (2, 274) = 10.91, $p < .01$; and women had more friends who adopted a plant-based diet than men, X^2 (1, 275) = 25.79, $p < .001$.

Table 2

Participant Characteristics (% or M ± SEM)

	Men	Women
Sample size (*N*)	91	184
Current Dietary Habits (*N*)		
Omnivores	83	130
Flexitarians	8	54
Age (y)	19.59 ± .19	19.28 ± .11
Family income > $100,000 (%)	41.56%	58.44%*
Intentions for future meat consumption (%)		
Continue to eat meat	67.03%	47.54%
Reduce meat consumption	32.97%	49.18%**
Eliminate meat from diet	0%	3.28%

Note: * Significant at $p < .05$, ** Significant at $p < .01$

Explicit and Implicit Attitudes Toward Vegetarians

The mean ATVS score (1.83 ± 0.01) was significantly lower than the neutral rating of 3 on the 5-point Likert scale, $t(274) = 41.30$, $p < .001$, 95% *CI* [1.73, 1.94]. This indicates that participants expressed an overall positive explicit attitude towards vegetarians. Nevertheless, the mean *D* score (0.00 $\pm$ .02) did not significantly differ from zero, $t(264) = -.30$, $p > .05$, *95% CI* [-.05, .04].

Sex Differences in Attitudes Towards Vegetarians

The mean ATVS score for women (1.77 $\pm$ .01) was significantly lower than that of men (1.95 $\pm$ .01), indicating that women expressed more positive explicit attitudes toward vegetarians than men, $t(273) = 1.89$, $p < .01$. There were also sex differences observed in the implicit scores of vegetarians. The mean *D scores* for women (-.04 $\pm$ .03) were significantly lower than men's scores (.10 $\pm$ .04), indicating that women expressed more positive implicit attitudes towards vegetarians than men, $t(262) = .24$, $p < .01$. Moreover, while women's scores did not differ from zero ($p > .05$), men's *D* scores were significantly higher than zero, $t(86) = 2.20$, $p < .05$. This indicated that men overall had a negative implicit attitude towards vegetarians.

