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ORIGINAL ARTICLE

Masculinity Matters for Meat Consumption: An Examination of Self-Rated Gender Typicality, Meat Consumption, and Veg*nism in Australian Men and Women

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Abstract

Previous research shows that men eat more meat than women. We explore the extent to which self-rated gender typicality explains differences in meat consumption intentions and behaviour. We recruited a large sample ($N = 4897$) of Australian men and women to complete an online survey about their attitudes and intentions regarding meat consumption and abstention and measured their self-rated gender typicality (the extent men view themselves as masculine, and women view themselves as feminine). We used moderated regression analyses to investigate self-rated gender typicality as a moderator of the relationship between gender and meat-related variables. We demonstrated that for men, identifying as more masculine was associated with a lower likelihood of reducing meat consumption or considering veg*nism, and a greater belief that eating meat is normal. We also found that men, and those with more gender-typical self-ratings (regardless of gender), viewed meat as more natural, necessary, and nice. These findings suggest that self-rated gender typicality may be relevant for understanding gender differences in meat consumption behaviours. Appeals to adopt low- or no-meat diets may be more effective if they consider the ways Australian diets are interconnected with genders and identities. Increasing acceptance of alternative masculinities, and developing masculinity-friendly advertising of plant-based foods, could be useful in promoting meat reduction.

Keywords Meat consumption · Masculinity · Femininity · Gender differences · Gender typicality · Gender identity · Vegetarianism

Reducing meat consumption reduces harm to the environment, human health, and animal welfare (Appleby & Key, 2016; Steinfeld et al., 2006). One barrier to achieving this goal is that gender is a consistent determinant of meat consumption, with men typically eating more meat than women (Gossard & York, 2003; Graça et al., 2015; Roos et al., 2001; Sobal, 2005). However, *being* male does not increase the need for meat (Sumpter, 2015), thus it could instead be that *enacting* masculinity accounts for this association (Sobal, 2005). Supporting this notion, Rosenfeld and Tomiyama (2021) demonstrated that self-rated gender typicality better captures the gender—meat-eating association than does binary gender category in a sample from the United States. For men, considering oneself as more *masculine* along a masculine-feminine bipolar measure predicted greater consumption of meat, while greater femininity among women was unrelated to meat consumption. We advance this examination of within-gender differences in meat consumption attitudes and behaviours among Australian men and women.

Australia has been labeled the "meat-eating capital of the world" (Ting, 2015). A recent informal survey found that most Australians view meat as masculine, and a surprising majority (73%) of male respondents claim they would rather have a decade taken from their life expectancy than give up meat (Tuohy, 2021). Moreover, Australians' meat consumption is among the highest in the developed world (OECD, 2022). Thus, there is great potential to save emissions and

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improve health outcomes by understanding the psychological factors behind Australians' meat intake. We extend Rosenfeld and Tomiyama's (2021) analysis into the Australian context, and examine how men's masculinity and women's femininity relate to a range of meat-related attitudes and behaviours. This includes the meat-eating justifications people endorse, their meat reduction behaviour, and willingness to consider going veg*n (i.e., vegetarian or vegan).

The Association Between Masculinity and Meat Consumption

On average, men eat more meat than women in many countries (e.g., for East European nations, see Prättälä et al., 2007), including Australia (Birrell et al., 2020). Men in the US report less willingness to reduce their meat consumption or consider going vegetarian (Nakagawa & Hart, 2019; Study 1), and fewer UK men than women are vegetarian (Gale et al., 2007). Men and women also use different strategies to justify their meat consumption. Rothgerber (2013) found that American men were more likely than women to deny that animals suffer, and to argue that humans' dominant position in the food chain justifies their eating of animals. Rothgerber described men's justifications as "unapologetic strategies that embrace eating meat" (p. 366), while women were more likely than men to avoid thinking about animal suffering, suggesting greater discomfort about eating animals.

Piazza et al. (2015) have shown that almost all justifications for eating meat from animals are captured by four rationalisations (the 4Ns): natural, normal, necessary, and nice. Endorsement of these rationalisations is associated with greater meat consumption and commitment to eating meat. Piazza et al. documented evidence for these four rationalisations in the US and Australia, and in the third study, using a sample from the US, they found that men reported eating meat as normal and nice more strongly than women did (although there were no differences for natural and necessary). We speculate that gender differences in meat rationalisations may depend on self-rated gender typicality. That is, it could be men's greater endorsement of masculinity that makes them more willing to defend eating animals on the basis of normality and enjoyment.

Men enact masculinity through everyday gender-typed behaviour. This process starts young, such as the (often-policed) expectation that boys play with a certain set of toys (Dinella & Weisgram, 2018) and regulate their emotional expression (Schrock & Schwalbe, 2009). Schrock and Schwalbe (2009) noted that men must "put on a convincing manhood act" to be viewed as men (p. 279). Nakagawa and Hart (2019; Studies 2 & 3) found that US men who had their masculinity threatened reported greater meat attachment: they were less willing to consider vegetarianism, and more strongly agreed they need meat to feel full. This suggests that meat consumption is a behaviour that helps men to assert a masculine identity.

