SELFISHLY EATING UP THE PLANET? THE INFLUENCE OF SELFISHNESS, EMPATHY, MOTIVATION, RELIGION, AND GENDER ON THE CONSUMPTION OF MEAT AND WILLINGNESS TO REDUCE ANIMAL PRODUCT CONSUMPTION.

A Thesis submitted by

Angela Dillon-Murray
MEdPsych; GradCertCrim; GradCertClinHyp; BSc(Hons)

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ABSTRACT

As the human behaviour of eating animal products is linked to several global issues spanning the environment, health, and the suffering of trillions of animals, understanding the psychology of animal product consumption and reduction may contribute to solving them. Psychological selfishness has not been explored in this area and was combined in this research with indicators of animal-oriented empathy, motivations, willingness, religion, and gender to determine what role they played in meat consumption and animal product reduction via a quantitative and cross-sectional research design. As this thesis is by publication, three articles describe the research carried out. An Australian sample, N = 497 for the first and third studies and N = 492 in the second were surveyed via *Zoho Survey* online. Article one reported that higher empathy and lower selfishness were accompanied by lower meat consumption for males but not females, suggesting other factors may influence meat consumption for females. Animal, environmental, and health motivations were positively associated with the psychological factors for males, implying that all motivations are convincing to males. Females' health and animal motivations were positively associated with empathy, and selfishness with environmental motivation. In article two, environmental motivation was the most significant influence of the three motivations on willingness to reduce animal product consumption. The next was animal motivation. In contrast, health motivation had a negative association with willingness; the belief that meat is healthy may be working against willingness. One psychological factor, pathological selfishness, predicted willingness. Article three revealed higher meat consumption groups reported higher selfishness. This was superseded by the interaction effect, where religious groups with higher meat consumption had higher pathological selfishness than non-religious high consumers. This thesis met its aim by adding a novel contribution to understanding the psychological and sociodemographic factors related to animal product consumption and reduction.

CERTIFICATION OF THESIS

I, Angela Dillon-Murray, declare that the PhD Thesis entitled, *Selfishly Eating Up the Planet? The influence of selfishness, empathy, motivation, religion, and gender on the consumption of meat and willingness to reduce animal product consumption* is not more than 100,000 words, including quotes and exclusive of tables, figures, appendices, bibliography, references, and footnotes.

This Thesis is the work of Angela Dillon-Murray except where otherwise acknowledged, with the majority of the contribution to the papers presented as a Thesis by Publication undertaken by the student. The work is original and has not previously been submitted for any other award except where acknowledged.

Date: 08 March 2024

Endorsed by:

Professor Jeffrey Soar

Principal Supervisor

Dr Aletha Ward

Associate Supervisor

Student and supervisors' signatures of endorsement are held at the University.

STATEMENT OF CONTRIBUTION

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DEDICATION

This dissertation is dedicated to the non-human animals we should be sharing the planet with and to Dr Steve Dillon for supporting my studies so long ago and inspiring me to commence a PhD, even if he is not here to know this. I would have liked for him to have been around for us to be the two Dr Dillons. I also dedicate it to my mother, Lorraine Fulton, who appreciated the value of education, as society restricted women of her generation from attaining further education. My mother wanted me to do or be whatever I wanted and enthusiastically encouraged my education. She was also a champion of social justice and became a vegetarian due to her concern for animals in 1950s Australia. She later became vegan. Her influence has naturally influenced my direction in life, and I wish I could have shared this achievement with her.

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CHAPTER 1: INTRODUCTION

Animal agriculture has a significant impact on the planet, humanity, and animals, accounting for a third of greenhouse gas (GHG) emissions generated by human activity (Xu et al., 2021). The urgency around reducing animal agriculture's impact on the environment cannot be understated, with climate scientists indicating that there will be catastrophic consequences for animals and humans unless we can reduce global warming by 1.5 degrees Celsius (Masson-Delmotte et al., 2022). In addition to the GHG emissions, the additional environmental issues include deforestation and land clearing, which not only reduces habitat for wildlife but results in loss of biodiversity and contributes to GHG emissions; pollution of air and water; and land degradation for various reasons including erosion from hooved animals (Bouvard et al, 2015, González et al., 2020; Masson-Delmotte et al., 2021; Poore & Nemechek, 2018; Schiermeier, 2019; Shepon et al., 2018; Shukla et al., 2019; Tufford et al., 2023; Willet et al., 2019). There is consensus in the scientific literature, supported by the United Nations (UN) and the World Health Organisation, that it is essential for humans to significantly reduce animal product consumption, especially red meat, to alleviate the problems (Eisen & Brown, 2022; Lee et al., 2023; Willet et al., 2019).

The cruelty and exploitation of animals for human purposes is another argument for reducing production and consumption of animal products. The number of animals farmed for food is estimated to be 75 billion, however, including animals that are fished and chicks culled in the egg industry, as well as others not counted in the farmed for food category, it accounts for numbers in the trillions (Ritchie, 2023; Rosner, 2023). Farmed animals are subjected to an extensive list of inhumane practices which are not all mentioned here, from tail docking and debeaking without anaesthetic, to crowded environments where animals are unable to enact their natural behaviour and grinding chicks alive (Bryant, 2019; Dhont et al., 2019; Francione, 2010; Gullone, 2017; Hannan, 2022; Joy, 2020; Pluhar, 2010; Springer,

2021; Singer et al., 2006). Furthermore, the loss of habitat for wildlife and pollution are other examples of how animals' lives are impacted by human activity (Scanes, 2018).

Health is another reason to reduce animal product consumption, particularly red and processed meats. The International Agency for Research on Cancer (IARC) listed processed meat such as sausages, ham, and salami as a group one carcinogen, which is an agent that is known to cause cancer in humans (Boada et al., 2016). This is in the same group as asbestos and tobacco (https://monographs.iarc.who.int/list-of-classifications/). Red meat is in Group 2A, meaning it is probably carcinogenic to humans (https://monographs.iarc.who.int/list-of-classifications/). Other issues include increased risk of all-cause mortality (Libera et al., 2021), obesity (Rouhani et al., 2014), diabetes (Barnard et al., 2014; Zhang et al., 2021), cardiovascular disease (Godfray et al., 2018; Zhong et al., 2020 -includes poultry). Other research has linked it with inflammatory bowel diseases, infertility, and non-alcoholic fatty liver (Libera et al., 2021).

Since there is evidence for the need for our species to alter our behaviour dramatically to improve the lives of animals, our health, and the environment, research targeting the most effective ways to reduce the consumption of animals contributes to this global imperative. As a result, research into the psychology of meat consumption and reduction has grown significantly in the last decade (Loughnan et al., 2014; Rosenfeld, 2018; Ruby, 2012; Tan et al., 2021), with a focus on determining the variables influencing these behaviours. Understanding the psychological factors that influence or drive behaviour in individuals and groups is anticipated to help lead to answers about how to reduce animal consumption (Hopwood et al., 2020; Mathur et al., 2021). Social psychology and the area of personality and individual differences inform the current research, and the aim was to discover explanations for differences between groups and individuals in their consumption and reduction of animal products (Loughnan et al., 2014; Rosenfeld, 2018; Ruby, 2012).

Psychological characteristics and personality vary according to dietary behaviour, with individuals differing according to their level of meat consumption (Pfeiler & Egloff; Reist et al., 2023). As not eating animals assists animals in avoiding the exploitation and cruelty involved in using them for food, it can be considered a form of prosocial behaviour (PSB) that benefits others, in this case, animals. Reducing meat consumption has been described as a PSB by Klein et al. (2022) as it is beneficial with respect not only to animals but also to humans since eschewing animal products can have significant positive benefits for humans, such as reducing the effects of climate change (Klein et al., 2022; Poore & Nemecek, 2018). Severe weather events exacerbated by climate change have already impacted humanity worldwide (Ebi et al., 2021).

Two constructs related to PSB, empathy and selfishness, were focussed on in this research not only because of their role in PSB but due to each being, or perceived to be, a significant influence on human behaviour (Carlson et al., 2022; Depow et al., 2021; Raine & Uh, 2019). Empathy is associated with lower meat consumption (Holler et al., 2021; Northrope et al., 2024) and is generally opposite to selfishness in its influence on PSB (Batson et al., 2014; Cialdini et al., 1987). Selfishness is a significant element in humans' social lives and moral decisions, but it has only been recently defined and measured as a psychological construct (Carlson et al., 2022; Raine & Uh, 2019). Although important in society and PSB, such as abstaining from animal product consumption, no research was discovered examining if psychological selfishness influences animal product consumption and reduction. Nor was there any that used both empathy and selfishness together in examining animal product consumption and reduction. Adding motivation into the variables explored to try and enhance understanding of what may lead to reducing consumption, it was also found that there was no research about selfishness in relation to motivation.

Certain motivations are claimed to lead to a reduction of animal product consumption (Zur & Klöckner, 2014) and the three that are most frequently selected are animal (welfare and rights), environmental, and health (Hopwood et al., 2020). Much of the previous research has examined which is most motivating and revealed dietary groups differ on what motivates them (De Backer & Hudders, 2014; Hopwood et al., 2020; Verain et al., 2022). This thesis was interested in whether the psychological factors selected here, and meat consumption levels, were associated with the three motivations, as no existing research directly examined the constructs' connections with each other.

As willingness could be regarded as the next step from motivation to reduction, it was questioned which of the three motivations would be most compelling in encouraging people to move to willingness to reduce consumption of animal products. There were minimal studies to inform this question as there were few studies on willingness and none on willingness against these three motivations. Of further interest around animal product consumption and reduction were the sociodemographic factors of gender and religion.

Males consume more meat than females, an explanation of which is that masculinity influences meat consumption (Love & Sulowski, 2018; Stone, 2022). As the psychological variables chosen also vary according to gender, it was regarded as crucial to include in this thesis, considering it is a major factor in the psychology of animal product consumption but also because if they are not separated in statistical analysis, accurate results may not ensue.

Religion was chosen as the other socio-demographics (gender, age, education, income) seemed to have more information in relation to animal product consumption, and it was not established whether having a religion as opposed to not having one made any difference to animal product consumption. Although not always rated highly as a reason to reduce meat consumption, it has been frequently provided as a reason to eat meat (Piazza et al., 2015). In a society where religion is declining (Inglehart, 2020), it was wondered how

much it might play a part in meat consumption and whether selfishness might interact with religion in affecting consumption levels.

The thesis examines the psychological variables of selfishness, animal-oriented empathy, motivations, and willingness to reduce animal product consumption, as well as gender and religion in relation to meat consumption and reduction. The current research aimed to add to these areas in a unique way by investigating constructs that had not been examined in this area before. A thorough examination of the extant literature indicated that there was no research examining selfishness as a psychological construct against meat consumption or reduction, motivations, or willingness to reduce, nor was there any combining selfishness with animal-oriented empathy as a factor that could affect meat consumption and motivation or willingness to reduce animal product consumption. This thesis reports on novel research involving new factors into the psychology of animal product consumption and reduction and addresses gaps in the literature.

Understanding the psychological mechanisms underlying animal product consumption and reduction is expected to contribute to the methods to ameliorate the environmental, health, and animal welfare issues mentioned in the introduction. If the influence of these psychological factors is more fully understood, they could be harnessed to assist individuals in reducing animal product consumption.

Aims and Research Questions

The overarching goal of this thesis is to explore and advance our understanding of factors that influence an individual's meat consumption and the willingness and motivations that contribute to reducing animal product consumption. To achieve this aim, the following research questions were developed:

1. Research Question One: Is meat consumption associated with psychological selfishness, animal-oriented empathy, gender, and three motivations (animal, health, or environment) to reduce meat consumption?
2. Research Question Two: Are the three motivations to reduce meat consumption associated with animal-oriented empathy and selfishness?
3. Research Question Three: Is willingness to reduce meat consumption influenced by animal-oriented empathy, three different subtypes (levels) of selfishness (adaptive, egoistic, and pathological), and three motivations (animal, environment, and health)?
4. Research Question Four: Do groups divided according to frequency of meat consumption differ according to selfishness, religion, or gender?

Articles one and two on motivations and willingness refer to a reduction in animal product consumption, not just meat consumption. Animal product consumption includes meat and by-products derived from animals, whereas by-products are not meat and include such items as eggs, dairy, and honey. The nature of the research questions lent themselves to a cross-sectional quantitative design. As the questions vary, they are explored in different ways using different variables and statistical operations which is outlined in the following methodology for the research.

Methodology

Participants and Procedure

As the goal of the research was to analyse these constructs in the Australian context, only participants from Australia were recruited. The age range was limited to participants between 18 and 80 years since adults possess more autonomy in their dietary choices than children and they are usually the main decision makers in relation to food purchases and meals in a household. They generally have established eating habits and behaviour that is more stable is likely to reflect long-term patterns.

Since the research design was quantitative the number of participants had to be significant to ensure the results were generalisable to the Australian population (Henrich et al., 2010), as well as

enhance the power (Columb et al., 2015) and robustness of data obtained from statistical analysis. Larger sample sizes provide greater power to detect a true effect (Columb et al., 2015) and increase likelihood of the sample being representative of the population (Sedgewick, 2015). To enable these assumptions to be met 500 participants was the target and was more than a G*Power analysis (Kang, 2021) indicated was more than the smallest sample size required to detect the effect. Having more than the minimum was also to protect against participant data that might have been unusable.

The Zoho Survey company's online survey tool (https://www.zoho.com/survey/) was used to collect data from a large sample representative of the Australian population. An advantage of using the tool was in helping to ensure anonymity, which enhances the likelihood that the participants will answer more honestly.

Zoho pays participants to complete surveys, thus there is incentivisation which can increase response/completion rates. (Lipps et al., 2019). Since Zoho recruited the sample it would also eliminate bias and possible overrepresentation of certain demographic groups.

Measures

To analyse the research questions surveys that had already established reliability and validity were used. The following section outlines the tools used according to the study, what they aimed to measure, and the statistics applied and why. All materials used can be found in Appendix A.

Study 1

Selfishness questionnaire (SQ) (Raine & Uh, 2019) measures selfishness and includes 3 subscales – Adaptive, Egoistic, and Pathological selfishness. In the first study total selfishness was examined. The Animal Empathy Scale (AES) (Paul, 2000) was used to measure animal-oriented empathy. The Vegetarian Eating Motives Inventory (VEMI) (Hopwood et al., 2020) provided motivations for vegetarian and vegan diets. These included Animal, Environmental, and Health Motivations.

Study 2

The SQ, the AES, and the VEMI were again used but in this study the three subscales of the SQ were used, Adaptive, Egoistic, and Pathological selfishness, to gain more depth into the influence of different types of selfishness on the dependent variable, Willingness – willingness to reduce meat

consumption. This was measured using one question, "Please indicate your willingness to reduce your consumption of animal products" with 5 choices on a Likert Scale, from 1: Not willing" to 5: "Very Willing."

Study 3

The three subscales of the SQ were measured against gender, meat consumption and religion. Meat consumption was measured using a Food Frequency Questionnaire (FFQ) that was altered from the one offered for use by Faunalytics (2021). It allowed for different types of meat and their frequency of consumption to be determined. Gender was delineated into two categories as, even though questions were provided to determine non-binary, transgender, or 'other' (for those who do not wish to delineate or do not fit in the other categories), there were too few to be statistically valid. Hence, they were removed and the two categories – Male and Female were used. Religion was also analysed and whether someone had a religion was compared against the non-religious combined with the atheist/agnostic members of the sample.

Data Analysis

To analyse all the variables and the relationships between them in a model, structural equation modelling (SEM) was used to answer questions one and two. SEM allows for the complexity of variables to be analysed concurrently. Research question three was analysed using hierarchical regression to determine the contribution of each independent variable on

willingness to reduce animal product consumption, the dependent variable. Question four was answered via analyses of variance (ANOVAs) of the data to assess group differences in the three subtypes of selfishness. Groups included religion, gender, and meat consumption levels and the main effects and interaction effects will determine if specific differences depend on more than one variable.

Thesis **Structure**As this thesis is by publication, three journal articles were compiled to focus on the different research questions. Article one fully addresses research questions one and two, article two examines research question three, and article three answers part of research question one and fully explores research question four. A chapter is associated with each article, including a brief introduction to the research and where it has been published or submitted for publication and is under review. How these journal articles fit into the overall structure of the thesis is described below.

Chapter 1*:* Provides an overview and rationale for the thesis topic, its aims and the design chosen to answer the research questions.

Chapter 2: Reviews the literature related to the factors proposed and found to influence animal product consumption and reduction selected for research in this thesis.

Chapter 3: Presents the article published in *Food Ethics*, which examined research questions one and two.

Chapter 4: This article examines research question three, which is currently under review at *Food Ethics*.

Chapter 5: This is a journal article that explores research question four that has been submitted to *The Australian Journal of Psychology*

Chapter 6: Summarises the findings and implications of all articles, discusses the limitations of the thesis, and makes recommendations for future research.

Appendix A: Survey materials

Appendix B: Document sent to Food Ethics outlining the differences between articles one and two.

CHAPTER 2: LITERATURE REVIEW

The overarching goal of this thesis is to explore psychological factors that may influence animal product consumption and reduction. The thesis will examine extant literature as well as studies on related concepts and constructs where there is no previous research relating to the selected variables, such as psychological selfishness. Exploration of the constructs and how they operate in relation to meat consumption and animal product reduction, as well as the reasoning behind their selection will be highlighted through this literature review.

The variables chosen for examination that relate to or are proposed as influences on the prosocial behaviour (PSB) of interest here, meat reduction, will be described. Two critical elements of prosocial behaviour (PSB), empathy and selfishness, will be explored, leading to a discussion of animal-oriented empathy and how it relates to meat consumption. As no studies have investigated psychological selfishness in relation to animal product consumption and reduction, research with related constructs or concepts will be outlined. Three motivations commonly found to be associated with the reduction of animal product consumption and their possible connection with empathy and selfishness, as well as with willingness to reduce, will then be discussed. Animal product consumption is associated with sociodemographic factors, and in this thesis gender will be explored as it differs according to not only PSB but also meat consumption and reduction. Finally, religion is another sociodemographic factor examined here due to its influence on dietary behaviour and the religion-prosociality hypotheses that religious individuals are more prosocially oriented.

Prosocial Behaviour (PSB)- empathy and selfishness.

As humans are a social species, they function most effectively in groups, which is one reason for their evolutionary success (Van Vugt & Kameda, 2012). To be a successful group, PSB is an essential component and accounts for the cohesion and working together for the

benefit of the whole (Francois et al., 2018), the Gestalt – the benefits to the group are more than the sum of their parts. PSB is defined as actions that benefit others and is a "critically important class of social behaviour" (pp 4, Shroeder & Graziano, 2014) since it has significant implications for society in relation to several factors, including interpersonal relationships (Wu et al., 2022). As both empathy and selfishness are reported to be an influence on PSB (Gamble et al., 2023; Telle & Pfister, 2015) and reducing consumption of animal products is a PSB, meat reduction according to Klein et al. (2022), it is argued that both would have a role in the reduction of animal product consumption.

Empathy and selfishness would be expected to influence animal product consumption and reduction in different ways since empathy is a more 'other-focussed' (externally directed) emotion, while selfishness is considered a more self-focussed (internally directed) emotion (Decety & Norman, 2015; Van Lange, 2008). Thus, as empathy focuses on others, actions resulting from empathy would be more likely to benefit others. In contrast, actions related to selfishness would primarily benefit the self. Extending this to animal product consumption, higher empathy and lower selfishness would be associated with lower meat consumption, and selfishness would lead to higher meat consumption. Empathy has been found to have a positive connection with PSB (Davis, 2015; Decety et al., 2016; Gamble et al., 2023; Telle & Pfister, 2015) and self-centredness a negative relationship with prosocial motives (Hopwood et al., 2021) providing support for the two constructs being at different ends of a spectrum of helping behaviour.

Both empathy and selfishness are claimed to be crucial in understanding human behaviour (Carlson et al., 2022; Depow et al., 2021; Hall & Schwartz, 2017; Raine & Uh, 2019), but empathy has attracted more research that relates to animal product consumption than selfishness. As far as can be ascertained from comprehensive literature searches, there is no research that measures how the construct selfishness relates to animal product

consumption, nor any that examines empathy towards animals in conjunction with selfishness and animal product consumption and reduction. The relationship of animal product consumption to the empathy extended toward animals (animal-oriented empathy; animal-directed), and the scant research relating to selfishness will be described to demonstrate the rationale for the research questions and hypotheses.

Animal-Oriented Empathy

Empathy has been a significant focus of research in psychology as it is a major influence on human life (Hall & Schwartz, 2017), especially considering people enact behaviour based on feelings of empathy (Cialdini, 1987; Davis, 2015; Van Lange, 2008). This importance is reflected in the large body of literature examining human-directed empathy. There is less published research relating to empathy for animals. Whether empathy toward animals impacts the behaviour of not eating animals was of interest in this research.

