



# Gender Role Identity and Meat-Eating Justifications: The Role of Cognitive Dissonance and Identity Threats

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## Abstract

A large-scale shift away from modern animal agriculture is crucial in the mitigation of climate change, as well as beneficial for animal welfare and human health. Nonetheless, most individuals continue to consume meat. Making this discrepancy salient may trigger feelings of cognitive dissonance, which can be reduced through meat-eating justification strategies. As the consumption of meat is highly gendered, differences between men and women in the type of justification strategy were frequently established. Less research has focused on the role that an individual's gender role identity plays. When a person feels threatened in their masculinity or femininity, they may compensate for this threat by justifying their meat consumption more extremely. The present study examines the relationship between gender, gender role identity, compensatory behaviors, cognitive dissonance, and meat-eating justifications. A 2 (affirming versus threatening feedback) x 2 (control versus cognitive dissonance triggering information) experimental design is employed, with random assignment to conditions. The sample consisted of 332 participants (68.7% female). Gender was the most robust predictor of justification strategies, with men using more direct and women more indirect justification strategies. While women used more indirect over direct strategies, there were no differences for men. The relationship between an individual's gender role identity and their use of justification strategies was not affected by the experimental conditions. Results of the present study highlight the importance of individual differences in meat-related behaviors, suggesting that gender-specific approaches should be taken when promoting sustainable behavior.

*Keywords:* Meat-eating justification strategies, gender differences, gender role identity, gender role identity threats, cognitive dissonance

## **Gender Role Identity and Meat-Eating Justifications: The Role of Cognitive Dissonance and Identity Threats**

Animal agriculture is one of the strongest drivers of climate change, contributing to a major share of global greenhouse gas (GHG) emissions (IPCC, 2023; Poore & Nemecek, 2018; Shafiullah et al., 2020; Vermeulen et al., 2012). The livestock sector accounts for 16.5 to 28.1% of all global emissions (Food and Agricultural Organization [FAO], 2006; Gerber et al., 2013; Seijan et al., 2015; Twine, 2021) and for at least 58% of all food production emissions (Xu et al., 2021). For effectively mitigating climate change, a large-scale shift away from animal- and towards plant-based diets is crucial and could reduce GHG emissions by up to 84% (De Boer et al., 2013; Ioannidou et al., 2023; Springmann et al., 2018).

However, the impact of animal agriculture on the environment extends beyond escalating GHG emissions. Next to being a major contributor to anthropocentric climate change, the livestock industry significantly contributes to related environmental issues, including the loss of biodiversity, deforestation, and the pollution of air, water, and soil (Fiestas-Flores & Pyhälä, 2017; Gradidge et al., 2021; Henchion et al., 2017; Thornton & Herrero, 2010; United Nations, 2006).

In addition to being environmentally destructive, the meat industry raises severe ethical concerns regarding animal welfare and animal rights (Foer, 2009; Henchion et al., 2017; Pew Commission on Industrial Farm Animal Production [PCIFAP], 2008). More than 80 billion land animals are killed annually to meet global meat demands (Ritchie et al., 2019), a number raised to at least two trillion when fish and other sea life are taken into account (Brown & Dorey, 2019). Especially factory farming imposes massive harm upon animals (Rossi & Garner, 2014). The living conditions within such farms are often harsh (Hestermann et al., 2020), restricting free

movement due to close confinement and overcrowding (PCIFAP, 2008; Rossi & Garner, 2014). Such health-compromising environments contribute not only to the physical and psychological distress of the animals (McClements, 2023) but also to the development of production-associated diseases and deformities (PCIFAP, 2008; Rossi & Garner, 2014). Processing procedures (e.g., surgical procedures such as debeaking in poultry without anesthesia) frequently inflict long-term pain and injuries, and transportation conditions and inhumane slaughtering methods further add to the immense suffering experienced by the animals (Rossi & Garner, 2014). However, the feasibility of “humane” slaughter is a subject open to debate (Browning & Veit, 2020). In recent decades, philosophical arguments, including anti-speciesism (Singer, 1976) and anti-carnism (Joy, 2010), have emerged that contest the ideas and practices that perpetuate the exploitation and unequal treatment of animals.

Besides climate-related, environmental, and ethical considerations, another noteworthy argument against meat consumption is its association with negative human health consequences. Epidemiological studies link meat-dense diets to several adverse health conditions (Abete et al., 2014). Particularly the consumption of red and processed meat is linked to an increased mortality risk from cardiovascular disease and various types of cancer (Abete et al., 2014; Farvid et al., 2021; Wang et al., 2015). Moreover, the production of meat elevates the risk of pathogens and the spread of infectious diseases (PCIFAP, 2008).

Although the reasons to reduce meat intake appear to be manifold, most individuals frequently consume meat (Koning et al., 2021). In the Netherlands, for instance, the combined share of vegetarians and vegans is estimated to only be 3% (Stichting Natuur en Milieu, 2019). Globally, meat consumption is on the rise (Alexandratos & Bruinsma, 2012) and the FAO anticipates a further increase of at least 14% by the year 2030 (OECD/FAO, 2021). These trends

are in contrast with evidence showing that the majority of people express concern and compassion for animals and condemn their suffering (Cornish et al., 2016). This contradiction, whereby individuals continue to consume animals despite their affinity for them, is referred to as the *meat paradox* (Loughnan et al., 2010).

Explanations for the meat paradox are rooted in cognitive dissonance theory (Collier et al., 2022), positing that such attitude-behavior inconsistencies lead morally conflicted individuals to experience distress and negative arousal (Festinger, 1957). This creates a psychological state of discomfort, which can express as feelings of guilt, anger, anxiety, embarrassment, and shame (Festinger, 1957; Leonard, 2017). Hence, meat-related cognitive dissonance is experienced when meat-eaters behavior (i.e., consuming animals) is not in accordance with their ethical beliefs and moral principles (i.e., not wanting to inflict harm upon animals). Triggers include, for instance, confrontations with evidence of animal suffering, information on the negative health consequences of meat consumption, or situations in which the meat-animal connection is made salient (Ioannidou et al., 2023; Rothgerber, 2020).

Various mechanisms can be implemented to overcome this adverse emotional and cognitive state of conflict and reduce the feeling of inconsistency. Individuals can (a) align their behaviors with their beliefs, (b) change their beliefs to match their behavior, or (c) obscure the contradiction between behavior and beliefs. Aligning behaviors with beliefs implies reducing or completely refraining from meat consumption, while a change in beliefs would, for instance, mean that individuals stop caring for animals (Fiestas-Flores & Pyhälä, 2017; Rothgerber, 2020). However, evidence shows that individuals experiencing dissonance rarely change their behaviors or beliefs (Gradidge et al., 2021). Behavioral change not only disrupts existing habits (van 't Riet, 2011), but also requires people to forego more immediate gratifications such as taste, or

practical factors such as availability (Fiestas-Flores & Pyhälä, 2017; Lester & Yang, 2009). Festinger (1957) suggests that existing behaviors are resistant to change, as such change is often accompanied by pain and dissatisfaction. Further, given the stability of values, a change in beliefs is unlikely (e.g., Bardi et al., 2009; Feather, 1995; Rokeach, 1973). Most people, therefore, opt for the third mechanism to perpetuate their meat consumption, which involves obscuring the contradiction between behavior and cognition (i.e., beliefs and values). This process is known as *disengagement* (Bandura et al., 1996; Docherty & Jasper, 2023; Gradidge et al., 2021; Hartmann & Siegrist, 2020). Disengagement, as a psychological mechanism to resolve meat-related cognitive dissonance, operates through different strategies used to justify one's behavior (Bandura, 1999; Gradidge et al., 2021). This allows individuals to maintain a positive self-image (Bandura, 1999; Hartmann & Siegrist, 2020). Consequently, meat-eaters can continue to engage in the scrutinized behavior without experiencing negative emotions or moral concern (Piazza et al., 2015; Uhlmann et al., 2009).

Rothgerber (2013) investigated the ways individuals disengage from animal-related moral principles and developed the Meat-Eating Justification (MEJ) scale. This scale comprises nine strategies used to justify meat consumption, categorized into seven direct and two indirect MEJ strategies (see Table 1). The use of direct MEJ strategies is less apologetic, meaning that individuals generally acknowledge that they regularly eat animals (Rothgerber, 2019). They also endorse a different moral worth of humans and animals based on their species, known as speciesism (Caviola et al., 2019; Rothgerber & Rosenfeld, 2021). In contrast, individuals using indirect strategies are more apologetic of their meat consumption and generally try to redefine or avoid thoughts about what they are consuming, thereby disconnecting their moral identity from

the ethical implications of eating meat (Rothgerber, 2013, 2019). MEJ strategies are employed once individuals are in an active state of dissonance (Rothgerber, 2019).

*H1a: Participants in the cognitive dissonance condition score higher on direct MEJ strategies than those in the control condition.*

*H1b: Participants in the cognitive dissonance condition score higher on indirect MEJ strategies than those in the control condition.*

**Table 1**

*Direct and Indirect MEJ Strategies*

Direct MEJ strategies
<i>Pro-meat justification:</i> Having a positive attitude towards the taste of meat.
<i>Denial:</i> Denying animal suffering and/or pain.
<i>Hierarchical justification:</i> Believing that humans are higher in the hierarchy than animals.
<i>Dichotomization:</i> Categorizing animals into those used for food purposes and those not used for food purposes (e.g., pets).
<i>Religious justification:</i> Giving justifications based on religious beliefs.
<i>Health justification:</i> Believing meat is necessary for a healthy diet.
<i>Destiny/fate justification:</i> Believing that it is human destiny to eat meat.
Indirect MEJ strategies
<i>Dissociation:</i> Obscuring the animal-food connection.
<i>Avoidance:</i> Avoiding negative and unpleasant thoughts, situations, and information about the practices employed in the meat industry and animal husbandry.

*Note.* MEJ = meat-eating justification. Adapted from Hartmann and Siegrist, 2020; Rothgerber, 2013, 2014, 2019.



Previous studies demonstrated a correlation between MEJ strategies and self-reported meat consumption: While indirect MEJ strategies are negatively correlated with meat consumption, direct strategies are positively correlated with meat consumption (Hartmann & Siegrist, 2020; Rothgerber, 2013). Both meat-eating and its justification strategies are linked to context-driven factors such as cultural or religious norms (Filippini & Srinivasan, 2019; Stoll-Kleemann & Schmidt, 2017), as well as to individual differences, including demographic and socioeconomic factors (Mayfield et al., 2007; Milford et al., 2019; Ruby & Heine, 2012; Tian et al., 2016). Especially gender differences are often observed as a relevant individual factor: Gender has emerged as the most important predictor of meat consumption and attitudes toward animals (e.g., Gossard & York, 2003; Kellert & Berry, 1987; Vollum et al., 2004). Men typically consume meat more frequently and in greater quantities (Gossard & York, 2003; Keller & Siegrist, 2015; Rosenfeld, 2018; Rosenfeld & Tomiyama, 2021). They are also more attached to meat compared to women (Ioannidou et al., 2023), expressed through a stronger positive affect and dependence towards meat (Graça et al., 2015). Moreover, men express utilitarian and dominionistic attitudes towards animals more often, meaning that they are more willing to support animal exploitation and are more prone to the experience of personal pleasure from achieving control over animals (Kellert & Berry, 1987). Conversely, women are less attached to meat and show greater concern and sensitivity towards animal abuse and suffering (Dowsett et al., 2018), have more negative attitudes toward meat consumption (Kubberød et al., 2002), show stronger support for the animal protection movement and are more inclined to advocate for increased restrictions on animal use for human purposes (Broida et al., 1992; Eldridge & Gluck, 1996; Kellert & Berry, 1987; Knight et al., 2004; Rothgerber, 2020; Vollum et al., 2004). Perhaps not surprisingly, women are more likely to follow a vegetarian or vegan diet (Cramer et

al., 2017; Forestell & Nezelek, 2018; Rothgerber, 2020) and have a lower self-reported meat consumption compared to men (Allen et al., 2000; Ritzel & Mann, 2021; Rosenfeld & Tomiyama, 2021).

Gender differences not only have to be considered in the amount of meat individuals consume or attitudes they hold towards animals, but also in the strategies they employ to justify their consumption. Specifically, a relationship between Rothgerber's (2013) MEJ strategies and gender has frequently been established. Men more often opt for direct MEJs and generally score higher on overall use of these strategies, reflecting the need to justify their meat consumption more strongly (Rothgerber, 2013). In contrast, women tend to be more apologetic about their meat consumption and thus more likely to use indirect MEJs, attributable to greater levels of affection and compassion towards animals, as well as an inclination to distance themselves from meat and its representing values (Rothgerber, 2013, 2020). Although these tendencies are in line with women's lower meat consumption compared to men, women were also found to deliberately underreport the amount of meat they eat (Rothgerber, 2013, 2019).