Indeed, media representations of meat are gendered, and many advertisements position meat as 'manly' (Buerkle, 2009; Rogers, 2008). Rozin et al. (2012) also showed that people freely associate meat with 'maleness,' and Sobal (2005) labeled meat "an archetypical masculine food" (p. 135). Even preschool-aged boys implicitly associate meat with maleness (though girls do not yet show this stereotyping effect; Graziani et al., 2021). In an investigation of Australian gendered foods, Nath (2011) suggested that rejecting meat is seen as symbolically rejecting a traditional masculine identity. Supporting this, some research from Canada shows that men who abstain from eating meat are viewed by others as less masculine (Ruby & Heine, 2011). However, Thomas (2016) found among US-based samples that perceptions of the masculinity of a vegan target depended on whether their veganism was freely chosen.

Importantly, meat is connected to a *traditional* masculine identity. When men identify with a traditional masculine identity characterized by competitiveness, strength, suppression of emotions, and rejection of femininity they tend to eat *more* meat and be *more* attached to meat compared to those endorsing alternative conceptualizations of masculinity, characterized by authenticity and sensitivity (De Backer et al., 2020). Furthermore, across ethnic groups living in the Netherlands, those who agree with traditional masculinity more strongly associate meat with masculinity (Schösler et al., 2015). Both these findings hint at within-gender differences based on how strongly men ascribe to traditional masculine norms.

The Association between Femininity and Meat Consumption

Compared to men, women eat less meat (e.g., in the US: Daniel et al., 2011) and report more openness to vegetarianism and reducing their meat intake (Nakagawa & Hart, 2019). Just as meat is viewed as a masculine food, vegetarianism is viewed as feminine (Mycek, 2018; Sobal, 2005). This is consistent with other findings that show pro-environmental behaviours are rated as feminine, and actors who engage in green behaviours are viewed as more feminine in the US (Brough et al., 2016).

Despite the association between vegetarianism and femininity, however, evidence suggests self-rated gender typicality is not an important factor in women's meat consumption or abstention. Rosenfeld and Tomiyama (2021) found that among women, self-rated gender typicality was associated with going vegetarian for health reasons, though unrelated to women's meat consumption or openness to becoming vegetarian or vegan. When women in Nakagawa and Hart's

(2019) first US study had their femininity threatened, there was no change to the importance they placed on meat. This study asked participants to list either two (easy; identity affirming) or eight (difficult; identity threatening) ways they acted feminine recently. Threatened participants were just as willing to consider vegetarianism or veganism, and feel they need meat to feel full, as those whose femininity was affirmed. Thus, the evidence suggests that femininity is not associated with women's attachment to meat consumption.

There are several reasons why women's femininity might be less predictive of women's meat-related attitudes and behaviours than men's masculinity. First, femininity is not valued to the same extent as masculinity (Ridgeway, 2011), and women may therefore feel less pressure to conform to feminine gender norms than males feel to conform with masculine norms. Second, people tend to give women greater leeway in their behaviours, with a broader range of acceptable behaviours than men have (Adams & Bettis, 2003). Finally, women may feel pressure to conform to both femininity (to reflect gender-typicality), *and masculine ideals* (given masculinity's higher status). For example, women in Nakagawa and Hart's (2019) second study who received false feedback that they were like the average male (versus average female) were more likely to believe that they need meat to feel full, although there was no difference in their intentions to go vegetarian or vegan in the future.

Current Study

The extant literature indicates that men are more likely to eat (and more resistant to give up) meat than women, and this is especially true for men who more strongly define themselves in terms of traditional masculinity in Western nations such as the United States. We advance Rosenfeld and Tomiyama's (2021) investigation of the central role of self-rated gender typicality in meat consumption in a new context. We examined the extent to which men identify as masculine and women identify as feminine explains gender differences in meat consumption and related attitudes in a large general population sample of Australians.

We expected to find evidence consistent with Rosenfeld and Tomiyama's (2021) findings, which would demonstrate that the association between gender and meat-related attitudes and behaviour is moderated by self-rated gender typicality, such that higher self-rated gender typicality would predict these variables more strongly for men than for women. More specifically, among Australian men, we expected a positive relationship between self-rated gender typicality and pro-meat attitudes and behaviours. Although femininity is tied to vegetarianism, women's femininity is not typically policed to the same extent as men's masculinity, thus we expected an attenuated or null association between self-rated gender typicality and meat-related attitudes and behaviours among women (consistent with Rosenfeld & Tomiyama, 2021).

We also aimed to replicate Piazza et al.'s (2015) work showing differences in rationalisations for eating meat, with men agreeing more strongly than women that eating meat is Normal and Nice (no differences were expected between men and women for Natural and Necessary), and extend this finding by testing whether there are gender differences in the extent to which self-rated gender-typicality predicts the tendency to view meat as more normal and nice. This advances the current literature by documenting whether men and women's use of justifications for meat consumption depend on their self-rated gender typicality.

For this investigation, we capture self-rated gender typicality in the same way that Rosenfeld and Tomiyama (2021) indexed this construct: by asking participants the extent to which they consider themselves masculine-to-feminine along a bipolar scale. The strength of the bipolar measure is the expedient measurement of how people who identify as either men or women perceive their own gender-typicality. The very strong negative correlation between separately measured masculinity and femininity among participants who identify with a binary gender ($r = .85$) was accepted by the developers of this bipolar scale as evidence of the sufficiency of a one-dimensional measure within these samples (Kachel et al., 2016). We acknowledge the research advocating for unipolar treatment of masculinity and femininity, reflecting that high femininity does not entail low masculinity, and allowing respondents to express both high femininity and high masculinity (e.g., Magliozzi et al., 2016), and that our measurement is not ideal for capturing the nuance of self-rated masculinity and femininity. However, our investigation is valuable in adding some nuance to the understanding of the gender-meat eating link: while the binary (man/woman) conceptualisation of gender in past work is interpreted to mean that simply *being male* entails eating more meat, we aimed to provide further evidence about the importance of the *psychological* component of 'maleness' (i.e., masculinity). We also further investigate when self-rated gender typicality is associated with meat-related variables among men and women.