The increase in studies of animal-directed empathy in the last 20 years was based on the lack of research that had been done in this area and the lack of validated means to measure it (Paul, 2000; Angantyr et al., 2011). Research into empathy that humans express toward animals mainly utilised measures of human-oriented empathy, as the commonly accepted view was that it also measured empathy toward animals (Pallotta, 2008; Paul, 2000). Whether there was a difference between empathy for animals and humans had not been investigated systematically until Paul (2000) began research in this area and created a validated measure of animal empathy, the Animal Empathy Scale (AES). Results indicated that animal-oriented empathy was linked with human-oriented empathy but did not measure the same construct. Therefore, it was asserted that animal-oriented empathy is a separate construct and thus would be more appropriately measured and researched as such (Apostol, 2013; Pallotta, 2008; Paul, 1980).

Animal-oriented empathy is defined in a similar way to human-oriented empathy, with it being commonly partitioned into two major constructs: cognitive, understanding the animal's experience, and affective (emotive) empathy, having an emotional response in line with the animal's emotion as it experiences suffering (Camilleri et al., 2020; Rothberger & Mican, 2014). Empathy for animals comes into play in animal product consumption, and results using different types of measures, both animal and human, have consistently revealed that higher empathy is associated with lower meat consumption (Camilleri et al., 2020; Holler et al., 2021; Niemyjska et al., 2018; Zickfield et al., 2018). In studies measuring brain activity, when observing negative scenes involving humans and animals, ethically motivated vegetarians and vegans had more empathy-related brain activity than omnivores (Fillipi et al., 2010).

Support for animal product consumption being lower with higher empathy comes from research that indicates vegans are the most empathic of all dietary groups, including vegetarians (Kessler et al., 2016; Rothberger, 2015). This can be interpreted as the more animal products consumed, the lower the empathy, and as vegans are the only group that shuns all animal products, it makes sense they would have higher empathy. Vegans differ in other ways as they not only do not eat animals but also avoid products made from them, such as honey. Other examples include not using products tested on animals or for entertainment.

Although empathy has been shown to have a negative relationship with meat consumption, based on extensive database searches, no current research looking specifically at the construct of selfishness in relation to animal product consumption could be discovered. There is a significant body of evidence supporting the harmful impact selfishness has on other humans (Raine & Oh, 2018; Sonne & Gash, 2018); it could be argued that animals bear the brunt of human selfishness significantly more than humans, given the billions upon billions of animals slaughtered for food in a year (Schiermeier et al., 2019). Studies that

explored other concepts related to selfishness and could inform the current research are included here due to the lack of research on psychological selfishness and animal product consumption.

Selfishness

As with empathy, selfishness is a crucial trait to study considering its influence on behaviour (Diebels et al., 2018; Raine & Uh, 2018) and its consequent impact on society. It is claimed to be a fundamental part of human nature and that it contributed to our survival and evolution (Caporael et al., 1989; van Vugt et al., 2014). Although it has been suggested that it is more common than altruism (Andreoni & Rao, 2011) and that many human decisions are driven by self-interest (van Vugt et al., 2014), there is empirical support that humans are not necessarily continually operating out of self-interest and that selfishness is not necessarily beneficial, especially not to maintaining social cohesion, critical to a species that functions in groups as humans do (Caporael et al., 1989; Crocker et al., 2017; Sonne & Gash, 2018). Therefore, surprisingly, the research on selfishness is not proportionate with its level of importance (Carlson et al., 2022; Diebels et al., 2018; Raine & Uh, 2019).

Much of the research investigating selfishness involves measuring behaviour in economic games. Aside from whether they accurately capture the construct of selfishness, they do not measure the trait of selfishness or psychological selfishness (Carlson et al., 2022; Raine & Uh, 2019) and measure economic behaviour, such as how much a person will share economic benefits, not the behaviour or interest in this research, animal product consumption. Psychological selfishness can be defined as benefiting the self without considering others' wishes or at their expense (Carlson et al., 2022). It can be divided into three types representing varying severity of impact on others.

While developing what they determined was the first instrument to assess the personality trait of selfishness, the Selfishness Questionnaire (SQ), Raine and Uh (2018)

found three different types of selfishness, from least to most pathological. The first is adaptive selfishness, which does not generally affect, and may even benefit, others (Raine & Uh, 2019). The next is egocentric selfishness, which is neither beneficial nor detrimental to others but focuses wholly on the self, not others (Raine & Uh, 2018). Lastly is pathological selfishness, which is the most damaging, as others are harmed to gain an advantage of some kind (Raine & Uh, 2018). Pathological selfishness was found to correlate with dark triad traits of psychopathy, Machiavellianism, and narcissism more than the other two types of selfishness (Raine & Uh, 2019), which aligns with descriptions of the dark triad traits as maximising benefits to the self, whilst concurrently causing damage to others (Mertens et al., 2020; Moshagen et al., 2018).

The dark triad consists of three traits. The first is Machiavellianism, marked by manipulative behaviour motivated by self-interest and lack of morals. The second is narcissism, a feeling of superiority and grandiosity, and lastly, psychopathy, marked by antisocial behaviour and lack of empathy (Book et al., 2015; Deutchmann & Sullivan, 2018; Sariyska et al., 2019). The dark triad is frequently noted for selfishness and lack of empathy (Deutchmann & Sullivan, 2018; Dinic et al., 2023; Kaufmann et al., 2019; Wai & Tiliopolous, 2012), and those higher in dark triad traits eat more meat (Mertens et al., 2020; Palnau et al., 2022; Sariyska et al., 2019). This suggests that pathological selfishness is the one out of the three types of selfishness most likely to be associated with the most meat consumption.

Self-centredness relates to selfishness and omnivores, and those who agree with the view that meat eating is socially normal as well as natural, were found to have higher ratings on self-centredness than vegetarians, as well as having more self-focussed values (Hopwood, Rosenfeld, Chen, & Bleirdon, 2021; Hopwood, Piazza, Chen, & Bleidorn, 2021). Choices based on self-enhancement or those defined as egoistic (those derived primarily for the

person making the decision), such as taste, familiarity, price, convenience, and health, are associated with higher meat consumption (Graham & Abrahamse, 2017; Malek & Umberger, 2021). Purposefully ignoring how meat causes harm was also designated as selfish behaviour (Onwezen & van der Weele, 2016). Although not measuring psychological selfishness directly, this research supports that it would be related to higher meat consumption, as does the negative correlation between psychological selfishness and empathy (Raine & Uh, 2019). Since higher empathy accompanies lower meat consumption, and selfishness is negatively correlated with empathy, it was plausible to expect selfishness to be associated with higher meat consumption.

Another area that has attracted abundant research is what motivates consumers to reduce meat consumption. However, there is minimal research to guide how animal-oriented empathy and selfishness may influence motivation to reduce animal product consumption. The following section outlines studies that explored the three most common motivations to reduce animal product consumption that may inform the research in this thesis.

Motivation

Research has examined motivation to reduce meat consumption to determine what will be the most effective in prompting behaviour change and thereby finding ways to increase the chances of achieving a reduction in animal product consumption. The literature suggests animal welfare/rights, the environment, or health are the main motivators (Hopwood et al., 2020; McCormick, 2019; Mathur et al., 2021) and that matching the motivation to the individual's dietary category will have the most impact (De Backer & Hudders, 2014; Hopwood et al., 2020; Malek et al., 2019) on behaviour change, but it is uncertain whether particular personality factors are associated more with specific motivations than others. It has been suggested directly and indirectly that health is a more selfish motivation (Fox & Ward, 2008; Malek & Umberger, 2021) as it is self rather than other-focussed.

The motivations to reduce animal product consumption most frequently mentioned in the literature are animal (ethics/welfare concerns), health, and the environment (Bryant, 2019; Hopwood et al., 2020; Hopwood et al., 2021a; Janssen et al., 2016; Malek et al., 2019; Mathur et al., 2021; Rosenfeld, 2018; Schenk et al., 2018). As with empathy being higher in lower meat consumption groups, the different dietary groups vary on what is most motivating for the reduction of meat consumption. Health is a motivator to all groups but is frequently rated most highly by omnivores and reducers of different kinds (flexitarians, semi-vegetarians), whereas meat abstainers more often chose animal rights (De Backer & Hudders, 2014; Hopwood et al., 2020; Lehikonen & Salonen, 2019; Malek et al., 2019; Neff et al., 2018; Verain et al., 2022). As with empathy, vegans come out with different profiles to all other groups on motivations to reduce meat consumption.

A consistent finding in the literature is that those who do not consume any animal products (vegans) select animal reasons as a motivator for their reduction in animal product consumption more frequently than omnivores and any other group, including vegetarians (Kessler et al., 2016). Animal-related motivations include concern or care for the welfare and rights of animals, an ethical stance rejecting the exploitation of animals for our purposes. Vegans were found to have an especially high rate of being animal rights proponents, such that it was a "defining characteristic of vegans," independent of the length of time being a vegan (Lund et al., 2016) as well as possess what are classified as higher moral and prosocial motivations (Holler et al., 2021; Lund et al., 2016; Janssen et al., 2016; Kessler et al., 2016; McCormick, 2019; Rosenfeld, 2019).

Those with the most empathy also happen to be the group that endorse animal motives more frequently than other dietary groups, so it could be argued that animal motivation for reducing animal product consumption is more associated with empathy than health or the environment. Effectively, a focus on others – animals. In contrast, considering selfishness is a

focus on gaining advantages to the self, it is feasible that health is a more selfish motivation than animal and environment. However, there is minimal research on motivation to reduce meat consumption in relation to personality (Hopwood et al., 2021). Some studies suggest that selfishness and empathy relate to motivations, but no research directly measures them against motivations. Vegetarians who chose their diet for personal reasons, such as health rather than concern for animals, were described as making a selfish choice (Fox & Ward, 2008). Health motivation is considered egoistic and a personal reason, which is described as selfish in some studies as it concerns the self, not others (De Backer & Hudders, 2014; Malek & Umberger, 2021). Lai et al. (2020) implicated health concerns as a selfish motivation that affected meat consumption.

Moving to what could be considered the next step from motivation in the process to reducing animal product consumption is willingness. Motivation is purported to precede willingness (Seffen & Dohle, 2023) and considering those who eat animals versus those who do not vary on how much empathy and selfishness they have, it was thought possible that different types of selfishness would influence willingness differently, as would animal empathy. The studies leading to these hypotheses are outlined in the next section.

Willingness to Reduce Animal Product Consumption

Understanding the psychological mechanisms that explain why some people are willing to reduce animal product consumption whilst others are reluctant could help contribute to finding ways to increase the likelihood of behaviour change (de Boer et al., 2017; Wolstenholme et al., 2021). Certain factors can increase or decrease willingness, and demographics, personality, and motivation are factors known to impact willingness to reduce meat consumption differentially (Harguess et al., 2020). There is a wide variation in willingness to reduce meat consumption rates and types of studies, not just because they are

carried out in different countries but also because of the methodology, for example, in how willingness is measured or only red meat.

Ranging from 11% (Hielkema & Lund, 2021) to around 50% of consumers (Graça et al., 2015; Leiserowitz et al., 2020; Szczebylo et al., 2022) are willing to reduce their meat consumption. Most meat consumers were found to be unwilling to reduce their meat consumption (Hartmann and Siegrist, Hoek et al., 2017; Macdiarmid et al., 2016; May & Kumar, 2022; 2017; Niva et al., 2014; Sanchez-Sabate and Sabate, 2019). A large portion who had not already reduced their meat consumption stated they were not willing, or planning to, reduce the frequency of consumption and serving size of meat intake to less than twice a week (Niva et al., 2014). The country where this research was undertaken, Australia, is less willing to reduce meat consumption or eat alternatives compared to the UK and China (Ford et al., 2023. Most were not willing (46%), 22% were willing, 15% were intending to stop eating meat, and 17% were undecided (Malek et al., 2019). This could be explained by willingness to reduce meat consumption being lower with higher meat consumption (Graça et al., 2015; Roozen & Raedts, 2023; Szczebylo et al., 2022). It could be attributed to Australia having one of the highest levels of meat consumption worldwide (Marinova & Bogueuva, 2019) with Australians embracing eating meat as part of their own, and the country's national, identity (Rodan & Mummery, 2019).

Although people indicate a willingness to reduce meat consumption, it does not necessarily lead to an actual reduction (Cheah et al., 2020), but there is a paucity of data about whether animal-oriented empathy and selfishness impact willingness to reduce meat consumption. Empathy was expected to be higher in those more willing to reduce meat consumption because empathy is associated with lower meat consumption, as described above. Different manipulations which gave visual reminders of the origins of meat, such as leaving the head of an animal on a roast compared to one without the head, showing live

animals in meat advertisements, and descriptions, “killing’’ and “slaughter” as opposed to “harvesting”, and using cow or pig rather than beef or pork, led to more empathy and less willingness to eat the meat (Kunst & Hohle, 2016). Additionally, when disgust increased, so did empathy, with subsequently less willingness to eat a meat option (Earle et al., 2019; Kunst & Haugestad, 2018). The cuter an animal is perceived also increased empathy towards the animal, thereby reducing the willingness to eat them (Zickfield et al., 2018). These studies primarily examined willingness to reduce meat consumption in the specific circumstances of those studies, they did not measure commitment to reduce meat consumption on an ongoing basis.

The evidence of how selfishness may influence willingness to reduce meat consumption comes from similar sources as those relating to selfishness and meat consumption. As greater meat consumption is accompanied by lower willingness and those with dark traits eat more meat (Mertens et al., 2020), it would be expected that selfishness would be higher in those with lower willingness to reduce meat consumption. This was borne out in the study by Palnau et al. (2022), where the most unwilling to minimise meat consumption had the highest dark triad traits.

Motivation and Willingness.

Literature examining motivation and willingness to reduce meat consumption is limited but Harguess et al. (2020) found intention, which is correlated with willingness, was influenced by concerns about health, the environment, and animal welfare. Awareness of the connection of meat consumption with climate change and social connection with others who had reduced or given up meat consumption were drivers of intentions to reduce meat consumption (Hielkema & Lund, 2021), while in another study, higher willingness to reduce meat consumption was associated with animal welfare reasons but not environmental of health concerns (Roozen & Raedts, 2023). It is unclear from the extant research which

motivations are more likely to lead to willingness, so the current study aimed to add to the literature. In this research, how the three motivations relate to willingness to reduce meat consumption (or what motivated them if they had already reduced) was of interest.

The remaining section of the literature review relates to sociodemographic factors that may intersect with the other constructs influencing animal product consumption and reduction, one with substantial previous research, gender, and the other with minimal, religion.

Gender

Research has established a relationship between meat consumption and gender. Males consume more meat than females, and the most feasible explanation is the strong association that eating animals has with masculinity (Rosenfeld, 2023; Rothberger, 2013; Ruby & Heine, 2011). Masculinity is associated with dominance and strength and is perceived as being related to being a "real man", and expressing masculinity through eating red meat is perceived as masculine, whilst not eating it is perceived as feminine (Love & Sulowski, 2018; Rosenfeld, 2023; Salmen & Dhont, 2023; Sobal, 2005; Stanley et al., 2023; Stone, 2022; Sumpter, 2015). Females are also generally found to be more willing to reduce their meat consumption (Rosenfeld, 2023), have higher levels of animal-oriented empathy (Camilleri et al., 2020), and have lower levels of selfishness (Raine & Uh, 2019). Although links between gender and these variables are established, based on scrutiny of the literature, it is uncertain whether gender influences the three primary motivators due to a dearth of research.

In the country of focus here, Australia, there is a strong meat culture (Rodan & Mummery, 2019), with many social events centred on grilling meats on a barbecue (most often described as a 'barbie'). This strong meat culture has been entwined with the socialisation of men to believe their masculinity is expressed through their love of meat, by cooking meat on the 'barbie' and eating larger quantities than females. However, there seems

to be an emergence of different masculinities, particularly in younger men (Carroll et al., 2019), which may reduce those who identify as male linking their masculinity with the consumption of meat.

Males have been found to have higher meat consumption, selfishness, and lower empathy (Love & Sulikowski, 2018; Raine & Uh, 2019; Soutschek et al., 2017; Zickfield et al., 2018). As higher empathy is associated with lower meat consumption (Holler et al., 2021), and empathy is negatively correlated with selfishness, it was expected that selfishness would be higher in males and they would eat more meat. While there is research examining empathy, meat consumption and gender, gender has not been explored in relation to other variables that may contribute to understanding meat reduction. Nor were any previous studies that examined gender in relation to selfishness or combined these variables with motivation to reduce animal product consumption. This research is anticipated to further inform the meat-masculinity connection.

Looking into gender influence in meat consumption and animal product reduction was not only due to the impact of gender on several variables analysed here but also to achieve more accurate results by separating them for statistical analysis. It is considered necessary to analyse genders separately in circumstances where there are known gender differences so as not to confound the results (Shapiro et al., 2021). This prevents seeing an overall relationship that may only apply to one gender. Combining females and males could lead to misguided conclusions, such as certain levels of psychological factors being reported as related to meat consumption rather than gender.

Another variable that has limited analysis in relation to meat consumption and reduction is religion, specifically whether individuals who have a religion differ from those who are non-religious or atheist.

Religion

Religion continues to be a part of Australian society, with 62.2% of the 93.1% who answered the ABS 2021 census having a religion and 39.9% indicating they have no religion (Australian Bureau of Statistics [ABS], 2022). Considering many religions have guidelines about what their followers can and cannot eat, and religious reasons are sometimes used to justify meat consumption (Piazza et al., 2015) as well as a motivation for being vegetarian (Plante et al., 2019), it is a relevant variable to consider with respect to meat consumption and reduction. Christianity is the main religion in Australia (43.9%) (ABS, 2022), and countries with the most Christians had higher meat consumption compared to those with the most Hindus or Buddhists (Vranken et al., 2014). Whether having a religion versus not leads to higher meat consumption was of interest here, and few studies were available to inform this question.

Although not having set rules for consumption, Christianity has influenced believers to rationalise their meat consumption based on passages in the bible about dominion over animals (Mclaughlin, 2017). 'Dominion' has frequently been used by both the religious and the non-religious to justify the use of animals for our benefit and has fortified an anthropocentric view of humans as being more important in a hierarchy of beings (Kopnina et al., 2018; Mclaughlin, 2017; Linzey, 2016; Nir, 2020).

The high numbers of non-religious people and vegans in the North American animal rights movement compared with the general community, as well as the atheists and vegans giving more animal reasons to be vegan than the religious, led Wrenn (2019) to suggest that religion may be associated with higher animal product consumption. In contrast, the atheist community were commonly hostile towards vegans (Wrenn, 2019).

There is a lack of research to inform the links between gender, religion, selfishness, and meat consumption. The religion-prosociality hypothesis is relevant to the discussion of

religion and animal product consumption as reducing it is designated in this thesis as a PSB. Analysis of the literature revealed there is support for and against the argument that being religious leads to more behaviour that helps others (Reddish & Tong, 2023; Arli & Perketi, 2017; Guo et al., 2018; Karataş & Gürhan-Canli, 2020). The limited research that examined one of the constructs that relate to PSB, selfishness, against religion found no concrete results suggesting that being religious is associated with being more or less selfish than the non-religious (Arli & Tjiponto, 2014; Arli & Tjiponto, 2022; Galen et al., 2022). In relation to gender, one study was accessed which showed men used religion more often than women to justify meat consumption (Rothberger, 2013).

A novel angle is taken here by investigating whether having a religion has a different profile with respect to selfishness and meat consumption compared to those who are not religious. Since gender is known to vary according to meat consumption and selfishness, it was also measured to see if it interacted with religion to influence meat consumption levels.

Conclusion

The research aimed to expand the knowledge around what elements of human psychology contribute to animal product consumption and reduction, as this has been shown to be relevant to finding what might influence its reduction. Due to the lack of literature and the importance of several of the constructs to society, it is suggested that more research is required. This thesis aims to not only add to the current body of research but also to address the lack of knowledge regarding constructs of significance in society that potentially influence animal product consumption and reduction.

Research to achieve these aims included determining whether selfishness is related to meat consumption, three main motivations for reducing consumption of animal products, the willingness to reduce animal product consumption, gender, and religion, which has not been done before. Information will be added to the area of animal-oriented empathy and meat

consumption and whether it also has some association with motivations, willingness, and gender. The research is anticipated to be significant in contributing to the body of knowledge in this area and add to the larger goal of reducing the consumption of animals for the benefit of animals, the environment, and our health.

CHAPTER 3: THE ASSOCIATION BETWEEN SELFISHNESS, ANIMAL-ORIENTED EMPATHY, THREE MEAT REDUCTION MOTIVATIONS (ANIMAL, HEALTH, AND ENVIRONMENT), GENDER, AND MEAT CONSUMPTION

Introduction

The first journal article examined research questions one and two, which measured the associations between meat consumption and the psychological factors of selfishness and animal-oriented empathy. It also explored whether the three main motivations to reduce animal product consumption were related to the psychological factors and meat consumption. Gender differences were of interest so separate analysis for each gender was carried out. It was accepted for publication in Food Ethics in October 2023 and published on 13 November, 2023. The paper is cited as:

Dillon-Murray, A., Ward, A., & Soar, J. (2023). The Association Between Selfishness, Animal-Oriented Empathy, Three Meat Reduction Motivations (Animal, Health, and Environment), Gender, and Meat Consumption. *Food Ethics, 9*(1), 1. https://doi.org/10.1007/s41055-023-00135-5

Appendix A includes all the relevant study materials, such as the survey used for the research presented as participants viewed it. These materials apply to all three articles, but each used different variables. The journal article is presented as published in *Food Ethics*.

