



The Association Between Selfishness, Animal-Oriented Empathy, Three Meat Reduction Motivations (Animal, Health, and Environment), Gender, and Meat Consumption

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Abstract

This study examined how the level of meat consumption was related to two psychological factors, selfishness and animal-oriented empathy, and three motivations related to animal, health, and environmental issues. A sample of Australian adults between 18 and 80 ($N=497$) was surveyed online via the Zoho Survey platform. Structural equation modelling was applied to the data, and the resulting models revealed that higher selfishness and lower empathy were associated with higher meat consumption for males but there was no association between psychological factors and meat consumption for females. All three motivations were associated with both higher empathy and selfishness for males. For females, higher empathy was associated with higher health and animal motivations, while higher selfishness was associated with higher environmental motivation. Lastly, none of the three motivations were related to meat consumption for either gender. Thus, the results only partially supported the hypotheses that selfishness and empathy would influence meat consumption and motivations. Nevertheless, this study contributes to research on personality factors in relation to meat consumption and the link between masculinity and meat consumption.

Keywords Meat Reduction Motivations · Selfishness · Animal-oriented Empathy · Meat Consumption, Gender

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Introduction

Reducing the consumption of animal products is a recommendation of several international organisations such as the World Health Organisation (WHO) and the United Nations (UN) due to its adverse effects on health, sustainability, climate change, animal welfare, decreasing habitat for wild animals, human famine, and various other impacts (Bouvard et al. 2015; Cassidy et al. 2013; Masson-Delmotte et al. 2021; Poore and Nemecek 2018; Shepon et al. 2018; Schiermeier 2019; Willett et al. 2019). Emissions from animal agriculture contribute to at least a third of climate warming, so transitioning individuals to a plant-based diet is expected to significantly reduce this impact (Eisen and Brown 2022). The cruelty and exploitation in animal farming are also reasons many people reduce animal product consumption (Singer et al. 2006).

Changing human behaviour by reducing meat consumption is suggested as a strategy to improve the lives of animals, human health, and the environment. One avenue to achieve this is understanding the psychological factors associated with meat eating (Loughnan et al. 2014; Rees et al. 2018; Rosenfeld 2018; Tan et al. 2021). Determining what drives or influences eating behaviour can inform approaches that support behaviour change (Hopwood et al. 2020; Martin et al. 2017; Mathur et al. 2021; Rees et al. 2018; Tan et al. 2021). Personality factors have been found to influence dietary behaviour (Keller and Siegrist 2015; Pfeiler and Egloff 2020); however, minimal studies examine the relationships between selfishness, animal-directed empathy, and motivations to reduce meat consumption.

Empathy and selfishness influence human behaviour and are commonly described as opposite in their influence on helping behaviour, known as prosocial behaviour (PSB). Empathy can motivate other-focussed behaviour whilst selfishness leads to individually oriented behaviour. (Cialdini et al. 1987; Decety and Norman 2015; Eisenberg et al. 2010; Mestre et al. 2019; Raine and Uh 2019; Van Lange 2008). Reducing or eliminating meat consumption is a (PSB) (Graves and Roelich 2021), and since selfishness and empathy play a part in PSB, they may influence meat consumption in opposite ways. Support for this assertion was found by Hopwood et al. (2021a), who measured self-centredness and lack of empathy and revealed that the belief that meat tastes nice, a self-centred perspective, is negatively related to prosocial motives. How empathy and selfishness relate to three motivations to reduce meat consumption (animal welfare, health, and environment) is explored in the current research, as well as the relationship between these constructs and meat consumption.

Animal-Oriented Empathy

Although empathy has been studied for some time in psychology, frequently concerning its role in ethical behaviour, its complexity continues to lead to debate, confusion, and a lack of agreement on how to define and measure it (Cuff et al. 2016; Guthridge et al. 2021; Hall and Schwartz 2019; Melchers et al. 2016). Eklund and Meranius (2021) claim that there is a consensus on a definition of empathy as where a person understands, feels, and shares the world of someone else with differentiation of the self from the other. It was assumed measures of empathy towards humans also measured empathy toward animals (Pallotta 2008; Paul 2000). To test this assumption, Paul (2000) created a validated measure of animal empathy, the Animal Empathy Scale (AES), finding that animal-oriented and human-oriented empathy were linked but were separate constructs. The AES allowed for a

more accurate representation of animal-oriented empathy and to measure it as a different construct from human-oriented empathy (Apostol et al. 2013; Pallotta 2008; Paul 2000).

Empathy is associated with less meat consumption using measures of animal and human empathy (Holler et al. 2021) and brain function (Filippi et al. 2010). Factors that were associated with increased empathy included reminders of the animal where the meat came from (such as pictures of live animals or dead ones with their heads still attached), increased disgust (Earle et al. 2019; Kunst and Haugestad 2018; Kunst and Hohle 2016), increased subjective ratings of cuteness (Zickfeld et al. 2018), anthropomorphising animals (Niemyjska et al. 2018), and less moral disengagement (Camilleri et al. 2020). Furthermore, those who do not eat any animal products (vegans) have been found to have more empathy than vegetarians and omnivores, with omnivores having the least (Kessler et al. 2016; Rothgerber 2015).