Method

Participants

In total, 5244 people living in Australia completed our survey. We focus our analysis on a subset of 4897 participants who indicated a meat-eating diet identity (Flexitarian: 'flexible vegetarian, mostly vegetarian but will occasionally eat

meat', $n = 862$, Omnivore: 'consumes meat, poultry, or fish', $n = 4035$). Of our sample, 48.3% identified as men, 51.2% as women (0.5% indicated another gender or they preferred not to say, and were removed from analyses of binary gender). Ages ranged from 18 to 92 years ($M = 46.99$, $SD = 18.35$). In lieu of a formal power analysis to determine the required sample size, we set a target sample size of 5000 to ensure we reached a good range of demographics within Australia. To support this aim, we engaged Qualtrics to manage data collection using quota sampling to achieve an overall sample matching the location, gender, and age of the Australian adult population.

Procedure

Ethical aspects of the study protocol were approved by the Australian National University Human Research Ethics Committee (protocol number 2020/429). Qualtrics is a panel aggregator, which means it recruits online samples from multiple market research panels to build a sample approximating the Australian adult population. Thus, the survey was advertised to people who had signed up to take part in research in exchange for rewards, using the project title: "Survey of climate change attitudes in Australia." Participants completed the study online, by first providing informed consent and then continuing with the survey. Participation was voluntary and could be withdrawn at any time before participants submitted their responses. The measures for our study were included in this larger 20-min online survey, which aimed to address distinct research questions and report on Australian's pro-environmental behaviours, climate policy support, eco-emotions, and related constructs such as ideological attitudes. None of these measures are expected to induce gender threat.

Rosenfeld and Tomiyama (2021) examined two dependent variables: consumption of different types of meat, and openness to vegetarianism. In our study, we asked participants a series of six questions about their meat-related attitudes and behaviour. This includes the extent to which they have reduced or eliminated their meat consumption in the past year, and whether participants would consider going vegetarian or vegan in the future (Nakagawa & Hart, 2019). We also included short measures of Piazza et al. (2015) four rationalisations for meat consumption: that consuming meat from animals is natural, normal, necessary, and nice.

Measures

Self-Rated Gender Typicality

We used the same bipolar treatment of masculinity-to-femininity as Rosenfeld and Tomiyama (2021). In an initial pilot study (see Supplement A, Tables S1, S2, and Fig. S1 in the online supplement for further details on the pilot study), we used all six items from Kachel et al.'s (2016) Traditional Masculinity and Femininity Scale to capture participants' self-identification as masculine vs. feminine in a convenience sample of Australian adults. We selected the item for the main study based on the highest corrected item-total correlation (and thus the strongest association with all other items), which also matched Kachel et al.'s (2016: Study 1) findings (see Supplement B and Table S3 in the online supplement for further details on the selection of the self-rated gender typicality item), and captured the most holistic rating of one's self-rated gender typicality. In this item, participants were presented with the sentence stem: "I consider myself as…" and rated their response along a sliding scale from *very masculine* (0) to *very feminine* (100). We reversed men's ratings so that higher scores indicate more gender typical self-ratings for each gender.

Meat Reduction Behaviour

The measure of meat reduction behaviour was one item within a block of questions about engagement in pro-environmental behaviours. Participants read the instructions: "In the past year, how often have you done the following behaviours? Please give your response from 0 (*never*) to 100 (*at every opportunity*)" and responded to the item: "Reduced or eliminated my meat consumption."

Consider Veg*nism

Participants responded to one item adapted from Nakagawa and Hart (2019): "I would consider going vegetarian or vegan in the future" from 1 (*strongly disagree*) to 7 (*strongly agree*).

The 4Ns

Based on a factor analysis performed by Piazza et al. (2015), we chose the top-loading item from each of the four subscales (natural, necessary, normal, nice) that comprise their 4 N scale. Participants indicated their agreement from 1 (*strongly disagree*) to 7 (*strongly agree*) that meat is *natural* ("It is only natural to eat meat"), *necessary* ("A healthy diet requires at least some meat"), *normal* ("It is abnormal for humans to not eat meat") and *nice* ("Meat adds so much flavour to a meal it does not make sense to leave it out").

Results

De-identified data are available on the Open Science Framework: https://osf.io/kyxdu/. Data were analysed in SPSS v.28. Although an analysis based on Mahalanobis distance identified 64 multivariate outliers, analyses are presented with the outliers retained, as their removal did not affect the results. Correlations were calculated to examine bivariate

associations between predictor and outcome variables. Moderated regression analyses were performed to test whether the effect of gender on outcome variables was dependent upon (i.e., moderated by) self-rated gender typicality. Significant interactions were followed up via regression analyses performed separately for each gender.

The correlations in Table 1 show that men reported restricting their meat intake and considering vegetarianism less than women. We found a significant gender association with all 4Ns (natural, necessary, normal, nice), indicating men endorsed each meat-eating justification more strongly than women. We found significant (albeit weak) associations with self-rated gender typicality: Greater gender-typicality was related to a lower likelihood of meat reduction or considering veg*nism and stronger endorsement of the 4Ns. There was also a small correlation between gender and self-rated gender typicality, indicating that women tend to rate themselves as slightly more gender-typical than men do (also shown in the mean scores in Table 1).