Explicit Attitudes Towards Vegetarians in Comparison to Other Social Groups

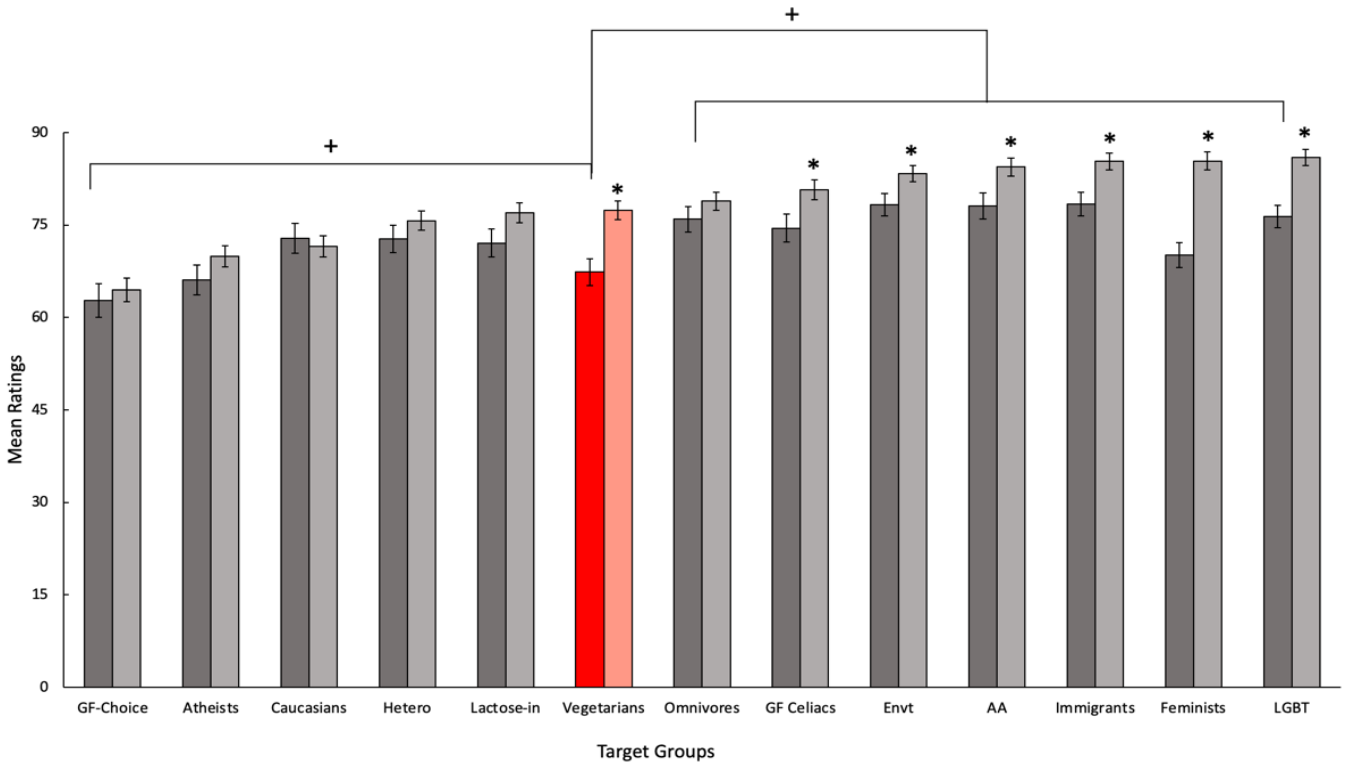
The repeated measures ANOVA, examining participants' explicit feelings of warmth and coldness towards 13 socially prejudiced groups, revealed a main effect of sex, $F(1, 273) = 8.08$, $p < .01$, $\eta^2 = .03$, and a main effect of social group, $F(12, 3276) = 35.06$, $p < .001$, $\eta^2 = .13$. There was also a sex by group interaction, $F(12, 3276) = 5.05$, $p < .001$, $\eta^2 = .02$.

As shown in Figure 2, men generally had more negative attitudes toward the 13 social groups (72.73 $\pm$ 1.65) than women (78.45 $\pm$ 1.16, $p < .01$). Moreover, vegetarians (72.37 $\pm$ 1.30), were perceived more negatively than immigrants (81.85 $\pm$ 1.19, $p < .001$), members of the LGBT community (81.15 $\pm$ 1.27, $p < .001$), African Americans (81.24 $\pm$ 1.27, $p < .001$), environmentalists (80.80 $\pm$ 1.13, $p < .001$), feminists (77.77 $\pm$ 1.23, $p < .001$), people who eat gluten-free because of Celiac disease (77.61 $\pm$ 1.38, $p < .001$), and omnivores (77.39 $\pm$ 1.28, $p < .01$). In contrast, vegetarians were perceived more positively than people who eat gluten-free by choice (63.60 $\pm$ 1.67, $p < .001$). Finally, attitudes towards vegetarians did not significantly differ from people who are lactose-intolerant (74.51 $\pm$ 1.40, $p > .05$), heterosexuals (74.22 $\pm$ 1.34, $p > .05$), Caucasians (72.17 $\pm$ 1.48, $p > .05$), and atheists (68.01 $\pm$ 1.49, $p > .05$).

To understand the sex by attitude interaction, we compared men's and women's ratings within each social group. Women had significantly more positive explicit attitudes compared to men for the following social groups: vegetarians ($p < .001$), people who eat gluten-free because of Celiac disease ($p < .05$), environmentalists ($p < .05$), African Americans ($p < .05$), immigrants ($p < .01$), feminists ($p < .001$), and members of the LGBT community ($p < .001$). For the remaining groups, there were no differences in attitudes between men and women.

Figure 2

Sex differences in mean attitudes (± SEM) towards social groups.