*H2a: Men score higher than women on direct MEJ strategies.*

*H2b: Men score higher on direct than indirect MEJ strategies.*

*H2c: Women score higher than men on indirect MEJ strategies.*

*H2d: Women score higher on indirect than direct MEJ strategies.*

Ultimately, the consumption and justification of meat is highly gendered, with men and women showing distinct behavioral patterns. With gender as a highly salient and relevant social group (Deaux & Major, 1987) and as a core component of one's self-concept (i.e., the beliefs one holds about themselves; Kuhn, 1960; Steiner et al., 2022), individuals may be driven to conform

to socially conceptualized gender roles. When meaning is attached to expected behaviors (e.g., consuming meat), these behaviors can become an integral part of an individual's self-concept and embedded in one's gender identity (Branković et al., 2023; Oleschuk, 2019; Loughnan et al., 2014). Part of a person's gender identity encompasses their gender role identity<sup>1</sup>, referring to the identification with the socially and culturally determined attributes, behaviors, and characteristics associated with femininity or masculinity (Lindsey, 2005). Generally, femininity is associated with attributes that would more effectively permit individuals to empathize and identify with animal suffering, including empathy and compassion (Burriss et al., 2015; Rothgerber, 2013). Masculinity, on the other hand, has historically been associated with manhood, strength, status, and power, qualities stereotypically attributed to men (Bogueva et al., 2017; De Backer et al., 2020). Further, abstaining from meat is often regarded as a compromise to masculinity and male gender identity (Gal & Wilkie, 2010; Ruby & Heine, 2012; Sobal, 2005).

Research indicates that a person's gender role identity, compared to their gender, may be more predictive of MEJ strategies (Mertens & Oberhoff, 2023; Rothgerber, 2013). Individuals with more masculine identities, rather than men, engage less with animals and hence may justify their consumption in more direct ways (Gradidge et al., 2021). Rothgerber (2013) further found that the gender-justification strategy association disappears when controlling for masculinity. Additionally, a stronger endorsement of traditional gender role attitudes positively correlates with MEJ strategies (Allcorn & Ogletree, 2018). A notable limitation these studies have in common is the focus on masculinity and direct MEJs, leaving the question of how femininity relates to "female-style" MEJ strategies.

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<sup>1</sup> Terms in the literature may including gender role identity, gender role identification, and gender role orientation. In this paper, the term gender role identity will be used.

*H3a: Individuals with more masculine than feminine gender role identities score higher on direct MEJ strategies, even when controlling for gender.*

*H3b: Individuals with more feminine than masculine gender role identities score higher on indirect MEJ strategies, even when controlling for gender.*

With society ever evolving and the concept of gender becoming more fluid, moving away from a binary conceptualization, traditional views on gender and gender roles (specifically hegemonic masculinity) do not necessarily reflect contemporary perspectives (Bridges & Pascoe, 2014; De Backer et al., 2020; Jewkes et al., 2015). Nonetheless, such views are still present in people's minds (Mertens & Oberhoff, 2023) and may motivate individuals to conform to stereotypical gender expectations (Rothgerber, 2013). Empirical evidence suggests that this may be especially the case for men (Vandello et al., 2008). Indeed, men were found to engage in acts of compensatory masculinity following gender identity threats, for instance, by taking greater financial risks (Weaver et al., 2013), opposing transgender rights (Harrison & Michelson, 2019), or sexually harassing female interaction partners (Maass et al., 2003). Moreover, research has predominantly focused on men (Mertens & Oberhoff, 2023), while studies on women are either lacking or yield contradicting results, painting a less clear picture of gender differences in compensatory responses (e.g., Sinclair et al., 2016; Willer et al., 2013).

To overcome these limitations, Mertens and Oberhoff (2023) investigated the effect of threatening feedback to an individual's self-ascribed gender in both men and women. These authors suggest that MEJ strategies may be a potential compensation mechanism in response to such threats. Against expectations, threatening feedback neither lead to higher experienced threat nor to participants scoring higher on MEJ strategies as means of compensating for the threat.

Participants only scored higher in experienced threat when there was a mismatch between the received feedback and the participant's identity-related self-description (i.e., their gender role identity), instead of their gender. Although generally significant for both genders, this effect was especially pronounced in female participants. These findings oppose studies showing that men react more strongly to gender identity or gender role identity threats. Whether mismatched individuals justified their meat consumption stronger or in different ways as a compensatory mechanism, compared to matched participants, was not investigated.

*H4a: Individuals with masculine gender role identities score higher on direct MEJ strategies when their gender role identity is threatened than when it is affirmed.*

*H4b: Individuals with feminine gender role identities score higher on indirect MEJ strategies when their gender role identity is threatened than when it is affirmed.*

Furthermore, research thus far mainly applied threats directed towards stereotypical masculine (e.g., finances or sports) or feminine domains (e.g., cooking or child-care), instead of direct threats to gender or gender roles (e.g., Rudman et al., 2007; Vandello et al., 2008; Weaver et al., 2013). Nonetheless, some studies threatened gender or gender roles directly by providing feedback on a scale from masculine to feminine (Munsch & Willer, 2012; Schmitt & Branscombe, 2001). Although the use of this unidimensional scale increased experienced threat and using a single-dimensional assessment was supported by previous psychometric findings (Kachel et al., 2016), such approaches oppose the conceptualization of masculinity and femininity as two unipolar dimensions (Spence & Helmreich, 1978). Measuring masculinity and femininity independently and providing feedback on two separate scales may better capture the

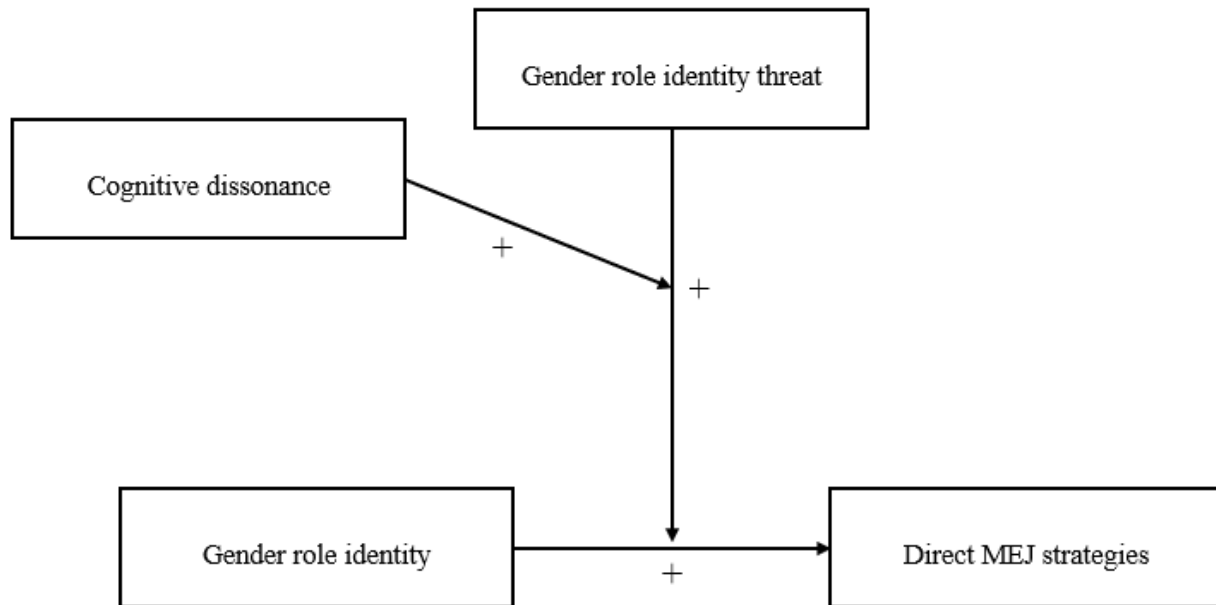
complexity of modern gender role conceptualizations (Rosenfeld & Tomiyama, 2021), thus potentially being a more effective method of inducing threat.

Mertens and Oberhoff (2023) further suggest that triggering cognitive dissonance in participants may be necessary to evoke the desire to resolve it via MEJ strategies. It remains unclear whether gender role identity threats may prompt individuals to compensate for such threats by using MEJ strategies, especially in situations where meat-related cognitive dissonance is experienced. When individuals are exposed to both threatening feedback and information designed to increase cognitive dissonance, those identifying as masculine might use direct justification strategies (see Figure 1), while those identifying as feminine might use indirect justification strategies (see Figure 2).

*H5a: Individuals with masculine gender role identities score higher on direct MEJ strategies when their gender role identity is threatened and when cognitive dissonance is triggered, compared to those where gender role identity is affirmed and those in the control condition.*

**Figure 1**

*Conceptual Moderated Moderation Model Predicting Direct MEJ Strategies (H4a and H5a)*

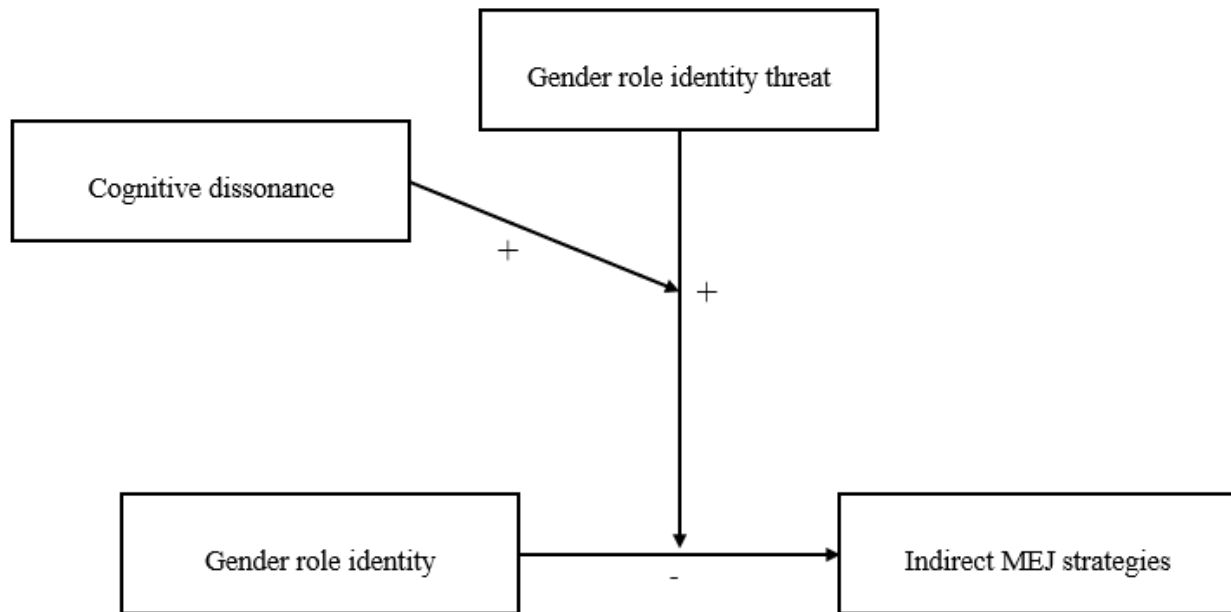


*Note.* MEJ = meat-eating justification. Positive scores of the independent variable gender role identity indicate a more masculine compared to feminine gender role identity.

*H5b: Individuals with feminine gender role identities score higher on indirect MEJ strategies when their gender role identity is threatened and when cognitive dissonance is triggered, compared to those where gender role identity is affirmed and those in the control condition.*

**Figure 2**

*Conceptual Moderated Moderation Model Predicting Indirect MEJ Strategies (H4b and H5b)*



*Note.* MEJ = meat-eating justification. Positive scores of the independent variable gender role identity indicate a more masculine compared to feminine gender role identity.

The present study aims to address the shortcomings in the existing literature by focusing on both masculine and feminine gender role identity to investigate their association with the types of strategies individuals employ to justify their meat consumption. Exploring how identification with gender roles influences meat-related attitudes and behaviors may provide valuable insights into the dynamics of gender identity and societal expectations. Furthermore, investigating how notions of both masculinity and femininity intersect with dietary behaviors and choices adds to the discussion on gender roles and their impact on various aspects of social behavior. By creating mismatched (i.e., threatening) or matched (i.e., affirming) feedback specifically on the participant's gender role identity, threats will not only be more applicable but



also more comparable. This study further tests the role of cognitive dissonance as a potential necessary precondition to trigger the use of MEJs in the context of gender role identity threats, thus shedding light on the psychological processes that underly decision-making and behavior. To the best of the author's knowledge, the present study is the first to experimentally investigate (a) the relationship between triggering cognitive dissonance and MEJ strategies, as well as (b) the effectiveness of a multi-dimensional approach to gender role identity threats. Given the environmental impact of the livestock industry, gaining an understanding of the underlying reasons and factors that motivate meat consumption is crucial, as it can inform efforts to promote sustainable food practices.