We next tested whether the strength of the association between gender and meat consumption attitudes and behaviour depends on self-rated gender typicality. To conduct these analyses, we computed the interaction between gender (1 = male, 2 = female) and self-rated gender typicality by multiplying these variables. Then, using hierarchical multiple linear regression, we added gender and self-rated gender typicality as predictors in Step 1, and the interaction term in Step 2. We analysed each dependent variable separately, and thus results in Table 2 present our findings from a series of moderated regression analyses.

These results, presented in Table 2, identify significant interactions between self-rated gender typicality and gender for reductions in meat intake, consideration of going vegetarian, and the *normal* justification of the 4Ns. This means that for our other dependent variables (i.e., viewing meat as natural, necessary, and nice), self-rated gender typicality was associated with greater pro-meat attitudes, *regardless of gender*. We examined the significant interactions by splitting the data file by gender and conducting linear regression analyses in which each dependent variable was regressed on self-rated gender typicality. This showed that for men, there was a weak negative relationship between self-rated gender typicality and reduced meat consumption ($\beta = -.16$, $p < .001$), while self-rated gender typicality was not a significant predictor of women's meat reduction behaviour ($\beta = .00$, $p = .955$).

Among men, self-rated gender typicality weakly predicted greater agreement that eating meat is normal ($\beta = .14$, $p < .001$), though for women, self-rated gender typicality was not significantly related to viewing meat consumption as normal ($\beta = .03$, $p = .179$). The one exception to this pattern is for considering veg*nism (our 'feminine-typed' behaviour). Supporting our prediction, men with higher self-rated gender typicality were less likely to consider veg*nism ($\beta = -.21$, $p < .001$). However, we unexpectedly found that women's self-rated gender typicality also related (though less strongly) to *lower* consideration of going veg*n ($\beta = -.09$, $p < .001$). Figure 1, 2 and 3 illustrate these significant interactions visually.

Discussion

Our findings support previous research suggesting that it is not simply *being* male that leads to greater meat consumption behaviours. Instead, self-identified levels of

Table 1 Descriptive Statistics and Correlations

	1	2	3	4	5	6	7	8
1. Gender (1 = male, 2 = female)	-							
2. Self-rated gender-typicality	.18***	-						
3. Reduced meat intake	.17***	-.05**	-					
4. Consider veg*nism	.17***	-.11***	.49***	-				
5. Natural	-.17***	.09***	-.44***	-.48***	-			
6. Necessary	-.14***	.09***	-.37***	-.51***	.69***	-		
7. Normal	-.16***	.05***	-.31***	-.40***	.52***	.56***	-	
8. Nice	-.19***	.07***	-.42***	-.52***	.59***	.61***	.56***	-
Mean (*SD*) full sample		74.83 (19.26)	33.63 (31.81)	3.02 (1.90)	5.45 (1.33)	5.51 (1.32)	4.43 (1.72)	4.94 (1.56)
Mean (*SD*) men		71.23 (20.73)	28.21 (30.09)	2.68 (1.79)	5.68 (1.23)	5.70 (1.22)	4.72 (1.71)	5.24 (1.42)
Mean (*SD*) women		78.25 (17.07)	38.70 (32.53)	3.33 (1.93)	5.24 (1.39)	5.34 (1.38)	4.16 (1.68)	4.66 (1.62)
Scale range		0–100	0–100	1–7	1–7	1–7	1–7	1–7

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

Table 2 Testing the Moderating Effect of Self-Rated Gender Typicality on the Association Between Gender and Meat Related Attitudes and Behaviours Using Hierarchical Multiple Linear Regressions

	Reduced meat intake	Consider veg*nism	Natural	Necessary	Normal	Nice
Step 1	$R^2 = .03$	$R^2 = .05$	$R^2 = .04$	$R^2 = .03$	$R^2 = .03$	$R^2 = .05$
Gender (1 = male, 2 = female)	.18***	.20***	-.19***	-.16***	-.18***	-.21***
Self-rated gender typicality	-.08***	-.15***	.12***	.12***	.09***	.11***
Step 2	$\Delta R^2 = .004$***	$\Delta R^2 = .002$**	$\Delta R^2 = .000$	$\Delta R^2 = .000$	$\Delta R^2 = .002$***	$\Delta R^2 = .000$
Gender (1 = male, 2 = female)	-.09	.04	-.10	-.15*	.01	-.12*
Self-rated gender typicality	-.27***	-.27***	.18***	.13**	.22***	.17***
Gender * Self-rated gender typicality	.37**	.22**	-.12	-.02	-.26***	-.12

Standardised regression coefficients (β) are shown

*$p < .05$; **$p < .05$; ***$p < .001$

masculinity may explain apparent gender differences, with more masculine men more resistant to reducing their meat intake. Interestingly, we also found some evidence that women's femininity was similarly (and often, just as strongly) associated with meat-related attitudes as men's masculinity. Thus, self-rated gender typicality can help us understand the gendered nature of meat consumption and low prevalence of veg*nism in Australia.