Note: Bar graph reflects mean ratings on the feeling thermometer for each of the 13 groups. Dark bars represent men's ratings and light bars represent women's ratings. Asterisks (*) denotes sex differences, such that women had significantly more positive attitudes towards social groups than men at $p < .05$. Plus symbols (+) denote group differences relative to vegetarians at $p < .05$. Social groups from left to right: GF Choice = Gluten-free by choice, Atheists, Caucasians, Hetero = Heterosexuals, Lactose-In = People who are lactose-intolerant, Vegetarians, Omnivores, GF Celiacs = Gluten-free because of Celiac disease, Feminists, Envt = Environmentalists, AA = African Americans, Immigrants, Feminists, and LGBT.

Correlations Between Variables of Interest

Table 3 illustrates mean scores and inter-correlations between implicit and explicit attitudes and sex, dietary habits, frequency of meat consumption, friends who restrict meat consumption, SDO, HSB, and global and subscale scores of the MAQ.

Pearson Correlations revealed that ATVS scores were significantly correlated with the feeling thermometer for vegetarians, sex, dietary habits, frequency of meat consumption, friends who restrict meat consumption, SDO, MAQ (both the global measure and the four subscales) and HSB (all p values < .05). Similarly, the D scores were significantly correlated with sex, dietary habits, frequency of meat consumption, MAQ (both the global measure and the four subscales) and HSB (all p values < .05). D scores were not significantly correlated with ATVS, the feeling thermometer for vegetarians, friends who restrict meat consumption from their diets, and SDO (all p values > .05).

Table 3

Means, standard deviations and Pearson correlations between variables of interest

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ATVS	1.83	0.10													
2. FT	74.08	20.80	-.45***												
3. *D* scores	-0.00	.37	.08	-.104											
4. Sex	N/A	N/A	.19**	-.23***	.17**										
5. GEH	N/A	N/A	.19***	-.15*	.29***	.23***									
6. MFreq	13.87	10.79	.21***	-.26**	.22***	.24***	.49***								
7. FRM	.29	.66	-.16**	.22***	-.07	-.31***	-.20***	-.20***							
8. SDO	1.66	.15	.42***	-.29***	.03	.17**	.06	.10	-.12*						
9. MAQ-G	3.38	.65	.37***	-.30***	.23***	.27***	.48**	.49***	-.30***	.18**					
10. MAQ-H	3.52	.78	.31***	-.25***	.19**	.28***	.42***	.43***	-.25***	.16**	.83***				
11. MAQ-A	3.52	.78	.24***	-.26***	.24***	.21***	.44***	.41***	-.23***	.09	.83***	.56***			
12. MAQ-E	3.28	.80	.28***	-.10	.17**	.17**	.22***	.28***	-.21***	.17**	.63***	.38***	.38***		
13. MAQ-D	2.95	.95	.38***	-.32***	.15*	.22***	.46***	.44***	-.31***	.17**	.89***	.70***	.68***	.40***	
14. HSB	3.07	.80	.23***	-.23***	.21***	.25***	.22***	.24***	-.14*	.18**	.44***	.37***	.47***	.31***	.29***

Note: ****correlations significant at p < .001 level,* ***** correlations significant at p < .01 level,* ****correlations significant at p < .05 level.* All categories from top to bottom: ATVS = Attitudes Towards Vegetarians measure, FT = feeling thermometer for vegetarians, *D* scores, Sex, GEH = general eating habits of participants, MFreq = meat frequency (per month), FRM = friends who restrict meat from diet, SDO = Social Dominance Orientation, MAQ-G = Meat Attachment global measure, MAQ-H = Meat Attachment hedonism subscale, MAQ-A = Meat Attachment affinity subscale, MAQ-E = Meat Attachment entitlement subscale, MAQ-D = Meat Attachment dependence subscale, HSB = Human Supremacy Beliefs.