## **Method**

### **Participants and Recruitment**

To determine the required sample size, an a priori power analysis using G\*Power (Faul et al., 2007) was performed. A medium effect size ( $f_2 = 0.15$ ), a power of .80, and a .05 alpha cut-off criterion were entered as parameters. Because of the statistical model used (i.e., three-way interaction), the number of predictors was seven. For conducting a hierarchical multiple regression, a sample size of 103 participants was needed.

Two channels were used to recruit participants: First, the link to the questionnaire was distributed through social media platforms including WhatsApp and Instagram with no compensation offered but combined with the request to forward it. A total of 130 people participated through this method. Second, the online recruitment system SONA of the University of Groningen was used, allowing students to receive course credits for their participation. A total of 244 students participated through SONA system.

Participation was limited to English-speaking individuals above 16 years old. The initial sample consisted of 374 participants. Participants who did not complete the survey ( $n = 24$ ) and outliers ( $n = 7$ ) were excluded before data analysis. The final sample included 332 participants. Outliers were removed when they fulfilled both of the following criteria: (a) an unusually brief (below five minutes) or long response time (above two hours), which may have compromised the efficacy of the experimental manipulation, and (b) a lack of variance across scale items, which may indicate inattentiveness to items or the task. On average, participants took 15.53 minutes to complete the questionnaire. Year of birth was inquired as a proxy for age and ranged from 1948 to 2006 ( $M = 1998$ ). Gender was unequally represented, with 68.7% of participants identifying as female ( $n = 228$ ), 29.5% as male ( $n = 98$ ), 0.9% as non-binary/ third gender ( $n = 3$ ), 0.3% as genderfluid ( $n = 1$ ), and 0.6% preferred not to indicate their gender ( $n = 2$ ). Most participants in the final sample were carnivores, meaning that they frequently eat meat/fish and animal products (59.6%;  $n = 198$ ), flexitarians (i.e., eating meat and/or fish, but only very rarely) made up 18.7% of participants ( $n = 62$ ), pescatarians (i.e., eating fish but no meat) 6.6% ( $n = 22$ ), and vegetarians (i.e., not eating meat and fish but other animal products) 11.1% ( $n = 37$ ). Finally, 3.9% indicated being vegan, meaning that they do not consume any animal products including meat, fish, egg, dairy products, and honey ( $n = 13$ ).

Given that participants were recruited via different methods, subsamples were compared to check for significant differences. Detailed information and analyses can be found in Appendix A. Samples were shown to significantly differ on various variables. However, as multiple comparisons were carried out, the probability of at least one Type I error is higher, as there is an inflated family-wise error rate (Nicholson et al., 2021).

## Procedure

The Ethics Committee of the Faculty of Behavioral and Social Sciences at the University of Groningen approved the research. After approval, the study was conducted online using Qualtrics. Participants were first informed about the study procedure, including information about the study content and duration of the study. To minimize suspicion about the research question and the experimental manipulation, and to avoid unwanted effects on responses, the ultimate purpose of the study was withheld from participants. Instead, they were told that the research aims to investigate the role of individual differences, such as a person's gender role identity, in dietary decisions, as well as differences in the processing and evaluation of food-related information, visual and textual material, and feedback (see Appendix B for the participant information text). It was therefore not mentioned that the questionnaire would inquire about justifications of meat consumption.

After obtaining informed consent, participant's demographic information was collected, including the year in which they were born and the gender they identify with, instead of their biological sex. Next, dietary type was inquired, followed by the assessment of participants identification with masculine and feminine gender role attributes. Participants were told that they would receive feedback on their scores, but that these would need to be processed first. In the meantime, they viewed pictures of two sandwiches, one with meat and cheese (meat sandwich) and one with cheese and tomato (vegetarian sandwich). Participants rated how much they expected to like each of these sandwiches. Next, an experimental design was employed, following a 2 (cognitive dissonance: triggered versus control) x 2 (Gender role identity feedback: threatening versus affirmed). Participants were randomly assigned to conditions. In the cognitive dissonance trigger condition, participants were asked to read a text on the negative health

consequences of the consumption of red and processed meat, alongside a picture of a pig next to the sandwich with ham (i.e., processed meat) described above. In the control condition, participants read a text about an unrelated topic, i.e., the University of Groningen, and saw an image of only the meat sandwich. This was followed by the measurement of cognitive dissonance (Weingarten and Lagerkvist, 2023). In the next part of the questionnaire, participants received fictitious feedback about their outcome of the questionnaire measuring identification with gender roles. This feedback was either matched or mismatched to the participant's score on the masculinity and femininity subscale and therefore affirmed or threatened their gender role identity. A more detailed description of the development and delivery of the feedback conditions is described below. People were randomly assigned to experimental conditions. In total, 89 participants were assigned to the cognitive dissonance control group and received affirming feedback, 71 participants were assigned to the cognitive dissonance control group and received threatening feedback, 95 participants were assigned to the cognitive dissonance trigger condition and received affirming feedback, and 77 participants were assigned to the cognitive dissonance trigger condition and received threatening feedback. There were no significant differences in terms of allocation to conditions,  $\chi^2(1) = 0.01, p = .943$ .

Following the feedback manipulation, participants' experienced threat was measured. Afterwards, individuals completed the MEJ scale (Rothgerber, 2013), followed by two open-ended questions inquiring whether the participant found any aspect of the study not believable and what they thought the purpose of the study was. Finally, participants were debriefed on the true purpose of the study and the experimental manipulation and were informed that the feedback on the gender role questionnaire was fictitious and meant to deceive. The opportunity to contact

the researchers was provided to ask questions or discuss concerns. All study materials can be found in Appendix C.

## **Study Material**

### ***Gender Role Identity Feedback***

The feedback images were broadly based on the procedure by Schmitt and Branscombe (2001), where male participants received bogus feedback about their masculinity score compared to an average masculinity score typical for men. Feedback was delivered on a scale from low to high masculinity.

Participants in the present study received either gender role identity matching (affirmation condition) or mismatching (threat condition) feedback based on their outcome on the masculinity and femininity subscales of the BSRI, rather than their gender. This approach resulted in four possible combinations of masculinity and femininity: 1) high masculinity/low femininity, 2) high masculinity/high femininity, 3) low masculinity/low femininity, and 4) low masculinity/high femininity. Feedback was delivered on two independent scales, ranging from low masculinity/femininity to high masculinity/femininity, accompanied by a short explanatory text on how to interpret the results. Participants' fictitious scores were represented by both a number and an "X" placed at the corresponding point on each scale. Additionally, "average masculinity" ( $M = 4.48$ ) and "average femininity" ( $M = 4.94$ ) scores were marked on the scale to create comparison values. These average scores were calculated using data from Mertens and Oberhoff (2023), as the same instrument for assessing gender role identity was used and samples were expected to be similar.

As there were two conditions (affirmation versus threat), a total of eight possible feedback texts with images were created. For example, someone assigned to the threat condition

who scored high on masculinity but low on femininity would receive feedback stating that they scored well below average on masculinity and above average on femininity. In the affirmation condition, they would receive feedback stating that they scored slightly above average on masculinity and below average on femininity (see Appendix C for all eight feedback possibilities).

## **Measures**

### ***Cognitive Dissonance***

Following Weingarten and Lagerkvist (2023), participants rated the question “How do you feel about your own meat consumption?” on a 7-point semantic bipolar scale with five adjectives as end-point anchors (*relaxed-distressed; easy-uneasy; comfortable-uncomfortable; pleased-bothered; calm-upset*;  $M = 2.61$ ,  $SD = 1.50$ ;  $\alpha = .96$ ). Items were averaged to create an index, whereby higher scores indicated stronger experienced dissonance.

### ***Meat-Eating Justifications***

Rothgerber’s (2013) MEJ scale was used to assess the assumptions people hold that justify their meat consumption, measured with 27 items comprising nine subscales, each including three items. Statements were randomized and rated on a 7-point Likert-type scale (1 = *strongly disagree*; 7 = *strongly agree*;  $M = 3.12$ ,  $SD = 1.01$ ; see Table 2 for descriptives of direct and indirect MEJs). Direct MEJ strategies were measured by pro-meat (e.g., “I enjoy eating meat too much to ever give it up.”;  $\alpha = .86$ ), denial (e.g., “Animals don’t really suffer when being raised and killed for meat.”;  $\alpha = .65$ ), hierarchical justification (e.g., “It’s acceptable to eat certain animals because they’re bred for that purpose”;  $\alpha = .76$ ), dichotomization (e.g., “To me, there is a real difference between animals we keep as pets and animals we eat as food.”;  $\alpha = .57$ ), religious justification (e.g., “Got intended for us to eat animals.”;  $\alpha = .90$ ), health justification

(e.g., “Meat is essential for strong muscles.”;  $\alpha = .93$ ), and human destiny/fate justification (e.g., “It violates human destiny and evolution to give up eating meat.”;  $\alpha = .75$ ). Subscales comprising indirect MEJ strategies included dissociation (e.g., “When I look at meat, I try hard not to connect it with an animal.”;  $\alpha = .83$ ) and avoidance (e.g., “I try not to think about what goes on in slaughterhouses.”;  $\alpha = .63$ ). Items for each subscale were averaged to create indices for the respective scale, and items for direct strategies ( $\alpha = .94$ ) and indirect strategies ( $\alpha = .85$ ) were averaged to form composite scores of direct and indirect MEJs. Higher scores indicate stronger justifications. Although the Cronbach alphas for denial, dichotomization, and avoidance were low, other studies reported similar values (e.g., Ioannidou et al., 2023; Mertens & Oberhoff, 2023; Rothgerber, 2013).

### ***Gender Role Identity***

Gender role identity was measured using the short version of the Bem Sex Role Inventory (BSRI; Bem, 1981). This scale contains a total of 30 items measuring gender-stereotypical traits. Participants were asked to indicate how much they feel the presented masculine and feminine characteristics applied to them. Two subscales assessed participants’ ratings of being masculine (e.g., dominant, willing to take risks;  $M = 3.56$ ,  $SD = 0.68$ ) or feminine (e.g., compassionate, understanding;  $M = 4.51$ ,  $SD = 0.68$ ). Additionally, a third neutral subscale included neutral filler items (e.g., truthful, conventional) that were not associated with either stereotype. Each subscale consists of 10 items. All items were shown in randomized order. Following recommendations from Geldenhuys and Bosch (2020), a 6-point, instead of a 7-point response format was used (1 = *never true*; 6 = *always true*). To create indices for the masculinity ( $\alpha = .80$ ) and femininity ( $\alpha = .82$ ) subscales, items were averaged. Gender role identity was calculated as a difference score

between the masculinity and femininity subscales, so that values above zero indicate a more masculine identity and values below zero a more feminine identity.

### ***Experienced Threat***

A 10-item scale, adapted from Schmitt and Branscombe (2001), was used to measure experienced threat, framed as an assessment of “how you generally feel about feedback in questionnaires and how you experienced your feedback”. This scale included two types of items: Five filler items to prevent suspicion about the manipulated feedback, framed as questions asking about the value of giving feedback to participants in research studies (e.g., “Showing participants their scores is a good idea.”, “Participants benefit from knowing their scores.”). The remaining five items inquired about the feelings of the participant and comprised the actual scale measuring experienced threat (e.g., “I am pleased with my scores”;  $M = 3.07$ ,  $SD = 1.21$ ;  $\alpha = .89$ ). Items were randomized and rated on a 7-point Likert-type scale (1 = *strongly disagree*; 7 = *strongly agree*). Where applicable, items were reverse scored and then averaged, with higher scores indicating stronger experienced threat.

### **Statistical Analysis Strategies**

The collected data were analyzed using the statistical software program SPSS 29.01.0. Preliminary analyses were conducted prior to hypothesis testing to assess the validity of the model assumptions and to verify the effectiveness of the experimental manipulation. For all analyses with gender as a predictor, only participants who identified as either male or female were included, while all others were excluded. An alpha value of .05 was used to determine significance.



### ***Independent and Paired Samples T-Tests***

Two independent samples t-tests were conducted to determine whether there is a significant difference in scores on direct (H1a) and indirect MEJ strategies (H1b) between participants in the cognitive dissonance experimental condition and the control condition. Two independent samples t-tests were used to compare direct (H2a) and indirect MEJ strategy (H2c) scores between men and women. To identify whether significant differences in the use of direct versus indirect MEJ strategies exist within each gender group, paired samples t-tests were conducted for men (H2b) and women (H2c) separately.

### ***Hierarchical Linear Regressions***

To investigate the relationship between gender role and MEJ strategies and indirect MEJ strategies when controlling for gender, two hierarchical regression analyses were carried out, one predicting direct (H3a) and one predicting indirect MEJ strategies (H3b) as dependent variables. In each analysis, gender was included in step 1 as the controlling factor and gender role identity in step 2 as the independent variable.

Hypothesis testing of the moderated moderation models (H4a, H4b, H5a, and H5b) involved two hierarchical regression models, with direct MEJ strategies (see Figure 1) and indirect MEJ strategies (see Figure 2) as dependent variables. In both analyses, gender role identity was included as the independent variable, feedback experimental condition (0 = affirmation condition, 1 = threat condition) as the moderator, and cognitive dissonance experimental condition (0 = control condition, 1 = cognitive dissonance condition) as the moderating moderator. Predictors were added with each step as follows: 1) Gender role identity, 2) gender role identity, gender role identity threat, and their interaction, and 3) gender role identity, threat, cognitive dissonance versus control, and all possible interactions.