We found the expected interaction whereby the effect of gender on three dependent variables depends on self-rated gender typicality. Consistent with Rosenfeld and Tomiyama (2021), these results demonstrated that for men, self-rated gender typicality was associated with a lower likelihood of reducing meat consumption, considering veg*nism, and greater agreement that eating meat is normal. The standardised effect sizes found in our study regarding reduced meat consumption are similar to those reported in Rosenfeld and Tomiyama (2021). Meanwhile for women, self-rated gender typicality was unrelated to meat reduction behaviours and the perceived normality of meat.

However, our findings for the remaining dependent variables run counter to our predictions derived from Rosenfeld

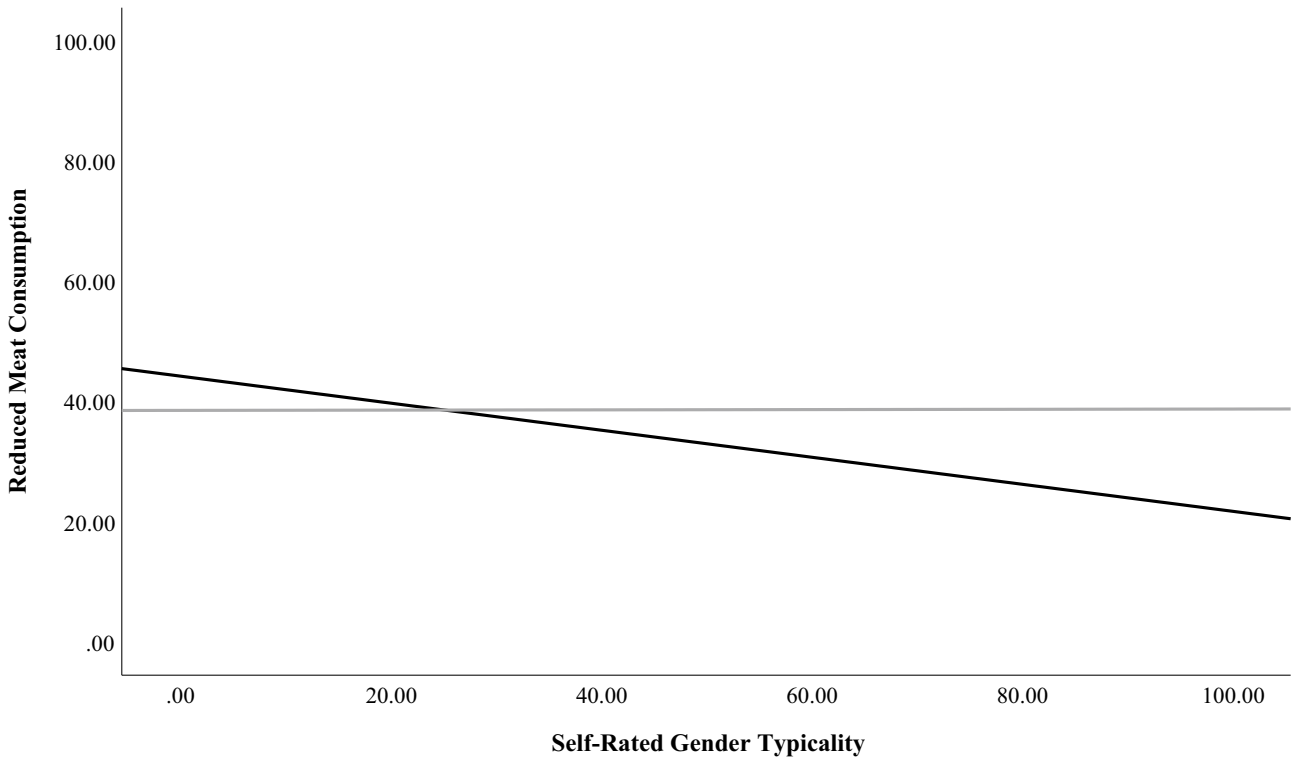

Fig. 1 The Association Between Self-Rated Gender Typicality and Meat Reduction for Men (Black) and Women (Grey)

