Meat-Eating, Cognitive Dissonance and Gender Differences

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Abstract

Previous studies have found that exposing meat-eaters to the meat-animal connection can induce cognitive dissonance. However, these studies have only used lamb as the stimulus for the meat-animal connection, and it is unclear whether the results are reproduceable with other animals. Furthermore, consistent gender differences in dissonance have been observed, and there has been little investigation into the possible mechanisms behind them. The present study aimed to reproduce previous findings using a chicken stimulus, to explore empathy and gender role orientation as possible mechanisms for gender differences in dissonance, and to further investigate justifications for eating meat. Recruited meat-eaters (n = 235) were randomly assigned to three conditions: lamb, chicken and control. Those in the lamb and chicken conditions were exposed to the meat-animal connection by reading about the processing of an Australian meat lamb or chicken. Those in the control read about apples. All participants completed a pre- and post-condition affect measure with dissonance-related emotions. A positive difference between pre- and post-condition affect was indicative of cognitive dissonance. Results indicated that, on average, participants in the lamb and chicken conditions experienced greater dissonance than those in the control, indicating that exposure to the meat-animal connection induced dissonance. However, when analysed by gender, an average dissonance effect was found only in women. Small associations were found between cognitive dissonance, empathy and gender role orientation. Justifications for eating meat were also analysed. Implications are discussed.

Keywords: meat, animals, cognitive dissonance, meat-paradox, gender

Declaration

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To the animals, *your lives are important.*

CHAPTER 1

Introduction

The morality of eating animals has been questioned by some for millennia; but with rising human populations and an ever-increasing global demand for meat, not only are the impacts of meat consumption on animals becoming more pressing, so too are the environmental and human health impacts. According to the World Health Organisation (WHO; 2003), global annual per capita meat consumption in 2030 is expected to be almost double what it was in the 1960's. The industrialisation of animal agriculture has made this kind of increase in meat consumption possible by enabling the production of greater amounts of meat with fewer economic costs. However, the cost to animals has never been higher. Not only are more animals being raised and killed, but many of them are living in poorer conditions. Furthermore, using animals for food is not as necessary as it once was. Organisations such as the American Dietetic Association (ADA) have stated that appropriately planned diets which exclude meat and other animal products are healthful and nutritionally adequate (Craig & Mangels, 2009). In many cases, particularly in developed countries, the consumption of animals could be considered as causing unnecessary harm and suffering.

The environmental impacts of animal agriculture are also a serious issue. Land degradation, habitat loss, fresh water use, and pollution, are some of the main environmental concerns surrounding meat production. A recent systematic review on sustainable diets revealed that a reduction in the environmental footprint of any particular diet – determined by contributions to greenhouse gas emissions, land use and water use – was proportional to the restriction of animal foods, especially meat (Aleksandrowicz et al., 2016).

Reducing or ceasing meat consumption may also be beneficial in the prevention or treatment of certain illnesses (Craig & Mangels, 2009). Research suggests that people who do

not consume meat have lower incidences of obesity, type two diabetes and cardiovascular disease, and appear to have greater life expectancies (Fraser, 2009). According to the World Health Organisation (WHO; 2015) there is also evidence linking the consumption of processed meat to an increased risk of colorectal cancer.

Despite growing awareness of these issues, meat continues to be a central dietary element for many people. However, concern about these issues has sparked an increase in research directed at understanding attitudes towards meat and animals, and what influences the choice to consume meat. From this research has emerged a novel context in which to understand and apply two major theories in psychology: cognitive dissonance theory (Festinger, 1957) and moral disengagement theory (Bandura, 1999).

1.1 Meat-Eating and Cognitive Dissonance

Many people claim to care about animals, and are distressed by animal suffering, yet they continue to eat meat. This contradiction has been termed the 'meat-paradox' (Loughnan, Haslam, & Bastian, 2010). However, meat-eaters may avoid coming to terms with this kind of paradoxical thinking by dissociating meat from its animal origins (Kunst & Hohle, 2016; Rothgerber, 2013). This kind of dissociation has been referred to as 'mindless' meat-eating. Mindless meat-eating likely starts at a young age, when people begin to eat meat. Particularly in urban areas, children tend to grow up disconnected from farmed animals and the processes involved in using them for food (Bray et al., 2016). The rearing and slaughter of animals for food is a subject which may be intentionally shielded from children to avoid causing them distress. Additionally, parents may be reluctant to bring up the meat-animal connection with children to avoid their own discomfort or possible challenges that could arise; for example, having to explain why killing animals for food is justified, or having to accommodate for dietary changes if their child is put-off meat. The meat-animal dissociation in childhood

commonly extends into adolescence, by which time there is often a lack of interest to consider the sources of food (Smith & Brower, 2012). Even as adults, mindless meat-eating persists. Most consumers are very removed from the meat production process; having not been involved in the slaughter of animals and never seeing animals alive before they become meat. Detachment from the meat-animal connection may also be attributed to the fact that many people have never lived with an animal typically used for food (Hoogland, de Boer, & Boersema, 2005). Additionally, when meat is presented in shops, features of the animal associated with life and personality – particularly facial features – have often already been removed (Plous, 1993). This, along with the use of euphemistic language (e.g. 'beef' instead of cow, 'pork' instead of pig) may further distance people from the meat-animal connection (Bastian & Loughnan, 2017). It is clear from the above factors that the dissociation between meat and animal is not necessarily a deliberate choice by consumers, but rather it is passive and embedded in everyday life.

It follows that an important part of understanding the meat-paradox is to ask: what happens when the 'mindless' aspect of meat-eating is removed? Two recent experimental studies by Dowsett et al. (2018) and Van der Velde (2017) investigated this by looking at the emotional responses of meat-eaters when the meat-animal connection was or was not made salient to them. The aim of these studies was to test whether exposure to the meat-animal connection could causally induce cognitive dissonance – the uncomfortable psychological tension experienced when one has two conflicting cognitions (Festinger, 1957). Participants in the experimental groups were exposed to the meat-animal connection by reading a passage about the life and death of an Australian meat lamb – 'Sam' – and participants in the control groups were not. A measure of emotional affect emphasising dissonance-related emotions (Elliot & Devine, 1994) was completed by participants before and after whichever manipulation they received. If participants' affect had become more negative after being

exposed to the meat-animal connection, this was indicative of dissonance. Dowsett et al. (2018) and Van der Velde (2017) found that on average, participants in the experimental condition exhibited a significant increase in negative affect, whilst those in the control condition did not, demonstrating that exposure to the meat-animal connection could induce negative affect, or dissonance. However, in both studies there was an important gender effect: it seemed to be mostly women who experienced dissonance.

The studies by Dowsett et al. (2018) and Van der Velde (2017) were the first of their kind and have invited cause for further exploration. For example, would the results reproduce if an animal different to lamb was used as a stimulus? And why do some people – especially women – experience more dissonance than others? The present study will investigate these questions by replicating the experiments of the two aforementioned studies with some modifications.

1.2 Animal Type

Research shows that we tend to like animals more and feel greater moral concern towards them if they are perceived to be similar to us, in terms of their physical features and their mind (Batt, 2009; Bastian et al., 2012). Some animals are seen as having more or less mind than others. For example, Bastian et al. (2012) found that chickens and fish were perceived as having less mind than other animals, and suggested that because of this, dissonance related to their consumption may be less evident. This theory is supported by a study which indicates that the perceived intelligence of animals predicts the amount of disgust felt about eating them, with more intelligent animals eliciting greater disgust (Ruby & Heine, 2012). Notably, chickens seem to be consistently lower down on the list of perceived intelligence, such as in Davis & Cheeke's (1998) study, where the order from highest intelligence to lowest was dogs, cats, pigs, horses, cows, sheep, chickens, and turkeys. In

addition to intelligence, the cuteness of an animal is positively related to negative feelings about eating them (Ruby & Heine, 2012).

Socio-cultural factors may also affect how people feel about meat consumption. For example, in Australia, lamb meat became linked to national identity when Meat and Livestock Australia started promoting lamb in conjunction with Australia Day as a strategy to increase red meat consumption (Ankeny, 2007). Another example is the way red meat, more than any other meat, is associated with masculinity (Rozin et al., 2012).

Variation in how different animals and meat types are perceived is important to consider when studying cognitive dissonance induced by the meat-animal connection, as different animals may elicit different responses. Therefore, as well as replicating the lamb experimental condition of Dowsett et al. (2018) and Van der Velde (2017), the present study will also include a chicken experimental condition to investigate whether previous results can be reproduced with a different animal. Chicken should provide a distinct comparison to lamb for a number of reasons relevant to the points above; unlike lamb, chicken is not tied to cultural identity in Australia (which is the location of the previous studies and this study); it is not associated with masculinity in the same way as red meat; and chickens are perceived as having lower intelligence than other animals and may have a different perceived cuteness.

1.3 Meat and Gender

Little is known about the possible mechanisms behind individual differences, particularly gender differences, in cognitive dissonance induced by exposure to the meat-animal connection (Dowsett et al., 2018; Van der Velde, 2017). Van der Velde (2017) suggests that it is possible that men experience less cognitive dissonance than women because there is not as much discrepancy between their attitudes towards animals and their meat-eating behaviour. Indeed, there exists an extensive amount of research indicating that men report less

concern for animal welfare (e.g. Taylor & Signal, 2015; Herzog, 2007; Mathews, 1997) and stronger pro-meat attitudes than women (e.g. Dowsett et al, 2018; Van der Velde, 2017; Rothgerber, 2013). Men also tend to exhibit more utilitarian and dominionistic attitudes towards animals, whereas women tend to exhibit more humanistic and moralistic attitudes (Kellert & Berry, 1987).