Exploratory Analyses: **Predicting Attitudes Towards Vegetarians**

To examine the factors that predicted explicit and implicit attitudes towards vegetarians, we conducted two linear regression models; one for explicit attitudes (using the ATVS as an outcome variable) and one for implicit attitudes. In both models, the following variables were added simultaneously as predictors: sex, dietary habits, number of friends who restricted meat from their diets (all three dummy-coded), and the mean-centered values of meat frequency, SDO, MAQ subscales and HSB. Table 4 illustrates the standardized beta-coefficients for the regression models.

An examination of the predictors of explicit attitudes revealed that the overall regression model was highly significant and explained 29.2% of the variance in explicit attitudes towards vegetarians, F (10, 273) = 10.85, $p < .001$, $\eta^2 = .29$. Further, SDO and the MAQ subscale of Meat Dependence were significant predictors of explicit attitudes towards vegetarians (both *p values* $\leq .001$).

An examination of the predictors of implicit attitudes revealed that the overall model was highly significant and explained 13% of the change in implicit attitudes towards vegetarians, F (10, 262) = 3.76, $p < .001$, $\eta^2 = .13$. Further, dietary habit (omnivore vs. flexitarian) was the only significant predictor of implicit attitudes towards vegetarians ($p < .01$).

Table 4

Standardized beta-coefficients of predictors of attitudes towards vegetarians.

	Explicit Attitudes (*N* = 275)	Implicit Attitudes (*N* = 264)
Sex	.040	.078
Dietary Habits	.015	.207**
Friends RM	.003	.027
Meat Frequency	.017	.070
SDO	.334***	-.020
MAQ Hedonism	.020	.034
MAQ Affinity	-.084	.121
MAQ Entitlement	.099	.071
MAQ Dependence	.285***	-.141
Human Supremacy Beliefs	.073	.080
r^2	.292	.130
F	< .001***	< .001***

Note: Standardized beta-coefficients reflect the predictive nature of factors in explicit and implicit attitudes towards vegetarians. ***Standardized beta-coefficients are significant at $p \leq .001$. **Standardized beta-coefficients are significant at $p < .01$.

Discussion

Although previous research shows that omnivores have relatively positive feelings (MacInnis & Hodson, 2017) and attitudes (Chin et al., 2002; Judge & Wilson, 2019) toward vegetarians, and omnivores do not report consciously discriminating against vegetarians (MacInnis & Hodson, 2017), vegetarians report experiencing more negative social daily interactions and are more likely to suffer from depression (Forestell & Nezlek, 2018, Nezlek et al., 2018). Therefore, the goal of the current study was to understand this apparent discrepancy by measuring explicit as well as implicit attitudes toward vegetarians, understanding sex differences in attitudes towards vegetarians, and to investigate predictors of these attitudes.

Explicit Attitudes toward Vegetarians

Overall, this study revealed that participants had positive explicit attitudes towards vegetarians, which is consistent with previous research that used the ATVS (Chin et al., 2002; Judge & Wilson, 2019). Findings from the ATVS were significantly correlated with those from the feeling thermometer, with participants generally expressing warmth towards vegetarians (a mean of 72 out of 100). Despite these high scores, similar to MacInnis and Hodson (2017), we found that feelings of warmth toward vegetarians were significantly lower than those for common targets of prejudice such as African Americans, immigrants and members of the LGBT community. It is likely that both the ATVS and the feeling thermometer are vulnerable to social desirability bias – which may explain why scores were high for vegetarians as well as other groups that are typically targets of bias.

It is important to note that explicit attitudes were not uniformly positive across participants. There were individual differences that were predicted by a combination of personal characteristics. Through exploratory linear regression analyses, we demonstrated that those who endorse higher levels of SDO and greater meat dependence reported more negative explicit attitudes towards vegetarians. These findings are not surprising given previous research has also found that these variables positively predicted more negative explicit attitudes towards vegetarians (Dhont & Hodson, 2014; Earle & Hodson, 2019; MacInnis & Hodson, 2017; Veser et al., 2015). People who endorse higher levels of SDO are more likely to resist structural changes in social hierarchies, support the status quo, and are more likely to legitimize meat consumption (Becker et al., 2019; Brandt & Reyna, 2017; Jost et al., 2003). Similarly, it has been previously shown that people who endorse a higher attachment to meat are more likely to consume large amounts of red meat frequently, less likely to express intentions to reduce regular meat consumption, and are more likely to express negative explicit attitudes towards vegetarians (De Backer et al., 2020).