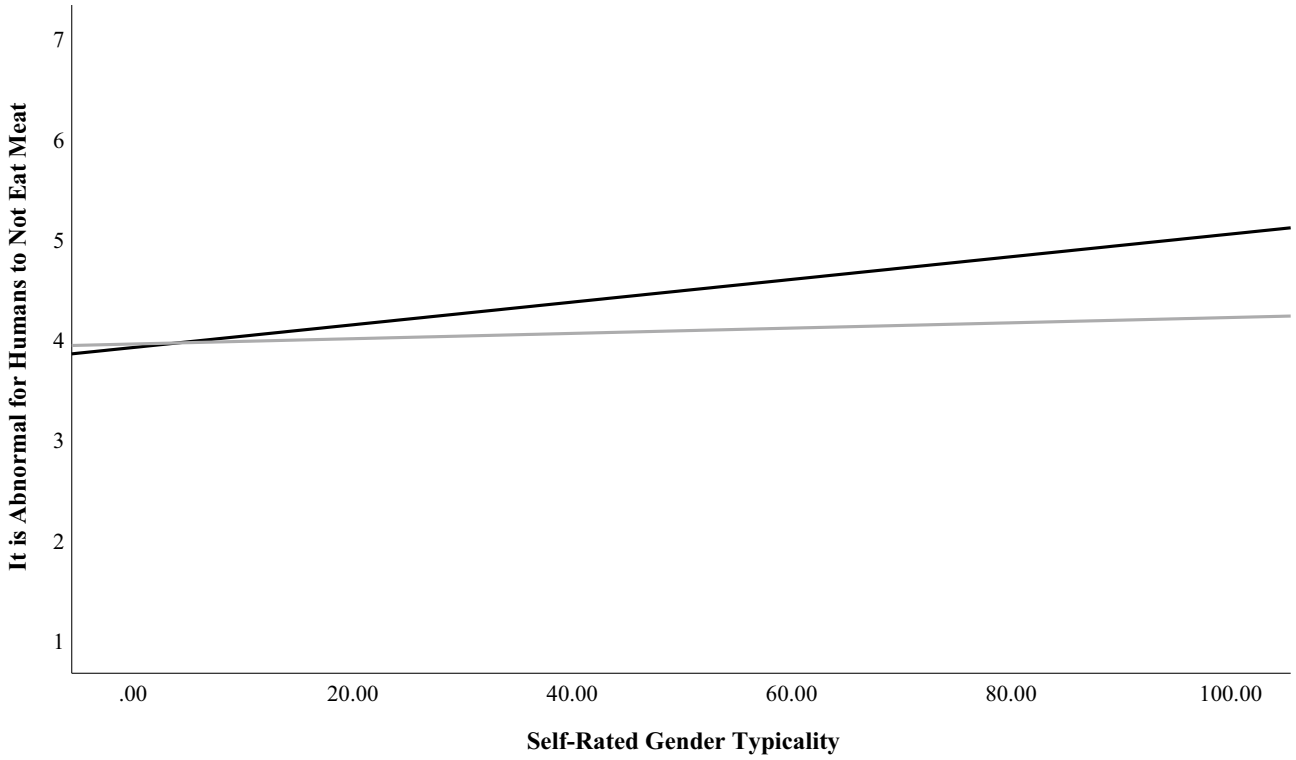

Fig. 2 The Association Between Self-Rated Gender Typicality and 4Ns-Normal for Men (Black) and Women (Grey)

and Tomiyama's findings. We found a significant (albeit small) association between women's self-rated gender typicality and considering going vegetarian or vegan. Women who identified as more feminine were *less* likely to consider going veg*n. Furthermore, on our remaining dependent variables, higher self-rated gender typicality predicted greater belief that eating meat is natural, necessary, and nice. With no significant interaction effect, this suggests similar effects of men's masculinity and women's femininity, with more gender-typical Australians agreeing more strongly that eating meat is natural, necessary, and nice. These conflicting findings indicate that the facet of meat-related attitudes or intentions matters. Rather than consistent effects only for men's self-rated gender typicality, our work suggests that gender typicality is equally relevant for predicting women's agreement with these justifications for meat consumption.

We have three potential explanations for these disparate findings. The first is that men's self-rated gender typicality is unique in that it only matters in predicting *behavior* (i.e., reported meat reduction), while self-rated gender typicality is a more uniform determinant of participants' *attitudes* (i.e., justifications for eating meat, and attitudes towards considering veg*nism). This explanation is consistent with the greater precarity of masculinity, which requires constant demonstration to maintain (Vandello et al., 2008), and with the stronger effect of threats to masculinity on public behaviour compared to private behaviours (Fowler & Geers, 2017; Van Kleef et al., 2007). Thus, men might disproportionately exert their gendered identities through action. Meanwhile, self-rated gender typicality is equally predictive of men and women's attitudes, perhaps revealing less performative displays of gender typicality given that attitudes can be held privately. Further investigations can test this explanation, for example by testing if self-rated gender typicality affects gender differences in meal selections made in public and private settings, such as delivered in a workplace or dating setting versus delivered anonymously.

The second explanation is that while reducing meat consumption constitutes a masculinity violation for men, adopting veg*nism is a norm violation for *both* men and women in Australia, potentially explaining why femininity and masculinity similarly reduce veg*nism intentions. Specifically, those who are more likely to conform to norms of their gender (i.e., masculinity for men and femininity for women) may be less likely to engage in behaviour that deviates from societal norms, or to reject the normative views about meat being natural, necessary, and nice. High mean scores demonstrate that our sample endorsed the 4Ns strongly, thus reflecting the normativity of these meat justifications. As with considering veg*nism, to reject these justifications represents a violation of an established Australian norm. This explanation