Central to this literature is the concept of masculinity. There is a body of literature documenting the association that exists between meat, in particular red meat, and masculinity (e.g. Rozin et al., 2012; Timeo & Suitner, 2018; Rothgerber, 2013; Stibbe, 2004), which may play an important role in gender differences in attitudes towards animals and meat (Rothgerber, 2013). For example, a recent study has shown that women find men who eat meat to be more attractive than those who do not, and that this is because they are perceived as being more masculine (Timeo & Suitner, 2018). It was suggested that these kinds of gender role expectations influence men's decisions to consume meat. This is reflected in meat consumption patterns, with men generally consuming more meat than women (e.g. Daniel et al., 2011; Clonan et al., 2015) and women being more likely to not consume any meat (e.g. Allès et al., 2017; Perry et al., 2001).

The historical role of males as hunters may offer a rationale for the meat-masculinity association (Rozin et al., 2012). Hunting animals for food was a task that required strength and displayed dominance and power over other animals. Meat was seen as a high-energy food important for strength and prime cuts were often reserved for men. Even today, particular cuts of meat are reserved for men in some cultures (Rozin et al., 2012). These factors may contribute to the reasons that meat remains associated with typically masculine characteristics such as strength and power, and building muscle (Rozin et al., 2012; Stibbe, 2004). The meat-masculinity association indicates that eating meat is likely to be an important aspect of the

social and personal identity of men, validating their masculinity (Rothgerber, 2013; Ruby & Heine, 2011; Timeo & Suitner, 2018).

Another factor that appears to be related to individual differences in attitudes towards animals and meat is empathy. Research indicates that higher self-reported, human-directed empathy is correlated with greater concern for the treatment of animals (Signal & Taylor, 2015). Women typically score higher on self-reported empathy than men (Baez et al., 2017; Eisenberg & Lennon, 1983), therefore, it might be assumed to be the reason that they show more concern for animals than men. In this sense, empathy may help explain gender differences in meat-related dissonance. Indeed, according to Van der Velde (2017) research on the meat-paradox often assumes that dissonance is a result of feeling empathy for animals, though there is a lack of empirical evidence for this.

The relationship between gender and empathy has received a lot of academic attention; however, it is a contentious issue. There is evidence which points to neurobiological differences between men and women in the affective and cognitive neural networks related to empathy (Christov-Moore et al., 2014), but it appears that the extent of gender differences in empathy may be exaggerated when self-report measures are used (Baez et al., 2017; Eisenberg & Lennon, 1983). The latter studies showed that women scored considerably higher than men on self-reported empathy; but when experimental methods were used, which involved measuring physiological responses and assessing reactions to hypothetical scenarios, the results showed minimal differences. Interestingly, it was suggested that gender role stereotypes were behind this inconsistency. Eisenberg & Lennon (1983) showed that in both men and women, higher self-reported masculinity was associated with lower self-reported empathy, and higher self-reported femininity was associated with higher self-reported empathy. They concluded that men and women differ in how empathetic they wish to appear, and that this is influenced by gender role stereotypes. In the context of attitudes towards animals, the empathy-

femininity relationship is elucidated by research which shows that pro-animal welfare attitudes are negatively correlated with a masculine gender role orientation and positively correlated with a feminine gender role orientation (Herzog, Betchart & Pittman, 1991).

The meat-masculinity and empathy-femininity associations reported in the literature suggest that it is important to consider gender role orientation and empathy as mechanisms for gender differences in cognitive dissonance induced by the meat-animal connection. Therefore, the present study will explore whether gender role orientation and empathy correlate with dissonance.

1.4 Resolving the Meat-Paradox

Another important aspect of understanding the meat-paradox has been analysing the reasons people give for eating meat, and how they report – implicitly or explicitly – the ways they resolve or reduce psychological discomfort resulting from the discrepancy in cognitions that arises from both caring about animals and eating them. One way this discrepancy could be reduced is by ceasing the behaviour of eating meat. However, research has shown that people generally resolve dissonance in such a way that is easiest for them (Zipf, 1949). Eating meat is a behaviour often acquired in childhood, becoming a habitual and convenient behaviour in adulthood, reinforced by society and government and health authorities. Furthermore, eating meat can be tied to personal identity and culture, as discussed earlier. Therefore, for many meat-eaters, ceasing meat consumption would require considerable effort and may not be perceived as the easiest dissonance reduction strategy. Indeed, research shows that people often intend to continue to eat meat even after the meat-animal connection is made salient to them, and dissonance is experienced (Dowsett et al., 2018; Van der Velde, 2017). Instead of changing their behaviour, meat-eaters may reduce dissonance through moral disengagement.

Moral disengagement is a term describing the process of disengaging from moral control by convincing oneself that a moral standard (e.g. causing harm to animals should be avoided) does not apply to oneself in a particular context (Bandura, 1999). One strategy of moral disengagement involves cognitively restructuring an inhumane behaviour into something benign or worthy by using moral justifications. This strategy of moral disengagement has been demonstrated in the context of the meat-paradox. For example, recent studies indicate many meat-eaters believe eating meat to be 'natural' for humans, 'normal' in society, 'necessary' for adequate nutrition, and 'nice', or tasty (Joy, 2010; Piazza et al., 2015). These four 'N's' are frequently used as justifications for eating meat (e.g. Joy, 2010; Piazza et al., 2015; Dowsett et al., 2018), and are ways of restructuring meat consumption into a benign or worthy behaviour. A fifth N – 'neutralisation' – was proposed by Dowsett et al. (2018) to accommodate for another category of justifications. Neutralisation describes attempts to minimise the harmful impacts of eating meat by focusing on positives. The justifications "I only eat free range meat" and "I don't eat much meat" are examples (Dowsett et al., 2018). Dowsett et al. (2018) found that neutralisation was the most commonly used justification type compared to the other N's. In order to add to and bolster previous literature on moral disengagement theory applied to the meat-paradox, part of the present study will involve an analysis of justifications used by participants who are exposed to the meat-animal connection and remain unwilling to reduce meat consumption.

1.5 Summary of Aims and Hypotheses

The first aim of the present study is to replicate the main findings of the previous experiments by Dowsett et al. (2018) and Van der Velde (2017). As in previous studies, cognitive dissonance will be measured as the difference between pre- and post-condition affect, with a greater affect difference indicating greater dissonance. Based on previous findings, it is hypothesised that, on average, participants in the lamb condition will exhibit greater affect

difference (dissonance) than those in the control condition (hypothesis 1); that, on average, women in the lamb condition will exhibit greater affect difference than women in the control condition (hypothesis 2); and that, on average, men in the lamb condition will not exhibit greater affect difference than men in the control condition (hypothesis 3).

The second aim is to test whether the results of Dowsett et al. (2018) and Van der Velde (2017) can be reproduced with a different animal by comparing participants' affect difference in the chicken condition with that of those in the control condition. A comparison of affect difference will also be made between the chicken and lamb conditions. There will be no set hypotheses, as these are novel analyses.

The third aim is to explore the possible mechanisms behind individual differences, particularly gender differences, in cognitive dissonance induced by exposure to the meat-animal connection. This will be done by assessing whether empathy and gender role orientation are correlated with affect difference. There will be no set hypotheses for these correlations, as they have previously been unexplored.

The fourth aim is to investigate whether participants' openness to reduce their meat consumption is associated with the condition they are exposed to and their gender, for which there will be no set hypotheses.

The final aim is to strengthen previous literature on understanding justifications for meat consumption and ways that dissonance may be resolved. This will be done by analysing the qualitative explanations of participants who are unwilling to reduce their meat consumption after being exposed to the meat-animal connection. Based on the findings of Dowsett et al. (2018), it is hypothesised that the five N's of justification types – *natural*, *normal*, *necessary*, *nice* and *neutralisation* (Joy, 2010; Piazza et al., 2015; Dowsett et al., 2018) will be evident in the responses, and that *neutralisation* will be the most common (hypothesis 4).

CHAPTER 2

Method

2.1 Participants

Participants (n = 235, women = 177, mean age = 26.47, SD = 9.78) were first-year psychology students from the University of Adelaide, who participated in exchange for course credit, and people from the broader global population who were recruited through social media. Approximately 63% of participants were born in Australia. The sample was fairly well-educated, with approximately 54% of participants having completed a bachelor's degree or higher, and approximately 11% having completed an apprenticeship, diploma or certificate I-IV.

Participants were recruited via a student recruitment pool at the University of Adelaide (SONA) and convenience sampling using social media. The requirements for participation included being 18 years or older, a meat-eater, and proficient in English. An *a priori* power analysis indicated that each condition should have 64 participants (n = 192) to detect a moderate effect with 80% power when employing an alpha level of .05.

2.2 Materials

Data collection was via an online survey using Qualtrics[TM] (2018). The survey first included a participant information sheet (see Appendix A) which informed participants that the purpose of the study was to understand food as a function of people's emotions and individual differences. The word 'food' was used rather than 'meat' so as not to confuse participants in the control condition who were not presented with information about meat or animals. The survey also included demographic information (Section 2.2.1, see Appendix B), the experimental and control conditions (Section 2.2.2, see Appendix C, D & E), comprehension checks (Section 2.2.3, see Appendix F), the *Affect Measure* for pre- and post-condition affect

(Section 2.2.4, see Appendix G, Elliot & Devine, 1994), the Empathetic Concern and Perspective-Taking sub-scales of the *Interpersonal Reactivity Index* (Section 2.2.5, see Appendix H, Davis, 1980), the *Traditional Masculinity and Femininity* scale (Section 2.2.6, see Appendix I, Kachel et al., 2016), and meat consumption questions (Section 2.2.7, see Appendix J).

2.2.1 Demographic Information. The demographic information requested included age, gender, highest education level, and country of birth (see Appendix B). The demographic questions and response options were replicated from Dowsett et al. (2018) and Van der Velde (2017).

2.2.2 Conditions. There were two experimental conditions (lamb and chicken) and a control condition (apple). In the relative conditions, a selection of six pictures of meals containing either lamb, chicken or apples was first displayed for participants to choose from (see Appendix C, D & E). In the lamb and chicken conditions, this represented their commitment to meat-eating. The images were obtained from previous studies (Dowsett et al., 2018; Van der Velde, 2017) and by searching various relevant terms on Google Images. All pictures within and between conditions were selected according to similarities in background and appeal, and they were all matched in size.