### *Statistical Assumptions*

The dataset was tested according to the assumptions of independent and paired samples t-test and multiple regression analysis. For all conducted t-tests, the homogeneity of variances assumption was met (Levene's test values were all  $p > .05$ ). No univariate or multivariate outliers were excluded based on inspections of boxplots, Mahalanobis, Cook's and Leverage values, and visual inspection of the data. Significant Shapiro-Wilk values for both the cognitive dissonance and control experimental condition indicated deviations from normality (all  $W > .96$ , all  $p < .012$ ) on direct and indirect MEJ scores. Similarly, scores were not normally distributed for both men ( $W = .96, p = .007$ ) and women ( $W = .97, p < .001$ ) on indirect MEJ scores and for women ( $W = .97, p < .001$ ) but not men ( $W = .98, p = .201$ ) on direct MEJ scores. The differences between the paired observations of direct and indirect MEJ strategies were approximately normally distributed for both men ( $W = .96, p = .004$ ) and women ( $W = 1.0, p = .84$ ). For the linear regression analyses, assumptions were tested separately for direct and indirect MEJ strategies as dependent variables, but similar conclusions were reached. Collinearity statistics revealed that assumptions of multicollinearity were not violated (VIFs  $< 1.07$ ; Tolerances  $> 0.94$ ). The data met the assumption of independent errors for all regression models ( $1.89 > \text{Durbin-Watson values} < 2.22$ ). Investigation of the normal P-P plot of standardized residuals indicated that the data contained approximately normally distributed errors for all analyses. The data also met the homogeneity of variance and linearity assumptions, as indicated by the scatterplots of standardized residuals.

## Results

### Preliminary Analysis

Descriptive statistics and zero-order correlations between all variables of the tested models are presented in Table 2. Correlations between MEJ subscales are found in Appendix D.

**Table 2**

*Means, Standard Deviations, and Correlations*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1. Direct MEJ strategies	332	2.94	1.12	—					
2. Indirect MEJ strategies	332	4.03	1.46	.28***	—				
3. Gender <sup>a</sup>	326	—	—	.22***	-.31***	—			
4. Gender role identity <sup>b</sup>	332	-.095	0.91	.11*	-.15**	.25***	—		
5. Feedback condition <sup>c</sup>	332	—	—	.05	.09	-.08	-.01	—	
6. Cognitive dissonance condition <sup>d</sup>	332	—	—	-.07	-.05	-.06	-.03	.04	—

*Note.* MEJ = meat-eating justification. *SD* is not reported for gender, feedback condition, and cognitive dissonance condition due to the dichotomous nature of the variables.

<sup>a</sup> 0 = women, 1 = men.

<sup>b</sup> Difference score between masculinity and femininity, so that positive scores indicate a masculine gender role identity and negative scores a more feminine gender role identity

<sup>c</sup> 0 = affirming feedback, 1 = threatening feedback.

<sup>d</sup> 0 = control condition, 1 = cognitive dissonance condition.

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

## Manipulation Check

To check whether the experimental manipulations lead to the intended effect, differences between experimental groups were analyzed descriptively in advance of the main analysis. Outcomes showed that participants in the threatening feedback condition reported significantly higher levels of experienced threat ( $M = 3.64, SD = 1.24$ ) compared to those in the affirmation condition ( $M = 2.62, SD = 0.99$ ),  $t(277.97) = -8.16, p < .001$ . Similarly, participants in the cognitive dissonance condition reported significantly higher levels of experienced dissonance ( $M = 2.83, SD = 1.68$ ) compared to those in the control condition ( $M = 2.38, SD = 1.24$ ),  $t(323.59) = -2.76, p = .003$ .

## Main Analyses

### *Cognitive Dissonance and MEJ Strategies (H1a and H1b)*

Two independent samples t-tests were carried out to compare the group means of the cognitive dissonance experimental conditions on direct and indirect MEJ scores. Contrary to expectations, there were neither significant differences between groups for direct MEJ strategies,  $t(330) = 1.26, p = .104$ , nor indirect MEJ strategies,  $t(330) = 0.85, p = .199$ . Participants in the cognitive dissonance condition ( $M_{\text{direct}} = 2.86, SD_{\text{direct}} = 1.15$ ;  $M_{\text{indirect}} = 3.97, SD_{\text{indirect}} = 1.45$ ) did not score higher on either MEJ strategy compared to participants in the control condition ( $M_{\text{direct}} = 3.02, SD_{\text{direct}} = 1.10$ ;  $M_{\text{indirect}} = 4.10, SD_{\text{indirect}} = 1.46$ ). Therefore, both hypotheses H1a and H1b were rejected.

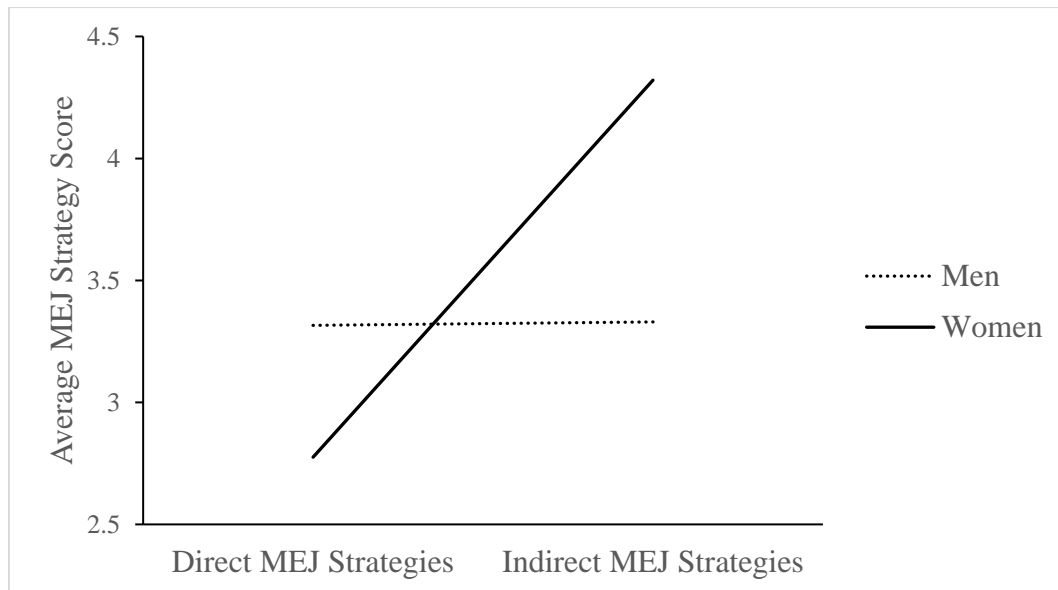
### *Gender Differences in Direct and Indirect MEJ Strategies (H2a, H2b, H2c and H2c)*

Two independent samples t-tests further tested whether men and women scored significantly different on either direct or indirect MEJ strategies. As hypothesized, men ( $M_{\text{direct}} = 3.32, SD_{\text{direct}} = 1.23$ ) scored significantly higher on direct MEJ strategies compared to women

( $M_{\text{direct}} = 2.78$ ,  $SD_{\text{direct}} = 1.05$ ),  $t(324) = -4.05$ ,  $p < .001$ . Further in line with expectations, women ( $M_{\text{indirect}} = 4.32$ ,  $SD_{\text{indirect}} = 1.44$ ) scored significantly higher on indirect MEJ strategies than men ( $M_{\text{indirect}} = 3.33$ ,  $SD_{\text{indirect}} = 1.27$ ),  $t(324) = 5.90$ ,  $p < .001$ . When comparing means of direct and indirect MEJ strategies within each gender group, results of the paired samples t-tests indicated that while women scored significantly higher on indirect than direct MEJ strategies,  $t(227) = -18.54$ ,  $p < .001$ , there was no significant difference in direct versus indirect MEJ scores for men,  $t(97) = -0.08$ ,  $p = .468$ . Conclusively, hypotheses H2a, H2b, and H2c were supported, while H2d was rejected. Figure 5 displays the within- and between gender differences in justification strategies.

**Figure 5**

*Meat-Eating Justification Strategies for Men and Women*



*Note.* MEJ = meat-eating justification.

***Gender, Gender Role Identity and Direct MEJ Strategies (H3a)***

To test whether being more masculine than feminine predicts direct MEJ strategies even when controlling for gender, a hierarchical regression analysis was carried out (see Table 3). Gender role identity was not a significant predictor of direct MEJ strategies when controlling for gender,  $\beta = .06$ ,  $t(323) = 1.06$ ,  $p = .292$ . Gender, however, accounted for a significant change in variance in direct MEJ strategies,  $\Delta R^2 = .05$ ,  $F(1, 324) = 16.43$ ,  $p < .001$ . Being a man significantly predicted direct MEJ strategies in step 1 ( $\beta = .22$ ,  $t(324) = 4.05$ ,  $p < .001$ ) and in step 2 ( $\beta = .21$ ,  $t(323) = 3.66$ ,  $p < .001$ ). There was no added variance explained in step 2 ( $\Delta R^2 = .003$ ,  $F(1, 323) = 1.12$ ,  $p = .292$ ). Therefore, hypothesis H3a was not supported by the data, indicating that individuals with more masculine than feminine gender role identities did not score higher on direct MEJ strategies when controlling for gender.

**Table 3***Hierarchical Regression Predicting Direct MEJ Strategies (H3a)*

Variable	<i>B</i>	<i>SE</i>	95% CI		<i>R</i> <sup>2</sup>
			<i>LL</i>	<i>UL</i>	
Step 1					.05
Gender <sup>a</sup>	0.54*	0.13	0.28	0.80	
Step 2					.05
Gender <sup>a</sup>	0.50*	0.14	0.23	0.78	
Gender role identity <sup>b</sup>	0.07	0.07	-0.06	0.21	

*Note.* *N* = 326. MEJ = meat-eating justification. *B* = unstandardized regression coefficient; *SE* = standard error; CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

<sup>a</sup> 0 = women, 1 = men

<sup>b</sup> Difference score between masculinity and femininity, so that positive scores indicate a masculine gender role identity and negative scores a more feminine gender role identity

\* *p* < .001.

***Gender, Gender Role Identity and Indirect MEJ Strategies (H3b)***

Another hierarchical regression analysis was carried out to test whether being more feminine than masculine predicts indirect MEJ strategies even when controlling for gender (see Table 4). Gender role identity did not significantly predict indirect MEJs when controlling for gender,  $\beta = -.08$ ,  $t(323) = -1.47$ ,  $p = .144$ . As for direct MEJs, gender contributed to a significant change in variance in indirect MEJ strategies in step 1,  $\Delta R^2 = .10$ ,  $F(1, 324) = 34.79$ ,  $p < .001$ . Being a woman significantly predicted indirect strategies in both step 1 ( $\beta = -.31$ ,  $t(324) = -5.90$ ,  $p < .001$ ) and step 2 ( $\beta = -.29$ ,  $t(323) = -5.35$ ,  $p < .001$ ). Again, there was no significant change in variance explained in step 2,  $\Delta R^2 = .01$ ,  $F(1, 323) = 2.15$ ,  $p = .144$ . Based

on these results, individuals with more feminine than masculine gender role identities did not score higher on indirect MEJ strategies when controlling for gender, hence hypothesis H3b was rejected.

**Table 4**

*Hierarchical Regression Predicting Indirect MEJ Strategies (H3b)*

Variable	<i>B</i>	<i>SE</i>	95% CI		<i>R</i> <sup>2</sup>
			<i>LL</i>	<i>UL</i>	
Step 1					.10
Gender <sup>a</sup>	-0.99*	0.17	-1.32	-0.66	
Step 2					.10
Gender <sup>a</sup>	-0.93*	0.17	-1.27	-0.59	
Gender role identity <sup>b</sup>	-0.13	0.09	-0.30	0.04	

*Note.* *N* = 326. MEJ = meat-eating justification. *B* = unstandardized regression coefficient; *SE* = standard error; CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

<sup>a</sup> 0 = women, 1 = men

<sup>b</sup> Difference score between masculinity and femininity, so that positive scores indicate a masculine gender role identity and negative scores a more feminine gender role identity

\**p* < .001.

***Gender Role Identity, Threatening Feedback, Cognitive Dissonance, and Direct MEJ Strategies (H4a and H5a)***

A hierarchical regression analysis was used to investigate whether individuals with more masculine than feminine gender role identities use more direct MEJ strategies when they receive



threatening feedback (H4a) and when cognitive dissonance is triggered (H5a). Results are shown in Table 5.