Selfishness

Even though selfishness is an important trait, considering its purported influence on behaviour, the level of research is not commensurate with its level of influence, with minimal research that measures it as a psychological construct (Carlson et al. 2022; Diebels et al. 2018; Raine and Uh 2019). None measure how meat consumption relates to psychological selfishness, defined as putting the needs of the self above or at the expense of others outside of societal norms (Carlson et al. 2022). Selfishness may contribute to the reluctance of animal product consumers to reduce their consumption even when they become aware of the impact of animal agriculture on climate change (Macdiarmid et al. 2016; Sanchez-Sabate and Sabaté 2019). Those who do not want to be aware about how their meat consumption may cause harm, who purposefully ignore information ('strategic ignorance'), are suggested to be behaving selfishly (Onwezen and van der Weele 2016). People who endorsed meat eating as natural and socially normal have more self-focused values and had higher ratings on self-centredness (Hopwood et al. 2021a), whilst omnivores were found to be more self-centred than vegetarians (Hopwood et al. 2021b).

The research into the concept in psychology of a "dark triad" supports the relationship between selfishness and meat consumption. The dark triad is associated with selfishness (Deutchman and Sullivan 2018; Dinić et al. 2021; Kaufmann et al. 2019; Raine and Uh 2019; Sariyska et al. 2019) and men high in these traits consumed more meat (Sariyska et al. 2019). It involves Machiavellianism, marked by manipulative behaviour motivated by self-interest and lack of morals; non-pathological narcissism, a feeling of superiority and grandiosity; and non-pathological psychopathy, characterised by antisocial behaviour and lack of empathy (Sariyska et al. 2019).

The evidence indicates empathy is associated with lower meat consumption and it could also be argued selfishness potentially influences higher consumption. While there is plentiful research into motivation and reduced meat consumption, there is less about psychological factors' effects on motivation to reduce meat consumption.

Motivation

Motivation is a drive to achieve some goal (Nissen et al. 2022), and the most chosen motivations for reducing meat consumption are animal welfare concerns, health, and the environment (Hopwood et al. 2021b; Malek et al. 2019; Mathur et al. 2021). Which of these is most motivating seems to depend on the dietary status of the individual (Hopwood

et al. 2020; Lehtikoinen and Salonen 2019; Lund et al. 2016). Omnivores of different kinds (reducers, flexitarians, and ‘semi-vegetarians’) generally chose health over animal rights, while meat abstainers chose animal reasons (rights/welfare) more often (De Backer and Hudders 2014; Hopwood et al. 2020; Lehtikoinen and Salonen 2019; Malek et al. 2019; Neff et al. 2018; Verain et al. 2022). Vegans, who do not consume any animal products and have a lifestyle that extends the ethics of doing minimal harm beyond dietary behaviour, are the most likely to choose animal-related reasons as their primary motivation and have higher levels of prosocial and moral motivations than all other dietary groups (Holler et al. 2021; Lund et al. 2016; Janssen et al. 2016; Kessler et al. 2016; McCormick 2019; Rosenfeld 2019). It is unclear whether the three motivators are influenced by empathy and selfishness, as research into how personality factors relate to motivation in the context of reducing meat consumption is scant (Hopwood et al. 2021a).

It has been suggested that health is a more selfish motivation than animal and environmental motives. Health motives have been described as egoistic or personal factors that relate to the self rather than others (De Backer and Hudders 2014; Malek and Umberger 2021). Vegetarians who chose their diet for health reasons chose personal reasons as their primary motivation rather than concern for animals, providing evidence for health motivations being a selfish choice according to Fox and Ward (2008) and a ‘selfish driver,’ such as concerns with health, influenced patterns of meat consumption (Lai et al. 2020). Empathy focuses on others, in this case, animals, and choosing food for health focuses on the self. This is a potential explanation for why health reasons might motivate the more selfish person and animal reasons motivate the more empathic individuals. Ethical motivations were associated with higher empathy in scan of brain activity (Filippi et al. 2010) and considering those highest in empathy (vegans) are primarily motivated by animal-related reasons suggests that empathy would have more of an association with animal than health or environmental motivation. Evidence for a connection between the personality factors and the three motivations has not been subjected to research and is a target of this research. Another significant influence on meat consumption is gender.

Gender Differences

A consistent finding in the research is that men eat more meat than women, which is explained by a link between meat and masculinity, where masculinity is exhibited by eating meat (Love and Sulikowski 2018; Rothgerber 2013; Ruby 2012; Stone 2022). Men are socialised to believe that to be a “real man” you must eat meat; the more meat you eat, the more masculine you are (Salmen and Dhont 2023; Stanley et al. 2023; Sumpter 2015). Traditional definitions of masculinity encompass several factors such as being tough and not showing emotion (de Boise and Hearn 2017; Love and Sulikowski 2018). Showing empathy could be perceived as a weakness for those who strongly need to assert their ‘maleness’ and feel more masculine. In contrast, women have been socialised to be caring and empathic (Christov-Moore et al. 2014; Löffler and Greitemeyer 2023). Lower empathy in men potentially explains why men eat more meat (Graça et al. 2018; Zickfeld et al. 2018). Selfishness could also play a part in explaining why males eat more meat than females, considering higher empathy is found to be associated with lower meat consumption (Holler et al. 2021), is negatively correlated with selfishness, and men have been found to have higher levels of selfishness (Raine and Uh 2019).