The other part of each condition involved a written passage and a video. The passage and video in the lamb condition (see Appendix C) were the same as those used by Dowsett et al. (2018) and Van der Velde (2017). Participants read a passage about the processing of an Australian meat lamb – 'Sam' – from birth to slaughter. The language used was intentionally non-emotive, and direct references to Australian animal welfare standards were included to increase credibility. However, a vital part of this experiment was that the meat-animal connection be made clear, meaning that it was necessary to draw attention to the thinking,

feeling animal behind the meat. This was achieved by naming the lamb, highlighting that lambs are playful, social and intelligent, and comparing their intellect to that of dogs. A short video of a lamb opening two fastened gates was included to further demonstrate the intellect of lambs and to increase familiarity

(the video can be found here https://www.youtube.com/watch?v=lOC9mD6XVC8).

The chicken experimental condition (see Appendix D) was created for this study. It replicated all the key elements of the lamb condition: non-emotive language, references to Australian industry standards, naming the chicken (Snowy), highlighting the personality and intellect of chickens, comparing them to dogs, and a short video of a chicken counting numbers on a dice (https://www.youtube.com/watch?v=410Td8bU_r0). The audio was removed from both the lamb and chicken videos, and human faces were edited out so as to keep the focus on the animal.

The control condition (see Appendix E) was the same as the one created by Van der Velde (2017). It comprised of a passage about the processing of an apple from an Australian orchard. Like the experimental conditions, it referenced industry standards and included a short video with no audio, showing the harvesting and processing of apples (https://www.youtube.com/watch?v=rX20P3_4LCg). The use of apples as a control stimulus was originally chosen because they are a food that is not particularly associated with either masculinity or femininity; and as this line of research is sensitive to gender effects, using a gender-neutral food as a control was considered important.

To control for time and other possible erroneous variables, the readability, Flesch-Kincaid grade level, word count and the video length in each condition were closely matched (see Table 1).

Table 1

Readability statistics for conditions

	Readability	Flesch-Kincaid Grade Level	Word Count
Lamb experimental condition	60	9.1	461
Chicken experimental condition	53	10.6	477
Apple control condition	63	9.3	472

Note. Statistics calculated in Microsoft Word, 2018.

2.2.3 Comprehension Checks. Directly following each condition were two multiple choice questions which assessed participants' knowledge about what they had read or watched (see Appendix F). It was decided that correct answering of at least one of these questions indicated sufficient engagement with the material.

2.2.4 Measuring Negative Affect. The *Affect Measure* (see Appendix G, Elliot & Devine, 1994) used to measure participants' pre- and post-condition negative affect consisted of 24 items which represented emotions related to dissonance, such as *uneasy* and *guilty*. Participants were required to rate each of these on a 7-point Likert scale (*1 = does not apply at all*, to *7 = applies very much*). Total scores ranged from 24 to 168, with higher scores indicating a more negative affect. Six items, such as *happy* and *energetic*, measured positive affect and were reverse scored. The items were presented in a different order in the post-condition measurement than in the pre-condition measurement to control for order effects. Previously, this measure has demonstrated high internal consistency, Cronbach's alpha = .81 (Elliot & Devine, 1994).

2.2.5 Measuring Empathy. The Empathetic Concern (EC) and Perspective-Taking (PT) sub-scales of the *Interpersonal Reactivity Index* (IRI; Davis, 1980) were used to measure individual differences in empathy in this study (see Appendix H). The EC scale measures

emotional aspects of empathy, such compassion for others (*"I often have tender, concerned feelings for people less fortunate than me"*), whereas the PT scale measures cognitive aspects of empathy, such as adopting others' perspectives (*"before criticising somebody, I try to imagine how I would feel if I were in their place"*).

The EC and PT scales represent two of four sub-scales from the IRI, the other two being the Personal Distress scale, which is emotion-based like the EC scale, and the Fantasy scale, which is cognitive-based like the PT scale. Previous studies have suggested measuring empathy using solely the EC scale, or the EC and PT scales combined, rather than the entire IRI (Cohen & Strayer, 1996; Alterman et al., 2003; Taylor & Signal, 2015). The present study used both the EC and PT scales in order to cover both emotional and cognitive aspects of empathy, which may be important when considering gender differences. Use of these two sub-scales alone reduced survey length, reducing the likelihood of fatigue effects on participants' responding.

The EC and PT sub-scales were presented as a single scale of 14 items (7 in each sub-scale), which were statements such as those mentioned earlier, that participants rated on a 5-point Likert scale (*1 = does not describe me well*, to *5 = describes me very well*). Total scores ranged from 14 to 70, with higher scores indicating greater empathy. There were 5 items which were reverse scored. Both the EC and PT sub-scales have been found to demonstrate high internal consistency, with Cronbach's alpha values of .80 and .75 respectively (Baldner & McGinley, 2014).

2.2.6 Measuring Gender Role Orientation. The *Traditional Masculinity and Femininity* scale (TMF; Kachel et al., 2016) was used to assess individuals' gender role orientation by directly measuring self-reported traditional masculinity and femininity (see Appendix I). The scale consisted of 6 items which were rated on a 7-point Likert scale (*1 =*

very masculine, to *7 = very feminine*). Total scores ranged from 7 to 42, with higher scores indicating a more feminine gender role orientation. Items included non-relative statements such as *"I consider myself to be…"*, as well as relative statements requiring the participant to make social comparisons, such as *"traditionally, my interests would be considered as…"*. The scale has previously demonstrated high internal consistency, Cronbach's alpha = 0.94 (Kachel et al., 2016).

2.2.7 Meat Consumption Questions. Participants were asked a multiple-choice question, *"Would you consider reducing meat consumption?"*, with the possible answers being *yes*, *no*, or *maybe*. This was followed by an open-ended question asking them to explain their answer to the previous question (see Appendix J). The purpose of this was to examine participants' openness to reducing meat consumption, and to analyse the justifications, or potential dissonance reduction strategies, of those who were not. Using the content analysis guidelines by Neuendorf (2002), the justifications of participants who were not open to reducing meat consumption after being exposed to the meat-animal connection were categorised into 18 categories by the principal researcher.

2.3 Procedure

This study was carried out in accordance with the *Australian Code for the Responsible Conduct of Research* (National Health and Medical Research Council, 2007) and approved by the *University of Adelaide's Human Research Ethics Subcommittee, School of Psychology* (approval number 18/57). Informed consent was obtained when participants chose to begin the survey after reading and accepting the participant information sheet (see Appendix A). No deception was involved, participation was voluntary, and anonymity was fully achieved by using data collection procedures which separated participants' identifiable data from their survey responses before it was accessed by the researcher.

Participants accessed the survey through a website link at their convenience. Participants who provided informed consent first rated their emotions at that point in time to create a baseline measure of negative affect. They then provided demographic information. After this, participants were randomly allocated to one of the three conditions – lamb, chicken or apple – with randomisation by gender to ensure an even spread of men and women across conditions. After exposure to whichever condition they received, participants completed the relevant comprehension checks. All participants then re-rated their emotions and completed the IRI and TMF scales. As the IRI and TMF scales are purported to measure stable individual differences, their placement after the conditions was not expected to affect participants' responses to them. Lastly, participants completed the meat consumption questions.

To ensure the data were complete, all questions up until this point were compulsory in order to proceed in the survey. At the conclusion of the survey, participants were directed to another webpage (separate from the survey to ensure anonymity) where they could provide their email address if they wanted to receive a summary of the results (see Appendix K) and, if they were first-year psychology students at the University of Adelaide, they could also provide their identification number to receive course credit for their participation.

CHAPTER 3

Results

3.1 Data Inspection and Screening

In total, 442 participants commenced the survey. However, responses of participants who did not pass at least one of two comprehension checks, took an unreasonably long time to complete the survey, or reported their gender as 'other' ($n = 2$) were removed from all analyses, except the content analysis (Section 3.5), leaving a final sample size of 235.

The dependent variables in this study were *affect difference total*, *affect difference women* and *affect difference men*. These variables were created by calculating the difference between the pre- and post-condition affect scores of each participant, with a positive difference indicating cognitive dissonance. Univariate outliers were assessed for the dependent variables within each gender and condition using boxplots. There were 11 outliers total (8 women, 3 men) and their scores were transformed to be within 2 standard deviations above or below the respective means (see Appendix L; Tabachnick & Fidell, 2001).

The ANOVA assumptions of homogeneity of variance and normality were assessed for the dependent variables. Levene's test was significant for *affect difference total* and *affect difference women*, indicating unequal variance across conditions for these variables. Skewness and kurtosis statistics and distribution plots indicated some deviation from normality in all three dependent variables (see Appendix M). However, these issues were expected to be adequately addressed by using the bootstrap re-sampling procedure.

Univariate outliers were assessed for the correlational variables – *affect difference*, *empathy* and *gender role orientation* – using boxplots. There were 7 outliers total, and their scores were transformed to be within 2 standard deviations of the respective means (see Appendix L; Tabachnick & Fidell, 2001). Skewness and kurtosis statistics and distribution

plots indicated an acceptable level of normality for the correlational variables (see Appendix N).

3.2 Main Effects Hypothesis Testing

One-way ANOVAs were conducted for each dependent variable to compare affect difference across conditions in the total sample, and in women and men. This addressed the hypotheses that, on average, participants in the lamb condition would exhibit greater affect difference (dissonance) than those in the control condition (hypothesis 1); that, on average, women in the lamb condition would exhibit greater affect difference than women in the control condition (hypothesis 2); and that, on average, men in the lamb condition would not exhibit greater affect difference than men in the control condition (hypothesis 3). It also addressed the aim to compare participants' affect difference in the chicken condition with that of those in the control and lamb conditions.