Gender role identity contributed to a significant change in variance in direct MEJ strategies,  $\Delta R^2 = .01$ ,  $F(1, 330) = 4.32$ ,  $p = .038$ . That is, being more masculine than feminine significantly predicted direct MEJ strategies,  $\beta = .11$ ,  $t(330) = 2.08$ ,  $p = .038$ . This, however, was only the case in step 1 of the regression. The interaction between gender role identity and feedback condition did not add significantly to the explained variance ( $\Delta R^2 = .002$ ,  $F(2, 328) = 0.42$ ,  $p = .660$ ) in step 2,  $\beta = .04$ ,  $t(328) = -0.38$ ,  $p = .707$ . That is, more masculine participants receiving threatening feedback did not score higher in direct MEJ strategies, contrary to H4a.

The three-way interaction between gender role identity, feedback condition, and cognitive condition did not predict direct MEJs,  $\beta = 0.16$ ,  $t(324) = 1.06$ ,  $p = .290$ . There was no added variance in step 3 of the regression,  $\Delta R^2 = .01$ ,  $F(1, 324) = 0.65$ ,  $p = .631$ . The data therefore did not support the moderated moderation hypothesis, rejecting H5a. When receiving threatening feedback and information triggering cognitive dissonance, individuals with more masculine than feminine gender role identities did not score higher on direct MEJs.

**Table 5***Moderated Moderation Model Predicting Direct MEJ Strategies (H4a and H5a)*

Variable	<i>B</i>	<i>SE</i>	95% CI		<i>R</i> <sup>2</sup>
			<i>LL</i>	<i>UL</i>	
Step 1					.01
Gender role identity <sup>a</sup>	0.14*	0.07	0.01	0.27	
Step 2					.02
Gender role identity	0.12	0.09	-0.06	0.30	
Feedback condition <sup>b</sup>	0.15	0.18	-0.20	0.51	
Gender role identity*Feedback condition	0.05	0.14	-0.22	0.32	
Step 3					.02
Gender role identity	0.17	0.12	-0.07	0.41	
Feedback condition	0.01	0.25	-0.49	0.51	
Gender role identity*Feedback condition	-0.10	0.20	-0.48	0.29	
Cognitive dissonance condition <sup>c</sup>	-0.25	0.24	-0.72	0.21	
Gender role identity*Cognitive dissonance condition	-0.11	0.18	-0.46	0.25	
Feedback condition*Cognitive dissonance condition	0.28	0.36	-0.43	0.99	
Gender role identity*Feedback condition*Cognitive dissonance condition	0.29	0.28	-0.25	0.84	

*Note.* *N* = 326. MEJ = meat-eating justification. *B* = unstandardized regression coefficient; *SE* = standard error; CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

<sup>a</sup> Difference score between masculinity and femininity, so that positive scores indicate a masculine gender role identity and negative scores a more feminine gender role identity

<sup>b</sup> 0 = affirmation condition, 1 = threat condition

<sup>c</sup> 0 = control condition, 1 = cognitive dissonance condition

\**p* < .05.

***Gender Role Identity, Threatening Feedback, Cognitive Dissonance, and Indirect MEJ Strategies (H4b and H5b)***

To investigate whether individuals with more feminine than masculine gender role identities score higher on indirect MEJs when they receive threatening feedback (H4b) and when cognitive dissonance is triggered (H5b), another hierarchical regression analysis was carried out (see Table 6).

In step 1 of the analysis, gender role identity again contributed to a significant change in variance in indirect MEJ strategies,  $\Delta R^2 = .02$ ,  $F(1, 330) = 7.65$ ,  $p = .006$ . Individuals identifying as more feminine than masculine used more indirect MEJs,  $\beta = -.15$ ,  $t(330) = -2.77$ ,  $p = .006$ . In step 2, the interaction between gender role identity and feedback condition was not significant ( $\beta = -.07$ ,  $t(328) = -0.73$ ,  $p = .468$ ) and did not add to the explained variance,  $\Delta R^2 = .01$ ,  $F(2, 328) = 1.64$ ,  $p = .195$ . Thus, H4b was rejected, indicating that individuals with a more feminine than masculine gender role identity did not score higher on indirect MEJ strategies when receiving threatening feedback.

Predictors in step 3 did not significantly explain more variance compared to the previous steps,  $\Delta R^2 = .01$ ,  $F(1, 324) = 0.76$ ,  $p = .553$ . The three-way interaction between gender role identity, feedback condition and cognitive condition was not predictive of indirect MEJs,  $\beta = .10$ ,  $t(324) = 0.68$ ,  $p = .496$ . H5b was therefore rejected, as no evidence for the moderated moderation hypothesis emerged. Individuals assigned to the threatening feedback and cognitive dissonance condition did not score higher on indirect MEJ strategies.

**Table 6***Moderated Moderation Model Predicting Indirect MEJ Strategies (H4b and H5b)*

Variable	<i>B</i>	<i>SE</i>	95% CI		<i>R</i> <sup>2</sup>
			<i>LL</i>	<i>UL</i>	
Step 1					.02
Gender role identity <sup>a</sup>	0.24*	0.09	-0.41	-0.07	
Step 2					.03
Gender role identity	0.19	0.12	-0.41	0.04	
Feedback condition <sup>b</sup>	0.14	0.23	-0.31	0.60	
Gender role identity*Feedback condition	0.13	0.18	-0.48	0.22	
Step 3					.04
Gender role identity	-0.04	0.16	-0.35	0.27	
Feedback condition	0.05	0.33	-0.60	0.69	
Gender role identity*Feedback condition	-0.23	0.25	-0.73	0.26	
Cognitive dissonance condition <sup>c</sup>	-0.47	0.31	0.14	0.14	
Gender role identity*Cognitive dissonance condition	-0.33	0.23	-0.79	0.13	
Feedback condition*Cognitive dissonance condition	0.23	0.46	-0.68	1.15	
Gender role identity*Feedback condition*Cognitive dissonance condition	0.24	0.36	-0.46	0.94	

*Note.* *N* = 326. MEJ = meat-eating justification. *B* = unstandardized regression coefficient; *SE* = standard error; CI = confidence interval; *LL* = lower limit; *UL* = upper limit.

<sup>a</sup> Difference score between masculinity and femininity, so that positive scores indicate a masculine gender role identity and negative scores a more feminine gender role identity

<sup>b</sup> 0 = affirmation condition, 1 = threat condition

<sup>c</sup> 0 = control condition, 1 = cognitive dissonance condition

\**p* < .05.

## Exploratory Analysis

Exploratory analyses were carried out to further explore the data. First, given that gender emerged as a better predictor of MEJ strategies than a person's gender role identity, the same moderated moderation models were analyzed with gender as dependent variable instead of gender role identity. Furthermore, individuals who do not consume any meat and/or animal products may not experience cognitive dissonance the same way as those who do consume animals, hence justification strategies may be less applicable. Thus, experienced threat and experienced dissonance among carnivores, flexitarians, and pescatarians were further explored.

### *Moderated Moderation Hypotheses With Gender as Dependent Variable*

Being a man was a significant predictor of direct MEJ strategies in step 1 ( $\beta = .22$ ,  $t(324) = 4.05$ ,  $p < .001$ ), step 2 ( $\beta = .21$ ,  $t(322) = 3.00$ ,  $p = .003$ ), and step 3,  $\beta = .24$ ,  $t(318) = 2.33$ ,  $p = .020$ . As in the main analysis, there was neither a two-way interaction between gender and feedback condition ( $\beta = .02$ ,  $t(322) = 0.25$ ,  $p = .805$ ), nor a three-way interaction between gender, feedback condition, and cognitive dissonance condition,  $\beta = .13$ ,  $t(318) = 1.18$ ,  $p = .238$ . Thus, compared to step 1 ( $\Delta R^2 = .05$ .,  $F(1, 324) = 16.43$ ,  $p < .001$ ), neither predictors in step 2 ( $\Delta R^2 = .003$ ,  $F(2, 322) = 0.55$ ,  $p = .576$ ), nor step 3 ( $\Delta R^2 = .003$ ,  $F(2, 322) = 0.55$ ,  $p = .576$ ) added significantly to the explained variance.

Similarly, being a woman significantly predicted indirect MEJ strategies in step 1 ( $\beta = -.31$ ,  $t(324) = -5.90$ ,  $p < .001$ ), step 2 ( $\beta = -.29$ ,  $t(322) = -4.12$ ,  $p < .001$ ), and step 3,  $\beta = -.41$ ,  $t(318) = -4.09$ ,  $p < .001$ . Again, the two-way interaction between gender and feedback condition was not predictive of indirect MEJ strategies,  $\beta = -.03$ ,  $t(322) = -.41$ ,  $p = .682$ . Neither was the three-way interaction between gender, feedback condition, and cognitive dissonance condition,  $\beta = -.10$ ,  $t(318) = -.90$ ,  $p = .367$ . Thus, compared to step 1 ( $\Delta R^2 = .10$ .,  $F(1, 324) = 34.79$ ,  $p <$

.001), neither predictors in step 2 ( $\Delta R^2 = .01$ ,  $F(2, 322) = 0.84$ ,  $p = .433$ ), nor step 3 ( $\Delta R^2 = .01$ .,  $F(4, 318) = 0.99$ ,  $p = .413$ ) explained additional variance.

These results show that gender significantly predicts justification strategies across all steps of the analysis. Men scored higher on direct, and women higher on indirect MEJ strategies. However, being assigned to the threatening feedback condition did not lead men and women to score higher on direct and indirect MEJ strategies respectively. Neither did men assigned to the threatening feedback and cognitive dissonance condition use more direct MEJs, nor did women assigned to both of these conditions use more indirect MEJs.

### ***Exclusion of Vegetarians and Vegans***

Correlations, means and standard deviations can be found in Table 7. Direct MEJ strategies were positively correlated to both experienced threat and experienced dissonance. Indirect MEJ strategies were positively correlated with experienced threat and negatively correlated with experienced dissonance. These results indicate that individuals scored higher on direct strategies when they feel threatened, while when experiencing more cognitive dissonance, they scored higher on indirect but lower on direct strategies.

**Table 7**

*Correlations Between Direct MEJ strategies, Indirect MEJ Strategies, Gender, Experienced Threat, and Experienced Cognitive Dissonance (Vegetarians and Vegans Excluded)*

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4	5
1. Direct MEJ strategies	282	3.18	1.03	—				
2. Indirect MEJ strategies	282	4.25	1.40	.10	—			
3. Gender <sup>a</sup>	276	—	—	.21**	-.43**	—		
4. Experienced threat <sup>b</sup>	282	3.12	1.23	.12*	.14*	-.13*	—	
5. Experienced cognitive dissonance <sup>b</sup>	282	2.78	1.44	-.30**	.27**	-.15*	.06	—

*Note.* MEJ = meat-eating justification. *M* and *SD* not reported for gender due to the dichotomous nature of the variable.

<sup>a</sup> 0 = women, 1 = men

<sup>b</sup> Higher values indicate stronger experienced threat/dissonance

\*  $p < .05$ . \*\*  $p < .001$ .

To further explore the negative correlations between gender and experienced threat, as well as gender and experienced cognitive dissonance, independent samples t-tests were used to investigate differences between men and women. Results indicated that women ( $M = 3.24$ ,  $SD = 1.24$ ) experienced significantly more threat than men ( $M = 2.89$ ,  $SD = 1.17$ ),  $t(274) = 2.24$ ,  $p = .026$ . The same effect was also found in the whole sample ( $M_{\text{women}} = 3.12$ ,  $SD_{\text{women}} = 1.22$ ;  $M_{\text{men}} = 2.82$ ,  $SD_{\text{men}} = 1.16$ ),  $t(324) = 2.50$ ,  $p = .013$ . For experienced cognitive dissonance, there were no differences in the whole sample between men ( $M = 2.47$ ,  $SD = 1.40$ ) and women ( $M = 2.67$ ,  $SD = 1.54$ ),  $t(324) = 1.08$ ,  $p = .280$ . However, when excluding vegetarians and vegans from the analysis, statistically significant gender differences emerged ( $M_{\text{women}} = 2.93$ ,  $SD_{\text{women}} = 1.49$ ;  $M_{\text{men}} = 2.48$ ,  $SD_{\text{men}} = 1.30$ ),  $t(274) = 2.44$ ,  $p = .015$ . These findings indicate that women

generally experience higher levels of threat and that women who consume meat and animal products experience more cognitive dissonance than men who consume meat and animal products.

### **Discussion**

A transition towards more sustainable food systems is crucial in the mitigation of climate change. Especially animal agriculture and meat consumption come along with adverse environmental, but also ethical and health-related concerns. Therefore, understanding individual differences in food choices, as well as identifying psychological barriers hindering individuals from choosing a meat-free diet is key in the transition towards sustainability. The present study builds upon recent research identifying gender and gender role identity as important aspects influencing meat-eating behavior and justification strategies, which are used to reduce cognitive dissonance. It is the first to investigate how threats to one's gender role identity influence the use of strategies justifying one's meat consumption in the context of cognitive dissonance.