There is minimal research that examines the link between motivation and gender in the context of meat consumption (Rosenfeld 2020). Rosenfeld (2020) found that vegetarian

women are more prosocially and morally motivated than vegetarian men, suggesting that differences in motivation according to gender are expected to be found in the current research. Determining the nature of the relationship between the types of motivations and gender and how these relate to selfishness and empathy has not been examined previously and will add to the lack of research in this area.

Aims and Hypotheses

This research aimed to address the gap in the body of knowledge regarding the relationship between selfishness as a psychological construct and animal product consumption since there was a lack of research examining the relationship between these constructs. Although research has found an association between animal- and human-focused empathy and reduced meat consumption, few use animal-focused measures in this endeavour. None look at the relationship between empathy and selfishness in meat consumption. This research aimed to add to this area in the context of two major influences in prosocial behaviour. Another objective is to explore the influence of empathy and selfishness on the three commonly studied meat reduction motivations. Minimal research examines the link between motivation and personality, specifically empathy and selfishness, in the context of reducing meat consumption. The current study aimed to fill this knowledge gap and investigate the relationship between the independent variables of selfishness, animal-directed empathy, and motivation and the dependent variable of meat consumption. Further, since differences have been found between males and females on empathy (Graça et al. 2018; Zickfeld et al. 2018) and meat consumption (Rosenfeld 2020; Rothgerber, 2013; Ruby 2012), differences are expected in relation to gender.

The hypotheses were specified before data collection and are as follows:

1. Higher levels of self-reported selfishness will be associated with higher levels of meat consumption.
2. Higher levels of empathy will be associated with lower levels of meat consumption.
3. Higher levels of selfishness will be associated with higher health motivation and lower levels of environmental and animal motivation.
4. Higher levels of empathy will be associated with higher levels of animal and environmental motivation and lower levels of health motivation.
5. Higher levels of environmental and animal motivation will be associated with lower levels of self-reported meat consumption.
6. Higher levels of health motivation will be associated with lower levels of self-reported meat consumption in females, with the reverse being true for males.
7. Males will have higher levels of selfishness and meat consumption and lower empathy than females.

Although age is to be used as a control variable it is predicted to have a negative relationship with meat consumption as a relationship between increasing age and lower meat consumption is frequently found (Liu et al. 2023; Malek et al. 2019) due to reduced appetite, health issues, liking it less, and lower calorie needs (Dinnella et al. 2023; Grasso et al. 2021; Kemper 2020; Pilgrim et al. 2015; Whitelock and Ensaff, 2018). However, sometimes there is no association or only with some meats. (Dinnella et al. 2023; Pfeiler and Egloff 2020; Turnes et al. 2023; Vandermoere et al. 2019).

Methods

Participants and Procedure

Participants were recruited via Zoho for an online survey in August 2022 to obtain a representative of the Australian population; Zoho pays participants for survey completion. The University of Southern Queensland Human Research Ethics Committee provided Ethics approval (reference number: H22REA128) and informed consent was gained from all participants. Participants were required to be Australian residents between 18 and 80.

The initial sample consisted of 526 individuals. Eight participants identified as neither male nor female; however, they were eliminated due to the low numbers of such responses. A further 19 participants were also removed due to incomplete surveys. Two additional participants were removed as multivariate outliers, leaving a final sample of 497 participants between 18 and 79 ($M_{\text{age}} = 35.11$, $SD = 12.27$). Of these participants, 247 (49.7%) were women and 250 (50.3%) were men. Based on answers to the Food Frequency Questionnaire (FFQ), 98.4% of the sample were omnivores and 1.6% were vegans and vegetarians.

Measures

Because they had been subjected to psychometric processes to ensure reliability and validity, thereby minimising measurement and other errors, surveys that had already been developed were used in this research. Although the instruments were selected based on various factors, including construct validity, it is recognised that they cannot measure abstract psychological constructs directly and therefore are not 100% accurate in capturing a construct. However, total scores can represent a construct of interest and the survey instruments were chosen because they each measure the variables that represent the constructs most effectively to answer the research questions, as it is essential to be clear about what construct is being measured to ensure you capture the one of interest and not something else (Fiske 2020; Stosic et al. 2022).

Empathy

Empathy for animals was measured with the 22-item Animal Empathy Scale (AES) (Paul 2000). It was selected due to specifically measuring animal-oriented empathy, rather than empathy towards humans. This scale has questions in 9-point Likert scales from *Strongly Agree* to *Strongly Disagree*. The scale measures the level of empathy toward animals a person has, with questions indicating high empathy, "It makes me sad to see an animal on its own in a cage," and those that would show lower empathy, "It is silly to become too attached to one's pets." The AES has been used in several studies, one mentioned in the introduction where empathy was found to be lower the more meat consumed (Camilleri et al. 2020). Internal consistency for the AES in this sample was rated as good ($\alpha = 0.80$).