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RESEARCH ARTICLE

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

Angela Dillon-Murray [1] [8] • **Aletha Ward** [2] [8] • **Jeffrey Soar** [1] [8]

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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

18'1 Angela Dillon-Murray
angela.dillon-murray@usq.edu.au

Aletha Ward
Aletha.Ward@usq.edu.au

Jeffrey Soar
Jeffrey.soe.r@usq.edu.au

School of Business, University of Southern Queensland, Springfield Education City, 37 Sinnathamby Blvd, Springfield Central, QLD 4300, Australia

School of Nursing and Midwifery, University of Southern Queensland, Springfield Central, Australia

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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 uggested 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 Egloff2020); 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. 201O; 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 constrnct 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 bow 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 agriculrure on climate change (Macdiarmid et al. 2016; Sanchez-Sabate and Sabate 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 narural 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; Dinic 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; Lehikoinen 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 Rudders 2014; Hopwood et al. 2020; Lehikoinen 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 dietru·y 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 bas 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 Rudders 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; Rotbgerber 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 (Cbristov-Moore et al. 2014; Loffier and Greitemeyer 2023). Lower empathy in men potentially explains why men eat more meat (Gra¥a 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 (Grafa 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 Egloff2020; Turnes et al. 2023; Vandermoere et al. 2019).

Methods

Participants and Procedure

Participants were recruited via Zoho for an online smvey in August 2022 to obtain a representative of the Australian population; Zoho pays participants for smvey 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 (Mage = 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 measmement and other errors, smveys that bad 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 (*a*= 0.80).

Selfishness

Selfishness was measmed by the Selfishness Questionnaire (SQ) (Raine and Uh 2019). It has 24 items in the form of Likert scales rating scores from O 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 const:rnct 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 (a= 0.92).

Motivation

The Veg*n Eating Motives Inventory (VEMJ) (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 bas 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 (a= 0.92 and *a*= 0.93, respectively) and good for Health *(a* =0.89).

Meat Consumption

A Food Frequency Questionnaire (FFQ) (Faunalytics 2021) was chosen to measme 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 (*a* = 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 (X2), comparative fit index (CFI), Tucker-Lewis Index (1LI), and root mean square error of approximation (RMSEA). Values of 0.90 on CF1 and TFI indicate acceptable fit, and0.95 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 I-tests for meat consumption, empathy, selfishness, and the three motivation scales are displayed in Table **1**.

The I-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, selfish-11ei;s, and motivations

	Female		Male		t-value (df=495	p-value	Total	
	M	SD	M	SD		p	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	470	1.58	-0.47	<0.001	4.46	159

Table2 Correlations of the variables for females (*N* = 247)

Females		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	O.G!	0.14*	0.32**	0.54**	

*p<.OS,**p < .01

Table3 Correlations of the variables in the structural equatio□ model for males (*N* = 250)

Males		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 < .OS, **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: x2 (5) = 17.23, CF1=0.98, TLl=0.925, RMSEA=0.07 and is shown in Fig. l.

A positive association between total selfishness on the SQ (selfishness) and total consumption of meat products (meat) was found (P=0.37,p< .001), and a significant negative association between total AES scores (empathy) and meat (P = -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: P= 0.49, p< .001; environmental: p = 0.95, p< .001; health: P = 0.37, p= .001. AES scores and motivations: animal: P = 0.42, p <.001; environmental: p = 0.14, p =.035; health: p= 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.

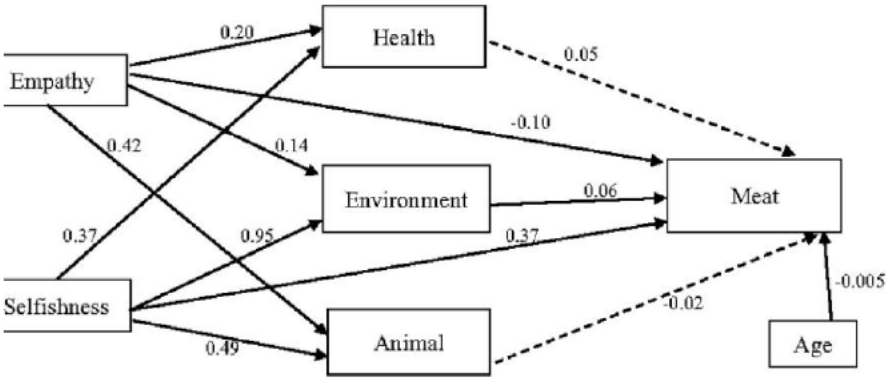

Fig. 1 The effect of selfishness and empathy on health, environment, animal motivations, and meat consumption. The dotted line indicates a non-significant association. For ease of interpretation error terms and covariances are nol shown

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

As males and females were found to differ on several variables on the t-tests, a multigroup analysis was carried out, with gender as the grouping variable. The model showed a strong fit to the data ,r2 (10) = 22.723, CFI =0.981, TI.I=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.

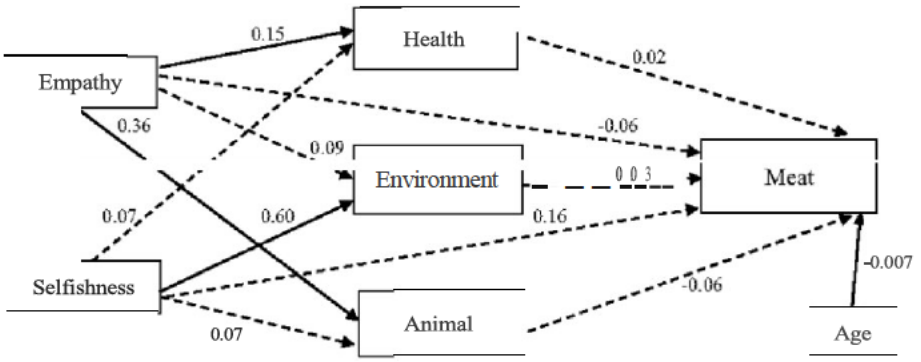

Fig. 2 SEM model for female sample: The effect of selfishness and empathy on health, environment, and animal motivations and meat consumption. The dotted line indicates a non-significant association. For ease of interpretation error terms and covariances are not sbown

Females

The female sample had no association between SQ or AES scores and meat consumption (P = 0.16, p=.106; P = -0.06, p=.097, respectively). Associations were found between the AES scores and both animal (P = 0.36, $p < .001$) and health motivations scores (P = 0.15, $p = .034$). However, environmental motivation showed no significant relationship (P = 0.09, p=.276) with *AES* scores, but it did with the SQ (P = 0.6, p<.014). The other two motivations had no association with SQ scores (animal: P = 0.07, p=.701; health: P = 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 (P = -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 (P = 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 (P = -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: p = 0.49, p<.001; environmental: p = *0.22*,*p*= .036; health: P = 0.30, $p < .001$. Similarly, selfishness, as represented by SQ scores, was also positively associated with all motivations: animal: p = 0.74, $p < .001$; environmental: p = 1.08, *p<.001;* health: p = 051, *p<.001.* However, there was no significant association between any motivation and total meat product consumption, animal: P = 0.03, $p = .608$;

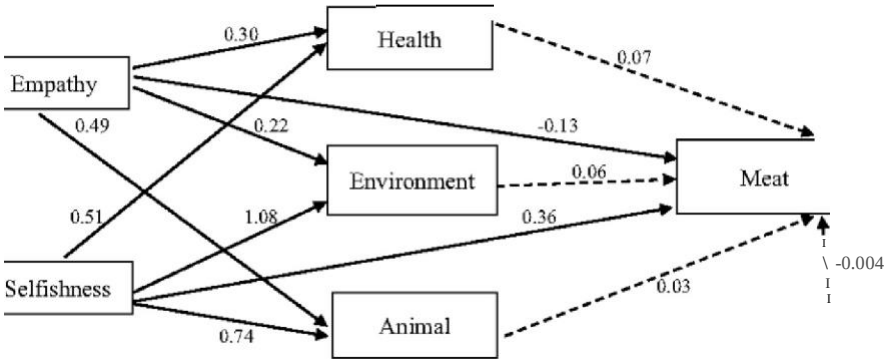

Fig. 3 SEM model for male sample: The effect of selfishness and empathy on health, environment, and animal motivations and meat consumption. The dotted line indicates a non-significant association. For ease of interpretation error terms and covariances are not shown

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

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, Hl 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 bad 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 (Grap 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; Graya 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., Graya 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 (Grn;a 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 (Gomez-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 (Gomez-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 ah-eady 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 Kleinhlickelkotten 2018; Zur and Kkickner 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 Sabate 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 Grietemeyer, 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.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s41055-023-00135-5.

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Author contributions Angela Dillon-Murray: Conceptualisation, Methodology, Data curation, Writing-Original draft preparation, Visualisation, Investigation, Project administration, Writing- Reviewing and Editing. Jefffrey Soar and Aletha Ward: Conceptualisation, Writing- Reviewing and Editing.

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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 Unive.sity of Southern Queensland Human Research Ethics Committee (reference number: H22REA128).

Consent *to* participate and *to* publish Informed consent wa;; obtained &om all individual participants included in the study to participate and fur the results to be published.

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

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Links and Implications

It can be concluded from this paper that psychological selfishness and animal-oriented empathy do have a part to play in meat consumption but only for males, thus highlighting a gender aspect to meat consumption which is consistent with previous studies. For males the more selfishness and lower empathy reported, the higher the meat consumption. Gender differences were also found in relation to motivations to reduce meat consumption, with selfishness and empathy influencing all motivations positively for males. For females health and animal motivations were positively associated and for selfishness the environmental motivation.

It is hypothesised that the next step on the path of meat reduction is from motivation to willingness to reduce meat consumption, which is the focus of the next study. Determining whether the three different motivations, as well as empathy and selfishness, have an impact on willingness to reduce consumption builds on the first article. Article two adds to the previous one by investigating willingness but it uses the variables from article one with one difference, the three subtypes of selfishness are examined – adaptive, egoistic, and pathological.

CHAPTER 4: WILLINGNESS TO REDUCE ANIMAL PRODUCT CONSUMPTION: EXPLORING THE ROLE OF ENVIRONMENTAL, ANIMAL, AND HEALTH MOTIVATIONS, SELFISHNESS, AND ANIMAL-ORIENTED EMPATHY

Introduction

The second article related to research question three and focused on the willingness to reduce animal product consumption, which is considered the next step in lowering animal products after motivation. The factors measured in article one were also used, but instead of total selfishness, all three subtypes were examined to determine if they differed in their influence on willingness. Animal, health, and environmental motivations were also measured to determine if particular motivations were more likely to lead to willingness to reduce animal product consumption than others. As with article one, the materials utilised in article two are found in Appendix A. The question on willingness was utilised here but not in article one as it was not related to research questions one and two. As articles one and two used the same data, Appendix B is an additional document submitted to *Food Ethics* clarifying the differences. They answered different questions by utilising different variables and statistical analyses. Article two is presented in the format as submitted to the journal *Food Ethics*, where it is under review.

Paper under review:

Abstract

Increasing the willingness to reduce animal product consumption has the potential to contribute to ameliorating the impact of animal agriculture on the environment, as well as foster healthier diets and improve the lives of farmed and wild animals. Reduction of animal product consumption is a prosocial behaviour (PSB), and factors that are considered to influence it are empathy and selfishness. In this research, animal-oriented empathy examined empathy specifically for animals. Animal oriented empathy and three types of selfishness: adaptive, egoistic, and pathological were measured to determine if they could predict willingness to reduce animal product consumption. PSB is also influenced by motivations and motivations can lead to willingness. The three most common motivations to reduce animal product consumption: animal welfare, the environment, and health were examined to determine whether they predict willingness. A sample of 492 Australian adults completed questionnaires via the Zoho survey platform, and the data underwent a hierarchical regression. Higher pathological selfishness predicted a greater willingness to reduce animal product consumption, as did environmental and animal welfare motivations. Higher health motivation however predicted a lower willingness to reduce animal product consumption. Interpretation of the perplexing results in relation to pathological selfishness suggested further research. The practical value of utilising environmental and animal motivations to increase willingness to reduce animal products, whilst bringing attention to the health issues was also discussed.

1. Introduction

There is overwhelming evidence about the catastrophic consequences of global warming and the significant contribution of animal agriculture in perpetuating climate change and environmental degradation (Masson-Delmotte et al., 2022; Shukla et al., 2019; Tufford

et al., 2023). As knowledge of the negative impacts of animal agriculture increases, there has been a rise in interest in plant-based diets and the reduction of meat consumption (Alae-Carew et al., 2021; Alcorta et al., 2021; Clem, 2021; Grassian, 2020). Environmental devastation is a worldwide issue, both practical and ethical, as is the cruelty and exploitation of animals inherent in animal agriculture (Bryant, 2019; Gullone, 2017; Hannan, 2022; Pluhar, 2010). Evidence that meat consumption, mainly red and processed meats, harms health is another consideration driving an increase in willingness to reduce animal product consumption and interest in plant-based diets (Camilleri et al., 2020; Boada et al., 2016).

Awareness of the damage of animal agriculture to the climate, animals, and health is not yet sufficient to convince consumers to become more willing to reduce or abstain from eating meat or animal products as the majority are found to be unwilling (Hartmann & Siegrist, 2017; Hoek et al., 2017; May & Kumar, 2022; Macdiarmid et al., 2016; Sanchez-Sabate & Sabate 2019; Valli et al., 2022). This lack of willingness to decrease consumption is reflected in the increase in meat consumption worldwide over the last 60 years, the current high levels of meat consumption, and the low level of animal product abstainers in the population (Godfray et al., 2018; Graça et al., 2015; Malek et al., 2019; Marinova & Bogueva, 2019; Sans & Combris, 2015).

Rates of willingness vary widely according to the country where measures were taken, and the kinds of variables and questions used. Around half of the sample from the United States of America indicated they are willing to eat less red meat and more plant-based meat alternatives (Leiserowitz et al., 2020). Other research showed a rate of 11.5% of Danes (Hielkema & Lund, 2021), 48.5% of Portuguese (Graça et al., 2015), and 41% of Polish participants (Szczebylo et al., 2022) were willing to reduce meat consumption. The country where this research was undertaken, Australia, is the least willing to reduce meat consumption or eat alternatives compared to the UK and China (Ford et al., 2023). Most are

not willing (46%) (Malek et al., 2019), with 22% indicating a willingness to reduce meat consumption (Malek et al., 2019). All the research accessed covered willingness to reduce meat consumption; no studies that examined all animal products could be found.

Determining what factors contribute to willingness to reduce animal product consumption could lead to finding mechanisms to achieve a reduction in the consumption of animals and their by-products (de Boer et al., 2017; Harguess et al., 2020; Pfeiler & Egloff, 2018; Ruby, 2012; Wolstenholme et al., 2021). Willingness varies according to demographics, personality, and motivation (Harguess et al., 2020). Willingness is a part of the process of behaviour change and can predict meat reduction (Seffen & Dohle, 2023). Thus, it can be considered a precursor to reducing meat consumption. As meat reduction is a prosocial behaviour (PSB) (Klein et al., 2022), and willingness is a component in the process of meat reduction; it is conceivable that willingness is an influence in PSB.

Prosocial behaviour is usually defined as behaviour that serves to benefit others (van Kleef & Lelieveld, 2022) and empathy and selfishness are both implicated in PSB (Crocker et al., 2017; Graves & Roelich, 2021; Klein et al., 2022). PSB is considered to have been crucial to our survival and evolution, potentially explaining our success more than selfish actions (Crocker et al., 2017; Sonne & Gash, 2018), and it continues to be significant to humanity, as are empathy and selfishness. Since empathy and selfishness influence PSB (e.g. Crocker et al., 2017), it was thought they would likely influence the PSB of not eating animals and products taken or derived from them as well as the willingness to reduce animal product consumption. Also, both have been found to be associated with meat consumption (Holler et al., 2022; Dillon-Murray et al., 2023), so it was postulated that they could also relate to willingness to reduce animal product consumption.

It would be expected that higher levels of empathy would be more likely to lead to PSB than higher selfishness since empathy is other-focussed and selfishness is self-focussed

(Decety & Norman, 2015; Mestre et al., 2019), and they are negatively correlated (Raine & Uh, 2018). This is supported by research that found a positive connection between empathy and PSB (Telle & Pfister, 2015) and a negative relationship between self-centredness and prosocial motives (Hopwood et al., 2021). Prosocial motives are those that drive prosocial behaviour for which the benefit of others is the primary aim (van Kleef & Lelieveld, 2022). Both motivation and willingness are suggested as being part of the process leading to meat reduction (Harguess et al., 2020; Seffan & Dohle, 2023), a PSB, but there is limited research examining whether there is a link between the two constructs in animal product consumption. The current research aims to redress this lack of evidence.

Therefore, in addition to whether empathy and selfishness lead to willingness to reduce animal product consumption, this research proposed to examine whether the three motivations for meat reduction (environmental, animal welfare, and health) also influence willingness to reduce consumption of animal products, both meat and non-meat.

1.1 Animal-Oriented Empathy

The lowest animal product consumption is found in those with the highest empathy Camilleri et al., 2020; Holler et al., 2021; Niemyjska et al.,2018; Zickfield et al., 2018). Vegans who do not consume animal products have higher empathy than all other dietary groups (Kessler et al., 2016; Rothberger, 2015), not just with self-reported empathy but with measures of brain activity (Fillipi et al., 2010). They have demonstrated a willingness to reduce animal product consumption by having already enacted the PSB of not consuming them. As vegans have higher levels of empathy than all other dietary groups, it can be argued that willingness is associated with higher levels of empathy. In this case animal-oriented empathy is of interest in this research since it relates to behaviour that affects animals and is different from human-oriented empathy (Paul, 2000; Apostol et al., 2013).

Although there is minimal research that has measured general willingness to reduce animal product consumption against empathy, there are several studies that show willingness not to eat meat that was presented in a specific way compared to another presentation is related to empathy (Earle et al., 2017; Harguess et al., 2020; Kunst & Haugestad, 2018; Kunst & Hohle, 2016). For example, showing pictures of a meat product with a picture of the animal which the meat came from versus those with just the meat without the animal's picture resulted in higher levels of empathy and less willingness to eat the meat presented in the image (Kunst & Hohle, 2016). There were none found in the literature that examined selfishness and willingness to reduce animal product consumption.

1.2 Selfishness

Although selfishness is considered important in human society, this is not reflected in the level of research investigating selfishness as a personality trait or psychological construct (Carlson et al., 2022; Diebels et al., 2018; Raine & Uh, 2018). More has been carried out measuring behavioural selfishness, commonly in economic games, where subjects choose to allocate money to strangers or keep it for themselves (Raine & Uh, 2019). Carlson et al. (2022) defined psychological selfishness as perceiving a situation where there is a desire to benefit the self that ignores others' wishes and goes against social expectations. To assist in addressing the dearth of research, a direct and standardised measure of selfishness as a psychological construct was developed, the Selfishness Questionnaire (SQ) (Raine & Uh, 2019), which partitioned selfishness into three types, which also corresponded to different levels depending on how damaging they are to others. Adaptive selfishness is the least damaging to others, where the benefit to the self is the priority, but others may also reap advantages, such as close friends and family (Raine & Uh, 2019). With egocentric selfishness, the attention is wholly on the self without concern for others and pathological

selfishness is described as the most damaging and is where others are harmed to gain an advantage to the selfish person (Raine & Uh, 2019).

No research could be found examining psychological selfishness against willingness to reduce animal product consumption, so extrapolating levels of selfishness from studies of related constructs aided in determining the possible relationship. Studies revealed self-interest played a part in not limiting meat consumption (Malek & Umberger, 2021; Waldman et al., 2023), and omnivores were more self-centred (Hopwood et al., 2021). The 'dark triad' (Deutchmann & Sullivan, 2018) is associated with higher levels of meat consumption and a lower likelihood of reducing meat consumption (Palnau et al., 2022; Sariyska et al., 2019). The dark triad is a combination of the related traits of psychopathy, Machiavellianism, and narcissism. Psychopathy describes antisocial tendencies with a lack of remorse, Machiavellianism is characterised by a lack of morality and manipulation of others for personal gain, and narcissism by grandiosity and a sense of superiority and entitlement (Book et al., 2015; Deutchmann & Sullivan, 2018).