Implicit Attitudes Toward Vegetarians

Despite having positive explicit attitudes, the results of the present study showed that omnivores' implicit attitudes toward vegetarians were neither positive nor negative, suggesting indifference or ambivalence. It is important to make a clear distinction between these concepts. While indifference would mean that omnivores have a truly neutral response towards vegetarians, ambivalence denotes a psychological conflict of positive and negative affect (Yoo, 2010). There has been increasing empirical

support for the theory that omnivores experience ambivalence towards vegetarians. For example, researchers recently found that although vegetarians reported being treated negatively by others as a function of their diet, they also reported that they were also treated more positively in some ways (Nezlek et al., 2022). These, and related findings, suggest that omnivores may simultaneously ascribe vegetarians with qualities of being responsible and principled but also qualities of arrogance and overzealousness (MacInnis & Hodson, 2017; Nezlek et al., 2022; Povey et al., 2001), a phenomenon known as attitudinal ambivalence (Conner & Sparks, 2002). A central focus for future research should be to explore this attitudinal ambivalence and its consequences on the treatment of vegetarians.

In terms of predictors of implicit attitudes, we found that only dietary habits predicted participants' implicit attitudes towards vegetarians. It is interesting that implicit attitudes towards vegetarians were being driven by dietary identity rather than frequency of meat consumption. In the current study, though all participants were technically omnivores, some identified as flexitarians because they reduced their intake of meat. This finding supports contentions that dietary habits go far beyond the food we eat and are a reflection of social identity, which encompasses a variety of social values (Nezlek & Forestell, 2021). For example, previous research has shown that participants who strongly identify as omnivores are more likely to support social hierarchies than those who weakly identified as an omnivore or identified with other dietary groups (Allen et al., 2000). Nonetheless, there are still questions remaining about the directionality of this association - it could be that more positive implicit attitudes

towards vegetarians influenced participants' dietary identity, or that their dietary identity led to more positive attitudes toward vegetarians.

It is worth noting the fact that SDO did not predict implicit attitudes. This finding is interesting, given the importance of SDO in predicting explicit attitudes towards vegetarians. Based on previous research, it appears that the saliency of in-group/out-group social contexts influences the way people express implicit prejudice. For example, people who are high in SDO are more likely to express implicit prejudice when primed with in-group saliency than people low in SDO (Pratto & Shih, 2000; Rowatt et al., 2005). Judge and Wilson (2019) also argue in support of this theory specifically for dietary identity saliency, stating that social groups like vegetarians that reject mainstream lifestyles may not be as salient in society as more socially salient groups such as racial, ethnic, and gender minority groups. Because we did not experimentally manipulate in-group/out-group saliency in the IAT, future research could examine this priming effect as a possible mechanism underlying the relationship between SDO and implicit attitudes toward vegetarians.

We did not observe a correlation between explicit and implicit attitudes towards vegetarians. This finding is consistent with the larger race and discrimination literature, where explicit and implicit measures have either been weakly correlated or non-significant (Greenwald et al., 1998; Oswald et al., 2013). While arguments can be made about sample sizes, previous research has demonstrated that explicit and implicit measures are only weakly correlated even in larger samples (Axt, 2017; Nosek et al., 2007). Even though there is considerable variability across studies, the findings in the

current study support the theory that explicit and implicit measures tap into different psychological processes. Further, the explicit-implicit findings of the current study support the dual-attitude theory (Judge & Wilson, 2019) that omnivores can have two different valanced attitudes simultaneously towards vegetarians.