Selfishness

Selfishness was measured by the Selfishness Questionnaire (SQ) (Raine and Uh 2019). It has 24 items in the form of Likert scales rating scores from 0 to 3 from *Agree* to *Disagree*. Individuals rate their agreement or disagreement with statements such as, "I'm not too concerned about what is best for society in general." It has three subscales: Egocentric,

Pathological, and Adaptive. The rationale for using the SQ is that other validated tools to measure the psychological construct of selfishness could not be sourced, which is why Raine and Uh (2019) created it. The questionnaire was used in a study of Turkish students where female students were revealed to be less selfish than male students (Tozoglu and Ozan 2020). This research used a 17-item version of the scale, and internal consistency was excellent ($\alpha = 0.92$).

Motivation

The Veg*n Eating Motives Inventory (VEMI) (Hopwood et al. 2020) was chosen because there were no other existing measures of eating behaviour available that measured health, environment, and animal rights as distinct motives for vegetarian diets (Hopwood and Bleidorn 2019) and since these motives have been found to cover the majority of those chosen (Hopwood et al. 2021a; Malek et al. 2018; Mathur et al. 2021) it was determined that they were the most relevant to focus on. The VEMI was also selected because it allows the comparison of individuals who consume different levels of animal products on the three specific motivations with one instrument. Also, it allowed for the hypotheses about health motivations to be tested empirically in relation to selfishness and empathy. The VEMI has 15 items with 7-point Likert Scales from *Not important* to *Very important* with three subscales (Animal, Environment, and Health); each subscale has five items. Examples of the different subscale questions are as follows: Animal: “Animal rights are important to me”; Environment: “Eating meat is bad for the planet”; Health: “I want to be healthy.” It has been used by the author Hopwood (2022) in subsequent studies, such as one that revealed those with higher pro-environmental attitudes had higher ethical motivations than health motivations. Internal consistency for the Animal and Environmental subscales was excellent ($\alpha = 0.92$ and $\alpha = 0.93$, respectively) and good for Health ($\alpha = 0.89$).

Meat Consumption

A Food Frequency Questionnaire (FFQ) (Faunalytics 2021) was chosen to measure meat consumption. It required participants to tick the box corresponding to their consumption level of different types of meat and animal byproducts. Consumption rates included *never*, *less than once a week*, *1–3 times a week*, *4–6 times a week*, and *1 or more times per day*. The inclusion of products from animals in addition to meat is due to the research being part of a larger study, so meat consumption, rather than all animal product consumption, is described here. The internal consistency of the meat scale was rated as good ($\alpha = 0.83$). Measurement in this way allows for a continuous scale to be used and include a variety of dietary groups, from no meat up to high frequency of consumption. Thus, the statistics did not need to be limited to omnivores.

The survey questions in the format as they appeared online are included in [Supplementary Information](#).

Data Analysis

All data screening and descriptive statistics were performed in SPSS v 29, as were T-tests and correlations between the variables. SPSS AMOS v. 28 was used to run confirmatory factor analyses (CFA) on the data to determine the reliability of all the scales as well as

design and test structural equation models (SEM). The use of SEM was specified before commencing the data collection. The model included six observed variables: Empathy, Selfishness, Animal Motivation, Health Motivation, Environmental Motivation, and Meat consumption, with age as a control.

Several indexes and tests can be used to test model fit, and those recommended by Kline (2011) were used here: Chi-squared (χ^2), comparative fit index (CFI), Tucker-Lewis Index (TLI), and root mean square error of approximation (RMSEA). Values of ≥ 0.90 on CFI and TFI indicate acceptable fit, and ≥ 0.95 indicates excellent fit (Kline 2011). On the RMSEA acceptable fit is shown by values ≥ 0.06 and ≤ 0.08 , while excellent fit is < 0.06 .

Furthermore, a multi-group analysis of the model was administered to test if the variables were similar across gender.

Results

Descriptive Statistics and T-Tests

Descriptive statistics and t-tests for meat consumption, empathy, selfishness, and the three motivation scales are displayed in Table 1.

The t-tests revealed several significant differences between men and women, with men having higher meat consumption, selfishness scores, and environmental motivation than women ($t(495) = -0.44$, $p < 0.001$ and $t(495) = -0.26$, $p < 0.001$, $t(495) = -0.47$, $p < 0.001$, respectively). Women had significantly higher self-reported empathy ratings than men ($t(495) = 0.41$, $p < 0.001$). Due to the number of differences between the genders, their correlations are presented separately (Tables 2 and 3).

Correlations

Correlations indicate that for females as AES scores increases, meat consumption and SQ scores decrease, while health and animal motivations increase. Increased selfishness is accompanied by increased meat consumption and environmental motivation. Animal, health, and environmental motivations are all positively correlated with each other (Table 2). Correlations for males are provided in Table 3.