Dark triad traits are characterised by selfishness and a lack of empathy (Deutchmann & Sullivan, 2018; Dinić et al., 2023; Wai & Tiliopolous, 2012) and the definition of dark traits as maximising advantages to the self whilst causing damage to others (Mertens et al., 2020; Moshagen et al., 2018) aligns with the definition of pathological selfishness (Raine & Uh, 2018). Pathological selfishness was associated with higher dark traits than egoistic and adaptive selfishness (Raine & Uh, 2018). Based on those high in dark triad traits being less likely to reduce meat consumption (Palnau et al., 2022), it can be extrapolated that pathological selfishness would be associated with less willingness to reduce meat and non-meat animal products.

The research outlined on the dark triad and the other constructs related to selfishness and meat reduction indicates that selfishness may be associated with a lower willingness to

reduce meat consumption. As empathy and selfishness are negatively correlated (Raine & Uh, 2019) and empathy has a positive relationship with willingness, selfishness is likely to be associated with less willingness. Empathy and selfishness are related to animal, environmental, and health motivations to reduce animal product consumption (Dillon-Murray et al., 2023). However, whether the motivations influence willingness is underdetermined, the second factor to be explored in this study.

1.2 Motivations

Prosocial behaviour is influenced by prosocial motivations (Aydinli et al., 2014), and since meat reduction can be defined as a type of PSB (Klein et al., 2022), it could be extrapolated that prosocial motivations lead to meat reduction. Motivations influence intentions to reduce meat consumption (Zur & Klöckner, 2014) and as willingness and intention are related (Pomery et al., 2009; Seffan and Dohle, 2023), it would be expected that motivations would also influence willingness to reduce meat consumption. Although the motivations to reduce animal product consumption have been investigated in relation to differences between dietary groups and level of meat consumption, there is meagre evidence examining it in relation to the willingness to reduce animal product consumption. Understanding which motivations lead to the most willingness to reduce animal product consumption will assist in the overall goal of animal product reduction, as using the most effective motivation would be expected to increase willingness and subsequent animal product reduction.

The three most frequently given motivations to reduce meat consumption are health, animal-related (ethics, welfare), and the environment (Bryant, 2019; Hopwood et al., 2020; Malek et al., 2019; Schenk et al., 2018). However, different dietary groups vary in the type of motivations they find most convincing (Hopwood et al., 2020) and, consequently, which motivation is most effective in increasing willingness to reduce (De Backer & Hudders, 2014;

Malek et al., 2019; Neff et al., 2018). A pattern found repeatedly in the literature is that those who eat the least meat, particularly those who do not eat any (vegans), chose animal welfare reasons as their motivation for reducing meat consumption more frequently than omnivores (Holler et al., 2021; Kessler et al., 2016; Rosenfeld, 2019) and higher meat consumption was accompanied by lower endorsement of animal welfare and environmental motivations (Bryant, 2019; Verain et al., 2022).

Omnivores of different kinds (reducer, flexitarian) are more likely to give health as their highest rated motivation to reduce meat consumption than the groups who abstain from meat consumption (De Backer and Hudders, 2014; Hopwood et al., 2020; Malek et al., 2019; Neff et al., 2018; Verain et al., 2022). However, health can be perceived as both a motivator and a barrier to meat reduction (Sanchez-Sabate & Sabaté, 2019), with the belief that eating meat is healthy (Szczebylo et al., 2022; Malek et al., 2019; Strässner & Hartmann, 2023) counteracting the willingness to reduce.

Based on the results on motivations, it is possible that willingness would follow a similar pattern. Those who have already eliminated all animal products from their diet (vegans) were likely to have been willing because they have also translated it into action. Providing animal motivations as their primary motivator may suggest that animal motivations led to a higher willingness for some people to become vegan. In contrast, based on meat consumption research, it would be expected animal motivations may not provide the same impact on willingness for omnivores, and health would lead to more willingness. This assumption is challenged by a recent study that showed selecting animal welfare reasons for reduction was related to a higher willingness to reduce meat consumption in omnivores, but environmental and health concerns had no effect (Roozen & Raedts, 2023). As there is a lack of research in this area, more is required to determine which motivations have the most impact on willingness to reduce animal product consumption.

1.3 The present study

Although there is research on how meat consumption relates to animal-oriented empathy, there is minimal published research exploring it as a predictor of willingness to reduce animal product consumption. Nor is there any examination of the role the three different types of selfishness play in the willingness to reduce animal product consumption. How the most common motivations to reduce animal product consumption (animal welfare, environmental and health) relate to the willingness to reduce animal consumption is also underexplored. This research is unique by being the first study to measure psychologically defined selfishness against willingness to reduce animal product consumption and measure willingness of non-meat and meat animal products.

Thus, this research aims to narrow the gap in these areas by examining how personality and motivational factors relate to willingness to reduce animal product consumption, thereby adding to knowledge about the most appropriate enablers and barriers to target in meat reduction interventions.

This article uses the same sample and explores some of the same constructs as a previous study (Dillon-Murray et al., 2023) but has a different focus– the willingness to reduce animal product consumption.

This research aims to answer questions about how personality factors and motivations relate to willingness to reduce meat consumption. The hypotheses and their rationales are described as follows:

H1: Higher animal-oriented empathy will be associated with a higher willingness to reduce animal product consumption.

Due to animal-oriented empathy being higher in those who do not consume any animal products, it is postulated that they were more willing to reduce animal product consumption than those who consume the most.

H2: Higher scores on all three types of selfishness will be associated with a lower willingness to reduce meat consumption, with pathological having the lowest, egoistic next, then adaptive the highest.

The three types of selfishness reflect different levels, with pathological being the most selfish as it is the most damaging of all three. Thus, different levels of willingness are expected to be associated with varying levels of selfishness. Empathy and selfishness are negatively correlated, and if empathy is expected to enhance willingness, then selfishness would do the opposite. Also, other related constructs (e.g. self-centredness) and the connection with the dark triad, which is associated with a lack of willingness to reduce (Palnau et al., 2022), have led to this hypothesis. Since being high on dark triad traits suggests a high level of selfishness and dark triad traits are linked with a lower probability of decreasing meat consumption, it could be argued that willingness to reduce animal product consumption would be lower in those with higher selfishness. Also, the link between dark triad traits and pathological selfishness would suggest that pathological selfishness is most likely associated with the least willingness to reduce animal product consumption.

H3: All three motivations will be associated with willingness to reduce animal product consumption. Health will be the highest rated motivation, and animal motivation will be the lowest.

Since the sample is primarily omnivorous, it would be expected that health would be the highest rated based on previous research, and therefore, the motivation most related to willingness to reduce animal product consumption.

2. Methods

2.1. Participants and Procedure

The Zoho survey platform was used to administer an online survey to 526 participants. Zoho allows the selection of a representative sample of the population, in this case, Australians between the ages of 18 and 80. Ethical approval was granted by the University of Southern Queensland Human Research Ethics Committee (reference number H22REA128).

The number of participants responding as non-binary, transgender, and other was too low (n = 8) to use in statistical operations, so these were left out of the sample, as well as those who did not complete their surveys (19). Multivariate outliers were eliminated (using Mahalanobis distance), and the remaining sample was 492. The sample size is less than the previous study using this sample (Dillon-Murray et al., 2023) as both statistical models use slightly different variables and analysis, so there will be some variation in multivariate outliers.

2.2. Measures

2.2.1. Willingness to reduce meat consumption.

Willingness to reduce animal product consumption was measured in a similar method to that reported by Graça et al. (2015) by asking the question: "Please indicate your willingness to reduce your consumption of animal products" with responses on a Likert scale with from 1: Not willing" to 5: "Very Willing." The only difference was the inclusion of an option to say not applicable, "already vegan," as some participants may already not eat any meat.

2.2.2. Empathy

Animal empathy was measured with the 22-item Animal Empathy Scale (AES) (Paul, 2000). 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." Internal consistency for the AES in this sample was rated as good (α = .80).

2.2.3. Selfishness

The Selfishness Questionnaire (SQ) (Raine & Uh, 2019) was used to measure selfishness. It has 24 questions on a Likert scale, rating scores from 0-2 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. This research used a 17-item version of the scale, and internal consistency was excellent (α = .92).

2.2.4. Motivation

The Veg*n Eating Motives Inventory (VEMI) (Hopwood et al., 2020) measured health, environment, and animal rights as motives for vegetarian diets (Hopwood and Bleidorn, 2019). The VEMI has 15 items with 7-point Likert Scales from *Not Important* to *Very Important* with three subscales (Animal, Environment, and Health); each 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."

3. Data Analysis

Descriptive statistics were generated for the categorical and continuous variables. Religion was collapsed into dichotomous variables (no religion = 0; religion = 1). Males and females were coded 0 and 1, respectively. The *Very Willing* rating included those who answered, *Already Vegan*. A power analysis using GPower revealed that the minimum sample size to detect a moderate effect size was 104 participants. As no scores were over .90 and the VIF scores were all below 5, no issues with multicollinearity were found.

IBM SPSS version 29 was used to conduct the statistical analyses.

A hierarchical regression was conducted to test the hypotheses. The predictor variable was the willingness to reduce consumption. The first step included the demographic variables: religion, gender, education, income, and age. Personality variables, including empathy and adaptive, egoistic, and pathological selfishness, were introduced in the second step. The third step added the three motivations: health, environment, and animal.

4. Results

Descriptive data, including demographics and willingness to reduce animal product consumption, are shown in Table 1, and correlations between target, predictor, and control variables were produced and provided in Table 2.

Table 1 Descriptive data (N = 492)

Variable	**(N = 492)**
Age	34.98 (SD = 12.10)
Range	18-79 years
Gender	
Male	248 (50.4%)
Female	244 (49.6%)
Religion	
No	248 (50.4%)
Yes	244 (49.6%)
Education	4.89 (SD = 2.89)
Income(AUD)	2.12 (SD = 0.99)
Willingness	3.29 (SD = 1.36)
1 Not willing	84 (16.9%)
2	49 (9.9%)
3	122 (24.5%)
4	127 (25.6%)
5 Very willing	115 (23.1%)
Personality	
Empathy	5.55 (SD = 1.12)
Adaptive Selfishness	2.00 (SD = 0.52)
Egoistic Selfishness	1.89 (SD = 0.55)
Pathological Selfishness	1.79 (SD = 0.61)
Motivations	
Health	5.56 (SD = 1.22)
Environment	4.50 (SD = 1.57)
Animal	5.16 (SD = 1.32)

Table 2: Correlations of the Predictor, Control and Target Variables (N = 492).

Variable	1	2	3	4	5	6	7	8	9	10	11	12
Willing												
Religion	.24**											
Gender	.10*	.23**										
Education	.29**	.31**	.24**									
Income	.24**	.19**	.28**	.59**								
Age	.02	.22**	-.02	.06	.02							
Empathy	-.08	-.11*	-.18**	-.16**	-.16**	.13**						
Adaptive	.14**	.09*	.19**	.21**	.25**	-.14**	-.28**					
Egoistic	.14**	.09*	.22**	.20**	.23**	-.08	-.36**	.73**				
Path	.27**	.17**	.28**	.30**	.31**	-.13**	-.35**	.79**	.76**			
Health	.17**	.18**	.09*	.13**	.08	.06	.12**	.13**	.04	.10*		
Environ	.63**	.24**	.14**	.30**	.23**	.03	-.02	.21**	.20**	.32**	.40**	
Animal	.43**	.10*	-.01	.10*	.04	.10*	.28**	.05	.04	.09	.51**	.65**

*p<0.05, **p<0.01

The results of the hierarchical regression model of the predictors of willingness to reduce animal product consumption are outlined in Table 3.

Table 3: Hierarchical regression model predicting willingness to reduce animal product consumption.

	Variable	B [95% CI]	β	R^2	ΔR^2	F	ΔF
Step 1				.12		13.09***	
	Religion	.48 [.23, .73]	.18***				
	Gender	-.04 [-.29, .20]	-.02				
	Education	.09 [.04, .14]	.19***				
	Income	.13[-.01, .28]	.10				
	Age	-.004 [-.13, .01]	-.03				
Step 2				.16	.04***	10.18***	5.89***
	Religion	.42 [.17, .67]	.15***				
	Gender	-.13 [-.37, .11]	-.05				
	Education	.07 [.02, .12]	.16**				
	Income	.10 [-.04, .24]	.07				
	Age	-.001 [-.01, .01]	-.01				
	Empathy	.04 [-.07, .15]	.03				
	Adaptive	-.38 [-.75, -.01]	-.15*				
	Egoistic	-.19 [-.52, .14]	-.08				
	Pathological	.82 [.47, 1.17]	.37**				
Step 3				.44	.28***	31.60***	80.70***
	Religion	.25 [.05, .46]	.09*				
	Gender	-.12 [-.31, .09]	-.04				
	Education	.03 [-.01, .07]	.07				
	Income	.08 [-.04, .20]	.06				
	Age	-.002 [-.01, .01]	-.02				
	Empathy	-.081 [-.18, .02]	-.07				

Variable	B [95% CI]	β	R^2	ΔR^2	F	ΔF
Adaptive	-.20 [-.51, .11]	-.08				
Egoistic	-.19 [-.47, .08]	-.08				
Pathological	.34 [.05, .64]	.15*				
Health	-.15 [-.24, -.06]	-.14***				
Environment	.44 [.36, .53]	.51***				
Animal	.17 [.06, .27]	.16**				

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

As seen in Table 3, results showed that for the first regression model, the willingness to reduce animal product consumption, the first step was significant, $F(5,486) = 13.09$, $p < .001$, and the demographic variables accounted for 11.9% of the variance in willingness to reduce animal product consumption. The addition of empathy and the three selfishness variables (adaptive, egoistic, pathological) in step two ($F(4,482) = 10.18$, $p < .001$) significantly improved on the first model ($\Delta R^2 = 0.04$, $p < .001$) and explained 16.0% of the variance.

An additional significant 28.2% of the variance in willingness was explained by introducing motivations to the final step ($\Delta R^2 = 0.28$, $p < .001$). The final model accounted for 44.2% of the variance in willingness to reduce animal product consumption ($R^2 = .44$, $F(3,479) = 31.597$, $p < .001$). This third step revealed religion and higher pathological selfishness predicted a higher willingness to reduce animal product consumption ($\beta = 0.09$, $p< .05$; $\beta = 0.15$, $p< .05$, respectively). Health motivation predicted a lower level of willingness to reduce meat consumption ($\beta = -0.14$ $p< .001$), whilst environmental ($\beta = 0.51$, $p< .001$) and animal motivations ($\beta = 0.16$, $p < .002$ predicted a higher willingness to reduce meat consumption

The results led to rejecting Hypothesis 1 as the relationship between empathy and willingness was not significant, suggesting empathy is not associated with willingness to reduce animal product consumption. Hypothesis 2 was rejected because there was no

significant relationship between adaptive or egoistic selfishness and willingness to reduce animal product consumption. The results went in the opposite direction concerning pathological selfishness; it predicted a higher willingness to reduce animal product consumption. Hypothesis 3 was only partially supported, as although all three motivations significantly predicted willingness to reduce animal product consumption, health was related to a lower willingness. The part of hypothesis 3 that was in the anticipated direction was environmental and animal-related motivations, which were predictors of higher willingness to reduce animal product consumption.

5. Discussion

Results showed that pathological selfishness, and environmental and animal motivations predicted a higher willingness to reduce animal product consumption, whilst health motivation predicted a lower willingness to reduce animal product consumption. Some hypotheses were supported, or partially, others were rejected, such as empathy not being found to be a significant predictor of willingness to reduce animal product consumption.

5.1. Animal-oriented empathy and selfishness

The rejection of the hypothesis that animal-oriented empathy would predict a greater willingness to reduce animal product consumption contrasts with previous research. Although most of the previous research measured willingness in relation to presentations of specific meat samples rather than willingness to change diet overall, the studies that showed vegans are higher in empathy and those that indicated lower empathy is associated with higher levels of meat consumption suggested that empathy would be related to willingness to reduce animal product consumption. Considering vegans have already eliminated all animal products from their diet, this suggests a prior willingness to reduce. As they have already reduced, questions about willingness are moot, hence the question whether they are already vegan being included in the study. The studies that show vegans have the highest empathy also lend

support to the argument that those that are higher in animal-oriented empathy have already reduced their consumption, and so may not have high willingness to reduce any further.

The most unexpected result was that higher pathological selfishness predicted the willingness to reduce consumption whilst adaptive and egoistic selfishness did not. Previous research which found those who are high in selfishness and dark triad traits have higher meat consumption (Dillon-Murray et al., 2023; Sariskya et al., 2019) and less willingness was associated with higher meat consumption, and the dark triad (Palnau et al., 2022) is inconsistent with the present results and the nature of pathological selfishness. Willingness to reduce animal product consumption or endorsing the response would be expected to provide some advantage to those high in pathological selfishness as it is marked by a self-serving attitude where others are harmed for their benefit, not by being prosocially oriented. In this case, no obvious harm to others is revealed. Here it was expected that the harm to others would be indirect through eating animals and their products, as this causes harm to animals through cruelty, exploitation, and displacement of wild animals. It would be anticipated that those high in pathological selfishness would not be concerned about harm to animals and, therefore, would not be willing to reduce for these reasons. Those high in dark triad traits are negative about and towards animals, having engaged in more animal cruelty than the general population (Kavanagh et al., 2013). The advantage to the self may explain the association between willingness and pathological selfishness.

Perhaps understanding the impact for themselves may have prompted the increased willingness of those higher in pathological selfishness. As outlined in the introduction, health issues and climate change are already impacting humanity, and the situation is anticipated to deteriorate. Specific individuals would be more concerned about the impact on themselves than on others. Another alternative could be related to the gap between being willing and actual change (Cheah et al., 2020). Stating you are willing differs from the actual reduction of

animal product consumption. It is feasible that those high on pathological selfishness may be more likely to appear willing without the associated action compared with those lower on the scale. The connection of pathological selfishness with the dark triad may illuminate this concept further.

Those higher in pathological selfishness are also higher in dark triad traits (Raine & Uh, 2019). Deception is another notable characteristic of those with high dark triad traits (Jonason et al., 2014), so whether they are willing to reduce animal product consumption could be questionable. The narcissistic element of the dark triad is associated more with self-deception than intentional lying for advantage, as with psychopathic and Machiavellian traits (Jones & Paulhus, 2017). Thus, endorsing willingness, without any real intention of changing behaviour, could be due to appearing to be doing the right thing for egoistic, self-centred reasons (Kesenheimer & Greitemeyer, 2021). Although the questions were anonymous, those higher in pathological selfishness may have been endorsing higher willingness to appear to be more moral or socially desirable, mainly those persons higher in narcissistic traits of the triad.

Although the pathological selfishness results are challenging to explain, this was not so for motivations. This was more straightforward, with all three motivations providing predictive value in relation to willingness.

5.2. Motivations

This research provides evidence that motivations predict willingness to reduce animal product consumption; two were positive predictors (environment and animal), and one was negative (health). Environmental motivation was the best predictor of willingness to reduce consumption, accounting for 51% of the variance. Awareness of the environmental issues related to meat consumption has increased in recent years (Grummon et al., 2022), which may be reflected in these results. This contrasts with the research where environmental motivations were not as prevalent as consumers were not as aware or accepting of the impact

of animal agriculture on the environment (Macdiarmid et al., 2016; Sanchez-Sabate & Sabaté, 2019).

Animal welfare motivation also predicted increased willingness but at a lower level than environmental motivation. Knowledge of animal welfare has also increased, with Australians indicating a concern with the treatment of farmed animals (Fleming et al., 2020; Futureeye, 2018), which may explain that although most of the sample reported eating animal products, animal motivations did have some impact on willingness.

As there is negligible research with respect to the three motivations and willingness, it is difficult to compare the study to previous research. There was one related study found by Roozen and Raedts (2023), who found no effect on willingness for the environment or health, but animal welfare led to a higher willingness to reduce. The similarity is that animal motivation was connected to willingness but it was not the highest predictor of willingness in the present research. As motivation was predicted to be connected to willingness, it was anticipated that health would have a more significant impact on willingness, given the majority of the sample were omnivores and in previous research have generally been more motivated by health (e.g. Bryant, 2019)

Health motivations predicted significantly less willingness to reduce consumption, indicating that health motivations decrease the willingness to reduce animal product consumption. This contrasts with a significant portion of the literature which reports that omnivores select health as a reason to reduce meat consumption more frequently than environmental and animal reasons (e.g. Hopwood et al., 2020). Health can lead to willingness and work against it. These results suggest animal product consumption is considered as healthy to many consumers, with numerous studies showing many view meat as nutritious and necessary for a healthy diet (Clonan et al., 2015; Collier et al., 2021; Neff et al., 2018; Valli et al., 2019). Like this research, Silva Souza & O'Dwyer (2022) found health was not as

strong an influence on a positive attitude toward animal product reduction as animal rights and the environment.

6. Conclusion and Implications

This study examined the predictive power of personality factors and motivations on willingness to reduce animal product consumption. The combination of factors and the measurement of variables previously not analysed in this context presented a unique perspective on personality, motivation, and willingness to reduce animal product consumption. Analysing willingness to reduce animal product consumption, encompassing meat and non-meat products, expanded on previous research, which mainly measured willingness to reduce meat consumption. It has also forged new ground by using a psychological measure of three types of selfishness. The research showed willingness was higher for participants with a higher level of pathological selfishness and those who endorsed environmental and animal motivations, while health had the opposite relationship.