Efron and Tibshirani's (1994) bias-corrected and accelerated bootstrap procedure was implemented for the ANOVAs, with 2,000 re-samples, to increase the robustness of results. A significant difference was found across conditions for the variable *affect difference total*, $F(2,234) = 16.04$, $p = < .001$. Follow-up t-tests indicated significantly greater affect difference in the lamb condition ($M = 12.82$, $SD = 23.33$) compared to the control condition ($M = -5.57$, $SD = 10.93$), $t(153) = 5.97$, $p = < .001$, $d = 1.0$, supporting hypothesis 1; and significantly greater affect difference in the chicken condition ($M = 9.69$, $SD = 24.29$) compared to the control condition, $t(108) = 4.73$, $p = < .001$, $d = 0.81$. No significant difference was found between the lamb and chicken conditions. This suggests that, on average, both experimental conditions induced dissonance in participants and were similarly effective in doing so.

Likewise, there was a significant difference across conditions for *affect difference women*, $F(2, 176) = 15.75$, $p = < .001$. Follow-up t-tests indicated significantly greater affect

difference in the lamb condition (M = 15.87, SD = 24.42) compared to the control condition (M = -5.80, SD = 11.29), $t(116)$ = 5.87, p = < .001, d = 1.14, supporting hypothesis 2; and significantly greater affect difference in the chicken condition (M = 12.20, SD = 25.07) compared to the control condition, $t(108)$ = 4.73, p = < .001, d = 0.93. No significant difference was found between the lamb and chicken conditions. This suggests that both experimental conditions induced an average dissonance effect in women and were similarly effective in doing so.

There was no significant difference in *affect difference men* across conditions, $F(2, 57)$ = 1.20, p = .31, supporting hypothesis 3. This indicates that neither experimental condition resulted in an average dissonance effect in men.

Notably, further observation of the data indicated that some participants – particularly men – exhibited a positive reactance response to the experimental conditions; that is, their affect became more positive after exposure to the meat-animal connection.

3.3 Correlational Analyses

Pearson correlations were conducted to assess whether affect difference was associated with empathy and gender role orientation (see Table 2). There were no set hypotheses for these correlations. Only the responses of participants in the experimental conditions were relevant to this analysis, leaving a sample size of 164. Results showed that affect difference was significantly but weakly positively correlated with empathy and gender role orientation overall, indicating that greater dissonance was associated with greater empathy and femininity. However, when assessed by gender, the correlation with empathy was only significant in men, whereas the correlation with gender role orientation was only significant in women (see Table 2; see Appendix O for scatter plots).

Table 2

Pearson correlations by gender

|	Gender	Empathy	Gender Role Orientation
Affect Difference	Women	.08	.13*
	Men	.36*	.14
	Total	.20*	.29***

Note. *p = < .05, **p = < .01, ***p = < .001

3.4 Categorical Data Analyses

Participants were asked the question *"Would you consider reducing your meat consumption?"*, to which the possible answers were *yes*, *no*, or *maybe*. Of the 228 valid responses for this section, 42.11% answered *yes*, 33.77% answered *maybe*, and 24.12% answered *no*, indicating most participants were open to reducing meat consumption. A 3x3 Pearson chi-squared test of association was conducted to examine whether there was an association between participants' openness to reducing meat consumption and the condition they were in. The result was non-significant, $X^2(4) = 2.8$, $p = .59$, indicating exposure to the meat-animal connection did not influence openness.

A 2x3 Pearson chi-squared test of association was conducted to examine whether gender was associated with openness to reducing meat consumption. A significant association was found, indicating that women and men differed in their openness, $X^2(2) = 9.765$, $p = < .01$. The proportions of *yes*, *maybe* and *no* responses amongst women and men indicated that women were more open to reducing meat consumption (see Figure 1).

Figure 1

Responses to "Would you consider reducing meat consumption?" by gender (n = 228)
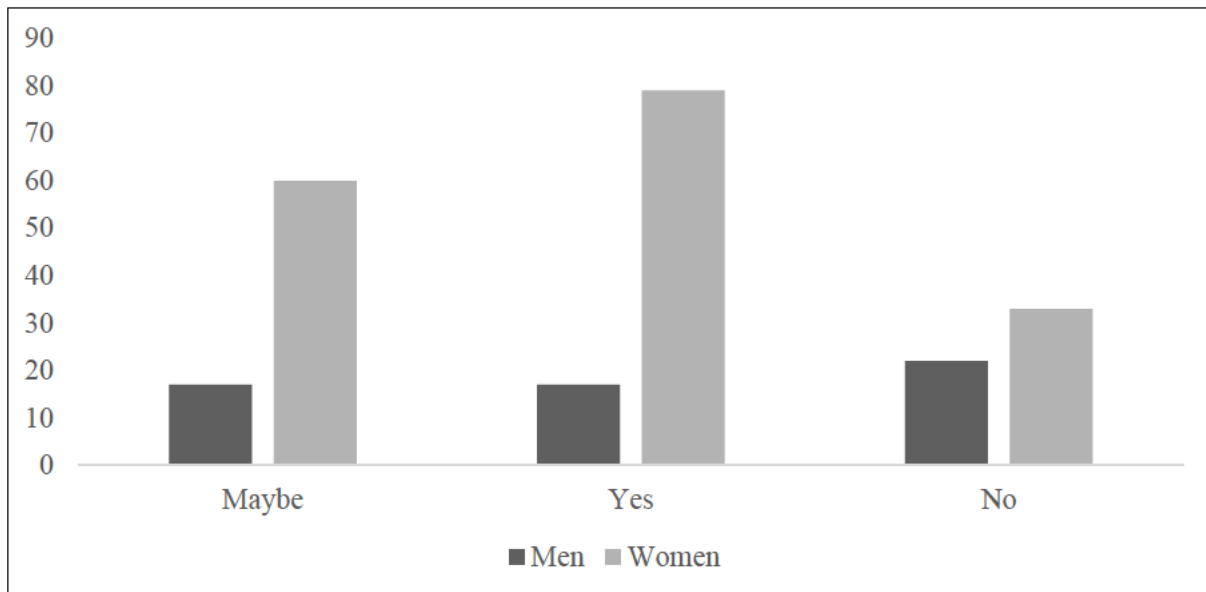
3.5 Content Analysis

For their responses to be included in the content analysis, participants must have been in one of the two experimental groups, answered 'no' to the question *"Would you consider reducing your meat consumption?"*, and provided a justification for this answer. There were 50 valid responses in total, and these were subjected to content analysis according to the guidelines by Neuendorf (2002) to ascertain the justifications for unwillingness to reduce meat consumption and possible dissonance reduction strategies. The results of the present analysis were largely supportive of a previous analysis by Dowsett et al. (2018). There were 18 response categories found (see Table 3) and many of them were the same as, or similar to, those of Dowsett et al. (2018). Some novel categories emerged which were not identified by Dowsett et al. (2018), such as *low concern for animals, support farmers/jobs, unconvinced, dissociated* and *plants feel pain*. Additionally, some categories previously identified were not found in this study, such as *reduced alternatives/difficult/one person can't change things* and *questioning*. It was also decided that some previously separated categories should be merged due to their

similarity in meaning. For example, *enjoyment/love/like* and *taste* were merged into *enjoyment/taste*, as liking the taste of meat was considered enjoyment. *Enjoyment/taste* was the most common response category in the present study.

Table 3

Response categories of 'no' participants in experimental groups (n = 50)

Category	Frequency	%	Quotation
Enjoyment/taste	21	20.79	*I enjoy eating meat*
Nutrients/protein	12	11.88	*Meat has a lot of nutrition*
Low intake	9	8.91	*I only eat meat a couple times a week*
Health reasons	8	7.92	*I feel better when eating meat*
Ethical/humane	7	6.93	*I consume ethically raised and slaughtered animals*
Healthy/balanced diet	7	6.93	*It should be eaten as part of a healthy diet*
Comfortable/my choice	6	5.94	*I am comfortable with my meat consumption*
Acknowledgement	5	4.95	*It is unfortunate that slaughtering is part of the process to acquire meat*
Natural	5	4.95	*Natural selection is the law of nature*
Habit/upbringing/culture	4	3.96	*Eating meat is a large part of my culture*
Low concern for animals	4	3.96	*I can't feel sympathy [for animals]*
Part of my diet/lifestyle	3	2.97	*It is a part of my diet*

Support farmers/jobs	2	1.98	*Supports thousands of Australians in the livestock industry*
Sustainability	2	1.98	*Important dietary element for billions of people*
Farm experience	2	1.98	*I lived on a farm*
Unconvinced	2	1.98	*Yet to hear an unbiased argument [against eating meat]*
Dissociated	1	0.99	*I don't have to see or kill the animal*
Plants feel pain	1	0.99	*Plants feel pain as well*

Note. Frequency refers to the amount of times content from a particular category appeared. Therefore, each participants' response may have included content from several categories.

It was hypothesised that the five N's – *normal, natural, necessary, nice* and *neutralisation* (Joy, 2010; Piazza et al., 2015; Dowsett et al., 2018) – would be evident in responses and that *neutralisation* would be the most common (hypothesis 4). The response categories above were sorted into justification types (see Table 4). All justification types were present, however *necessary* was the most common, therefore hypothesis 4 was partially supported. Although not a justification type, *acknowledgement* was a recurring theme in responses, where participants stated that they felt sadness or disagreement about the treatment of animals. This was consistent with the findings of Dowsett et al. (2018).

Table 4

Justification types of response categories

Category	Justification Type
Enjoyment/taste	Nice
Nutrients/protein	Necessary

Low intake	Neutralisation
Health reasons	Necessary
Ethical/humane	Neutralisation
Healthy/balanced diet	Necessary
Habit/upbringing/culture	Normal
Comfortable/my choice	Normal
Acknowledgement	Acknowledgement*
Natural	Natural
Low concern for animals	Normal
Part of my diet/lifestyle	Necessary
Support farmers/jobs	Neutralisation
Sustainability	Neutralisation
Farm experience	Normal
Unconvinced	Normal
Dissociated	Normal
Plants feel pain	Neutralisation

Note. *Acknowledgement is not a justification type.