For males, most of the variables were correlated with each other (Table 3). Like females the score on the AES was negatively correlated with meat consumption and scores on the

Table 1 Independent t-tests comparing gender differences in meat consumption, animal empathy, selfishness, and motivations

	Female		Male		t-value (df=495) <i>t</i>	p-value p	Total	
	M	SD	M	SD			M	SD
Meat	1.45	0.66	1.87	0.80	-0.44	<0.001	1.67	0.77
Empathy	5.75	1.25	5.34	0.94	.41	<0.001	5.55	1.12
Selfishness	1.76	0.44	2.02	0.55	-0.26	<0.001	1.89	0.51
Health	5.47	1.25	5.65	1.22	-0.18	0.05	5.56	1.24
Animal	5.17	1.29	5.14	1.38	0.03	0.39	5.15	1.33
Environment	4.23	1.58	4.70	1.58	-0.47	<0.001	4.46	1.59

Table 2 Correlations of the variables for females ($N=247$)

Females	1	2	3	4	5	6
1. Meat	-					
2. Empathy	-0.20**					
3. Selfishness	0.20**	-0.38**				
4. Health motivation	-0.01	0.14*	-0.03			
5. Animal motivation	-0.11	0.34**	-0.11	0.49**		
6. Environmental motivation	0.05	0.01	0.14*	0.32**	0.54**	-

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

Table 3 Correlations of the variables in the structural equation model for males ($N=250$)

Males	1	2	3	4	5	6
1. Meat	-					
2. Empathy	-0.20**					
3. Selfishness	0.36**	-0.30**				
4. Health motivation	0.20**	0.16*	0.16*			
5. Animal motivation	-0.19**	0.24**	0.20**	0.53**		
6. Environmental motivation	0.27**	0.02	0.33**	0.45**	0.74**	-

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

SQ, and increasing selfishness meant increased meat consumption. Ratings of selfishness increased with increasing health and environmental motivations, and health and animal motivations increased with increasing empathy. All VEMI motivations were positively related to each other.

Structural Equation Models

The structural equation modelling was first carried out on the sample overall and the model obtained in the SEM in AMOS showed an acceptable-to-excellent fit: $\chi^2(5) = 17.23$, CFI = 0.98, TLI = 0.925, RMSEA = 0.07 and is shown in Fig. 1.

A positive association between total selfishness on the SQ (selfishness) and total consumption of meat products (meat) was found ($\beta = 0.37$, $p < .001$), and a significant negative association between total AES scores (empathy) and meat ($\beta = -0.10$, $p = .003$). Hypotheses 1 and 2 were supported, with AES total scores and SQ scores associated with meat consumption, empathy having a negative relationship, and selfishness having a positive association.

All motivations were positively influenced by self-reported selfishness and empathy. SQ scores and VEMI motivation subscales scores: animal: $\beta = 0.49$, $p < .001$; environmental: $\beta = 0.95$, $p < .001$; health: $\beta = 0.37$, $p = .001$. AES scores and motivations: animal: $\beta = 0.42$, $p < .001$; environmental: $\beta = 0.14$, $p = .035$; health: $\beta = 0.20$, $p < .001$. This indicates that H 3 and 4 are not fully supported as there were no negative relationships and all motivations were significantly associated with both psychological factors.

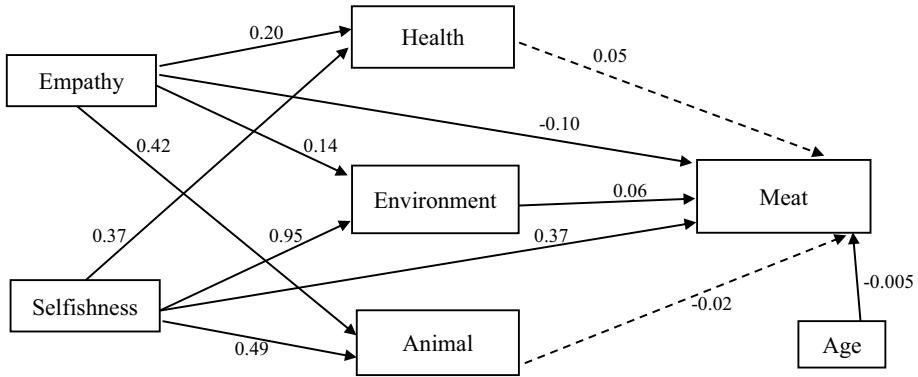


Fig. 1 The effect of selfishness and empathy on health, environment, animal motivations, and meat consumption. The dotted line indicates a non-significant association. For ease of interpretation error terms and covariances are not shown

There was no significant link between animal or health motivations and consumption of meat products (animal: $\beta = -0.02, p = .592$; health: $\beta = 0.05, p = .073$), while there was between environmental motivation and meat: $\beta = 0.06, p = .029$. Suggesting the more environmental motivation, the more meat consumed. Meat consumption was also lower with increasing age ($\beta = -0.005, p < .048$).

As males and females were found to differ on several variables on the t-tests, a multi-group analysis was carried out, with gender as the grouping variable. The model showed a strong fit to the data $\chi^2(10) = 22.723, CFI = 0.981, TLI = 0.919, RMSEA = 0.051$. The unconstrained model differed significantly from the constrained model ($p = .048$), indicating that males differed significantly from females, thus affecting overall hypotheses.

The model for females is presented in Fig. 2.