The implications of these results show that demonstrating how reducing animal product consumption would benefit very selfish individuals could effectively encourage them to reduce consumption. Results on the relationship between motivations and willingness aligned more with the hypotheses and may provide more utility in relation to directions for advocacy.

Appealing to people motivated by environmental and animal reasons is anticipated to be more effective to reduce animal product consumption than those high in pathological selfishness as the numbers of the latter are much smaller. Increasing willingness by providing materials or through approaches that appeal to environmental factors is also suggested, as evidenced by the environment being the most motivating factor to reduce animal products. Animal welfare arguments could enhance motivation and willingness, particularly for those who find the animal-related perspectives most convincing. Using health as a motivator is not

recommended as it would appear to have the opposite effect and lead to less willingness to reduce animal consumption. Providing data explaining the health issues related to, especially high meat consumption, may counteract misinformation.

Further research is recommended to determine the mechanisms to account for the patterns discovered in this research. Determining the reasons for those higher in pathological selfishness reporting more willingness would be particularly useful. Further research on pathological selfishness in relation to the dark triad and willingness to reduce animal product consumption could potentially provide the answers.

7. Limitations

Although the research was exploratory, there were some limitations, such as the data being self-reported by the participants who may have responded inaccurately, intentionally, or unintentionally. Furthermore, cross-sectional data does not provide information over time, such as whether the levels of motivation and willingness did lead to a decrease in animal product consumption. There may have been difference in selfishness and motivation depending on the type of animal product if the question on willingness was split into two questions on willingness in relation to meat and non-meat animal products. Possibly providing more accurate data and allow for more effective comparison between the different groups of animal products.

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Links and Implications

This study confirmed that motivations are important to consider in affecting willingness to reduce meat consumption and that the environment is the most significant for Australian consumers. Animal motivations were also rated as an influence on willingness. Health had the opposite effect suggesting that trying to motivate Australians with the negative impacts of meat on health is not going to be as successful as utilising environmental and animal welfare motivations. More work on educating the public on how health is impacted by meat consumption before using it as a motivator is required. Out of the psychological factors, only pathological selfishness had a positive impact on willingness, which was an unexpected result.

Religion was of interest in the thesis and, although utilised as a control factor in study two it was not a focus. It had a significant positive relationship with willingness, but to answer research question four, further analysis was carried out in study three. The link between article three with article one was meat consumption and gender, adding different information in relation to both variables. Using the three subtypes of selfishness links article three with article two.

CHAPTER 5: HOW MEAT EATING RELATES TO SELFISHNESS, RELIGION, AND GENDER.

Introduction

This article examines the differences in three types of selfishness between groups divided according to the level of meat consumption, religion, and gender. It builds on articles one and two by adding religion, and it is also different because it explores the data from a different perspective by measuring group differences. It answers research question four and research question one in relation to selfishness and meat consumption. It expands on total selfishness in article one by measuring the three subtypes of selfishness, which also correspond to increasing levels of selfishness, from least to most damaging. The questions used for this article are included in Appendix A and, similar to articles one and two, only some of the questions were analysed to answer the research questions. The status of the paper is that it has been submitted to the *Australian Journal of Psychology.*

Submitted paper:

Abstract

Objective

Climate change, health issues, and animal welfare concerns can be alleviated by reducing animal product consumption. Understanding the psychological and sociodemographic factors that influence meat consumption can contribute to finding strategies for its reduction. This study aimed to add to the psychology of meat consumption by examining the combination of constructs with minimal research, including selfishness, meat consumption, religion, and gender.

Method

A sample of Australian adults (N = 497) was examined for their level of adaptive, egoistic, and pathological selfishness according to which meat consumption group they were in – low, medium or high. Religion and gender were also included. Several Analyses of Variance measured combinations of groups based on different variables, and main effects and interaction effects were analysed.

Results

Higher adaptive, egoistic, and pathological selfishness were associated with higher meat consumption groups and males. The interaction between the meat consumption group and religion only occurred for pathological selfishness, and pairwise comparisons showed that the religious high meat-consuming group had higher pathological selfishness than the non-religious high consumers.

Conclusions

Those who eat higher levels of meat and are religious reported higher levels of pathological selfishness, which may be due to the religious justification of dominion over animals.

Keywords: meat consumption; selfishness; religion; gender

Key points

What is already known about this topic:

1. Psychological factors and demographics influence meat consumption.
2. There are gender differences in meat consumption, with total selfishness associated with higher meat consumption in males.
3. Religion is sometimes provided as a reason for meat consumption and reduction.

What this topic adds:

1. Three subtypes of total selfishness are higher in the high-consuming groups.
2. The religious high-meat consumers show more pathological selfishness than the non-religious high consumers. The difference was proposed to be due to religious justification.
3. Contributes to the literature on psychology and meat consumption. Specifically, it adds to an area with no previous research- the role of selfishness and religion in meat consumption.

Introduction

Animal agriculture and animal product consumption contribute to climate change, ecological destruction, and damaging health (Bouvard et al., 2015; Gonzalez et al., 2020; Masson-Delmotte et al., 2021; Willett et al., 2019). Ethical issues surrounding how animals are farmed are also of concern (Dhont et al., 2019; Joy, 2020). Hence, reducing animal product consumption is expected to contribute to addressing numerous global concerns (Poore & Nemecek, 2018; Tufford et al., 2023; Willett et al., 2019). Sociodemographic and personality factors have been found to account for differences in preferences for and consumption behaviour of meat (Clonan et al., 2016; Lui et al., 2023; Reist et al., 2023; Stoll-Kleemann & Schmidt, 2017). Understanding these differences could contribute to

determining the most effective marketing interventions and approaches to encourage dietary changes leading to reduced meat consumption (Malek & Umberger, 2021; Vandermoere et al., 2019). Religion and selfishness are two factors, singularly and combined, with a lack of empirical data to determine their influence on meat consumption, which this research aims to redress.

Religion has been examined concerning meat consumption, usually as one of many factors rather than the primary focus (Mussig et al., 2022; Piazza et al., 2015). Few investigate whether being religious compared to being non-religious impacts meat consumption. Personality factors are also implicated in differences in the level of meat consumption between individuals (Reist et al., 2023). A personality-related factor, psychological selfishness, has negligible data to confirm its role in meat consumption or in relation to religion. The current research addresses this lack of information about how religion and meat consumption are linked with psychological selfishness. Since gender differences are found in meat consumption and selfishness (Dillon-Murray et al., 2023), this was also included as a factor of interest.

Selfishness and Meat Consumption

Selfishness is often defined as meeting the needs or wants of the self before others, often without consideration of how it affects others or doing so even in the face of that knowledge (Carlson et al., 2022; Raine & Uh, 2018). Studies of selfishness often use measures of behaviour to determine level of selfishness, such as in dictator games, but research using measures of psychological selfishness is scarce (Carlson et al., 2022; Raine & Uh, 2018). Psychological selfishness is hereafter referred to as selfishness. Total selfishness can be divided into three subtypes based on levels of harm that it causes to others, from least pathological to the most. Adaptive is the least damaging, where the person's primary focus is

their interests, but their selfishness may benefit others, such as family (Raine & Uh, 2019). Egoistic selfishness is where a person focuses only on their self-interest without regard to others, whilst pathological selfishness is where others are harmed or disadvantaged for the benefit of the selfish person (Raine & Uh, 2019). Pathological selfishness is the most antisocial and correlated with dark triad traits (Raine & Uh, 2019).

The dark triad includes the interconnected traits of narcissism (grandiosity, self-centred egoistic), Machiavellianism (manipulative behaviour, exploiting others, lacking ethics), and psychopathy (callous, impulsive, lacking empathy) (Koehn et al., 2017; Schrieber & Marcus, 2020). They have several traits in common, including advancing what will benefit them at others' expense- pathological selfishness (Dinić et al., 2023; Moshagen et al., 2018). High levels of the dark triad were associated with less positive attitudes toward animals and a higher rate of perpetrating acts of animal cruelty than those lower in these traits (Kavanagh et al., 2013). This is consistent with those of high dark triad trait not being concerned about cruelty or harm involved in factory farming of animals and the ethics of where their food came from. Support for this assertion comes from research where individuals with dark triad traits had a higher level of meat consumption (Mertens et al., 2020; Palnau et al., 2022; Sarisyksa et al., 2019). As selfishness is an element of the dark triad (Deutchmann & Sullivan, 2018; Kaufmann et al., 2019), a positive relationship between selfishness and meat consumption would be expected.

The literature supported this with studies examining selfishness and meat consumption and terms similar to selfishness. In previous studies, a positive relationship between total selfishness and meat consumption was found but only for males (Dillon-Murray et al., 2023). Studies that examined terms related to selfishness with meat consumption have shown that vegetarians are perceived as more selfless (Patel & Buckland, 2021), whilst not wanting to reduce meat consumption was influenced by self-interest

(Waldmann et al., 2023). Choices defined as egoistic (self-centred, personal concerns such as taste, familiarity, price, convenience, and health), self-centredness, and values of self-enhancement are associated with higher meat consumption (Graham & Abrahamse, 2017; Hopwood et al., 2021; Malek & Umberger, 2021).

Selfishness and Gender

Selfishness is higher in males than females (Dillon-Murray et al., 2023; Raine & Uh, 2019; Soutschek et al., 2017; Wollf & Keith, 2019). This has been explained by social norms designating female's primary role as caregivers as well as being rewarded more than men for prosocial behaviour and punished more for selfish behaviour (Downing, 2019; Rand et al., 2016; Rothberger, 2019; Soutschek et al., 2017). Selfishness appears to be associated with masculinity and selflessness with femininity (Rand et al., 2016; Downing, 2019). Men's selfish behaviours align with the type of leadership perceived as masculine (Wollf & Keith, 2019). Higher selfishness in males may explain why males eat more meat, as meat consumption is regarded as masculine behaviour (Rosenfeld, 2023; Salmen & Dhont, 2023; Stanley et al., 2023).

Selfishness and Religion

Minimal research exists relating to religion and selfishness. Selfishness can work against and for ethical and prosocial behaviour (PSB) (Zlatev & Miller, 2016) and there is a perspective that religion is associated with PSB more than the non-religious, the religion-prosociality hypotheses (Reddish & Tong, 2023). Some studies have found religion is associated with higher ethics and prosociality and others revealed no connection, thus, the complex and mixed results cannot confirm a religion-prosociality hypotheses (Arli & Perketi, 2017; Guo et al., 2018; Karataş & Gürhan-Canli, 2020; Reddish & Tong, 2023). In a review

of the research, no evidence suggested that being religious bestows an individual with greater morality than those without (Bloom, 2012). In another study (Saslow et al., 2013), the less religious were more motivated by compassion than the religious and their compassion was associated with prosocial behaviour. At the same time, there was no association between feeling compassion and PSB for the religious, and it was suggested that religious people carry out PSB because of other factors such as doctrine or reputation (Saslow et al., 2013). Also, the religious are more likely to extend prosocial behaviour to others who are also religious than the non-religious (Isler et al., 2021; Reddish & Tong, 2023), and the results are frequently influenced by the social desirability bias of self-reporting (Galen et al., 2022; Tsang et al., 2021).

Sometimes the religious are less selfish or no different to the non-religious (Arli & Tjiptono, 2014; Arli & Tjiptono, 2022; Galen et al., 2022), but the relationship between selfishness and religion is complex as evidenced by a study of consumer behaviour where intrinsic religion did not influence selfish behaviour, while atheism and extrinsic religion had a positive relationship (Arli & Tjiptono, 2022) and research that indicated spirituality is associated with more prosociality than religion (Saroglou & Craninx, 2021). Buddhist monks have been found to be less selfish than the general population (Raine & Uh, 2019), but that study did not compare the religious against the non-religious, which is the focus of this current study.

Selfishness, Religion, and Animals

The research on PSB and selfishness generally does not include attitudes to animals. However, it could be argued that PSB would be more likely to be extended to humans rather than animals, particularly considering the Abrahamic religious doctrines that put humans ahead of animals. The Judeo-Christian construct that humans have dominion over nature and

are made in God's image has led humans to believe they are more important than animals and that they are here for our purposes (Kilner, 2010; Linzey, 2016; Singer, 2009). Islam has a similar concept (Kilner, 2010). This allowed speciesism, "The systematic exploitation of other species by humans" (Dhont et al., 2019, p.30) and anthropocentrism, that humans are of more value than animals and everything is for human benefit (Kopnina et al., 2018), to thrive (Dhont at al., 2019).

Having dominion over animals and nature is said to account for centuries of ecological damage (Nir, 2020) and may have led to greater compassion towards humans than animals. Evidence for this was found in research where people donated less to animal charities than those for human concerns, supporting their views that animals count less than humans in moral considerations (Caviola et al., 2019). An experiment on job selection and religion showed "God-believers" were more likely to be selected for jobs that involved harm to animals than atheists, as it was perceived they would be more willing because of their hierarchical view of humans being above animals (Rabinovitch et al., 2023).

Religion and Meat Consumption

It can also be inferred from the concept of dominion over animals and hierarchical views that Abrahamic religious adherents can eat meat with impunity. Not eating animals can be defined as a prosocial behaviour since PSB is extending care or concern to other beings as well as humans. Lessening the impact of climate change by reducing meat consumption will benefit humans, farmed animals, and wildlife (Klein et al., 2022).

There is limited research concerning religion and meat consumption. Religion has an influence on dietary behaviour as beliefs proscribe certain foods that can be eaten as well as those that are restricted, such as Judaism and Islam forbidding their proponents from eating products from pigs (Cohen, 2021). Some religions encourage their disciples to be vegetarian,

believing that not eating animals is a path to spiritual enlightenment (Donaldson, 2016). Hindus and Buddhists have encouraged their believers to be vegetarian, with the high numbers of Hindus accounting for the highest rate of vegetarianism in India (Agrawal, 2017; Ruby et al., 2013). It has been found that the more Christians in a country, the higher the meat consumption and in countries where Hindus and Buddhists are in the majority, the meat consumption is lower (Vranken et al., 2014). However, none of the major religions preclude eating meat, even those that recommend not eating it as part of their doctrines encouraging non-violence, such as Buddhism and Hinduism (Chouraqui et al., 2020; Fillipi & Srinivasan, 2019). Although Australia has Hindus (2.7%) and Buddhists (2.4%) in the population, Christianity is the main religion, with 43.9% indicating it as their religion, and Islam is the next highest (3.2%) (Australian Bureau of Statistics [ABS], 2022).

Some people who ascribe to Christianity, the largest religious group in Australia, refer to passages in the bible about the dominion over animals (Mclaughlin, 2017) to rationalise meat consumption (Piazza et al., 2015). If the followers of the dominant religion in Australia believe that their religion gives them the right to eat animal products and the alternative narrative of the Bible supporting vegetarianism (Mclaughlin, 2017) is not promulgated then it supports continuing high meat consumption, particularly in a country that considers meat eating as part of their cultural identity (Rodan & Mummery, 2019) and is one of the highest meat consuming countries in the world (Marinova & Bogueva, 2019). Conversely, it is selected as a rationale for reducing meat consumption (de Boer et al., 2017; Malek et al., 2019) but not usually as the highest-rated reason. Although society has become more secular, the principles of dominion over animals that originated in Judeo-Christian doctrine have expanded beyond their origins and underpin Western culture irrespective of religion (Nir, 2020). As a result, the non-religious may also rationalise their meat consumption with this belief, which may contribute to explaining that although the percentage of people identifying

with a religion has been declining (Inglehart, 2020), meat consumption continues to increase (Milford et al., 2019).

In relation to non-religious people, the number of Australians answering "No Religion" was 38.9% of the 93.1% of the population who responded to the question related to religion in the 2021 census (ABS, 2022). In terms of how being non-religious relates to meat consumption, there has not been much research. Wrenn (2019) confirmed that there was a higher rate of non-religious persons in the American Animal Rights movement (Atheists: 55% & Agnostics: 18%) and argued that this is feasible as atheists have rational and logical arguments against religious beliefs as vegans do in relation to not eating animal products (van den Berg, 2016). Both atheists and vegans challenge societal norms and give animal reasons for going vegan more than those who are religious (Wrenn, 2019). This contrasts with the atheist community's hostility towards veganism (Wrenn, 2019).

As there are few studies examining differences between those who subscribe to a religion compared to those who do not, it cannot be confirmed if having a religion means a person is more likely to eat animals than those who do not have a religion, particularly in relation to the Australian population. As Buddhism and Hinduism are in the minority in Australia, the influence of these religions on meat consumption rates would be low, and there may be a different expression of the Hindu religion outside of the country where it is the majority religion (India). Dietary acculturation, where immigrants change their diet over time to be more like the country they immigrate to (Elshahat & Moffat, 2020), could lead those who were primarily vegetarian to eat more meat (Fillipi & Srinivasan, 2019).

The focus of the current study was to determine how religion, gender, and meat consumption relates to selfishness, and whether religious people are more selfish than the non-religious and if this impacts meat consumption.

Few studies examine whether religion influences meat consumption compared to those who are non-religious. To our knowledge, no research examines how religion and meat consumption differ or interact in relation to selfishness. Also, there is only one study as far as the authors are aware, that examines meat consumption groups against the total selfishness. Here the three types of selfishness were used in relation to meat consumption, which has never been researched before. The current study aims to address this lack of research, and the following hypotheses and rationales provide more detail as to the questions to be answered and the results predicted.

H1: Groups with the highest meat consumption will have highest selfishness ratings than medium and low meat consumption groups

Previous research measuring selfishness or associated constructs suggests those groups who eat the most meat will be higher in selfishness. The most selfish and harmful of the three, pathological selfishness, will be at the highest level, based on the connection it has with dark triad traits.

H2: Those with a religious belief of any kind will eat more meat than those who are not.

The rationale behind this hypothesis is that Christianity is the largest religious group in Australia and the other Abrahamic religions, which are in smaller numbers, also view humans as having dominion over animals. They believe it gives them the right to eat them. Also supporting this is the evidence that more meat is consumed in countries where Christianity is the main religion (Vranken et al., 2014).

H3: Males will be higher in selfishness than females.

Higher selfishness is predicted in males due to previous research and the differing effects of masculinity.

H4: Groups who are both religious and have a high rate of meat consumption will be higher in all types of selfishness than the non-religious groups.

Based on the previous hypotheses and the higher selfishness and meat consumption expected.

Methods

Participants and Procedure

A total of 526 participants from Australia, aged 18-80, were recruited and completed a survey through 'Zoho Survey', the online survey-based product of the Zoho corporation. They were modestly compensated by Zoho. Using Zoho to recruit participants allowed for the sample to be representative of the Australian population. The University of Southern Queensland Human Research Ethics Committee approved the research (reference number H22REA128).

As the number of participants responding as non-binary, transgender, and other was not large enough (n = 8) to use in statistical operations, they were removed from the sample. Removing the incomplete surveys and 5 outliers (using Mahalanobis distance) left a sample of 497.

The sample consisted of 249 participants who were not religious and 248 who reported they were, and there were 247 females and 250 males in the sample.

This dataset has been used and reported on in a previous study (Dillon-Murray et al., 2023). However, this research is unique as it tests different variables, including group differences in meat consumption and religion in relation to selfishness. The previous reports included different variables and statistical approaches to obtain information answering different hypotheses.

Measures

Selfishness

Three types of selfishness, Egocentric, Pathological, and Adaptive, were measured using a 17-item version of the Selfishness Questionnaire (SQ) (Raine & Uh, 2019). Likert scales, ranging from 1 (*Disagree)* to 3 (*Agree),* captured participant's agreement or disagreement with statements such as, "I'm not always honest because honesty can end up harming myself and others." Scoring in the middle (*2)* meant *Neither Agree nor Disagree*. The SQ had excellent internal consistency (α = .92).

Meat Consumption

Rates of meat consumption were captured using a Food Frequency Questionnaire (FFQ) adapted from that recommended by Faunalytics (2021). Participants were asked, "How often do you eat the following?" and selected their consumption level of different types of meat from the following categories: *never*, *less than once a week, 1-3 times a week, 4-6 times a week,* and *1 or more times per day*. Categories of meat, as written in the survey, included: poultry (chicken, turkey, etc.); fish and seafood (e.g. tuna, prawns, etc.); pork (made from pigs), e.g., ham, pork chops, ribs); beef (made from cows), e.g. Steakburgers); sheep (lamb, mutton, etc.); other meat (e.g. goat, venison, kangaroo). Internal consistency for the scale was good (α = .83).

Religion

Participants were given predetermined categories to select one answer to the question, *What is your religion?* The list of different religions was as follows: *Judaism, Hinduism, Islam, Christianity, Jainism, Buddhism, and Taoism*. For the non-religious, the following categories were *No religion* and *No religion: Atheist*. The *Other* category was included for anyone who did not fit those listed above.