In line with expectations, gender differences in the use of justification strategies emerged. Men used more direct MEJs than women and women used more indirect MEJs than men. Moreover, masculine gender role identities correlated with direct strategies, while feminine gender role identities correlated with indirect strategies. Unexpectedly, however, gender was a better predictor of justification strategies than gender role identity. Contrary to expectations, individuals in the cognitive dissonance condition did not justify their meat consumption in more direct or indirect ways. No support was found for acts of compensatory behavior following gender role identity threats, as those receiving threatening feedback did not score higher on MEJ strategies. Lastly, when receiving both threatening feedback and information triggering cognitive dissonance, neither did individuals with masculine gender role identities score higher on direct



MEJs, nor did those with feminine gender role identities score higher on indirect MEJs. Further inspection of the data resulted in some noteworthy findings.

Consistent with previous research (Mertens & Oberhoff, 2023; Rothgerber, 2013), women justified their meat consumption in more indirect, apologetic strategies compared to men. They also resorted to indirect over direct strategies. Women's inclination toward indirect MEJs is consistent with stereotypical feminine attributes such as empathy and compassion (e.g., Burris et al., 2015). Compared to women, men used more direct, unapologetic ways of justification. While this tendency toward direct MEJ strategies aligns with stereotypical masculine traits like dominance or toughness (Bogueva et al., 2017), there was no difference in the use of direct and indirect justifications for men. Perhaps because women are generally more sensitive towards animal suffering (Dowsett et al., 2018), the use of the two types of MEJs is not as compatible for them as it is for men. Hence, for women, taking complete distance from the thought of consuming animals may better protect their positive sense of self and maintain self-serving eating behaviors that contradict their ethical beliefs (Hartmann & Siegrist, 2020). Men, on the other hand, may more easily acknowledge that they consume animals, while at the same time trying to avoid thought about the origins of meat and the process procedures. For example, an individual believing that meat is necessary for a healthy diet (direct strategy) can simultaneously try to avoid connecting the meat to the animal (indirect strategy). It follows that direct and indirect strategies may not always be mutually exclusive, especially for men. Indeed, direct and indirect strategies were positively correlated in the current study, contrasting research establishing a negative correlation between the two (Rothgerber, 2013). Nevertheless, it should be noted that positive relationships were previously reported as well (Mertens & Oberhoff, 2023; Vandehei & Perry, 2023). Hence, a black-and-white perspective on gender and justification

strategies may be too limited, as the use of direct and indirect MEJ strategies can depend on situational, cultural, and personal factors (e.g., Mertens et al., 2020; Rothgerber, 2020).

Furthermore, shifts in the definition of masculinity and masculine behavior (Bridges & Pascoe, 2014; De Backer et al., 2020; Jewkes et al., 2015) may allow men to rely on a variety of justification strategies.

Furthermore, significant correlations between gender role identity and justification strategies were found. When controlling for gender, however, being more masculine was not predictive of direct MEJs and being more feminine not predictive of indirect MEJs. These findings show that gender is more robust in explaining the types of strategies individuals rely on. That is, being a man, rather than being more masculine, predicted the use of direct justification strategies, while being a woman, rather than being more feminine, predicted the use of indirect justification strategies. Through cultural and social influences, the consumption and justification of meat might become deeply ingrained into a person's gender identity (Branković, 2023). Individuals may be subjected to societal pressure to adhere to specific dietary practices and justify their choices in certain manners and thus, over time, internalize these behaviors and cognitions (Figueredo, 2021). Moreover, compared to gender role identity, gender identity transcends contexts and is less situational in nature (Diekman & Schmader, 2020). Hence, the impact of gender may go beyond the impact of one's identification with masculine and feminine attributes and is therefore possibly a more stable predictor of justification strategies. Another reason potentially explaining these findings may be the outdated nature of the measurement tool used to assess gender role identity. Conceptualizations of masculinity and femininity have become more fluid (Figueredo, 2021; Jewkes et al., 2015) and individuals may rather identify

with new forms of masculinity and femininity that oppose traditional conceptualizations (Sumpter et al., 2015).

These redefinitions of gender roles may also explain the findings that justification strategies did not function as a compensation mechanism in response to gender role identity threats. Neither scores on direct nor indirect justification strategies were higher for men or women receiving threatening feedback. The link between gender roles and eating behavior is becoming more blurred and it may become more common to reject notions such as “meat is masculine” (Sobal, 2005). Greenebaum and Dexter (2017), for instance, found vegan men to align the values underlying their diet with the concept of masculinity, arguing veganism to be the ultimate expression of masculinity. Thus, given the changing nature of typical masculine and feminine attributes, the threatening feedback may be less applicable as it is based on stereotypical definitions of gender roles.

Nonetheless, participants receiving threatening feedback generally experienced more threat compared to those receiving affirming feedback. This may reflect that participants in the present study still made stereotypical connections of the presented attributes to either masculinity or femininity. Moreover, gender differences emerged in the amount of threat individuals experienced. Women generally expressed higher levels of discomfort following feedback about their masculinity and femininity, in line with Mertens and Oberhoff (2023). These findings oppose notions of precarious manhood, proposing that men are more sensitive to identity threats and thus more likely to compensate by engaging in extreme demonstration of masculinity (e.g., Vandello et al., 2008). Additionally, the exclusion of vegetarians and vegans from the analyses resulted in positive, although weak, correlations between experienced threat and both direct and

indirect MEJ strategies. Perhaps using justification strategies as compensatory responses when feeling threatened in one's self-image applies only to those consuming meat.

As Mertens and Oberhoff (2023) suggested, it may also be that justification strategies are simply not a suitable impression management strategy in response to gender role identity threats and that the experience of cognitive dissonance is necessary to trigger a need to reduce it through MEJ strategies. These claims were not supported in the present study. That is, men who receive both threatening feedback and cognitive dissonance triggering information did not score higher on direct strategies. Similarly, when women received both threatening feedback and information triggering cognitive dissonance, they did not score higher on indirect strategies. These findings contest the idea of cognitive dissonance as a necessary precondition in compensatory responses following gender role identity threats.

Despite effectively triggering cognitive dissonance, the experimental manipulation was not related to higher scores in MEJ justifications as expected. These findings indicate that participants did not use direct and indirect strategies to justify their meat consumption. Although mean scores of experienced dissonance were comparable to those reported by Weingarten and Lagerkvist (2023), it may be that the increase in negative affect in the experimental condition was not strong enough to elicit a need to justify meat consumption through MEJ strategies. This suggests a threshold effect, whereby a certain degree of dissonance must be experienced for it to effect justifications. An alternative to treating the experimental conditions as dichotomous variables is a continuous approach, whereby the amount of experienced cognitive dissonance predicts the strength of MEJ strategies. The dichotomization of variables likely results in loss of information and power, as well as lack of variability in responses, and may only be appropriate

when a threshold value exists (Baneshi & Talei, 2011). The use of continuous variables may therefore provide more robust results (Bastos et al., 2022).

Further, individuals who do not consume meat might not experience cognitive dissonance about their meat consumption at all or in the same way as those who eat animals. Hence, they may not have the need to justify their meat consumption (Mertens & Oberhoff, 2023). Indeed, when excluding vegetarians and vegans from the analysis, individuals experiencing higher levels of dissonance justified their meat consumption in more indirect and, interestingly, less direct ways. Gender differences in the experience of cognitive dissonance may explain these findings, as results further showed that the experience of cognitive dissonance was especially pronounced in women. Previous research found that women show greater emotional reactivity to unpleasant information (Bianchin & Angrilli, 2012), are more sensitive to animal suffering (Dowsett et al., 2018), and experience higher levels of disgust and negative attitudes toward meat (Kubberød et al., 2002). Compared to women, men may experience less meat-related cognitive dissonance, as the discrepancy between their behavior (i.e., eating meat) and attitudes (i.e., caring less about animals) is not as large (Semmler et al., 2023). It may also be that women in the present study experienced higher cognitive dissonance due to the setup of the experimental manipulation. Highlighting the meat-animal connection and referencing to red meat was shown to be especially impactful in influencing women's, compared to men's, meat consumption and experience of dissonance (Dowsett et al., 2018; Rousset et al., 2005). These findings may explain why experiencing more cognitive dissonance was positively related to "female-style" and negatively to "male-style" MEJ strategies.

The results of the present study should be viewed in light of several limitations, from which suggestions for future research emerge. First, the effectiveness of the experimental

manipulations can be questioned. Although resulting in small effects, they may have been too weak to influence the relationship between gender role identity and justification strategies. Given that significant effects were found when cognitive dissonance was included as a continuous variable, rather than a binary expression of the experimental condition, it is likely that dissonance also increased for at least some individuals in the control condition. Including a pre- and post-manipulation measure of cognitive dissonance may be beneficial, however, simply having to reflect on one's meat consumption could already increase negative affect. Future research should also consider gender differences in the effectiveness of persuasive arguments, as making the meat-animal connection salient may be less impactful for men.

Second, results may be attributable to measurement errors inherent to the questionnaires used. The BSRI (Bem, 1981), used to assess gender role identity, was created over 40 years ago and is therefore likely outdated. Since then, societal conceptualizations of gender roles have undergone drastic changes. Accounting for such changes is important to capture the complexity of gender and gender role identities, which the present study failed to do. Therefore, identification with non-traditional masculinity and femininity should be explored. Moreover, some of the MEJ subscales had low internal inconsistency, indicating that that the respective items did not adequately measure the underlying construct. Closer investigation of the denial subscale, for instance, reveals inconsistencies in wording. The first two items (“Animals don’t really suffer when being raised and killed for meat” and “Animals do not feel pain the same way humans do.”) are phrased in terms of denying animals suffering and pain, while the third item (“Meat is processed so that animal pain and discomfort is minimized and avoided.”) accepts the experience of pain in animals, but reflects a belief in humane slaughter practices. As such,

different issues are targeted in items of one subscale, potentially reducing the overall consistency.

Third, perhaps other relevant factors were not accounted for in the present study. Confounding variables that may influence the use of direct and indirect justification strategies were not examined, such as personality, consumption levels, meat attachment, or habits (Gradidge et al., 2021; Hartmann & Siegrist, 2020; Mertens et al., 2020). Future research should therefore consider including other potential predictors. It could also be that the MEJ scale did not fully capture the range of strategies individuals use to justify their meat consumption. Meat-eaters may use other strategies to defend their meat consumption. For example, Joy (2010) and Piazza (2015) proposed four justifications that perpetuate such behavior by labeling meat consumption as *Normal*, *Natural*, *Necessary*, and *Nice*. That is, meat consumption is seen as (a) a cultural tradition and common social norm in society, (b) an important part of the biological nature of humans, (c) a necessary component of a balanced and healthy diet, and (d) a pleasurable experience, referring to meats 'tastiness'. Dowsett et al. (2018) identified *Neutralization* as another justification strategy, whereby individuals minimize their perceived personal impact and responsibility by comparing their consumption with alternatives that have higher moral concern (e.g., sourcing sustainable and ethical products). Incorporating a wider range of justification strategies is advisable for future research.

Fourth, the moralized nature of meat-eating may have influenced participants to answer in ways that align with social expectations (Peacock, 2018). The tendency for socially desirable responding may be especially pronounced in research involving ethical topics (Randall & Fernandes, 1991).

Lastly, methodological limitations should be considered. Due to violated statistical assumptions, a predominantly female sample and potential differences in sample populations, results should be interpreted with caution. Regardless, given the inflated family-wise error rate, differences in samples may be not as pronounced as the significance values may indicate.

Despite these shortcomings, several advantages can be highlighted. Due to its experimental design, the present study allows for causal inferences and adds to the existing, predominantly correlational, literature on justification strategies, cognitive dissonance, and gender role identity. It was the first to test whether feelings of threat to one's gender role identity can be triggered using two independent feedback scales for masculinity and femininity. Moreover, while previous research has mainly measured justification strategies and assumed that they are used to reduce dissonance, the present study is the first to investigate the effect of a cognitive dissonance experimental condition on MEJ strategies. Furthermore, by recruiting participants through various methods, the present study countered the oversampling of university students common in psychological research.

## **Conclusion**

The present study extends previous research linking gender with meat-eating justifications, suggesting that gender is especially robust in explaining differences in direct and indirect justification strategies. Women and men also differ in their experience of cognitive dissonance and react differently to gender role identity threats. These findings underscore the importance of individual differences in the psychological processes that underlie emotional processing, while simultaneously calling for gender-specific approaches. Furthermore, this study highlights the need to test whether relationships between gender, gender role identity, gender role identity threats, cognitive dissonance, and MEJ strategies found in the literature are



correlational or causal in nature. Given the adverse impacts of animal agriculture on the environment, animals, and human health, it is crucial to create an underlying understanding of motivational and influential factors for pro-environmental behavior.