CHAPTER 4

Discussion

4.1 Summary of Results

This study aimed to further understand cognitive dissonance in meat-eaters induced by exposure to the meat-animal connection. The lamb condition used in previous studies was replicated, and the reproducibility of previous results with a novel stimulus (chicken) was tested. Empathy and gender role orientation were assessed as mechanisms for gender differences in dissonance. Furthermore, openness to reducing meat consumption and justifications for eating meat were analysed.

Exposure to the meat-animal connection in both the lamb and chicken conditions was effective in inducing dissonance in the total sample. However, gender differences were found. Though some men experienced dissonance, when their responses were averaged there was no overall dissonance effect in the experimental groups compared to the control. Women, on the other hand, did show an average dissonance response in the experimental groups compared to the control. The chicken condition was similarly effective to the lamb condition in inducing dissonance in the total sample and in women.

Overall, greater empathy and a feminine gender role orientation were weakly to moderately correlated with greater cognitive dissonance. However, when analysing genders separately, the correlation between dissonance and empathy was only significant in men, and the correlation between dissonance and gender role orientation was only significant in women.

Exposure to the meat-animal connection did not appear to affect participants' openness to reducing meat consumption, but gender did, with women being more open than men. As hypothesised, the five N justification types for eating meat – normal, necessary, natural, nice and neutralisation – were evident amongst participants' open-ended responses. It was

hypothesised that 'neutralisation' would be the most commonly used justification type, however, 'necessary' was the most common.

4.2 Implications

The present study successfully reproduced the results of Dowsett et al. (2018) and Van der Velde (2017), providing further empirical evidence that exposure to the meat-animal connection can induce cognitive dissonance in meat-eaters, and demonstrating the application of cognitive dissonance theory in understanding the meat-paradox. The results indicate that, for some people, 'mindful' as opposed to 'mindless' meat-eating involves different cognitive and emotional processes (i.e. varying degrees of cognitive dissonance).

The finding that the chicken stimulus was able to induce a dissonance response provides some evidence that the results of the previous studies, where a lamb stimulus was used, may be generalisable to other types of animals. Although the average dissonance experienced by participants was less in the chicken condition than in the lamb condition, the difference was non-significant, indicating the conditions were similarly effective in inducing dissonance. Given that greater perceived animal intelligence has been found to be related to worse feelings about eating them (Ruby & Heine, 2012), and that chickens have been found to be perceived as less intelligent than sheep (Davis & Cheeke, 1998), it was a possibility that the chicken condition might induce less dissonance than the lamb condition. However, there was not adequate evidence of this in the present study. Perhaps this was because the conditions were made to be as similar as possible, such that the lamb and chicken were described as having very similar intellectual and social abilities. Therefore, intelligence and other potentially perceived differences were largely controlled for.

There was substantial variation in the emotional responses of individuals who were confronted with the meat-animal connection. As expected, women were more negatively

affected than men, exhibiting greater dissonance. Gender role orientation was investigated as a potential mechanism for gender differences in dissonance. It has been previously suggested that the well-documented link between masculinity and meat-eating (e.g. Rozin et al., 2012; Timeo & Suitner, 2018; Rothgerber, 2013) could explain why men did not appear to exhibit dissonance overall. Van der Velde (2017) theorised that it is possible men do experience dissonance when faced with the meat-animal connection, but that the desire to appear masculine may lead them to consciously or unconsciously report their emotions as more positive than they actually feel. Whilst causation could not be determined in this study, if gender role orientation (i.e. masculinity and femininity) does influence meat-eaters' dissonance, the two variables should be correlated. This study provided the first empirical evidence of an association between greater femininity and greater cognitive dissonance induced by exposure to the meat-animal connection, which can also be interpreted as an association between greater masculinity and less cognitive dissonance. This association was observed when women and men were analysed together. If the association were present within genders, it would make a stronger case for gender roles being a mechanism for dissonance; however, the association was only significant in women. This could be taken to mean that gender role orientation may only be a mechanism for dissonance in women; although, the strength of the correlation was very similar in both genders. Further research may be required to provide more evidence for the correlation within men. Nonetheless, the correlations found between gender role orientation and dissonance were very small, suggesting that other mechanisms are involved.

Empathy was also investigated as a potential mechanism for gender differences in dissonance. According to Van der Velde (2017) research on the meat-paradox often assumes empathy as a mechanism for dissonance; if one feels less empathetic concern for others or finds it difficult to adopt the perspectives of others, they may not feel as negatively when faced with

the idea that they are causing another harm (i.e. by eating meat). The present study provided some evidence of a correlation between greater empathy and greater dissonance. When men and women were assessed together, the correlation was weak. When assessed by gender, the correlation was significant and fairly strong in men, providing evidence that empathy may be an important mechanism for dissonance in men. However, in women, the correlation was close to zero. All women tended to rate themselves as having similarly high empathy, regardless of their emotional responses to the experimental conditions, hence no correlation between empathy and dissonance was found. There are two main possible explanations for why this was the case. Either empathy was simply not a mechanism for dissonance in women or it was a mechanism, but women who experienced less dissonance exaggerated their empathy. There is some evidence to support the latter scenario. Baez et al. (2017) found that women tend to portray themselves as having greater empathy when self-report measures are used rather than experimental measures. They suggested that self-report measures may induce biases that lead individuals to assume gender role stereotypes. Indeed, the stereotype of women being more empathetic than men, or rather the positive association between empathy and femininity, has been documented before (e.g. Eisenberg & Lennon, 1983).

In addition to the influences of the meat-masculinity and empathy-femininity relationships on gender differences in dissonance, it should be noted that dissonance in previous studies and in the present study was measured as the expression of negative affect – including emotions such as guilt, shame and self-criticism. Since gender norms dictate that men generally should not express 'weak' emotions such as these, it could also be the case that men may have under-reported negative feelings after being exposed to the meat-animal connection. Furthermore, a positive reactance response to the experimental conditions was observed in some women and men, meaning their affect became more positive after being exposed to the meat-animal connection. This could have been a form of dissonance reduction or 'dissonance

denial' – whereby participants may have tried to overcompensate for negative feelings with positive ones. Importantly, it seemed a greater proportion of men compared to women reacted in this way. When affect difference – the measure of dissonance – was averaged in men, the scores of those who felt dissonance would have been counterbalanced by men who showed positive reactance, resulting in no overall dissonance effect in men.

The present study's findings indicate that the mechanisms for variation in dissonance amongst individuals – particularly men and women – when faced with the meat-animal connection are likely to be complex. Furthermore, measuring them may be even more complex, particularly when self-report data is used, the limitations of which will be discussed later.

Exposure versus non-exposure to the meat-animal connection did not appear to affect whether participants were open to reducing their meat-consumption. In previous studies, people's attitudes towards animals and attachment to meat were also found to be unaffected by exposure to the meat-animal connection (Dowsett et al., 2018; Van der Velde, 2017). This suggests that attitudes underlying meat-eating may be too deeply entrenched to be changed by an instance of exposure to the meat-animal connection, even if it does induce dissonance. Women were more open to reducing meat consumption than men, which may be explained by previous evidence that men typically hold stronger pro-meat attitudes than women (Rothgerber, 2013) and women hold stronger pro-animal welfare attitudes than men (Signal & Taylor, 2015).

Participants' justifications for continued meat-eating after being exposed to the meat-animal connection demonstrated Bandura's (1999) moral disengagement theory in the context of the meat-paradox. There were many ways in which participants restructured the behaviour of eating meat into something benign or worthy by moral justification. The well-documented 'four N's' – nice, necessary, normal and natural – were all employed as justifications, or strategies of moral disengagement. The most frequent strategy was to frame meat as a dietary

requirement – necessary for optimal health and for preventing nutrient deficiencies and other perceived health problems. The prevalence of this strategy likely indicates that it is one of the more effective strategies for making meat-eating seem worthy, thereby reducing dissonance. It also indicates that meat being necessary for health is still a pervasive belief amongst meat-eaters. The present study also provided further evidence of the recently proposed fifth N – neutralisation – where the harmful impacts of one's meat consumption are minimised, or neutralised, by focusing on positives (Dowsett et al., 2018). This mostly appeared in the form of participants claiming that they have a low meat intake or that they buy 'ethically' sourced meat.

The findings regarding participants' openness to reducing meat consumption and their justifications for continued meat consumption could be applied in the context of activism. For example, animal or environmental activists who wish to promote reduced meat consumption could tailor their approach to be more effective by targeting women, as they were more open to reducing meat consumption than men. Participants' justifications could be used to identify possible barriers to reducing meat-consumption, such as the belief that it is necessary for health, which may then be granted larger attention in campaigns.

4.3 Limitations and Future Research

One of the limitations of this study was that there were more women who took part than men. This may have been because the study was advertised as being about attitudes and emotions relating to food, which might have interested women more than men. This limits the robustness of the conclusions drawn when men's data were analysed separately and compared to women's data.

Other limitations of the present study pertained to the method. As the scales used for empathy and gender role orientation are supposed to measure stable individual differences,

their position in the survey was after the main experiment to keep the structure of the survey as similar as possible to that of the previous studies being replicated. However, in hindsight, it is possible that participants' dissonance, and interpretations of what the study may have been about, might have influenced their responses to the scales, particularly the empathy scale. For example, an over-compensation in reported empathy may have served as a dissonance reduction strategy.

This relates to another limitation – the use of self-report data. Though it is a convenient method of measuring things like attitudes and emotions – and is sometimes the only possible method of doing so – it is not a direct measure of the mind. Social desirability response biases, such as impression management and self-deception, as well as lack of introspection, can influence participants' responses, even in online surveys where they know their responses are anonymous (Lautenschlager & Flaherty, 1990). Based on previous literature, it is more than likely that the desire to conform to social norms surrounding masculinity/femininity, empathy, and meat-eating affected at least some participants' responses in one way or another.

Another limitation of the present study was that the content analysis of justifications for meat consumption lacked inter-rater reliability testing. Having inter-rater reliability is ideal for more robust results; however, due to time limitations, the analysis was only conducted by the primary researcher.