Data Analysis

Religion was collapsed into dichotomous variables (no religion = 0; religion = 1) due to the low numbers in the different religious groups and because the research question was aimed at differences between religion versus no religion. Males and females were coded 0 and 1, respectively.

Participants were divided into three meat consumption groups, as a central goal of the research question was to examine differences between groups based on the level of meat consumption. The sample was divided into three groups corresponding to the interquartile range. The top (High; N= 123) and bottom (Low, N = 109) quarters and the middle half (Medium = 265) approximate a normal curve (L:0-25%; M: 26-75%; H: 76-100%).

To conduct the statistical analyses IBM SPSS version 29 was used. Three 3 x 2 between-subjects univariate ANOVAs were carried out corresponding to the adaptive (A), egoistic (E), and pathological (P) selfishness as the dependent variables in each. Independent variables were meat consumption (High, Medium, Low), religion (Y/N), and gender (M/F).

Non-adjusted pairwise comparisons were used to determine differences between the groups of independent variables on the dependent variables. Visual checks and tests of skewness and kurtosis established no normality violations.

Results

Descriptive data broken down by meat consumption, religion (yes and no), and gender (male and female) are displayed in Table 1.

Table 1 Means, standard deviations, and sample sizes for comparison groups.

MCG	Religion	Gender		Adaptive	Egoistic	Pathological
			N	Mean (SD)	Mean (SD	Mean (SD)
	No	Female	45	1.90 (.50)	1.79 (.48)	1.51 (.45)
Low		Male	19	1.87 (.63)	1.83 (.66)	1.79 (.68)
	Yes	Female	27	1.82 (.52)	1.70 (.52)	1.58 (.52)
		Male	18	1.73 (.47)	1.68 (.46)	1.48 (.35)
	No	Female	86	1.91 (.46)	1.76 (.48)	1.63 (.53)
Med		Male	59	1.99 (.47)	1.85 (.55)	1.72 (.54)
	Yes	Female	54	1.76 (.48)	1.66 (.48)	1.52 (.52)
		Male	66	2.06 (.54)	2.00 (.61)	1.88 (.64)
	No	Female	20	1.93 (.34)	1.84 (.34)	1.72 (.50)
High		Male	20	2.33 (.45)	2.20 (.48)	2.12 (.55)
	Yes	Female	15	2.30 (.38)	2.13 (.52)	2.17 (.53)
		Male	68	2.34 (.57)	2.22 (.57)	2.34 (.57)
Total		Female	247	1.89 (.48)	1.77 (.48)	1.62 (.53)
		Male	250	2.10 (.55)	2.01 (.59)	1.95 (.63)
Total			497	2.00 (.53)	1.89 (.55)	1.79 (.61)

The 3 x 2 ANOVAs, including main and interaction effects, are shown in Table 2

Table 2 *Analysis of Variance Between Meat Consumption Groups (MCG), Religion, and Gender (N = 497).*

Variables	DV (type of selfishness)	*df*	*F*	η_p^2
Meat consumption group	Adaptive	2, 485	16.60**	.06
(MCG)	Egoistic	2, 485	12.11**	.05
	Pathological	2, 485	22.07**	.08
Religion	Adaptive	1,485	0.08	.00
	Egoistic	1,485	0.12	.00
	Pathological	1,485	2.03	.00
Gender	Adaptive	1,485	4.75*	.01
	Egoistic	1,485	7.20*	.02
	Pathological	1, 485	11.69**	.02
MCG × Religion	Adaptive	2, 485	2.37	.01
	Egoistic	2, 485	1.67	.01
	Pathological	2, 485	4.29*	.02
MCG × Gender	Adaptive	2, 485	2.58	.01
	Egoistic	2, 485	1.45	.01
	Pathological	2, 485	0.78	.00
Religion x Gender	Adaptive	1, 485	0.39	.00
	Egoistic	1, 485	0.07	.00
	Pathological	1,485	0.88	.00

**$p \leq .001$, * $p \leq .05$

Adaptive Selfishness

Meat consumption

The results shown in Table 2 show a significant main effect of meat consumption on adaptive selfishness ($F(2,485) = 16.60$, $p < .001$, $\eta_p^2 = .06$). Pairwise comparisons indicated high meat consumption groups had significantly higher adaptive selfishness than both medium ($M^{diff} = 0.30$, $p < .001$) and low consumption groups ($M^{diff} = 0.40$, $p < .001$) but there was no significant difference between medium and low MCGs.

Gender

A significant main effect for gender was also found ($F(1,485) = 4.75$, $p < .05$, $\eta_p^2 = .01$), with males having higher adaptive selfishness than females ($M^{diff} = 0.12$, $p = .03$).

No other significant main effects or interactions were detected for adaptive selfishness.

Egoistic Selfishness

Meat consumption

A significant main effect of MCG on egoistic selfishness was found (see Table 2), $F(2,485) = 12.11$, $p < .001$, $\eta_p^2 = .05$. The high MCG was revealed to be significantly higher in adaptive selfishness than the medium ($M^{diff} = 0.30$, $p < .001$) and low consumption groups ($M^{diff} = 0.40$, $p < .001$). Like adaptive selfishness there was no difference between medium and low consumption groups.

Gender

A main effect for gender, $F(1,485) = 7.20$, $p < .001$, $\eta_p^2 = .02$, was revealed and pairwise showing a significantly higher egoistic selfishness for males ($M^{diff} = 0.15$, $p = .008$).

Significance was limited to the main effects for MCG and gender; no others were found, nor were any interaction effects discovered.

Pathological Selfishness

Meat consumption

As seen in Table 2, a significant main effect of MCGs was found on pathological selfishness $F(2,485) = 22.07$, $p<.001$, $\eta_p^2 = .08$, with pairwise comparisons revealing differences between the high MCG and both the medium MCG ($M^{diff} = 0.40$, $p <.001$) and low MCG ($M^{diff} = 0.50$; $p <.001$) but not medium and low MCGs.

Gender

As per adaptive and egoistic selfishness, there was a main effect for gender on pathological selfishness ($F(1,485) = 11.69$, $p<.001$, $\eta_p^2 = .02$), and pairwise comparisons indicated a strong gender component, with males again being higher in pathological selfishness than females ($M^{diff} = 0.20$; $p <.001$).

The differences between the meat groups on each type of selfishness are represented in Figure 1.

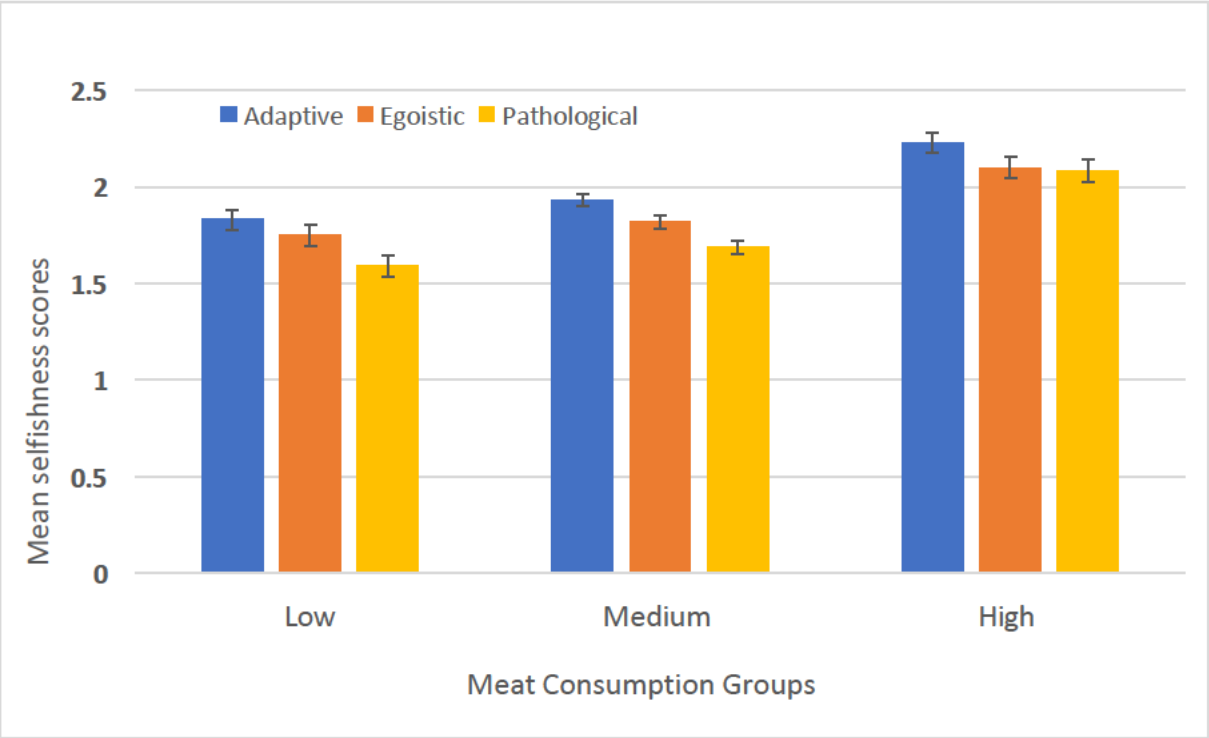

Figure 1. Differences in the three subtypes of selfishness on meat consumption.

Interaction between MCG and religion

There was a significant two-way interaction between meat consumption groups and religion ($F(2,485) = 4.29$, $p = .014$, $\eta_p^2 = .02$), as seen in Table 2. The differences are shown in Figure 2.

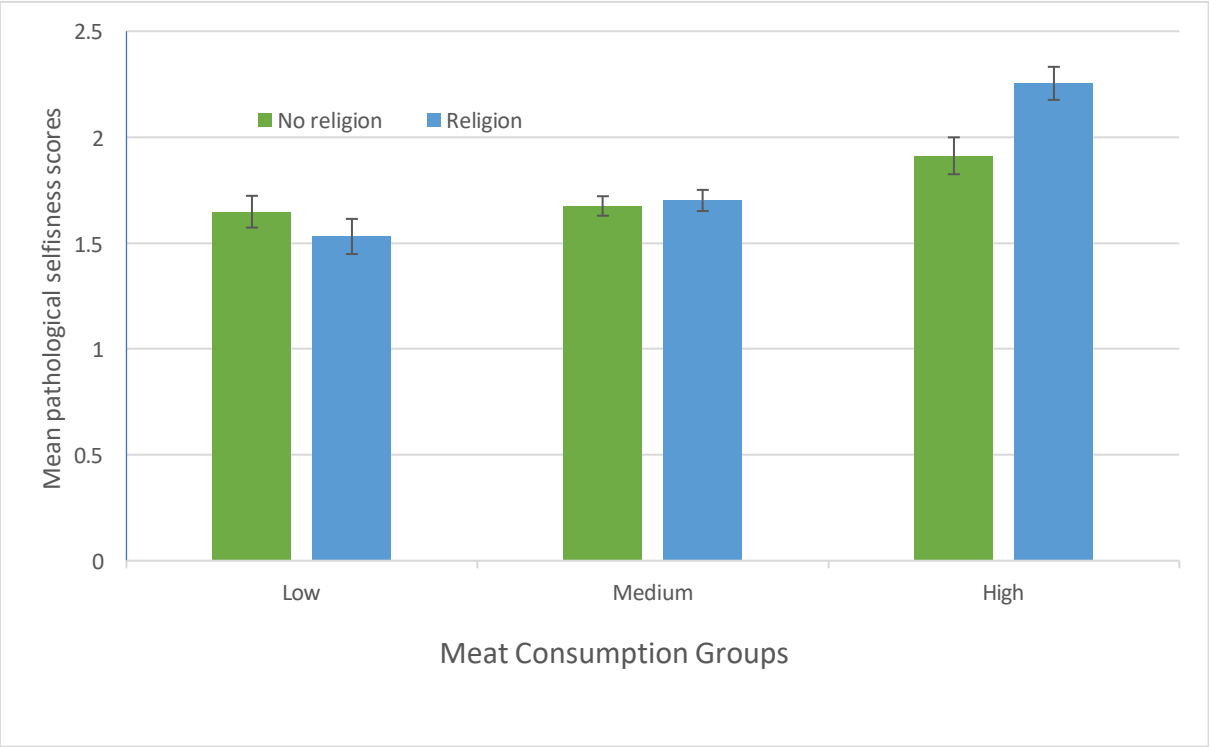

Fig. 2. Differences between religious and non-religious meat consumption groups on pathological selfishness

Pairwise comparisons of meat groups within religious and non-religious groups showed that pathological selfishness is significantly higher in the high consumption group compared with the low and medium groups. For the non-religious, those who were in the high consumption group were higher in selfishness than the medium (M^{diff} = 0.26; p = .02) and lower groups (M^{diff} = 0.24; p = .02). Those who were religious and high consumers of meat had significantly higher pathological selfishness than medium (M^{diff} = 0.72; p< .001) and lower religious consumers (M^{diff} = 0.55; p< .001). There was no significant difference between the medium and low consumption groups for either religious or non-religious.

When comparing religion within meat consumption groups only the high consumption group had significant differences. Pairwise comparisons revealed religious high consumers had higher selfishness than the non-religious high meat consumers (M^{diff} = 0.34; p = .004).

Discussion

This study investigated the differences in the three subtypes of selfishness between groups with membership based on meat consumption, religion, and gender, and combinations thereof to investigate interaction effects. The results supported the hypotheses that selfishness would be higher in those who consumed the most meat (H1) and in males (H3). Religion was associated with higher meat consumption than those who were not religious, but only for pathological selfishness, so hypothesis two is partially supported (H2). No interaction effects between meat consumption groups (MCG) and gender were found on any type of selfishness. This implies there are no differences between males and females in selfishness within meat consumption groups. However, interaction effects with meat consumption groups (MCG) and religion were discovered but only for pathological selfishness. Hypothesis four (H4) was partially supported as participants who were both religious and high meat consumers had higher pathological selfishness than non-religious high consumers, but there was no relationship for adaptive or egoistic selfishness nor for medium or lower consumption groups. This indicates that pathological selfishness has a greater influence on some factors than adaptive or egoistic selfishness.

Higher levels of all three types of selfishness were associated with higher meat consumption. This is partly consistent with previous research that showed total selfishness was associated with higher meat consumption as the relationship was only seen for males (Dillon-Murray et al., 2023). As selfishness is about benefiting the self frequently without thought of, and sometimes at the expense of others, it is congruous with eating higher levels of meat, since eating meat is at the expense of the animals. Those who do not factor in animal suffering, or human suffering because of climate change, when choosing to eat meat, especially if they are aware of the issues associated with meat consumption, aligns with the

definition of selfishness, and contributes to the explanation of why those who are more selfish eat more meat. This research is consistent with those studies that showed choosing taste, familiarity, health, or convenience above ethics was considered selfish, egoistic, or self-centred and associated with higher meat consumption (Malek & Umberger, 2021).

Consistent with previous research, males reported more selfishness (Dillon-Murray et al., 2023; Raine & Uh, 2018), which may be due to the socialisation of females to be more prosocial and caring and the associated stereotype that selfish behaviour in a woman is perceived more negatively than it is in males (Downing, 2019; Soutschek et al., 2017). This may have led to female underreporting because it is not considered socially desirable (Rothberger, 2019). Conversely, this may explain why males are more selfish as they may not be as concerned about reporting their selfishness.

The finding that religious groups are not more selfish than non-religious groups also indicates that they are not less selfish than the non-religious. The claim that the guidance of religious moral principles influences believers to be more ethical and less selfish than non-believers is not given weight by these results. It does not add to the religion-prosociality hypothesis either. This could be related to religious persons being prone to underreporting (Tsang et al., 2021). However, the religious were revealed as having higher reports of selfishness than the non-religious when combined with MCGs.

The high-meat consumers who are religious had higher pathological selfishness than those who are non-religious. These results may be due to the connection of the dark triad traits with pathological selfishness, the selfishness that benefits from the harm of others (Dinić et al., 2023; Raine & Uh, 2018). As the dark triad traits are associated with higher meat consumption (refs), the belief that God has given humans dominion over animals to do what we want with them, those who are higher in pathological selfishness have religion as a justification for higher levels of meat consumption. Those with dark traits have a higher

desire to dominate others (Jones & Figueredo, 2013) so dominion over animals' can be enacted by eating them. One of the three dark triad traits, narcissism, could come into play here as its subtypes (such as grandiose) is related to religiosity (Daghigh et al.,2019). Narcissism can be differentiated into different types, so what applies to one type may not be found with another (Miller et al., 2021). Further research would be necessary to establish if this religion-narcissism-meat consumption connection has any credence.

Although the results suggest further exploration is needed, they also potentially inform approaches for change. Discussing the animal-positive passages in the religious texts and how their religion encourages empathy toward other creatures could help in relation to religious people. However, the higher meat groups have higher selfishness so this may not be a productive approach due to those higher in pathological selfishness having a lack of concern for other people or animals. Helping those who eat a lot of meat see that it is affecting them or that it may affect them in the future, and that reduction would benefit them, could be an approach that would not only work for those high in pathological selfishness but selfishness generally.

This study found that meat consumption is associated with higher selfishness as is being male, and pathological selfishness was higher in the religious than the non-religious high consumption group. The additional differences revealed on pathological selfishness suggest it is more influential in meat consumption than the other subtypes of selfishness, which aligns with the dark triad being associated with higher meat consumption. This study effectively added to the understudied area of how meat consumption, gender, and religion relate to selfishness.

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Declaration of interest statement

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

Data Availability

The data described in this article is openly available on Open Science Framework at: https://osf.io/jsfx3/?view_only=b592abe2c0054eb0b9059ea912da01e4

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Links and Implications

The third study added religion to the factors examined in this thesis and supported the results of the first, with selfishness being higher with higher meat consumption. It also indicated that those who are religious and the most frequent meat eaters reported the highest pathological selfishness compared to those who were not religious. This suggests religion may have an association with meat consumption. It also shows pathological selfishness may be the factor most associated with meat consumption and warrants further investigation, as will be discussed in the following discussion and conclusions section.

CHAPTER 6: DISCUSSION AND CONCLUSIONS

The overarching aim of this thesis was to explore psychological and sociodemographic factors that influence animal product consumption and reduction, as decreasing animal product consumption will benefit all animals (human and non-human) by reducing environmental, health, and animal welfare problems. Animal products were defined as meat and animal by-products (non-meat animal products). Meat consumption and the motivations and willingness to reduce animal product consumption were a focus, as well as how they relate to the psychological factors of animal-oriented empathy and selfishness and the sociodemographic factors of gender and religion.

Most of the variables selected had not been explored in determining the influence of psychological factors on meat consumption and animal product reduction. Factors previously researched were combined in novel ways. All have, or been proposed to have, a connection with or influence in prosocial behaviour (PSB), behaviour that benefits others. Reducing animal product consumption can be described as a PSB, as not eating animals benefits animals and humans by helping reduce the environmental issues that affect humans (Klein et al., 2022). Selfishness and empathy were chosen for analysis because of their significance in human functioning and behaviour. Selfishness and empathy vary in their influence on PSB, with the former usually described as being negative and the latter positive, although this is not always the case (Cialdini et al., 1987; Kaufman & Jauk, 2020; Mestre et al.,2019). Sometimes people have selfish motivations for carrying out PSB, such as to appear more socially desirable, such as those with narcissistic leanings (Kaufmann & Jauk, 2020; Kesenhiemer & Grietemeyer, 2021).

The top three motivations for reducing animal product consumption were examined in relation to psychological selfishness, animal-oriented empathy, and the willingness to reduce said consumption. Extensive searches showed no prior research with all three variables

measured against these three motivations. Willingness was measured as it has been shown to lead to a reduction in meat consumption, but the research is scant (Seffen & Dohle, 2023). The inclusion of religion in the study was due to the lack of data on religion and meat consumption and its proposed link with PSB, the prosociality-religion hypotheses. The rationale for including gender for analysis was the consistent finding that meat consumption differs according to gender. As do empathy and selfishness.

This chapter will outline the research carried out in this thesis with the findings from each article as they relate to the research questions. The unique contribution to the field of the articles and the overall dissertation will be discussed, followed by a discussion of the implications, limitations, and future direction.

Aims and Research Questions

Broadly, the research questions centred around determining how psychological selfishness and animal-oriented empathy are associated with meat consumption and motivations and willingness to reduce animal product consumption. The three motivations were chosen because they have been consistently found in the literature on animal product reduction as the most frequent reasons to reduce meat consumption. Gender is also commonly found to impact meat consumption, with males consuming more than females, proposed as being due to the influence of masculinity. Gender was not only measured because of the meat-masculinity connection but also due to the gender differences in selfishness and empathy. Although there are several sociodemographic factors in addition to gender that have been explored in this area, religion was chosen for examination as it has less data available informing it than others. Religion is not the highest rated reason for meat consumption or reduction, but it is significant for many people. How meat consumption groups with varying levels of meat consumption differed in selfishness was investigated, and it was questioned whether adding religion and gender to the meat consumption groups would

affect results. It was proposed that interaction effects might come into play, such as with religion and high consumption, adding further to the differences between groups.