Sex Differences in Attitudes

When we probed for differences as a function of sex, we found that women expressed significantly more positive explicit attitudes than men. Moreover, while implicit attitudes of omnivores were not significantly different from zero, there were notable sex differences such that men's implicit attitudes were negative (i.e., significantly greater than zero) while women's implicit attitudes did not differ from zero (indicating either indifference or ambivalence).

Similar sex differences have been highlighted in previous literature, revealing that men are more likely to have negative attitudes towards vegetarians than women (Chin et al., 2002; Judge & Wilson, 2019; MacInnis & Hodson, 2017). We further found that men expressed less warmth towards vegetarians and other target groups of prejudice on the feeling thermometer compared to women. Indeed, women's attitudes toward most derogated groups are more positive than those of men. It has been suggested that because women have experienced more discrimination than men, they have more shared experiences with other minority groups (Cunningham, 2005; Richeson & Craig, 2011). In the current study, sex differences in attitudes toward vegetarians may have arisen because men are more likely than women to perceive vegetarianism as a threat to the status quo of meat consumption in Western societies. This may be the

result of commonly accepted social principles of masculinity and male dominance in Western society (Modlinska et al., 2020). As discussed earlier, previous research has shown the pivotal role of endorsing traditional masculine norms and attachment to meat in influencing gendered perceptions of vegetarianism as a lifestyle choice (Nakagawa & Hart, 2019; Rosenfeld & Tomiyama, 2021; Rothgerber, 2020). More research is needed to examine these associations and establish the factors that drive men's implicit attitudes towards vegetarians.

Limitations

The current study is not without its limitations. Due to the COVID pandemic, this study was conducted online where participants used their personal laptop devices to participate in the study. Even though steps were taken to ensure the environment of each study session was consistent across participants, future research should attempt to replicate this study using an in-person experimental design to control for miscellaneous noise (Brand & Bradley, 2012; Plant & Turner, 2009; Reimers & Stewart, 2015). This way, researchers could use standardized latency-response keyboards to accurately assess responses to the IAT and ensure that the experimental environment of the study is consistent across participants. Secondly, our study focused on college students, who may have different attitudes towards vegetarians compared to the general public. These different attitudes may have been the result of an interaction between characteristics of the college campus and the sociocultural-political elements of society. Such an interaction further impacts the way students differentiate from and integrate new values and beliefs into their concept of self (Chickering & Reisser, 1993). Nonetheless,

our study's findings show that college students, like the general public, have relatively positive explicit attitudes towards vegetarians, but college student's implicit attitudes were ambivalent towards vegetarians. Because these findings of implicit attitudes cannot be generalized to a larger population, future research should examine the dimension of implicit cognitions among a non-college sample. Finally, it could be that the valence of the stimulus words used in the IAT for this study was not strong enough to activate automatic associations.. Future research should identify descriptive words that reflect both positive and negative evaluations of vegetarians as a social group in order to further examine the implicit attitudes of omnivores.

Conclusion

Given that people tend to self-report desirable qualities in order maintain a positive self-presentation (Rowatt et al., 2005), the current study is novel in its approach to understanding attitudes towards vegetarians by examining both the explicit and implicit attitudes of meat-eating college students towards vegetarians. Because implicit attitudes reflect systemic, collective representations of a social group (Charlesworth & Banaji, 2019), it is important to understand the role of implicit cognitions in the formation of omnivores' attitudes toward vegetarians. Further, with the rise in advocacy of meat-reduced diets for various health, environmental and ethical reasons (for a review, see Kwasny et al., 2022), it is important to understand the social ramifications of adopting such a lifestyle.