The IRI scale used in this study measured human-directed empathy. Therefore, the correlation examined between empathy and dissonance was really between human-directed empathy and animal-related dissonance. Whilst this may still be a valid mechanism, and research indicates a relationship between human-directed empathy and pro-animal welfare attitudes (Signal & Taylor, 2015), there is also evidence for differences between human and animal-directed empathy (Ribeiro, 2017).

Future research is needed to further understand the mechanisms behind gender differences in meat-related cognitive dissonance. Examining the association between animal-directed empathy and dissonance may be important. Additionally, future research may involve comparing other animal stimuli (e.g. cows, pigs, or even dogs and cats) against each other in their capacity to induce dissonance. A similar experimental design to the present study could also be used to compare animal characteristics as causal mechanisms for dissonance. For example, previous studies have found that animal intelligence and cuteness are related to willingness to consume meat and feelings of disgust about eating meat (Ruby & Heine, 2012; Zickfield, Kunst & Hohle, 2018), however, no previous studies have manipulated solely intelligence or cuteness in an experiment to test the effect on cognitive dissonance.

4.4 Conclusions

The present study provided further evidence that cognitive dissonance can be induced by exposing people to the meat-animal connection and revealed that this effect may be generalisable with different animal stimuli. As found in previous studies, there was substantial variability in dissonance amongst individuals and there were gender effects; with women appearing to experience more dissonance than men. Higher self-reported femininity and empathy were correlated with greater dissonance, providing evidence that these may be underlying mechanisms for dissonance. However, the associations were unexpectedly small and varied between genders, and the influence of social desirability on self-reporting of these variables was speculated to have some impact on the results. What this research indicates is that the observed gender differences in meat-related cognitive dissonance are complex and there are likely to be other mechanisms involved. Furthermore, this study provided additional evidence of the five N justification types – including the newly proposed 'neutralisation' – and demonstrated the application of moral disengagement theory to the meat-paradox.

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Appendix A

Participant Information Sheet/Survey Preamble

Dear Participant,

You are invited to participate in this research project which aims to understand attitudes towards food as a function of people's emotions and individual differences. Conducted by Stefanie Di Stasio, this research is for an Honours thesis in Psychology at the University of Adelaide under the supervision of Dr. Carolyn Semmler and Prof. Anna Chur-Hansen.

Participation in this study is limited to those who meet the following criteria:
- Must eat meat
- Must be able to read and understand English
- Must be 18 years or older

Participants will be asked questions about emotions, various attitudes and beliefs, and food. This survey can be completed on any device with internet. Please allow 15-20 minutes to complete this survey in one session. If you wish to receive a summary of the results, submit your email address at the end of the survey. This will be stored separately to the data to ensure participants' anonymity.

Participation in this project is completely voluntary. If you agree to participate, you can withdraw from the study at any time; however, once submitted it will not be possible to withdraw your data.

All information provided by participants will be anonymous. The data will be stored on a secure server and accessed only by the researchers, and will be kept at the University of Adelaide for a minimum of five years. No identifiable information will be published.

There are no foreseeable risks to participating in this study. Should you experience any discomfort as a result of participating in this study, or should you have any questions, concerns or complaints, please contact the principal investigator ███████████████████
███
███
███
██
███

Although there are no immediate benefits to participants, this study may increase understandings of attitudes towards food.

By continuing, I acknowledge that I have read and understood the participant information sheet, my consent is given freely and I would like to participate in this study.

Appendix B

Demographic Information Questions

What is your age (in years)?

What is the highest level of schooling you have completed?

○ Year 12 or below

○ Certificates I-IV

○ Apprenticeship, diploma or advanced diploma

○ Bachelor's degree or honours

○ Post-graduate qualification

What is your place of birth?

○ Australia

○ New Zealand

○ China

○ UK

○ Other (please specify)

Are you...

○ Female

○ Male

○ Other

Appendix C

Lamb Experimental Condition

Please select a dish

Please carefully read through the following statement.

The meat you have selected is lamb. This lamb was born in December 2017. He was weaned from his mother at 8 weeks of age and vaccinated. Sam (the lamb) was put in a restraining device at 12 weeks of age for tail docking and castration without pain relief. These procedures were done to reduce soiling, risk of flystrike and improve meat quality.

Playful, social and a quick learner, Sam was typical of his breed. He was part of an Australian research study to show that lambs can solve mazes, like children, and get quicker at doing so with every repeat attempt. The study also found that lambs form friendships and even spend time thinking about their friends when they aren't around. Sam was able to learn his own name and perform tricks like a dog. Other studies have shown that lambs can recognise at least 50 individuals' faces and remember them for years.

Please watch the following video:

Standard 5.2 A person handling sheep must not:
2) throw or drop the sheep, except to land on their feet from a height less than 1.5 metres; or
3) strike, punch or kick sheep in an unreasonable manner; or
4) drag sheep that are not standing by only one leg, except in an emergency to allow safe handling, lifting, treatment or humane killing.

Sam was transported to a feedlot in February 2018 to reach a marketable weight through grain-based feed. On arrival he was given treatments for internal and external parasites and bacterial/viral diseases. His feedlot allowed for around 4 metres of land area and 1 centimetre of water trough space per lamb. The flock took around two weeks to adjust to their feedlot environment.

Once Sam met market requirements at 5 months of age he was taken off water and transported to an abattoir. Sam was not showing any of the following conditions; sickness, profuse diarrhoea, wounds, abscesses, or flystrike as outlined by the land Transportation of Livestock Welfare Standards.

Standard 10.6 A person must only use bleeding-out by neck cut to kill a conscious sheep when there is no firearm, captive bolt or lethal injection reasonably available.

Just prior to slaughter, Sam was walked up a raceway and into the stunning box where an operator stunned him with a captive bolt and then shackled his hind leg. Within seconds, the large blood vessels in his neck were severed to induce bleeding which caused his death. Sam was slaughtered and then inspected by a meat safety officer who determined that he was suitable for consumption. Within 2 hours, he was placed in a refrigerator to prevent bacterial growth and for the meat to age. Muscle shortening was not present as rigor mortis occurred before chilling. The carcass was then butchered, ready for cooking and consumption.

This passage was compiled from the following sources:
Australian Animal Welfare Standards and Guidelines – Land Transportation of Livestock (Edition 1, Version 1.1)
Australian Animal Welfare Standards and Guidelines for Sheep (January, 2016)
Australian Lot Feeders Association Factsheets.
Meat Industry Services is supported by the Australian Meat Processor Corporation (AMPC) and Meat & Livestock Australia (MLA)

Appendix D

Chicken Experimental Condition

Please select a dish

Please carefully read through the following statement.

The meat you have selected is chicken. This chicken was hatched in a hatchery in February 2018. After hatching, Snowy (the chicken) was placed under a heat lamp, with other newly hatched chicks, to dry out her feathers. She was then graded by weight class, and vaccinated to protect her and the other chicks from disease.

Curious, social and a quick learner, Snowy was typical of her breed. She was part of an Australian research study to show that young chickens could perform basic addition and subtraction tasks using small number sets, and could even exceed the capabilities of human babies. The study also found that chickens are social animals and can develop bonds with other chickens as well as humans. Snowy was able to learn her own name and perform tricks like a dog. Other studies have shown that chickens can count, develop many complex calls to communicate with other chickens, and recognise other individuals' faces and remember them for years.

Please watch the following video:

Snowy was transported to a growing farm in March 2018 to reach a marketable weight through grain-based feed. On arrival, she was placed in a cordoned off section of a large shed with thousands of other chickens. The lighting in the shed was dim to avoid over-stimulating the chickens, which can cause them to attack and mutilate each other. Snowy had constant access to water and food, which was kept in close proximity, so that she could continue to put on weight. As Snowy and the other chickens in the shed grew in size, their allocated floor space was increased to 14 birds per meter squared, giving them just enough room to move and access food. Snowy did not show any signs of sickness, disease or deformity whilst at the growing farm, as required by industry standards.

Standard 12.10 Birds with an incurable sickness or a significant deformity should be removed from the flock and humanely destroyed as soon as possible. Neck dislocation is an acceptable method of humane destruction provided it is carried out competently.

Once Snowy reached market weight at 6 weeks of age, she was taken off food and water and transported by truck in crates with the other chickens to a slaughter-house.

Standard 17.3 Birds must be slaughtered in a manner that minimises handling and stress. Acceptable slaughter methods include electrical stunning followed by bleeding out, neck dislocation or decapitation.

Just prior to slaughter, Snowy's legs were placed in shackles upside down on a conveyor belt which carried her head through electrified water, stunning her. She was then decapitated at the neck by an automatic blade which caused her death. Once her feathers were removed, Snowy was inspected by a meat and safety officer who determined she was suitable for consumption. Within 2 hours, she was placed in a refrigerator to prevent bacterial growth. The carcass was then ready for cooking and consumption.

This passage was compiled from the following sources:
Australian Chicken Meat Federation Inc. (2013)
Primary Industries Standing Committee, Model Code of Practice for the Welfare of Animals: Domestic Poultry (4th Edition)

Appendix E

Apple Control Condition

Please select a dish

Please carefully read through the following statement.

The dish you have selected contains an apple. The first stage of development for an apple fruit is when a bud on the tree starts to flower, a process called floral budburst. When the flowering is complete, a fruitlet starts to form, which is the beginning of the apple fruit. The cells of the fruit begin to fill with water and sugar and the apple rapidly increases in size. The enlargement of the apple to a mature picking stage will depend on proper watering and care. This growth continues at a steady rate from 6 to 7 weeks after budburst. At the end of the fruit fill stage, the apple is carefully picked from the tree and placed into a large bin.

Deciding when to harvest the fruit is one of the most important factors that influence the quality of the apple for consumers. Growers must ensure to pick the fruit at a time that optimises sugar and acidity levels (which increase with maturity), and starch and firmness levels (which decrease with maturity), while taking note of the colour, aroma and greasiness, all of which change as the apple matures.