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## Appendix A

Table A1

## Sample Information and Sample Comparison

Characteristics	<i>N</i> (Non-SONA)	Non-SONA sample	<i>N</i> (SONA)	SONA sample	Comparison of samples
Duration (in minutes)	104	$M = 19.56$ ( $SD = 20.45$ )	228	$M = 13.70$ ( $SD = 11.00$ )	$t(130.93) = 3.39$ , $p < .001$
Age in years	103	$M = 1987.48$ ( $SD = 17.38$ )	227	$M = 2003.337$ ( $SD = 2.04$ )	$t(103.27) = -13.56$ , $p < .001$
Gender	104		228		$\chi^2(4) = 8.22$ , $p = .084$
Women		62		166	
Men		41		57	
Non-binary/third gender		1		2	
Genderfluid		–		1	
Missing		–		2	
Diet	104		228		$\chi^2(4) = 15.52$ , $p = .004$
Omnivore		48		150	
Flexitarian		24		38	
Pescetarian		11		11	
Vegetarian		13		24	
Vegan		8		5	
Masculinity	104	$M = 3.69$ ( $SD = 0.64$ )	228	$M = 3.50$ ( $SD = 0.69$ )	$t(330) = 2.41$ , $p = .017$
Femininity	104	$M = 4.43$ ( $SD = 0.60$ )	228	$M = 4.54$ ( $SD = 0.69$ )	$t(330) = -1.34$ , $p = .182$
Cognitive dissonance condition	104		228		$\chi^2(1) = 2.10$ , $p = .147$
Control		44		116	
Cognitive dissonance		60		112	
Experienced threat	104	$M = 2.86$ ( $SD = 1.06$ )	228	$M = 3.16$ ( $SD = 1.27$ )	$t(235.45) = -2.25$ , $p = .025$
Experienced dissonance	104	$M = 2.97$ ( $SD = 1.77$ )	228	$M = 2.45$ ( $SD = 1.33$ )	$t(158.23) = 2.671$ , $p = .008$
Direct MEJ	104	$M = 2.34$ ( $SD = 0.91$ )	228	$M = 3.21$ ( $SD = 1.12$ )	$t(238.15) = -6.95$ , $p < .001$
Indirect MEJ	104	$M = 3.68$ ( $SD = 1.36$ )	228	$M = 4.12$ ( $SD = 1.47$ )	$t(330) = -3.01$ , $p = .002$

Note. MEJ = meat-eating justification.

## **Appendix B**

### **Participant Information About the Research Purpose**

#### **Aim of the Study**

The purpose of this research is to gain more insight into individual differences in people's dietary behavior. More specifically, we are interested in the way a person's gender and identification with different gender roles and a range of different attributes influences their food choices. Further, we are interested in the role of gender in the processing and evaluation of textual and visual information. That is, do people differ in the way they read, process and evaluate texts and images depending on their gender?

## Appendix C

### Study Material

#### BSRI Scale

The following questionnaire aims to explore your gender role identity. Please indicate how much you feel the presented ‘masculine’ and ‘feminine’ characteristics apply to you.

There are no right or wrong answers; we are interested in your honest self-perception. Answer every question. If a characteristic does not apply to you, choose the response that comes closest to your feelings.

After you finish, you will get the chance to get feedback on your answers and review your scores.

- |                                |                                   |
|--------------------------------|-----------------------------------|
| 1. Defends own beliefs         | 16. Eager to soothe hurt feelings |
| 2. Independent                 | 17. Warm                          |
| 3. Assertive                   | 18. Tender                        |
| 4. Strong personality          | 19. Loves children                |
| 5. Forceful                    | 20. Gentle                        |
| 6. Has leadership abilities    | 21. Moody                         |
| 7. Willing to take risks       | 22. Conscientious                 |
| 8. Dominant                    | 23. Reliable                      |
| 9. Willing to take a stand     | 24. Jealous                       |
| 10. Aggressive                 | 25. Truthful                      |
| 11. Affectionate               | 26. Secretive                     |
| 12. Sympathetic                | 27. Conceited                     |
| 13. Sensitive to other’s needs | 28. Adaptable                     |
| 14. Understanding              | 29. Tactful                       |
| 15. Compassionate              | 30. Conventional                  |

*Note.* Masculinity scale: items 1 to 10; Femininity scale: items 11 to 20. Neutral scale: items 21 to 30. Items were randomized.

### Sandwiches and Expected Food Liking

While processing your answers of the questionnaire you just filled out, we will first show you some pictures and ask you to read a text. You will then be asked questions about these pictures and the text. Please answer the questions honestly and to the best of your ability. Afterwards, you will get a chance to look at your results.

Two types of sandwiches are presented below: One with ham & cheese, the other one with tomato & mozzarella. Please take a look at the sandwiches below and rate how much you would like or enjoy different aspects of each sandwich.



1. This is the type of sandwich that I would enjoy to eat.
2. I think this sandwich would taste good
3. I like the ingredients of this sandwich.
4. I expect to like the taste of this sandwich.
5. The sandwich looks appealing to me.

*Note.* Items were randomized.



1. This is the type of sandwich that I would enjoy to eat.
2. I think this sandwich would taste good
3. I like the ingredients of this sandwich.
4. I expect to like the taste of this sandwich.
5. The sandwich looks appealing to me.

*Note.* Items were randomized.

## Cognitive Dissonance and Control Condition

Please look at the image and the text below and answer the following questions.

Control condition	Cognitive dissonance condition
<p><b>The University of Groningen</b></p> <p>The University of Groningen is a public research university located in the city of Groningen in the Netherlands. It was founded in 1614 and is therefore the second oldest in the country.</p> <p>Since its establishment, the university has brought forward striving academics, like the first female student in the Netherlands, the first Dutch astronaut and various Nobel prize winners.</p> <p>The University of Groningen has eleven faculties, with one being located in the Frisian capital of Leeuwarden. It is embedded in an invigorating international academic environment, with over 9.000 international students from more than 120 different nationalities. At the university, a variety of Bachelor and Master courses are being offered, many of which are fully taught in English.</p> <p>More information about the Bachelor and Master programs can be found on the website of the University of Groningen.</p> 	<p><b>Does the consumption of red and processed meat affect your own health?</b></p> <p>A meat-rich diet is associated with potentially negative consequences for your health. In particular, many scientific studies have shown that the consumption of red and processed meat, like pork or beef, increases the risk of colorectal and other types of cancer.</p> <p>Therefore, the WHO classifies red and processed meat as a possible cause of cancer. Moreover, heart diseases and diabetes are also linked to meat-rich diets. Red and processed meat include products such as ham, salami or sausages, which are often part of popular and convenient meals like sandwiches.</p> <p>Reduced consumption of red meat and processed meat lowers the risk of food-related illnesses and contributes to a longer life expectancy. Therefore, meat-free products are often the healthier choice and can support a healthy lifestyle.</p> 

How do you feel about your own meat consumption?

comfortable	...	uncomfortable
pleased	...	bothered
easy	...	uneasy
relaxed	...	distressed
calm	...	upset

### **Meat-Eating Justification (MEJ) Scale**

1. I enjoy eating meat too much to ever give it up. (PROMEAT)
2. Animals don't really suffer when being raised and killed for meat. (DENY)
3. It's acceptable to eat certain animals because they're bred for that purpose. (HIER. JUST.)
4. To me, there is a real difference between animals we keep as pets and animals we eat as Food. (DICHOT.)
5. When I look at meat, I try hard not to connect it with an animal. (DISSOC.)
6. God intended for us to eat animals. (REL. JUST.)
7. I try not to think about what goes on in slaughterhouses. (AVOID)
8. Meat is essential for strong muscles. (HEALTH JUST.)
9. It wouldn't surprise me to learn that scientists believe the human body (e.g., our teeth) has evolved to eat meat. (HD/FATE JUST.)
10. Meat tastes too good to worry about what all the critics say. (PRO-MEAT)
11. Animals do not feel pain the same way humans do. (DENY)
12. Humans are at the top of the food chain and meant to eat animals. (HIER. JUST.)
13. It seems wrong that people in some cultures eat dogs and cats. (DICHOT.)
14. I do not like to think about where the meat I eat comes from. (DISSOC.)
15. God gave us dominion over animals. (REL. JUST.)
16. I would have problems touring a slaughterhouse. (AVOID)
17. We need the protein we can only get in meat for healthy development. (HEALTH JUST.)
18. It violates human destiny and evolution to give up eating meat. (HD/FATE JUST.)
19. There is no food that satisfies me as much as a delicious piece of meat. (PRO-MEAT)
20. Meat is processed so that animal pain and discomfort is minimized and Avoided. (DENY)
21. Ultimately, animals are here to serve our needs. (HIER. JUST.)
22. I am more sensitive to the suffering of house pets like cats and dogs than other wild animals. (DICHOT.)
23. When I eat meat, I try not to think about the life of the animal I am eating. (DISSOC.)
24. It is God's will that humans eat animals. (REL. JUST.)
25. I try to stay away when people start talking to me in graphic terms about how the animals we eat suffer. (AVOID)
26. We need meat for a healthy diet. (HEALTH JUST.)



27. Our early ancestors ate meat, and we are supposed to also. (HD/FATE JUST.)

*Note.* Items were randomized. Names in brackets indicate the respective subscale the item belongs to.

### **Experienced Threat**

1. I am pleased with my scores.
2. I feel good about myself after seeing my results.
3. Seeing my results was a fun experience.
4. I am disappointed in my results.
5. I feel kind of down after seeing my results.
6. Showing participants their scores is a good idea.
7. Participants benefit from knowing their scores.
8. Sharing individual scores with participants fosters a sense of transparency and fairness in the study.
9. Feedback is essential for participants to understand the purpose and objectives of the study
10. Participants should only receive feedback if it directly contributes to their learning

*Note.* Items were randomized. Items 1 to 5 were used to calculate experienced threat. Items 1, 2, and 3 were reverse coded.

## Feedback Conditions

### *Threatening Feedback Texts and Images*

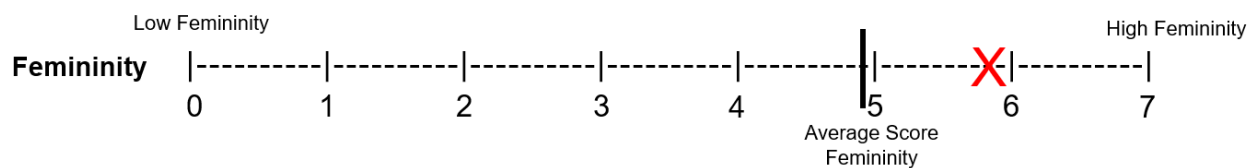
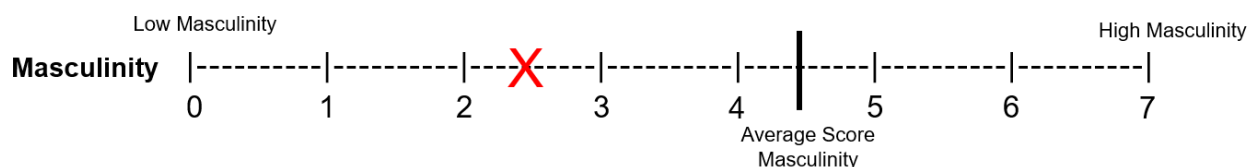
#### Gender Identity Survey Feedback

The following is your score on the gender identity survey. It has been placed on a 0 to 7 index on two independent scales: "Masculine" and "Feminine". Those scoring lower on the scale have weaker masculine/feminine identities, those scoring higher on the scale have stronger masculine/feminine identities.

Your Masculinity Score: 2.41

Your Femininity Score: 5.89

Below are two line graphs of average scores of masculinity and femininity on the gender identity survey. We have indicated your scores with a red "X" on the lines.



*Note.* Threatening feedback for an individual scoring high on masculinity and low on femininity.

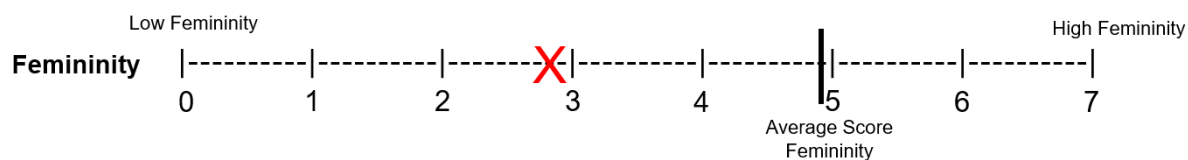
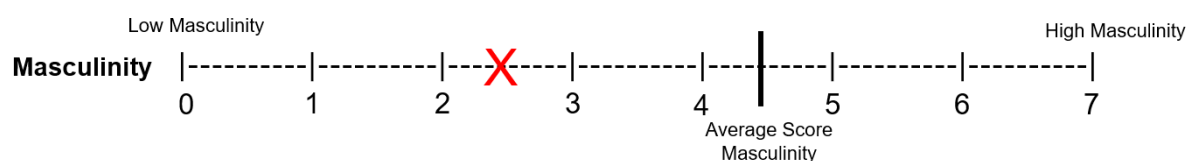
### Gender Identity Survey Feedback

The following is your score on the gender identity survey. It has been placed on a 0 to 7 index on two independent scales: "Masculine" and "Feminine". Those scoring lower on the scale have weaker masculine/feminine identities, those scoring higher on the scale have stronger masculine/feminine identities.