Appendices

Appendix A

Social Dominance Orientation (Pratto et al., 1994)

1. Some groups of people are simply inferior to other groups.
2. In getting what you want, it is sometimes necessary to use force against other groups.
3. It's OK if some groups have more of a chance in life than others.
4. To get ahead in life, it is sometimes necessary to step on other groups.
5. If certain groups stayed in their place, we would have fewer problems.
6. It's probably a good thing that certain groups are at the top and other groups are at the bottom.
7. Inferior groups should stay in their place.
8. Sometimes other groups must be kept in their place.
9. It would be good if groups could be equal.
10. Group equality should be our ideal.
11. All groups should be given an equal chance in life.
12. We should do what we can to equalize conditions for different groups.
13. Increased social equality.
14. We would have fewer problems if we treated people more equally.
15. We should strive to make incomes as equal as possible.
16. No one group should dominate in society.

Items 9-16 should be reverse-coded. The response scale was *very negative* (1) to *very positive* (7)

Appendix B

Meat Attachment Questionnaire (Graça et al., 2015)

1. To eat meat is one of the good pleasures in life.
2. Meat is irreplaceable in my diet.
3. According to our position in the food chain, we have the right to eat meat.
4. I feel bad when I think of eating meat.
5. I love meals with meat.
6. To eat meat is disrespectful towards life and the environment.
7. To eat meat is an unquestionable right of every person.
8. A good steak is without comparison.
9. I would feel fine with a meatless diet.
10. I'm a big fan of meat.
11. If I couldn't eat meat I would feel weak.
12. If I was forced to stop eating meat I would feel sad.
13. Meat reminds me of diseases.
14. By eating meat I'm reminded of the death and suffering of animals.
15. Eating meat is a natural and undisputable practice.
16. I don't picture myself without eating meat regularly.

Scoring

1) Response scale ranges were from 1 (strongly disagree) to 5 (strongly agree)
2) Items **4, 6, 9, 13, 14** are reverse scored, such as: 1=5; 2=4; 3=3; 4=1; 5=1.
3) Means for each dimension and the global scale:
   a) Hedonism: MEAN (items: 1, 5, 8, 10)
   b) Affinity: MEAN (items: 4, 6, 9, 14)
   c) Entitlement: MEAN (items: 3, 7, 15)
   d) Dependence: MEAN (items: 2, 9, 11, 12, 16)
   e) Meat attachment (global scale): MEAN (items: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16)

Appendix C

Human Supremacy Beliefs (Dhont & Hodson, 2014)

1. The life of an animal is just not of equal value as the life of a human being.
2. Animals are inferior to humans.
3. There is nothing unusual at all in the fact that humans dominate other animal species.
4. We should strive to more equality between humans and animals. (Recoded item)
5. In an ideal world, humans and animals would be treated on an equal basis. (Recoded item)
6. It is important that we treat other animal species more equally. (Recoded item)

Responses range from *Strongly disagree* (1) to *Strongly Agree* (5).

Appendix D

Attitudes Toward Vegetarians Scale (ATVS; Chin et al., 2002)

1. Vegetarians preach too much about their beliefs and eating habits.
2. Vegetarians should not try to hide their eating habits.
3. Vegetarian eating habits are harmful to the traditions of this country.
4. Individuals who don't eat meat are "wimpier" than individuals who do eat meat.
5. You can eat a balanced diet without meat.
6. Vegetarians are overly concerned about gaining weight.
7. Vegetarians are psychologically unhealthy.
8. It's not O.K. to tease someone for being vegetarian.
9. Refusing to eat meat is just a phase.
10. There are some good reasons not to eat meat.
11. Vegetarians are too idealistic.
12. I would approve if my children turned out to be vegetarians.
13. It is acceptable for individuals to refuse to eat meat that they have been served.
14. Vegetarians respect the rights of others who choose to eat meat.
15. Vegetarians use their eating habits to attract attention to themselves.
16. People who order vegetarian food often just are being cheap.
17. Many vegetarians secretly eat meat in private.
18. I avoid interacting with vegetarians whenever possible.
19. Vegetarians believe that they are better than others are.
20. People who refuse to eat meat are childish and immature.
21. Vegetarians often appear sickly and unhealthy.

Responses range from *Strongly disagree* (1) to *Strongly Agree* (5).

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