The tree this apple came from was part of an Australian research trial to investigate the use of canopies over the trees. The purpose was to establish good light distribution throughout the canopy for good bud quality and fruit colour. At the time the apple was picked, the trial was still ongoing but had yielded positive results so far.

This apple was hand-picked from the tree 12 weeks after its initial flowering. It was then transported from the orchard to a processing plant. Here, the apple was washed and scanned to assess its quality and grade. The apple contained no major defects.

Quality Control Guidelines for Apples
Major defects include:
- *All rots and moulds*
- *All cuts and splits*
- *Pest and insect damage*
- *Skin markings greater than a 5c coin*
- *Bruising that is discoloured at the surface and protrudes into the flesh*
- *Failing firmness or maturity requirements*

Next, the apple was placed into a storage bin with all other apples in its grade. The bin was submerged in water to reduce the chance of bruising or damaging any of the apples. The water was then slowly drained and the apples settled into place in the bin. The apple was then placed into storage, at just above freezing temperature to ensure its quality was maintained.

After 1 month in cold storage, the apple was removed from storage and transported to another packing facility where it underwent a final visual assessment, was tagged with a sticker and placed in a box by hand. It was then transported to a supermarket, ready to be purchased and consumed.

Please watch the following video:

This passage was compiled from the following sources:
Apple and Pear Australia LTD – "Aussie Apples: Guidelines, specifications and product description language" and "Post-harvest seminar focuses on improving quality"
TheKitchn.com – "From Orchard to Market: Come Along on an Apple Harvest, by Emma Christensen"

Appendix F

Comprehension Checks

Lamb Experimental

How many gates did the lamb open in the video?

○ 1

○ 2

○ 3

○ 4

How old was Sam when he met market requirements?

○ 1 month

○ 5 months

○ 9 months

○ 1 year

Chicken Experimental

What colour was the dice in the video?

○ White

○ Blue

○ Red

○ Green

How old was snowy when she reached slaughter weight?

○ 1 week

○ 6 weeks

○ 8 months

○ 1 year

Apple Control

What did the research trial look at?

○ Soil quality

○ New watering systems

○ Automated picking machines

○ Use of canopies over trees

How long was the apple in cold storage?

○ 1 day

○ 1 month

○ 6 months

○ 1 year

Appendix G

Affect Measure

Below are words that describe different types of feelings. For each word, please indicate how much it describes how you are feeling right now by selecting from the following options. "1" means "does not apply at all", and "7" means "applies very much". Don't spend too much time thinking about each word, just give a gut-level response.

	1 - Does not apply at all	2	3	4 - Neutral	5	6	7 - Applies very much
Content	○	○	○	○	○	○	○
Distressed	○	○	○	○	○	○	○
Disappointed with myself	○	○	○	○	○	○	○
Bothered	○	○	○	○	○	○	○
Optimistic	○	○	○	○	○	○	○
Angry at myself	○	○	○	○	○	○	○
Self-critical	○	○	○	○	○	○	○
Tense	○	○	○	○	○	○	○
Concerned	○	○	○	○	○	○	○
Uncomfortable	○	○	○	○	○	○	○
Uneasy	○	○	○	○	○	○	○
Disgusted with myself	○	○	○	○	○	○	○
Shame	○	○	○	○	○	○	○
Good	○	○	○	○	○	○	○
Guilty	○	○	○	○	○	○	○
Negative	○	○	○	○	○	○	○
Energetic	○	○	○	○	○	○	○
Annoyed at myself	○	○	○	○	○	○	○
Embarrassed	○	○	○	○	○	○	○
Anxious	○	○	○	○	○	○	○
Happy	○	○	○	○	○	○	○
Frustrated	○	○	○	○	○	○	○
Regretful	○	○	○	○	○	○	○
Friendly	○	○	○	○	○	○	○

Appendix H

Interpersonal Reactivity Index (EC and PT sub-scales)

For each of the statements below, please indicate what best describes you by choosing a number on the scale. "1" means "does not describe me well", and "5" means "describes me very well".

	1 - Does not describe me well	2	3	4	5 - Describes me very well
Sometimes I don't feel very sorry for other people when they are having problems	○	○	○	○	○
If I'm sure I'm right about something, I don't waste much time listening to other people's arguments	○	○	○	○	○
I sometimes try to understand my friends better by imagining how things look from their perspective	○	○	○	○	○
I often have tender, concerned feelings for people less fortunate than me	○	○	○	○	○
I try to look at everybody's side of a disagreement before I make a decision	○	○	○	○	○
When I see someone being taken advantage of, I feel kind of protective towards them	○	○	○	○	○
Before criticising somebody, I try to imagine how I would feel if I were in their place	○	○	○	○	○
Other people's misfortunes do not usually disturb me a great deal	○	○	○	○	○
I would describe myself as a pretty soft-hearted person	○	○	○	○	○
I believe that there are two sides to every question and try to look at them both	○	○	○	○	○
I would describe myself as a pretty soft-hearted person	○	○	○	○	○
I believe that there are two sides to every question and try to look at them both	○	○	○	○	○
When I'm upset at someone, I usually try to "put myself in their shoes" for a while	○	○	○	○	○
When I see someone being treated unfairly, I sometimes don't feel very much pity for them	○	○	○	○	○
I sometimes find it difficult to see things from the "other guy's" point of view	○	○	○	○	○
I am often quite touched by things that I see happen	○	○	○	○	○

Appendix I

Traditional Masculinity and Femininity Scale

For each of the statements below, please indicate what best describes you by choosing a number on the scale. "1" means "very masculine", and "7" means "very feminine".

	1 - Very masculine	2	3	4 - Neutral	5	6	7 - Very feminine
I consider myself as...	○	○	○	○	○	○	○
Ideally, I would like to be...	○	○	○	○	○	○	○
Traditionally, my interests would be considered as...	○	○	○	○	○	○	○
Traditionally, my attitudes and beliefs would be considered as...	○	○	○	○	○	○	○
Traditionally, my behaviour would be considered as...	○	○	○	○	○	○	○
Traditionally, my outer appearance would be considered as...	○	○	○	○	○	○	○

Appendix J

Meat Consumption Questions

Would you consider reducing meat consumption?

○ Yes

○ Maybe

○ No

What are your reasons for this?

Appendix K

Participant Summary of Results

Thank you!

Earlier this year you completed a survey about attitudes towards food. Though we could not tell you at the time, the study more specifically looked at cognitive dissonance surrounding meat-eating. Cognitive dissonance refers to psychological discomfort caused by conflicting attitudes (e.g. considering animals as having moral value yet eating them).

You would have been randomly assigned to one of three groups:

Experimental group 1: the processing of an Australian meat lamb named Sam

Experimental group 2: the processing of an Australian meat chicken named Snowy

Control group: the processing of Australian apples

Participants' change in emotions after being presented with one of the above conditions were used to assess cognitive dissonance. An overall increase in negative emotions in either experimental group compared to the control group would indicate that exposure to the meat-animal connection effectively induced dissonance.

This study compared dissonance responses between men and women, and between the lamb vs chicken stimuli. Additionally, this study assessed whether variation in dissonance in the experimental groups was associated with gender roles and empathy.

Results:

- Overall, participants in both experimental groups, who read about the processing of a meat lamb or chicken, did appear to experience an increase in negative emotions, or cognitive dissonance.
- On average, women were more affected than men, experiencing more dissonance.
- The type of animal stimulus (lamb or chicken) did not appear to significantly impact the amount of dissonance participants experienced – people did not feel worse about one animal compared to the other.
- Cognitive dissonance was weakly associated with femininity and empathy, indicating these may be mechanisms for dissonance.
- "Necessity" was the most common type of justification for continued meat consumption, indicating many people believe that reducing meat consumption would somehow have a negative impact on their health.

If you would like any further information about the study, please do not hesitate to reply to this ███████████████████████████████ Once again, thank you for sparing the time to participate in this research.

Appendix L

Outlier Transformations

Transformed univariate outliers (dependent variables)

Variable	Condition	Original Score	Mean	Standard Deviation x2	Adjusted Score
Affect difference women	Lamb	86	16.93	54.84	72
		117	16.93	54.84	72
		84	16.93	54.84	72
	Chicken	65	12.39	51.30	64
		76	12.39	51.30	64
		-41	12.39	51.30	-39
	Apple	31	-5.90	25.50	20
		-47	-5.90	25.50	-31
Affect difference men	Lamb	102	5.33	49.74	55
	Chicken	57	3.10	44.10	47
	Apple	-33	-5.19	21.88	-27

Transformed univariate outliers (correlational variables)

Variable	Original Score	Mean	Standard Deviation x2	Adjusted Score
Affect difference	117	11.61	51.84	63
	102	11.61	51.84	63
	86	11.61	51.84	63
	84	11.61	51.84	63
Empathy	27	53.98	16.32	38
	28	53.98	16.32	38
	33	53.98	16.32	38

Appendix M

Assessing Normality for Dependent Variables

Skewness and kurtosis statistics for the dependent variables

	Skewness	Kurtosis
Affect difference total	.97	.65
Affect difference women	.84	.29
Affect difference men	1.29	2.02