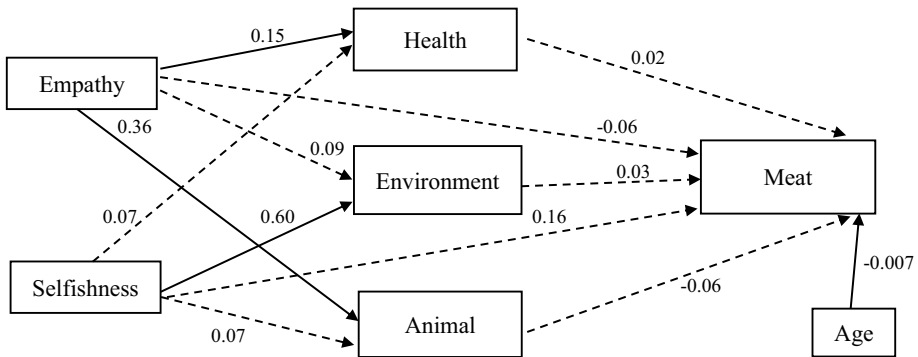


Fig. 2 SEM model for female sample: The effect of selfishness and empathy on health, environment, and animal motivations and meat consumption. The dotted line indicates a non-significant association. For ease of interpretation error terms and covariances are not shown

Females

The female sample had no association between SQ or AES scores and meat consumption ($\beta = 0.16, p = .106$; $\beta = -0.06, p = .097$, respectively). Associations were found between the AES scores and both animal ($\beta = 0.36, p < .001$) and health motivations scores ($\beta = 0.15, p = .034$). However, environmental motivation showed no significant relationship ($\beta = 0.09, p = .276$) with AES scores, but it did with the SQ ($\beta = 0.6, p < .014$). The other two motivations had no association with SQ scores (animal: $\beta = 0.07, p = .701$; health: $\beta = 0.07, p = .728$). Total meat product consumption had no significant association with any of the motivations, but it did have a negative association with age ($\beta = -0.007, p = .022$), indicating as women age, they eat less meat. The results suggest an association of the psychological variables with some motivations, but that motivation does not mediate meat consumption. The three motivations do not affect meat consumption in females.

The SEM model for males showed a different pattern, as seen in Fig. 3:

Males

As outlined in the model shown in Fig. 3, in contrast to the female sample the male sample has several associations found to be significant. There was a significant positive association between levels of self-reported meat consumption and scores on the SQ ($\beta = 0.36, p < .001$), indicating that males who reported higher levels of meat consumption generally reported higher scores on the SQ. In contrast, levels of self-reported meat consumption had a significant negative association with scores on the AES ($\beta = -0.13, p = .02$), indicating that males who reported higher levels of meat consumption generally reported lower scores on the AES.

Higher levels of total ratings on the AES were associated with higher rates of all VEMI motivations subscale scores: animal: $\beta = 0.49, p < .001$; environmental: $\beta = 0.22, p = .036$; health: $\beta = 0.30, p < .001$. Similarly, selfishness, as represented by SQ scores, was also positively associated with all motivations: animal: $\beta = 0.74, p < .001$; environmental: $\beta = 1.08, p < .001$; health: $\beta = 0.51, p < .001$. However, there was no significant association between any motivation and total meat product consumption, animal: $\beta = 0.03, p = .608$;

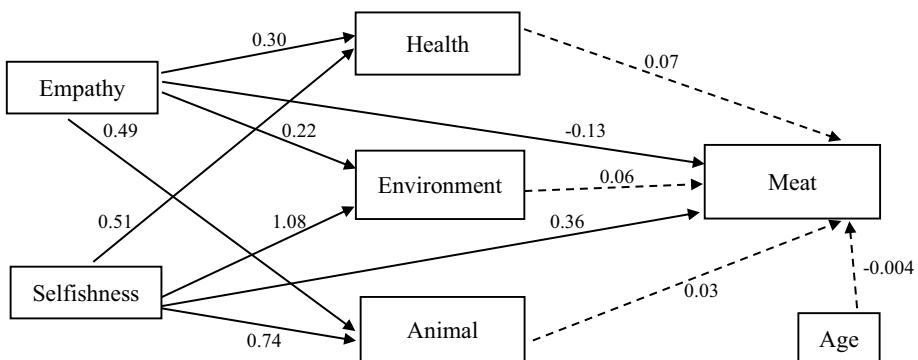


Fig. 3 SEM model for male sample: The effect of selfishness and empathy on health, environment, and animal motivations and meat consumption. The dotted line indicates a non-significant association. For ease of interpretation error terms and covariances are not shown

environmental: $\beta = 0.06$, $p = .21$; health: $\beta = 0.07$, $p = .112$, or age and meat consumption ($\beta = -0.004$, $p = .273$).

These results show that both psychological factors affect the three motivations, but motivation does not mediate meat consumption. Motivation does not have any link with meat consumption for males.

There were fewer significant relationships for females than males, indicating psychological factors play more of a part in meat consumption for men than women. Therefore, H1 and H2 are only partly supported in the case of males. The similarity between males and females is the non-significant association between motivations and meat consumption, leading to the rejection of Hypotheses 3, 4, 5, and 6 due to not being fully supported by the data. However, Hypothesis 7 is supported as several differences were found between males and females.