The thesis used a cross-sectional quantitative design, and all articles featured the same data, a representative sample of the Australian population gathered through a survey presented online by *Zoho Survey*. Although the three studies used the same data, different variables and statistics were used to answer the various research questions. The document sent to the publisher explaining the differences between articles one and two is attached in Appendix B.

Research Question One: Is meat consumption associated with psychological selfishness, animal-oriented empathy, gender, and three motivations (animal, health, or environment) to reduce meat consumption?

A representative sample of the Australian population was measured on pre-existing questionnaires, which measured animal-oriented empathy, total selfishness, and three motivations to reduce animal product consumption. The data on gender was part of a range of demographic data collected for the thesis. The complexity of the structural equation modelling used in article one allowed for concurrently examining the association between all the variables.

Journal articles one and three answered the question of whether psychological selfishness is associated with meat consumption using the Selfishness Questionnaire (SQ) (Raine & UH, 2019). Total selfishness was used in article one because the focus was on selfishness overall and how it was associated with the other variables and meat consumption. Selfishness was found to be associated with meat consumption for males but not females. The more selfish a male reported themselves as being, the more meat they consumed.

The subtypes of selfishness that combine to make total selfishness -adaptive, egoistic, and pathological were utilised in article three, and it was found that the meat consumption groups with the highest consumption also had higher ratings in all selfishness subtypes. However, interaction effects revealed differences between groups only on pathological selfishness, which will be explored further under question three below.

The relationship discovered between empathy and meat consumption was answered in article one. Animal-oriented empathy was measured with the Animal Empathy Scale (AES) (Paul, 2000) as empathy toward animals was the focus rather than general empathy or empathy towards humans as the food measured here is from animals. Just like selfishness, a relationship was found for males but not females. Therefore, the results only partially supported the hypothesis of higher empathy being associated with lower meat consumption.

Males were found to have higher selfishness, lower empathy, and eat more meat than females, which is consistent with previous research. The association of higher meat consumption with higher selfishness and lower empathy for males consistent with what was expected and the extant literature on empathy and meat consumption. Only empathy could be compared to previous literature since selfishness had never been examined in this way against these variables before. Since selfishness and empathy are associated with meat consumption for males, it adds to the explanation for the meat-masculinity connection.

Counteracting the literature was the result that animal-oriented empathy did not have a relationship with meat consumption for females. As empathy is negatively correlated with selfishness, it was also expected that higher meat consumption would be associated with higher selfishness in females, as there was with males. It is immaterial that men generally eat more meat than women, as based on previous research, regardless of how much females ate, it was predicted that selfishness and empathy would have an association for females. Higher meat consumption would have also been associated with higher selfishness and lower

empathy for females. This was explained in article one as other variables being more important in what influences meat consumption in women, such as weight and convenience.

Research Question Two: Are the three motivations to reduce meat consumption associated with animal-oriented empathy and selfishness?

Article one also examined whether there was a relationship between the psychological factors (empathy and selfishness) and motivations to reduce animal product consumption and whether motivations relate to meat consumption. As far as the author knew, measuring these motivations against the psychological factors was novel. This research examined what the literature indicates are the three most common motivations to reduce animal product consumption: animal reasons, those related to welfare and rights of animals, the environment, and health concerns. The Vegetarian Eating Motivations Inventory (VEMI) (Hopwood et al., 2020) measured all three motivations to reduce animal product consumption. It aims to determine motivations for participants in all the dietary groups, whether they are large consumers of meat or vegans who consume no animal products (in this instance it would measure what motivated them).

Empathy was positively associated with health and animal reasons for females and all motivations for males. Selfishness was only related to environmental motivations for females, while all motivations were also associated with selfishness for males. All motivations being influenced by both empathy and selfishness for males is unusual considering the two are negatively correlated (Raine & Uh, 2019). Explanations for the different associations were indicated as likely to be related to gender. Although males eat more meat, as shown in the first article, they may find all motivations convincing but do not transfer these into action. Selfishness is found to be linked with narcissism (Deutchmann & Sullivan, 2018), and the more selfish males may be more narcissistic, leading them to answer in a socially desirable

manner to impress others (Kesenheimer & Greitemeyer, 2021; Kowalski et al., 2018) by endorsing all motivations.

It was expected that selfishness would be more associated with health motivations as they are described as a personal and more selfish choice or reason for reducing animal product consumption (Fox & Ward, 2008), but this was not wholly supported due to females having no significant association between selfishness and health. Males had a positive association between selfishness and all three motivations, so health appears not to be a more selfish motivation than the others. It may mean that those who report high levels of selfishness are more likely to endorse all motivations for social desirability. Perhaps this endorsement is also related to gender. The results for the females concerning health motivation may be because females generally are more empathic and may want to be healthy so they can help others, such as family. If they are sick, they are less able to do so.

Article three partially covered research question one and examined the difference in selfishness according to the level of meat consumption, but instead of total selfishness, the three subtypes -adaptive, egoistic, and pathological- were used. As the groups of vegetarians and vegans were too low in number to allow for effective statistical processes to be applied to the different dietary groups, the sample was divided according to quartiles into low, medium, and high meat consumption groups. This allowed the application of Analyses of Variance (ANOVA) to analyse the data. Those in the high consumption group had higher selfishness of all types than in the low and medium groups. Thus, also answering research question one. Interaction effects indicated pathological selfishness was differentiated from the other two, which will be further detailed in article three.

Research Question Three: Is willingness to reduce meat consumption influenced by animal-oriented empathy, three different subtypes (levels) of selfishness (adaptive, egoistic, and pathological), and three motivations (animal, environment, and health)?

Progressing from meat consumption to meat reduction, whether the psychological factors explored in research question one influence willingness to reduce animal product consumption was questioned. Since willingness is argued to influence the desired behaviour, reduced consumption of animal products (Seffan & Dohle et al., 2023), it was expected to be predicted by the psychological factors and the motivations. This study differed from study one as it related to the willingness to reduce animal products rather than meat. Also, the three subscales of selfishness, rather than the total, as in article one, were used to determine differences in willingness related to the different types of selfishness. Although the same sample as article one was used, it was reduced in number due to different processes to eliminate outliers.

Several variables predicted the willingness to reduce animal product consumption. Surprisingly, empathy was not one of the psychological variables. This contrasts with the hypotheses and what the limited data in the literature on willingness and empathy shows. Empathy and willingness have been found to be positively associated in a few studies (Holler et al., 2021), and empathy is significantly higher in animal product abstainers (Kessler et al., 2016), suggesting that willingness would also be linked because those who had already reduced consumption implies that they had previously been willing to.

Out of all the psychological variables only pathological selfishness predicted willingness to reduce animal product consumption. Combining these findings with those of article three (see below) indicates pathological selfishness is associated with higher meat consumption and predicts a greater willingness to reduce animal product consumption. This was counter to the hypothesis that pathological selfishness would not predict willingness. It is

also perplexing considering the definition of pathological selfishness. They may be more willing because they are concerned about how it may affect them. It would be expected it would only be for personal reasons; such is the nature of selfishness. Perhaps it is due to fear of the damage environmental devastation may cause them now or in the future. It is not likely it is because of health motivations based on the results described below where it works against willingness.

There were other explanations for the link between pathological selfishness and willingness. One had to do with social desirability, even though it was anonymous. The dark triad traits may illuminate the reasons here since pathological selfishness is an element of the dark triad (Deutchmann & Sullivan, 2018; Kaufmann et al., 2019). These traits may lead to people reporting socially desirable responses, particularly those high in narcissism, one trait of the triad (Kowalski et al., 2018). They may underreport behaviour or endorse what may make them seem more responsible and elevate their social standing. Communal narcissists (a subclinical narcissism where prosociality is overestimated) are likely to appear to be doing something environmentally friendly to impress others and meet some need for self-enhancement (Kesenheimer & Greitemeyer, 2021). Alternatively, it's those who fool themselves into thinking they are behaving in a socially desirable fashion, as those who have narcissistic traits are more likely to do, whilst those with more Machiavellianism psychopathic elements of the dark triad lie intentionally for their advantage (Jones & Palhuas, 2017).

Essentially, lying is a hallmark of the dark triad, with the narcissistic being more likely to deceive themselves. In contrast, Machiavellianism and psychopathy are more likely to deceive others for some advantage (Jonason et al., 2014). Those with higher levels of psychopathic and Machiavellian traits would, therefore, be less likely to care about social desirability, possibly only appearing to concern themselves with what others think if it gave

them some personal advantage. The dark triad is also associated with higher self-monitoring behaviour, impression management and changing expressive behaviour in response to interpersonal cues to appear more socially acceptable (Kowalski et al., 2018).

Motivations to reduce animal product consumption is an area that has accumulated considerable research in the last ten years. Less concerning total animal product consumption as most relates to meat consumption. The hypotheses that the motivations would predict willingness to reduce animal product consumption was supported, with environmental motivation having the most predictive value, followed by animal-related motivations. Hence, environmental and animal motivations can influence willingness to reduce animal product consumption. Conversely, health had a negative relationship with motivations, meaning the higher the health motivation, the lower the willingness to reduce animal product consumption. This suggests that health is a motivator not to give up eating animals, effectively working against it. Environmental motivation is the most likely of the three motivations to lead to a willingness to reduce animal product consumption. Animal motivation also has positive predictive power over willingness but not at the same level as environmental.

Much of the literature on motivations to reduce animal product consumption (again, most looked at the subcategory of meat consumption) showed the selection of environmental motivation was low for omnivores (e.g. Macdiarmid et al., 2016). Times seem to have changed, as environmental motivation had the most impact on willingness in article two, perhaps due to an increased awareness of the relationship between meat consumption and environmental issues (Grummon et al., 2022). Although a significant number of Australians now agree that climate change is responsible for the increase in severe weather events, bushfires and flood for example, and how they may affect them (Borchers Arriagada et al., 2020; Jackson, 2023; Yu et al., 2020) there may still be a gap between willingness and action

since Australians continue to consume large amounts of meat (Marinova & Bogueva, 2019) This result is consistent with previous research indicating environmental concerns do influence Australian's attitude regarding meat reduction (Cheah et al., 2020)

Animal motivation is less of a predictor of willingness than environmental motivation, contrasting with many past studies where the environment has generally been the lowest out of three on omnivores' list of motivations to reduce animal product consumption (Hopwood et al., 2020; Malek et al., 2019). The welfare of animals is a concern for Australians (Fleming et al., 2020; Futureeye, 2018), and perhaps this is reflected in animal motivation, which features more in increasing willingness than health. Maybe it is due to climate change's potential and current impacts on Australians personally that animal motivation is less important than environmental motivation. Environmental issues have more impact on humans than animal welfare; animal harm is not seen as affecting humans. Improving the lives of farm animals benefits the animals, not necessarily humans, so in an anthropocentric society, any issues that affect humans will take priority over animals.

The result of the health motivation working against willingness contradicts as well as aligns with existing research (Cheah et al., 2020). Many studies showed omnivores were most likely to select health as a reason to reduce meat consumption over environmental and animal motivations (e.g. Malek et al., 2019) while also being more likely to choose health as a reason to eat meat (Neff et al., 2018). Omnivores' willingness to reduce meat consumption due to health considerations is low (Valli et al., 2019). This result can be explained by the belief that eating meat is healthy (Collier et al., 2021). Hence health is a special case as it not only motivates consumers to reduce animal product consumption but also to eat it. In this study it is more likely to be the latter since willingness is decreased in relation to health motivation.

Research Question Four: Do groups divided according to frequency of meat consumption differ according to selfishness, religion, or gender?

Due to a dearth of research concerning religion and meat consumption, it was pondered whether having a religion versus not having one would make any difference to meat consumption. Determining what part selfishness played in this regard was also interesting. How the three types of selfishness relate to meat consumption is discussed under Research Question One.

This research question brought in gender and religion to determine if groups differing on meat consumption, religion, and gender differed in their selfishness. Using Analysis of Variance (ANOVA) for the statistical analysis enabled an exploration of main and interaction effects to determine how the independent variables of meat consumption, religion, and gender interact with the three types of selfishness. There was a main effect for gender, with higher selfishness in males but no interaction effect of gender with meat consumption group (MCG) or religion. Despite higher levels of all selfishness subtypes being associated with higher meat consumption, interaction effects were only revealed for pathological selfishness.

Pathological selfishness had an interaction effect with religion. The highest meat consumption groups within both religious and non-religious groups had higher pathological selfishness than both the medium and lower meat consumption groups. There was no difference between medium and low groups. Religious persons in the high meat consumption group had higher pathological selfishness than the non-religious high-consuming group.

Religion does not have the influence it once did in previous decades (Inglehart, 2020), but a significant portion of the community is still religious. An explanation for why the religious high-consuming groups are higher in pathological selfishness than the non-religious may be related to the dark triad traits. Individuals high in dark triad traits are likelier to have higher pathological selfishness and prefer to dominate others (Jones & Figueredo, 2013),

which fits with the religious belief that we are above animals in a hierarchy and should dominate them as we have dominion over them. Religion may give those who report more pathological selfishness a reason to eat more meat, as religion states humans have dominion over animals. Believing that animals are put on the earth for our benefit fits with the definition of pathological selfishness. Individuals who have higher pathological selfishness and who also happen to be religious may use "the dominion over animals" to justify their high meat consumption. Alternatively, it is possible those high in pathological selfishness do not feel they have to justify what they do and that it is more the general belief that human beings dominating animals is acceptable.

Both articles one and two examined gender as the difference between males and females was a common finding in the literature on animal product consumption and reduction, such that a meat-masculinity link was provided as an explanation for its consistent appearance. Empathy and meat consumption had already been found to differ along gender lines, but there was no research that included selfishness in this domain. Consistent with previous research, gender emerged as a significant factor influencing meat consumption in this thesis.

Males consistently had higher levels of selfishness than females, which was associated with a greater frequency of meat consumption. Empathy and selfishness influenced meat consumption for males but not females, and it can be interpreted from this that for males, the psychological factors examined play a part in meat consumption, while different factors play a part for females. The association between psychological factors and motivation also differed according to gender. The only similarity was both males and females had an association between total selfishness and environmental motivation. So, although the genders differ in the types of motivations connected with the psychological factors, it is possible motivation is not as gender dependent as the other constructs. Overall, this research

supports the role of selfishness, as well as empathy in the meat-masculinity connection, where males are socialised to believe eating meat shows their manliness and associated strength and virility, whilst empathy reveals weakness and is perceived as a feminine quality. Lower empathy and higher selfishness may contribute to males choosing to eat meat to be more masculine, as empathy is perceived as feminine, and men who see themselves as particularly masculine do not want to appear feminine (Rosenfeld, 2023).

Several conclusions can be drawn from the three studies, including that psychological selfishness is associated with meat consumption, motivations to reduce animal product consumption, religion, gender, and willingness to reduce animal product consumption. Using total selfishness in answering research question one may not provide enough depth of information. Still, it did show a strong gender component in meat consumption, as it had an effect for males but not females. It was concluded that the meat-masculinity connection may be influenced by psychological selfishness and animal-oriented empathy.

The finding that pathological selfishness is the only one of the three subtypes to influence willingness to reduce animal product consumption was unexpected. Although all types of selfishness were highest in the higher meat consumption group, pathological selfishness was revealed to be higher in the religious high consumption group compared to the non-religious. The connection of pathological selfishness with the dark triad may give some insight into the contradiction in relation to willingness, as well as the mechanism with religious high consumers. It was posited in article three and above that they may use “the dominion over animals” argument to make them feel entitled to eat animals.

All three motivations were associated with willingness, with the environmental motivation taking the bulk of the variance. This finding can assist with appealing to consumers' environmental motivations to reduce meat consumption. As both males' and females' selfishness is associated with this motivation it would be the most appropriate to use,

particularly with omnivores, as most of the participants were in this thesis. Animal motivation was the next highest predictor of willingness and could also be used in advocacy, singularly or combined with environmental content. Health motivation would not be appropriate for advocacy to reduce as it would have the opposite effect based on the research here. The view that eating meat is healthy may explain this result.

Unique contribution to the field

In numerous ways, this thesis makes a unique contribution to the field by testing unexplored and under-researched constructs in combinations that have not been carried out before. Psychological selfishness had minimal research as a validated tool as one was not developed until recently. The SQ (Raine & Uh, 2019) enabled selfishness to be researched directly, not just part of several related constructs or in economic games measuring it behaviourally.

Selfishness had been explored behaviourally but not so much as a psychological construct, so applying it to the area of meat consumption and reduction using a validated tool to measure psychological selfishness was completely original, as no previous research could be found with either selfishness and meat consumption or including animal-oriented empathy, gender, and meat consumption.

Measuring the three types (associated with different levels) of psychological selfishness and animal-oriented empathy in relation to the three motivations to reduce animal product consumption was also novel. Regarding motivation, as far as the author is aware, this was the first time the contribution of these specific motivations to willingness to reduce animal product consumption was analysed. Adding gender and analysing it in relation to selfishness, meat consumption, and religion was also a different perspective taken in this area.

The connection between meat consumption and gender is consistent with previous research. It also brought new evidence into the body of work on the link between masculinity and meat consumption, as no previous research could be found including animal-oriented empathy with selfishness, gender, and meat consumption. Psychological selfishness had not been examined in the context of gender. Furthermore, whether having a religion relates to meat consumption and selfishness has not been studied in this way before.

These constructs were not just analysed because they were novel and combined in ways that had not been investigated before; they were chosen to add to the area of the psychology of animal product consumption. The question of an association between selfishness and health motivations had been alluded to but there was no empirical research that specifically investigated a possible link. There was limited research to inform how selfishness might play a role in meat consumption and reduction. Furthermore, selfishness was proposed to affect meat consumption as it influences much of human behaviour and decisions in daily life. It was also suggested based on the studies on empathy and the dark triad.

Religion has been researched before as part of a list of reasons to eat or not eat meat but has never been analysed in this way until now. Australians are not particularly religious by world standards, with an almost 50-50 split between having a religion and not having one. Although religion had been described as an influence on diet choice, there was little to determine whether it did in Australia.

Implications

Although complex, the results have implications that may inform approaches that utilise psychological factors in the strategies to reduce animal product consumption.

Harnessing the selfishness in males would seem to be implied by the results, although this has ethical implications. Using selfishness in a positive way so as not to contribute to

increasing tacit approval of selfishness is recommended. Appealing to selfishness may decrease meat consumption, such as utilising environmental issues to emphasise the damage that may affect them personally. This would not be anticipated to be damaging to others, nor would educating them on the health issues around meat. This could also be applied to females to counteract the view that meat is healthy since health operated against willingness in this sample. Working out ways to demonstrate that selfishness is not serving them in life and encouraging empathy could be a way to have some impact on males, but this would be expected to take some time.

Utilising pathological selfishness would be difficult as many would be interested in behaviour only if it benefits them, which could have negative consequences for others. They may seem more willing to reduce animal product consumption, but not for the same reasons as other participants. Relating pathological selfishness to the dark triad, the population of these individuals is small. Nevertheless, the behaviour of one individual with dark triad traits can significantly impact many others.

Appealing to males who are not the highest meat consumers and those who are more empathic may be another approach, considering they could further reduce their meat consumption. Finding what triggers empathy in males and targeting advocacy or marketing towards them could be considered. It suggests that finding out the levels of empathy and selfishness before an advocacy intervention may assist in reducing their consumption. This seems labour-intensive, and it would have to account for the meat-masculinity connection. Perhaps utilising this connection by detaching meat from a male's expression of masculinity, providing ideas about different ways to be masculine and using role models in the marketing may be another avenue.

The most promising area suggested from the research appears to be targeting environmental motivations and emphasising the connection of meat consumption with

climate issues that have affected Australians personally, such as fire and flood. Approaches to change behaviour have been found to be successful when addressing problems that affect them (Bouman et al., 2020). Animal welfare advocacy materials could be used separately or in addition to environmental materials since animal motivations also predicted willingness.

Limitations and Future Research

Although strategies were used to minimise the limitations, several in this research may have affected the results. These can inform future study designs and the use of surveys and other materials. Some limitations are common to this type of research, and others are specific to this thesis. One frequent issue for researchers is that the data gathered from self-reports are prone to social desirability bias, where individuals may not admit or dampen their responses to appear more socially acceptable. In this case, selfishness may have been underreported as it is considered a negative quality. Future research could combine the self-report with behavioural measures of selfishness, such as donations to animal charities, and determine how closely they align. Another idea is setting up experiments to see which dietary groups are more likely to help an animal in need. Virtual Reality could be utilised to achieve this and situations could be presented that are difficult to attain or unethical in real life, such as presenting an animal that is hurt or being inside a slaughterhouse. It need not be used in those extremes, such as showing living animals whilst making food selections.