Your Masculinity Score: 2.41

Your Femininity Score: 2.87

Below are two line graphs of average scores of masculinity and femininity on the gender identity survey. We have indicated your scores with a red "X" on the lines.



*Note.* Threatening feedback for an individual scoring high on masculinity and high on femininity.

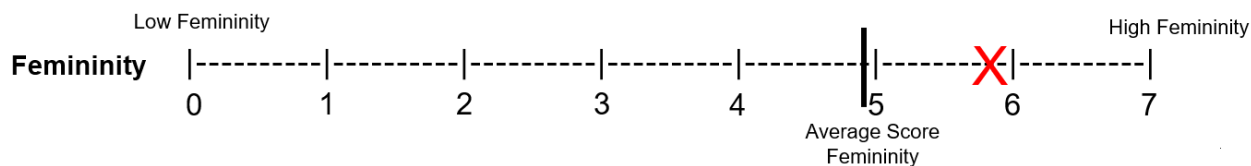
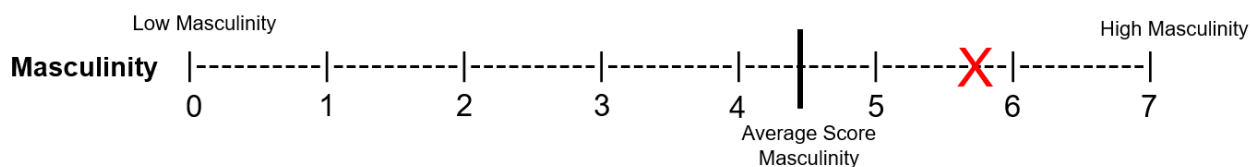
### Gender Identity Survey Feedback

The following is your score on the gender identity survey. It has been placed on a 0 to 7 index on two independent scales: "Masculine" and "Feminine". Those scoring lower on the scale have weaker masculine/feminine identities, those scoring higher on the scale have stronger masculine/feminine identities.

Your Masculinity Score: 5.73

Your Femininity Score: 5.89

Below are two line graphs of average scores of masculinity and femininity on the gender identity survey. We have indicated your scores with a red "X" on the lines.



*Note.* Threatening feedback for an individual scoring low on masculinity and low on femininity.

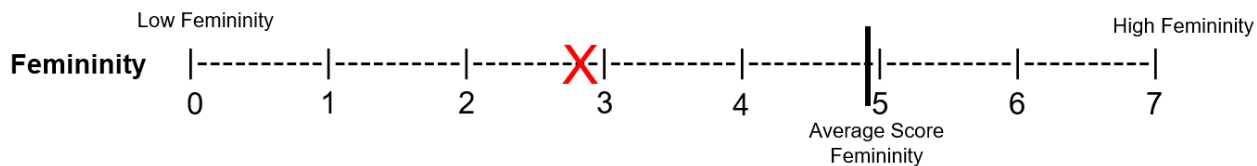
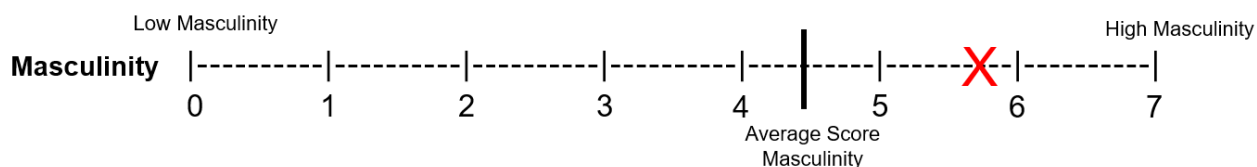
### Gender Identity Survey Feedback

The following is your score on the gender identity survey. It has been placed on a 0 to 7 index on two independent scales: "Masculine" and "Feminine". Those scoring lower on the scale have weaker masculine/feminine identities, those scoring higher on the scale have stronger masculine/feminine identities.

Your Masculinity Score: 5.73

Your Femininity Score: 2.87

Below are two line graphs of average scores of masculinity and femininity on the gender identity survey. We have indicated your scores with a red "X" on the lines.



*Note.* Threatening feedback for an individual scoring low on masculinity and high on femininity.

## *Affirming Feedback Texts and Images*

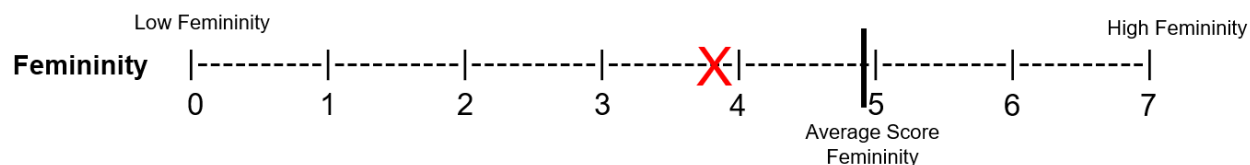
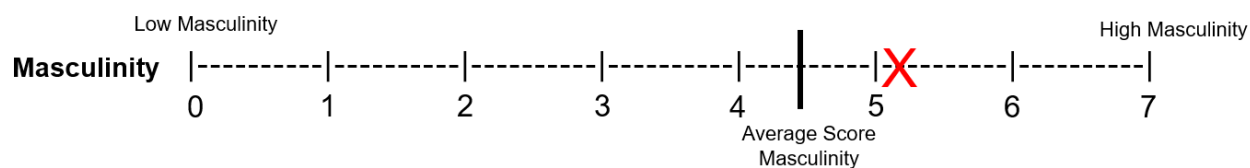
### Gender Identity Survey Feedback

The following is your score on the gender identity survey. It has been placed on a 0 to 7 index on two independent scales: "Masculine" and "Feminine". Those scoring lower on the scale have weaker masculine/feminine identities, those scoring higher on the scale have stronger masculine/feminine identities.

Your Masculinity Score: 5.17

Your Femininity Score: 3.86

Below are two line graphs of average scores of masculinity and femininity on the gender identity survey. We have indicated your scores with a red "X" on the lines.



*Note.* Affirming feedback for an individual scoring high on masculinity and low on femininity

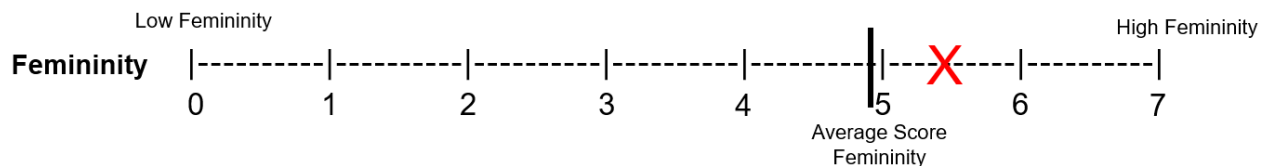
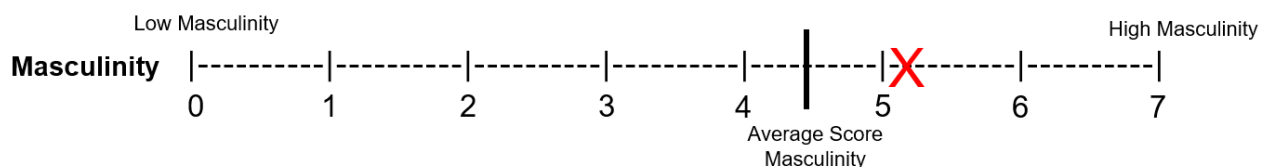
### Gender Identity Survey Feedback

The following is your score on the gender identity survey. It has been placed on a 0 to 7 index on two independent scales: "Masculine" and "Feminine". Those scoring lower on the scale have weaker masculine/feminine identities, those scoring higher on the scale have stronger masculine/feminine identities.

Your Masculinity Score: 5.17

Your Femininity Score: 5.48

Below are two line graphs of average scores of masculinity and femininity on the gender identity survey. We have indicated your scores with a red "X" on the lines.



*Note.* Affirming feedback for an individual scoring high on masculinity and high on femininity

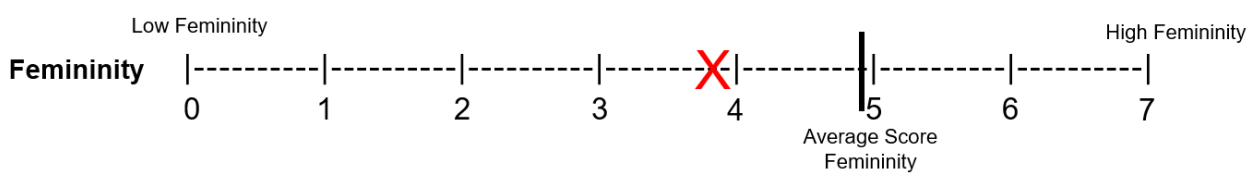
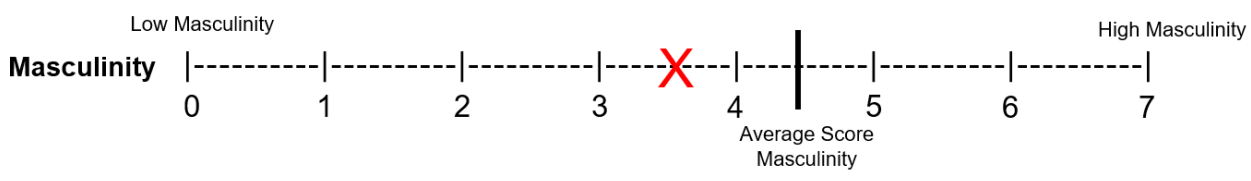
### Gender Identity Survey Feedback

The following is your score on the gender identity survey. It has been placed on a 0 to 7 index on two independent scales: "Masculine" and "Feminine". Those scoring lower on the scale have weaker masculine/feminine identities, those scoring higher on the scale have stronger masculine/feminine identities.

Your Masculinity Score: 3.59

Your Femininity Score: 3.86

Below are two line graphs of average scores of masculinity and femininity on the gender identity survey. We have indicated your scores with a red "X" on the lines.



*Note.* Affirming feedback for an individual scoring low on masculinity and low on femininity



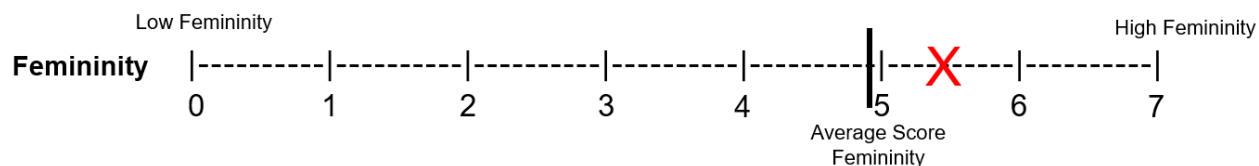
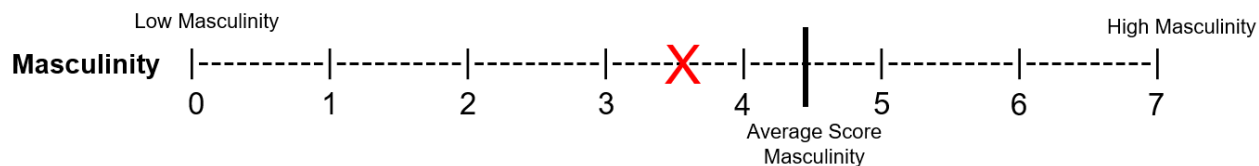
### Gender Identity Survey Feedback

The following is your score on the gender identity survey. It has been placed on a 0 to 7 index on two independent scales: "Masculine" and "Feminine". Those scoring lower on the scale have weaker masculine/feminine identities, those scoring higher on the scale have stronger masculine/feminine identities.

Your Masculinity Score: 3.59

Your Femininity Score: 5.48

Below are two line graphs of average scores of masculinity and femininity on the gender identity survey. We have indicated your scores with a red "X" on the lines.



*Note.* Affirming feedback for an individual scoring low on masculinity and high on femininity

## Appendix D

Table D1

*Correlations Between MEJ Subscales*

Subscale	1	2	3	4	5	6	7	8	9
1. Pro-meat	—								
2. Denial	.54**	—							
3. Hierarchical justification	.69**	.72**	—						
4. Dichotomization	.39**	.44**	.46**	—					
5. Dissociation	.24**	.13*	.11*	.41**	—				
6. Religious justification	.50**	.52**	.66**	.43**	.21**	—			
7. Avoidance	.09	.06	.02	.34**	.71**	.09	—		
8. Health justification	.69**	.48**	.60**	.42**	.31**	.48**	.19**	—	
9. Human destiny/fate	.69**	.53**	.70**	.48**	.27**	.63**	.19**	.77**	—

*Note.*  $N = 332$ . MEJ = meat-eating justification.

\*  $p < .05$ . \*\*  $p < .001$ .