Discussion

This study aimed to investigate the relationships between animal-directed empathy, selfishness, and motivation in the context of meat consumption. Due to the differences between males and females in the psychological variables related to meat consumption, it was prudent to analyse them separately. There was only partial support for the prediction that higher selfishness and lower empathy are accompanied by higher meat consumption since it only applied to males, not females. Selfishness and empathy were found to influence all motivations positively for men but only some for women. Motivations had no association with meat consumption for either gender.

The research indicated that psychological factors only affected males' dietary behaviour. Empathy had a significant negative association with meat consumption and selfishness had a positive one. Consistent with the literature, men had higher selfishness (Raine and Uh 2019), lower empathy, and more meat consumption than women (Graça et al. 2018; Zickfeld et al. 2018). The lower empathy and higher selfishness found for males partly explains why they also had a higher frequency of meat consumption than females. They are potentially components of the complex array of factors explaining the meat-masculinity connection (Rothgerber, 2013).

It could be argued that selfishness is garnered in the pursuit of masculine identity, with the focus on the self in consuming more meat to appear more masculine, particularly for those who subscribe to this as being necessary for their identity. The men who eat the least meat report being more empathic and less selfish than those on the opposite end of the meat consumption scale so they may not be as influenced by the meat-masculinity connection as those who consume the most. Age did not seem to dampen this connection, as although meat consumption decreased with age for males, it was not significant. This research supports the assertion that meat eating is a particularly masculine behaviour bolstered by the surprising result that the psychological factors explored here do not explain the meat consumption behaviour in women.

In contrast to other studies, psychological factors were not connected to meat consumption for females (Camilleri et al. 2020; Graça et al. 2018) – their higher empathy and lower selfishness, compared to men, were not connected with the level of meat consumption—a particularly unexpected result with respect to empathy. As women in this study ate significantly less meat than men, as found in previous research (e.g., Graça et al. 2018), there may be psychological or other reasons, not measured here, which explain this relationship, such

as women not being influenced by the need to eat meat to be masculine, weight loss, and a less strong attachment to meat than men do (Graça et al. 2015; Hagmann et al. 2019).

The associations found between the psychological variables and motivations depended on gender. For men all motivations were positively associated with higher levels of selfishness and empathy; this can be interpreted as men who are more selfish and more empathic have higher health, environment, and animal motivations. The animal motivation and empathy connection was also found for women. This association makes sense in the context of the literature; those who are more empathic on an animal empathy scale would have higher animal motivations.

Higher empathy being associated with higher health motives for both genders may be related to the desire to be healthy for others, such as family, to extend life to care, or be there for the benefit of others, for example, their children. Highly empathic people are likely to care about other people's health, even strangers (Fowler et al. 2020). Although animal empathy was measured here, it has been found that those with high animal empathy are also high on measures of human empathy (Gómez-Leal et al. 2021). Some of the AES questions related to pets, so it would have been interesting to determine the number of people who had pets, as it has been found that individuals with pets are more empathic (Gómez-Leal et al. 2021). Perhaps the health motivation was triggered not just for the human family but also for animal members.

The hypothesis that selfishness and health motivation would have a positive relationship was only partially supported because it only applies to men. Those reducing or considering reducing meat consumption for health were predicted to be more selfish due to health being a focus on the self. However, as previously noted, some people may maintain their health for external reasons, not just for their benefit. Both males and females who were more selfish selected higher environmental motivations. Perhaps the knowledge about environmental problems prompts people to think about themselves and how they might suffer if climate change begins to affect them.

Another hypothesis that was not supported was the finding of high selfishness and animal motivation, found only for males. This finding appears contradictory, as being more selfish would seem more likely to lead to having less or a negative relationship with motivations related to the care and welfare of animals. Perhaps an explanation lies in the narcissism-selfishness connection. Narcissism is associated with selfishness (Deutchman and Sullivan 2018). Those more selfish males are potentially more narcissistic and want to appear to be highly motivated by endorsing all motivations (Kesenheimer and Greitemeyer 2021) or believe they have high morals despite their high meat consumption. Regardless of the anonymity, many men may have answered with a view of what is socially acceptable, even if it contrasted with how they think or behave privately. On the other hand, the more empathic men endorse all motivations, perhaps because of their empathy. The motivations seem to be compelling to those men high in selfishness and empathy; however, reporting how motivated you are does not seem to reflect the level of action in the form of reduced meat consumption.

Although motivations were associated with psychological factors, none of the three motivations was associated with meat consumption for either gender, an unexpected finding as was that none of the motivations mediated meat consumption. Since other research highlighted the three motivations as those that are endorsed most often, these were focused on here. Participants in this sample selected them; however, omnivores have been found to rate these motivations differently to non-meat eaters, generally endorsing them less, perhaps except for health, as found in some studies (Hopwood et al. 2021b; Lentz et al. 2018; Rosenfeld and Burrow 2017). Omnivores also often select other motivations as more

salient, and since this was a sample dominated by omnivores (98.4%), motivations and variables other than those measured here may play a larger role in motivating omnivores to reduce their meat consumption, such as weight loss, taste, cultural, habit, family eating behaviour, social support, spirituality, beliefs, cost, and safety (Hagmann et al. 2019; Hoffman et al. 2013; Lentz et al. 2018; Malek et al. 2018; Verain et al. 2022). With a larger representation of vegans and vegetarians, a connection between the motivations and meat consumption may have been found.