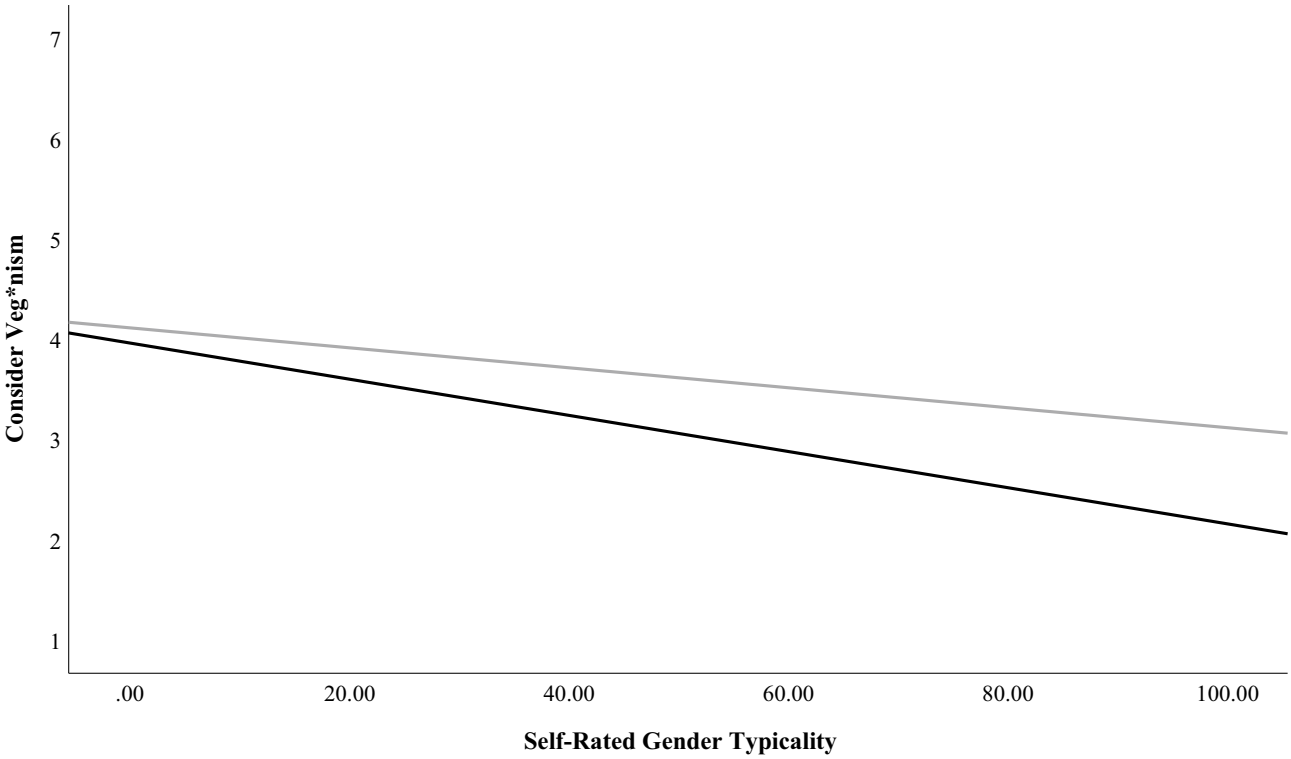

Fig. 3 The Association Between Self-Rated Gender Typicality and Considering Veg*nism for Men (Black) and Women (Grey)

raises the interesting possibility that self-rated gender typicality may strongly predict these variables in nations of high meat consumption (such as Australia and the United States), and less so in nations and contexts where meat abstention or reduction are more common, which ought to be examined in future research.

This explanation also highlights the important cultural elements at play in the study of gender typicality and food choices. Australia has a long agricultural history and Australian culture places high value on barbeque, with this style of cooking seen as a 'masculine' activity (Nath, 2011). Barbequed meat even takes centre stage on election days, with a customary 'Democracy Sausage' eaten after voting (Brett, 2019). Australians are almost exclusively omnivores (Sawe, 2017) and this high social norm to eat meat potentially explains why, in this context, women's self-rated gender typicality relates to some meat-related attitudes.

The third explanation is that those who more strongly endorse traditional gendered identities may hold more traditional and conservative ideals in general, and thus these associations may reflect conservative views regarding meat, which are correlated with traditional expectations of gender roles (Makwana et al., 2018) and meat consumption (Dhont & Hodson, 2014). Indeed, an examination of variables included in the larger dataset reveals small (.11 & .15 for men and women, respectively) associations between self-rated gender typicality and placement of one's political orientation on a left–right scale. Thus, both men and women who perceive themselves to be more gender typical tend to place themselves closer to the right-wing end of the political spectrum. From this finding, one possibility that requires further investigation is whether political conservatism demands more gender-typical self-expression. Our participants closer to the left of the political spectrum were more likely to reject gender typicality. Previous research finds that political liberals are more open to veg*nism (e.g. Milfont et al., 2021), and future research could investigate whether those of the political left are more willing to eschew traditional norms about food more generally.

Related constructs, such as being less open-minded, could also explain why those who rate themselves as more gender typical are less willing to shift away from conventional meat-heavy diets. If these individuals are less open minded, they may view non-traditional diets like veg*nism as more 'radical,' which may act as a deterrent. Indeed, compared to vegetarians, omnivores tend to score lower in openness (Holler et al., 2021). This personality difference could be reflected in both more rigid rules around gender identification and display, and around eating behaviour, with closed-mindedness as a barrier to embracing both alternative ways of eating and alternative gender identities for oneself and others. This possibility also warrants further investigation.

Limitations and Future Research Directions

One strength of the current research is the large representative sample. However, we relied on a cross-sectional design, precluding causal conclusions about what identity factors drive meat consumption. We also relied on single-item measures to manage survey time constraints, including only a single dimension to capture identification on a continuum from masculine to feminine. This operationalization overlooks the complexity of gender identification, and prevents capturing individual differences along each dimension. For example, someone who identifies as high in both femininity and masculinity cannot be represented using this bipolar scale (Rosenfeld & Tomiyama, 2021). Future research may find even greater nuance in the association between gender and meat consumption by operationalizing masculinity and femininity with distinct scales, thus treating them as orthogonal dimensions (as in Magliozzi et al., 2016).