Another common issue is that being a cross-sectional, correlational design means causality can only be alluded to. Experimental designs and longitudinal studies are more effective at revealing causality. This is how the limitation of attempting to connect motivations with levels of meat consumption could be addressed. This may explain why there was no connection between motivation and levels of meat consumption. If meat consumption had been measured before motivations were measured and then after a lapse of time, it may have shown some effect. Another experimental study could determine a change in

consumption before and after motivation and willingness were measured with different stages of time between measurement of consumption. This group could be compared with a control group to determine if motivation and willingness affected the consumption level. Meat consumption was also measured by self-report, which can lead to inaccuracy in responses. This issue could be redressed in future research by using observational studies or food diaries where consumption is recorded at the time food is eaten.

In relation to meat consumption, frequency was measured, not quantities, so it could not be determined if someone was eating a small or large amount of the selected food type. For example, whether someone ate 200g or 600g of meat could not be differentiated. This may have also affected the results in article three, where groups were divided according to interquartile range. Determining actual levels of meat consumption and aligning it with what is considered high, medium, and low according to dietary guidelines would have provided more accurate results. The groups were divided this way as it could not be done statistically according to the dietary group as the number of vegans and vegetarians was so small. Future research would ensure adequate numbers of each dietary group for statistical comparison.

It may have been helpful to determine what motivations led to some participants' current abstinence from meat or animal products. This connection could not be made as they were not asked what motivated them to be vegan. The only question related to this was asking if they were already vegan. The “vegan” groups’ motivations could have been analysed to see if they differed from other dietary groups. However, based on food frequency, only one person was found to fit the criteria for being vegan, so comparisons could not be made statistically or otherwise.

Three questions related to whether someone could be vegan: the food frequency, the dietary question category (which was not used in this research due to the numbers not being statistically viable), and whether they were already vegan. These questions did not align, such

that those who were “already vegan” or “vegan” ate animal products. This suggests further research to determine what is leading some people to call themselves vegan if they are not. Research has shown that many vegetarians eat meat (Rosenfeld & Tomiyama, 2019); perhaps some people similarly are not vegan but use the term. The psychological mechanism behind this could be a topic for further investigation.

The thesis focussed on the Australian population therefore, it may not generalise to other contexts, particularly non-Western countries. Differences such as cultural and religious differences may come into play. The breakdown of religions is different in other countries and would be anticipated to be vastly different in some cases; therefore, cross-cultural studies would add to this area.

The memory issues with the FFQ was mentioned in articles one and three, where some people may misremember that they ate food on the list. Recording the food during consumption would address this, such as by giving a reminder on the phone. The FFQ did not record the quantity of food eaten either, so future research could include the amounts and the frequency.

Although looking at meat consumption in articles one and three, the motivations and willingness referred to reducing animal products, not meat consumption. As animal product consumption subsumes meat consumption and non-meat products the accuracy of the results may have been compromised. Willingness and motivation to reduce animal by-products may be different to meat products. Two questions about willingness would have provided more specific detail on whether the different variables differed according to willingness to reduce meat and animal by-products separately and is recommended for future research. Further differentiation into subcategories within these groups could add more detail, as some people might be more willing to reduce consumption of red meat than chicken since it may tie in

with cost factors. Adding willingness to become vegan, vegetarian, and 'plant-based' is also recommended in future research.

The lack of connection with empathy and willingness to reduce animal product consumption may be because the AES (Paul, 2000) did not specifically measure empathy for the animals and their by-products that are eaten; it was broader. Using a measure of empathy toward farmed and animals that are eaten may have yielded an association with willingness and different results in article one. Perhaps it is not so much a limitation, but it may have provided different information than the AES, not just for research question three but also for research questions one and two. Another avenue would be further analysis of separate streams of the AES and how they relate to animal product consumption such that empathy toward pets could be differentiated from that toward other animals as the animal-oriented empathy covers pets and wild animals.

Other future research could include more on selfishness, particularly pathological selfishness as it relates to the dark triad and how much overlap there is between the two and animal product consumption. This would help confirm some of the suggested explanations for the data. The reason for males eating more meat than females is related to meat being an expression of masculinity, and being more selfish is proposed to be due to certain social roles and stereotypes. Further exploration into selfishness and empathy as it related to meat consumption and masculinity would provide more specific information about how these psychological factors contribute to the connection.

Conclusion

The research achieved its aim of determining the factors that may influence meat consumption, as well as what might motivate and increase individuals' willingness to reduce animal production. Each article examined a different perspective and answered different research questions but overall added knowledge to several areas. The findings from the three

main research questions and the associated articles were outlined here, from which several conclusions can be drawn.

Building on previous research on empathy, meat consumption is only related to animal-oriented empathy for males and not associated with females' rates of meat consumption. Nor does it contribute to increasing willingness to reduce animal product consumption. Animal-oriented empathy was associated with motivations and differed according to gender. Health and animal motivations were positively associated with empathy for females and all motivations for males.

Total psychological selfishness was also related to meat consumption for males but not females. In article three, all three types of selfishness were related to higher meat consumption groups. Environmental motivation was the only association between motivations and selfishness for females, and, like empathy, all motivations were associated with selfishness for males. This research also demonstrated the utility of breaking selfishness into three types, as selfishness is not one-dimensional, as shown by this research. The most damaging selfishness of the three, pathological selfishness, emerged as a primary factor influencing willingness to reduce animal product consumption, appearing to be a contradictory result.

It also differentiated some groups along religion, gender, and meat consumption, with pathological selfishness generally being higher in the high-consuming religious groups than the non-religious high-consuming group. It was also higher in the higher meat consumption groups than the lower groups of both religious and non-religious people, as well as in males as opposed to females. The three motivations predicted the willingness to reduce animal product consumption, with environmental motivation having the most variance. Animal motivations were next, whilst health motivations predicted an opposite effect.

Although some of the results were unexpected based on hypotheses built on what extant literature was available, as well as much of it being inconclusive, this thesis has added valuable information to the area of the psychology of animal product consumption. It has laid the groundwork for further investigation in this domain.

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APPENDIX A: MATERIALS

Dietary perspectives

Individual differences in dietary perspectives

Research team contact details
Principal Investigator: Ms Angela Dillon-Murray
mail: angela.dillon-murray@usq.edu.au
Mobile: +61 419 597 376

Supervisors
Prof Jeffrey Soar
[redacted]

Dr Aletha Ward
[redacted]

Description
This project is being undertaken as part of a Doctor of Philosophy through the University of Southern Queensland.
The purpose of this project is to find out more about differences between individuals in their dietary choices.

Participation
Your participation will involve the completion of an online questionnaire that will take approximately 10-20 mins of your time.
Questions will include: "I want to be healthy."
"I don't give to charities."

Your participation in this project is entirely voluntary. If you do not wish to take part, you are not obliged to. If you decide to take part and later change your mind, you are free to withdraw from the project at any stage. As the questionnaire is anonymous, data collected about yourself cannot be withdrawn after submission.
Your decision whether you take part, do not take part, or take part and then withdraw, will in no way impact your current or future relationship with the University of Southern Queensland.

Expected benefits
It is expected that this project directly benefits you due to the incentives from being a Zoho survey participant.

The survey will allow us to learn more about influences on dietary choices and potentially inform changes in individual dietary habits, which is beneficial not only for individuals but potentially to society.

Risks
In participating in the questionnaire, there are no anticipated risks beyond normal day-to-day living. However, if thinking about the sorts of issues raised in the questionnaire create some uncomfortable feelings and you need to talk to someone about this immediately, please contact Lifeline on 13 11 14.

Privacy and confidentiality
All comments and responses are confidential unless required by law.
Your name is not required in any of the responses.
Your data may be used for similar studies in the future. This data will be stored and re-used in a non-identifiable form.
If you wish to obtain a summary of the project's results please contact the Principal Investigator, as per the

details above.
Any data collected as a part of this project will be stored securely, as per the University of Southern Queensland's Research Data and Primary Materials Management Procedure.

Consent to participate
Clicking on the 'Submit' button at the conclusion of the questionnaire is accepted as an indication of your consent to participate in this project. As the survey is anonymous it will not be possible for participants to withdraw data after they have pressed 'submit.'

Questions
Please refer to the Research team contact details at the top of the form to have any questions answered or to request further information about this project.

Concerns or complaints
If you have any concerns or complaints about the ethical conduct of the project, you may contact the University of Southern Queensland, Manager of Research Integrity and Ethics on +61 7 4631 1839 or email researchintegrity@usq.edu.au. The Manager of Research Integrity and Ethics is not connected with the research project and can address your concern in an unbiased manner.

Thank you for taking the time to help with this research project. Please keep this document for your information.

Answers are anonymous and confidential

We can't always be charitable to others, and there are times when you have to look after your own self-interests.

Answer the questions as honestly as you can by indicating whether you:

Disagree (1), Neither Agree nor Disagree (2), or Agree (3) with each statement

* I have no problem telling "white lies" if it will help me achieve my goals.

Disagree		Agree
1	2	3

* I'm not too concerned about what is best for society in general.

Disagree		Agree
1	2	3

* Now and again I've manipulated my friends to gain an advantage.

Disagree		Agree
1	2	3

* At the end of the day I care mostly for myself, my family, and friends who can help me.

Disagree 1 2 3 Agree

* I've occasionally put others down to achieve my goals.

Disagree 1 2 3 Agree

* I don't give to charities.

Disagree 1 2 3 Agree

* Even if it meant giving my kids an unfair advantage over others, I'd do it for them.

Disagree 1 2 3 Agree

* Sometimes you need to take advantage of other people before they take advantage of you.

Disagree 1 2 3 Agree

* I'm not always honest because honesty can end up harming myself and others.

Disagree 1 2 3 Agree

* When it comes to helping myself or helping others, I tend to help myself.

Disagree 1 2 3 Agree

* It's not nice to exploit others, but there are times when you simply need to.

Disagree 1 2 3 Agree

* If there was only one space left on a lifeboat that a child needed, I'd honestly have to take it for myself and my family.

Disagree 1 2 3 Agree

* Quite often in life, it is more important to receive than to give.

Disagree 1 2 3 Agree

* I know I love rewards in life, even if there is a cost to others.

Disagree 1 2 3 Agree

* It's better to save for a rainy day than to give to charities where money can be misspent.

Disagree 1 2 3 Agree

* If I'm honest, there are times when I put myself first, even if it's someone else's loss.

Disagree 1 2 Agree 3

* If the choice was between killing someone or being killed, I'd kill.

Disagree 1 2 Agree 3

What you eat and how often

*__How often do you eat the following?__

Dairy (milk, cheese, & yoghurt from animals)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Poulty (chicken, turkey, etc.)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Fish and seafood (eg. tuna, prawns, etc.)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Pork (made from pigs) eg. ham, pork chops, ribs)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Beef (made from cows) eg. steak, burgers)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Sheep (lamb, mutton etc.)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Other meat (eg goat, venison, kangaroo)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Eggs (omelettes, in other products such as cakes)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Honey and other (describe below)

- ◯ Never
- ◯ Less than 1 time per week
- ◯ 1 - 3 times per week
- ◯ 4- 6 times per week
- ◯ 1 or more times a day

Other:

* Please indicate your willingness to reduce your consumption of animal products

Not Willing				Very Willing	Already vegan
1	2	3	4	5	

Please rate the importance of each of the following reasons for you to eat less meat or animal products.

Please rate these items even if you don't intend to change your diet.

* I want to be healthy.

Not important						Very important
1	2	3	4	5	6	7

* Plant-based diets are better for the environment.

Not important						Very important
1	2	3	4	5	6	7

* Animals do not have to suffer.

Not important						Very important
1	2	3	4	5	6	7

* Animals' rights are respected.

Not important						Very important
1	2	3	4	5	6	7

* I want to live a long time.

Not important						Very important
1	2	3	4	5	6	7

* Plant-based diets are more sustainable.

Not important						Very important
1	2	3	4	5	6	7

* I care about my body.

Not important						Very important
1	2	3	4	5	6	7

* Eating meat is bad for the planet.

Not important						Very important
1	2	3	4	5	6	7

* Animal rights are important to me.

Not important						Very important
1	2	3	4	5	6	7

* Plant-based diets are environmentally-friendly.

Not important						Very important
1	2	3	4	5	6	7

* It does not seem right to exploit animals.

Not important						Very important
1	2	3	4	5	6	7

* Plants have less of an impact on the environment than animal products.

Not important						Very important
1	2	3	4	5	6	7

* I am concerned about animal rights.

Not important						Very important
1	2	3	4	5	6	7

* My health is important to me.

Not important						Very important
1	2	3	4	5	6	7

* I don't want animals to suffer.

Not important						Very important
1	2	3	4	5	6	7

Please indicate to what extent the items describe your behaviour.

If you definitely agree that the question best describes your reaction the number to select would be '7.'

* I often have tender feelings and concern for animals suffering or living in bad conditions.

Definitely Disagree						Definitely Agree
1	2	3	4	5	6	7

* Sometimes I don't feel very sorry for animals in difficult situations.

Definitely Disagree						Definitely Agree
1	2	3	4	5	6	7

* When I see an animal being taken advantage of, I feel kind of protective towards it.

Definitely Disagree						Definitely Agree
1	2	3	4	5	6	7

* Animals' misfortunes do not usually disturb me a great deal.

Definitely Disagree						Definitely Agree
1	2	3	4	5	6	7

* When I see animals being treated unfairly, I don't always feel very much pity for them.

Definitely Disagree						Definitely Agree
1	2	3	4	5	6	7

* I would describe myself as pretty soft-hearted towards animals.

Definitely Disagree						Definitely Agree
1	2	3	4	5	6	7

* I am often quite touched by things that happen to animals.

Definitely Disagree						Definitely Agree
1	2	3	4	5	6	7

Please indicate how strongly you agree or disagree with the following statements, by selecting the appropriate number on the agreement - disagreement scale.

For example, if you think you agree with a statement fairly strongly, you might choose 2 on the left-hand side of the scale.

* So long as they're warm and well fed, I don't think zoo animals mind being kept in cages

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* Often cats will meow and pester for food even when they are not really hungry.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* It upsets me to see animals being chased and killed by lions in wildlife programs on TV.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* I get annoyed by dogs that howl and bark when they are left alone.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* Sad films about animals often leave me with a lump in my throat.

Agree very strongly — Disagree very strongly

1 2 3 4 5 6 7 8 9

* Animals deserve to be told off when they're not behaving properly.

Agree very strongly — Disagree very strongly

1 2 3 4 5 6 7 8 9

* It makes me sad to see an animal on its own in a cage.

Agree very strongly — Disagree very strongly

1 2 3 4 5 6 7 8 9

* People who cuddle and kiss their pets in public annoy me.

Agree very strongly — Disagree very strongly

1 2 3 4 5 6 7 8 9

* A friendly purring cat almost always cheers me up.

Agree very strongly — Disagree very strongly

1 2 3 4 5 6 7 8 9

* It upsets me when I see helpless old animals.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* Dogs sometimes whine and whimper for no real reason.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* Many people are over-affectionate towards their pets.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* I get very angry when I see animals being ill treated.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* It is silly to become too attached to one's pets.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* Pets have a great influence on my moods.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* Sometimes I am amazed how upset people get when an old pet dies.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* I enjoy feeding scraps of food to the birds.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* Seeing animals in pain upsets me.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* People often make too much of the feelings and sensitivities of animals.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* I find it irritating when dogs try to greet me by jumping up and licking me.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* I would always try to help if I saw a dog or puppy that seemed to be lost.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

* I hate to see birds in cages where there is no room for them to fly about.

Agree very strongly								Disagree very strongly
1	2	3	4	5	6	7	8	9

Demographic questions

Some questions about you.

*__Which of the following best describes your diet?__

- ◯ Omnivore/meat-eater (no restrictions on eating animal products)
- ◯ Reducetarian, flexitarian, or semi-vegetarian (reducing meat consumption or only eating it occasionally)
- ◯ Pescetarian (eats plant-based foods, eggs, dairy, and fish)
- ◯ Vegetarian (eats plant-based foods, eggs, and dairy)
- ◯ Vegan (eats only plant-based foods)
- ◯ Other (Please specify)

*How old are you?

- ◯ 18-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55-64
- ◯ 65-80

*What gender do you identify as?

- ◯ Male
- ◯ Female
- ◯ Transgender
- ◯ Non-binary
- ◯ Other (Please specify)

* What is the highest level of education you have completed?

- ◯ Some High School
- ◯ Year 12
- ◯ Certifcate/Diploma
- ◯ Apprenticeship
- ◯ Bachelor's Degree
- ◯ Master's Degree
- ◯ Ph.D. or higher
- ◯ Other (Please specify)

*What is your gross income per year?

- ◯ $0 - $35,000
- ◯ $36,000-$76,000
- ◯ $77,000-$150,000
- ◯ above $151,000

*What is your relationship status?

- ◯ Single
- ◯ Partnered
- ◯ Married
- ◯ Divorced
- ◯ Widowed

*What is your employment status?

- ☐ Not working
- ☐ Home duties
- ☐ Studying full time
- ☐ Casual employment
- ☐ Part-time employment
- ☐ Full-time employment
- ☐ Retired

*What is your religion?

- ◯ No religion
- ◯ No religion: Atheist
- ◯ Christianity
- ◯ Judaism
- ◯ Islam
- ◯ Buddhism
- ◯ Hinduism
- ◯ Jainism
- ◯ Taoism
- ◯ Other: _____

*What country were you born in?

- ◯ Australia
- ◯ Oceania and Antartica
- ◯ North-West Europe
- ◯ Southern and Eastern Europe
- ◯ North Africa and the Middle East
- ◯ South East Asia
- ◯ North East Asia
- ◯ Southern and Central Asia
- ◯ Americas
- ◯ Sub-Saharan Africa
- ◯ Other (Please specify)

[ ]

*How would you describe your cultural background?

Your cultural background is the cultural/ethnic group(s) to which you feel you belong or identify. This background may be the same as your parents, grandparents, or your heritage, or it may be the country you were born in or have spent a great amount of time in, or you feel more closely tied to.

- [ ] Indigenous Australian.
- [ ] Australian (excl.Indigenous Australian).
- [ ] New Zealander (not Maori).
- [ ] Maori, Melanesian, Papuan, Micronesian, and Polynesian.
- [ ] Anglo-European.
- [ ] North-West European (excl. Anglo-European).
- [ ] South-East European.
- [ ] South-East Asian.
- [ ] North-East Asian.
- [ ] Southern and Central Asian.
- [ ] North American.
- [ ] South and Central
- [ ] American and Caribbean Islander.
- [ ] North African and Middle Eastern.
- [ ] Sub-Saharan African.
- [ ] Other (Please specify)

*What country was your mother born in?

- ◯ Australia
- ◯ Unknown
- ◯ Other (Please specify)

*What country was your father born in?

- ◯ Australia
- ◯ Unknown
- ◯ Other (Please specify)

*Do you identify as an Australian Aboriginal and/or Torres Strait Islander person? (Please select one only).

Source: This question has been adapted from the Australian Bureau of Statistics (ABS).

- ◯ No
- ◯ Yes, Aboriginal Australian
- ◯ Yes, both Australian Aboriginal and Torres Strait Islander.
- ◯ Yes, Torres Strait Islander
- ◯ Unsure
- ◯ Prefer not to say

Q Unsure

Q Prefer not to say

APPENDIX B:
DIFFERENCES AND SIMILARITIES BETWEEN PAPER ONE AND TWO

Information sent to Food Ethics with submission of Article Two:

Differences and similarities between paper one and paper two.

First, I will briefly explain each article and then provide details of the differences and similarities between the two papers.

First article

The article analysed the association between meat consumption, the psychological variables of animal-oriented empathy and total selfishness, and the three motivations (animal welfare, environment, and health) to reduce animal product consumption. It also examined gender differences.

Second article

This paper involves the willingness to reduce animal product consumption and whether the three subtypes of selfishness (adaptive, egoistic, and pathological), animal-oriented empathy, and the three motivations (animal welfare, environment, and health) influence willingness.

The differences between the two:

- The first paper looks at meat consumption, whilst the second is about willingness to reduce the consumption of animals.

- Meat was examined in paper one, whereas paper two looks at the broader 'animal products.' 'Animal products' include meat and non-meat products such as honey, dairy, eggs, etc. That is, animals and their by-products.

- Paper one examined total selfishness only; paper two explores the three subtypes of selfishness: adaptive, egoistic, and pathological.

- The statistics applied were different to answer the different questions. Paper one used structural equational modelling to look at the relationships between all the variables simultaneously. Paper two used hierarchical regression to determine whether the psychological factors or motivations predict the willingness to reduce animal product consumption.

- Sample size- the different statistical procedures required the application of different parameters around multivariate outliers. The first article had a sample size of 497, the second has 492 participants.

- Separate analysis was applied according to gender in paper one; in this article, gender was used as a control variable to determine the unique contribution of the independent variables on willingness. Therefore, gender wasn't a focus as in the first paper.

- Article one looks at how the three motivations are associated with empathy and total selfishness. As this is done in the first article, the second article did not explore this relationship.

The similarities between the two papers:

- The use of the three (health, animal, and environmental) motivations and animal-oriented empathy.

- The sections discussing selfishness, empathy, and motivation are similar because of the use of similar literature but it has adjusted for what is applicable to willingness to reduce animal product consumption.