Those abstaining from all animal product consumption are more likely to carry out the behaviour to match the motivation; this is borne out in the research that shows, rather than merely indicating intentions, they act on their motivations and are consistent in maintaining meat-free diets (Lund et al. 2016). Vegans are particularly consistent and have stronger animal rights motivations than omnivores and vegetarians (Hopwood et al. 2020; Lund et al. 2016). Similar issues of lack of representation of meat abstainers have affected other studies; Lentz et al. (2018) indicated the most reported motivation to reduce meat consumption was cost and claimed that it was due to the large numbers of omnivores in the sample and if there had been more abstainers the motivation profile may have been different. However, unlike this research, their study did not measure levels of meat consumption.

It is also possible that, although endorsing the motivations, many participants may have felt that they did not need to reduce their consumption. Those who already have low levels of meat consumption may not be expressing motivation to reduce their meat consumption any further, perhaps believing they have made enough changes to their diet to satisfy their values and attitudes. Others might realise they need to reduce their meat consumption but have not yet translated it into behaviour change. Motivation does not always translate into action; people can claim they are motivated and report intentions to change their behaviour, but this is not necessarily reflected in actual impactful behaviour (Hagmann et al. 2019; Moser and Kleinhüeckelkotten 2018; Zur and Klöckner 2014) - the intention-behaviour gap (Cheah et al. 2020). This is reminiscent of other 'gaps' described in the literature that also show a lack of action despite strong attitudes, willingness, and beliefs (Nielsen et al. 2022; Stubbs et al. 2018). Consequently, few meat eaters are willing to reduce their consumption (Macdiarmid et al. 2016; Sanchez-Sabate and Sabaté 2019; Stubbs et al. 2018). However, this is hypothetical as participants were not asked about their intention or agreement about the need to reduce meat consumption. Endorsing motivations whilst not changing behaviour aligns with the narcissistic traits of those who "greenwash their self" – those who make claims about their PEB without enacting any of them (Kesenheimer and Gritemeyer, 2021), another explanation for the high selfishness high motivation connection.

Another reason for the lack of connection between motivation and meat consumption could be that participants were asked what would motivate them to reduce meat consumption, not what did motivate them to reduce their meat consumption if they already had. The three motivations used here are often given as the reason for meat reduction after reduced consumption has already occurred and by groups such as vegans and vegetarians.

In summary, levels of meat consumption have more to do with personality for males than females, with men high in selfishness and low in empathy eating more meat. Motivations also varied according to gender, with higher empathy and selfishness in men leading to higher health, environment, and animal motivations. In contrast, what is a more compelling motivation for women depends on whether women are more selfish or empathic. More empathic women are motivated by animal and health motivations, while more selfish women are motivated by environmental factors. However, these motivations did not translate into reduced meat reduction for either gender, suggesting these motivations are not a factor in reduced meat consumption. There may be other

more compelling reasons or motivations for the omnivore-dominated sample. Although many of the hypotheses were rejected, this research fills the gap in several ways, particularly concerning selfishness and meat consumption, psychological factors relating to the commonly found motivators for meat reduction, and in relation to gender differences. It adds to the body of knowledge of psychology and motivation in relation to meat consumption.

Determining the most compelling motivators for meat consumers to reduce their consumption is a critical focus of research. The study conducted here contributes to a further understanding of underlying mechanisms related to reducing meat consumption. Finding ways to tap into psychology and motivation will help lead to solutions to reduce meat consumption and assist in minimising climate issues, animal cruelty, and health problems.

Limitations

This research had a few limitations which may have affected the results. One common limitation in psychological research is using self-report measures, as subjects can answer in a way that may not reflect their reality. Social desirability is also a potential limitation of self-report measures, potentially more of an issue with selfishness and meat consumption. As the participants are part of a paid survey, this may have reduced the impact, as well as the length of the survey not being too long, and it was anonymous. Also, retrospectively reporting on the frequency of meat consumption can be inaccurate due to issues with memory over time and potential underreporting of consumption. Using observation or alternative ways to determine levels of meat consumption could reduce the impact of issues with self-report measures.

Although the aim was to measure the frequency of meat consumption, measuring the quantity or portion size may have added to differentiating those who consume the most meat, as one person's serving could be 2 g whilst another may have eaten 500 g. However, this method could also suffer issues with inaccurate recall as it further potentially burdens memory by adding quantity as well as frequency. It could also lead to a higher dropout rate due to taking longer than the frequency version.

Also, as the study was a cross-sectional design, the influence of different motivations on meat consumption could only be inferred. Longitudinal studies can give a more accurate picture of behaviour before and after interventions and assess causality more effectively. Questions looking at changes already made that are attributed to specific motivations or determining meat consumption before and after a source of motivation is measured may have provided a more accurate picture of the role of motivation in meat consumption.

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Data Availability Data will be made available upon request to the corresponding author.

Declarations

Ethics approval Approval was obtained from the Research Ethics Committee of the University of Southern Queensland Human Research Ethics Committee (reference number: H22REA128).

Consent to participate and to publish Informed consent was obtained from all individual participants included in the study to participate and for the results to be published.

Competing interests The authors have no financial or non-financial interests to disclose.

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