In this study, we were interested in the internalized self-conception of one's gender typicality: the extent to which men see themselves as masculine, and women see themselves as feminine. Thus, our focus was not on the extent their traits conform to gendered expectations (e.g., Bem, 1974; Spence et al., 1975). Future studies could aim to replicate our analyses using a measure of gender roles to further uncover the extent to which alignment with stereotypical masculinity and femininity accounts for meat consumption. Another alternative to our approach is to delineate the aspects of traditional masculine ideology, such as avoidance of femininity and restrictive emotionality (as captured by the male role norms inventory; Levant et al., 2010) to understand those most associated with meat consumption. In our study, we did not supply definitions of masculinity and femininity and people have different conceptualisations of these constructs, which could also affect our findings (e.g., De Backer et al., 2020).

Future research ought to clarify precisely *when* and *why* masculinity, femininity, or both, are associated with meat-related attitudes, including empirical tests of our three possible explanations for our findings described above. This may involve exploring the potential roles of conservative ideology and personality traits in the associations between self-rated gender typicality and meat consumption attitudes and behaviour. Future research could also explore whether the differences in second-order beliefs about veg*ns' masculinity relative to omnivores' masculinity reflect true differences in gender typicality among dietary groups. Particularly promising directions for future research are to test which factors and experimental interventions can reduce or eliminate the effect of self-rated gender typicality on meat consumption, thus helping to reduce individual contributions to climate change.

Practice Implications

Though people often underestimate the impact of meat-eating on the environment, taking steps to reduce or remove meat from one's diet is among the personal behaviours with the highest impact that one can adopt to reduce their carbon footprint (Wynes et al., 2020). Given that 100 g of protein from beef produces, on average, 50 kg of carbon dioxide equivalent emissions (CO_2eq, Poore & Nemecek, 2018), even small reductions in meat consumption can exceed the emission reduction impact of other household behaviours (such as recycling or conserving energy, which each save around 210 kg CO_2eq *per year*; Wynes & Nicholas, 2017). Thus, in the context of meat reduction, small effect sizes can make a big difference. By understanding *why* people make high-emission choices, we may develop and test solutions to facilitate plant-forward transitions.

Importantly, these patterns require further support and must be followed up with investigations into how to intervene to successfully promote sustainable diets. Supporting men's efforts to reduce their meat consumption likely requires a better understanding of the pressure to conform to masculine norms for behaviour, and the potential role of masculinity in reinforcing meat-eating behaviour. Interestingly, once a veg*n diet is adopted, there are no gender differences in lapses in veg*nism (Hodson & Earle, 2018), suggesting men and women are equally likely to *maintain* a veg*n diet. The biggest hurdle is thus taking steps to reduce one's meat consumption in the first place.

Our findings also draw attention to the need to explore masculine-friendly ways to abstain from eating meat. For example, it is possible that men who highly value masculinity might be more open to plant-based meats, which increasingly emulate their farmed meat counterparts in looks, packaging, taste, and social role, thus enabling participation in gendered gatherings like barbeques (Nath, 2011). Raising the masculine status of non-meat foods could also increase their appeal to men who value masculinity. Another possible way to apply these findings in practice is through the evolution of men's concept of masculinity. Indeed, men's endorsement of alternative masculinities is related in the opposite direction to meat consumption (De Backer et al., 2020), suggesting contemporary forms of masculinity are consistent with meat abstention. Finally, as well as shifting what it means to be masculine, increasing acceptance of alternative masculinities could facilitate meat reduction by reducing the perceived costs of violating displays of traditional masculinity.

To the extent that individuals higher in self-rated gender typicality are more likely to adhere to Australian meat-eating norms, it is possible that advertising a *dynamic* norm of increasing meat abstention could dampen the association between men

and women's self-rated gender typicality and their views on meat consumption. This is based on evidence that challenging dominant norms by showing how Americans are increasingly embracing meat-free options shows some promise in curbing their appetite for meat (Sparkman & Walton, 2017). Just as these norm-based interventions depend on the normative context, we suggest that our pattern of findings will replicate only in nations where meat eating is the norm. Where meat abstention is more common, traditional descriptive norm messages (i.e., highlighting that the majority eschew meat) may also be effective in shifting dietary practices (e.g., Robinson et al., 2014).

Conclusion

Our findings suggest that men in Australia may resist giving up meat because eating meat is a way of enacting their masculinity. We also showed that more feminine women – and more masculine men – viewed meat as more natural, necessary, and nice. This raises the interesting possibility that self-rated gender typicality may be equally predictive of men and women's meat-related *attitudes*, though men's masculinity more strongly predicts meat-related *behaviours*. Meat reduction appeals may benefit from considering the role of self-rated gender typicality and the way diets are tied to gender and identity more carefully.

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Authors' Contribution CD collected Study 1 data as part of an honours project on a related topic, supervised by PMB. SKS was responsible for study conception, collecting Study 2 data, and (re)analysing both datasets to test this research idea. SKS drafted the manuscript with input from PMB, and all authors approved the final manuscript.

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Data and Code Availability De-identified data for Study 1 and 2 are available on the Open Science Framework: https://osf.io/kyxdu/

Compliance with Ethical Standards

Ethics Approval Both studies involved surveying human participants and commenced only after ethical approval was obtained. The Human Research Ethics Committee at the University of Canberra approved ethical aspects of Study 1 (protocol number 4463), and the Australian National University Human Research Ethics Committee approved ethical aspects of Study 2 (protocol number 2020/429).

Informed Consent For both studies, participants viewed a detailed information sheet and provided informed consent by continuing on to the survey if they agreed to take part in the study (i.e., passive informed consent).

Conflict of Interests The authors have no conflicts of interest to declare.

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