Distribution plot
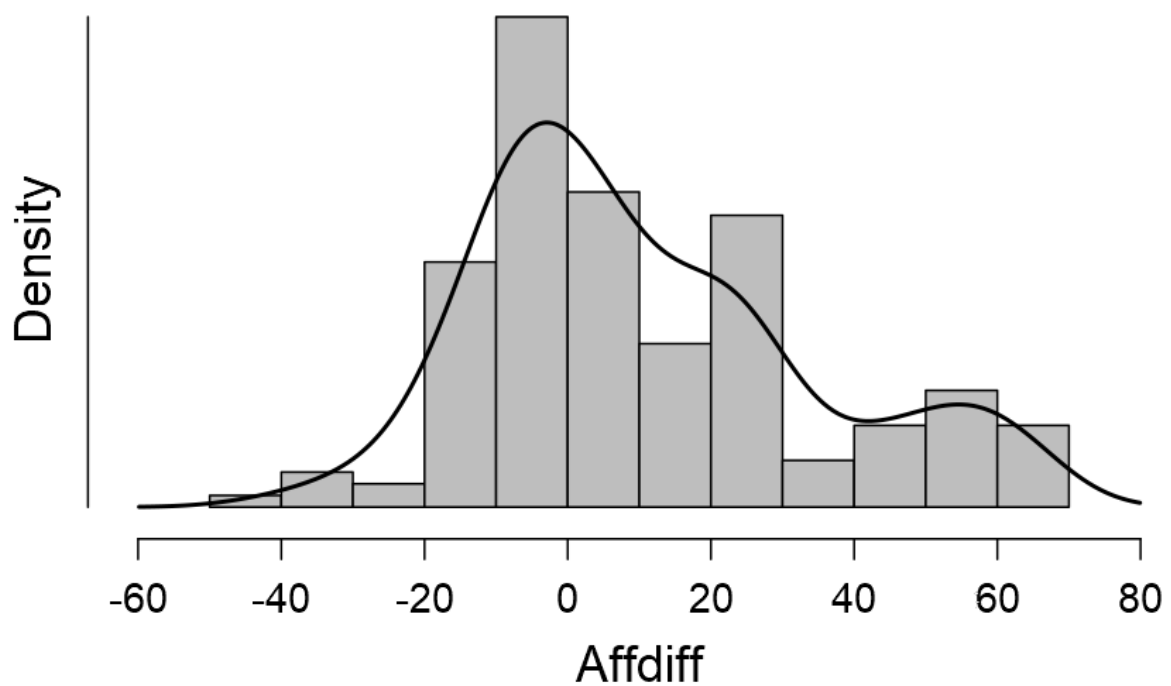
Affect difference total
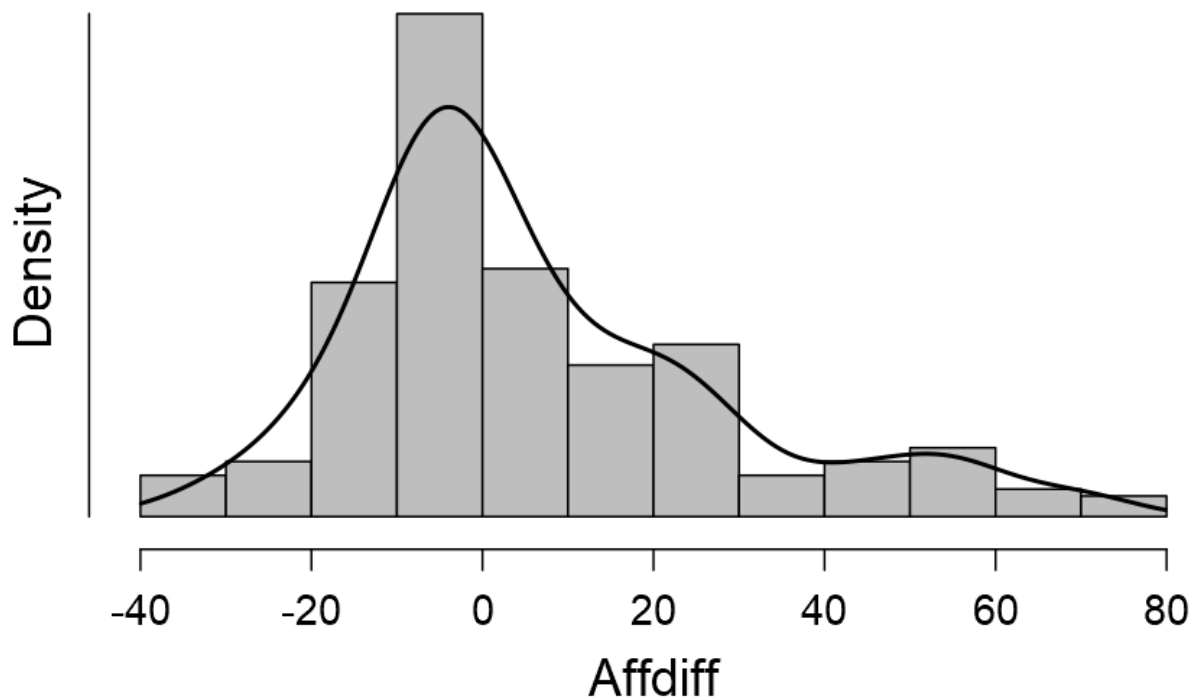
Distribution plot

Affect difference women
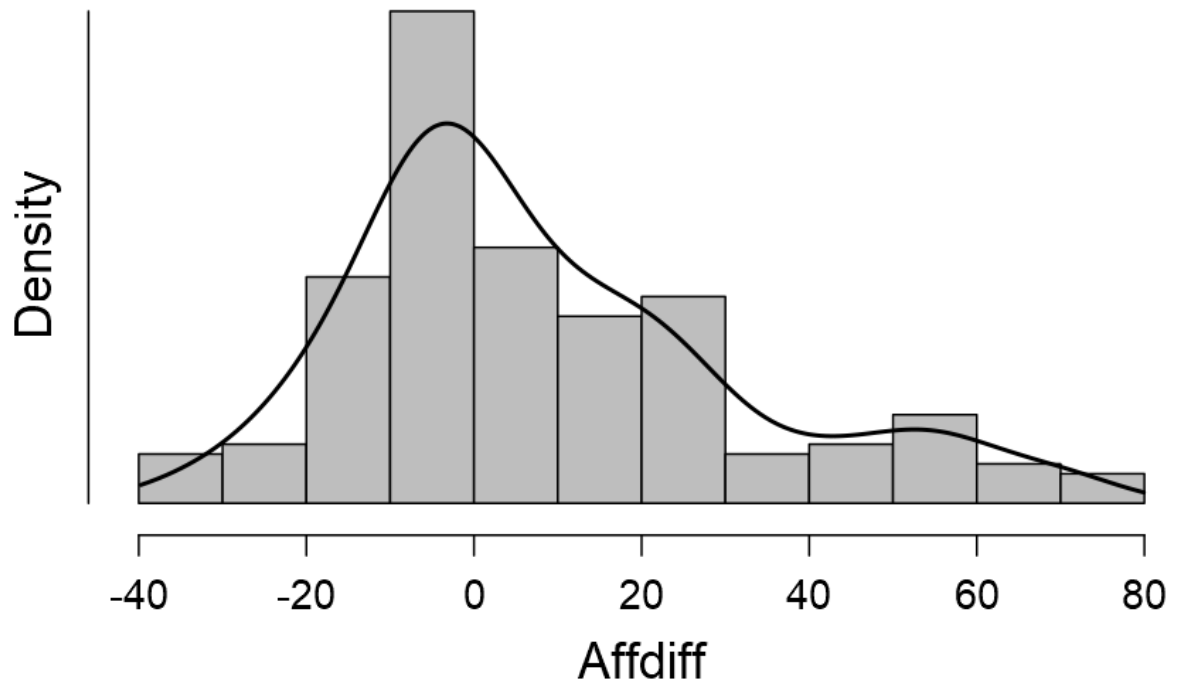
Distribution plot

Affect difference men
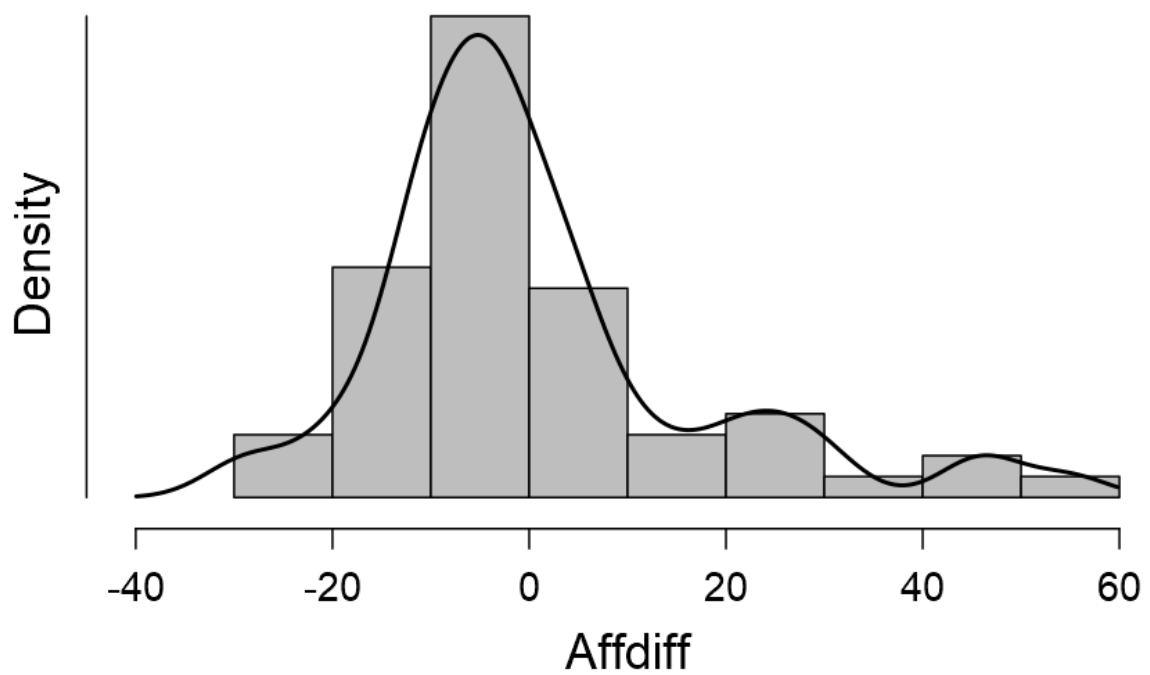
Appendix N

Assessing Normality for Correlational Variables

Skewness and kurtosis statistics for correlational variables

Variable	Skewness	Kurtosis
Affect difference	.65	-.19
Empathy	-.36	-.33
Gender role orientation	-.31	-.42

Distribution plot

Affect difference

Distribution plot
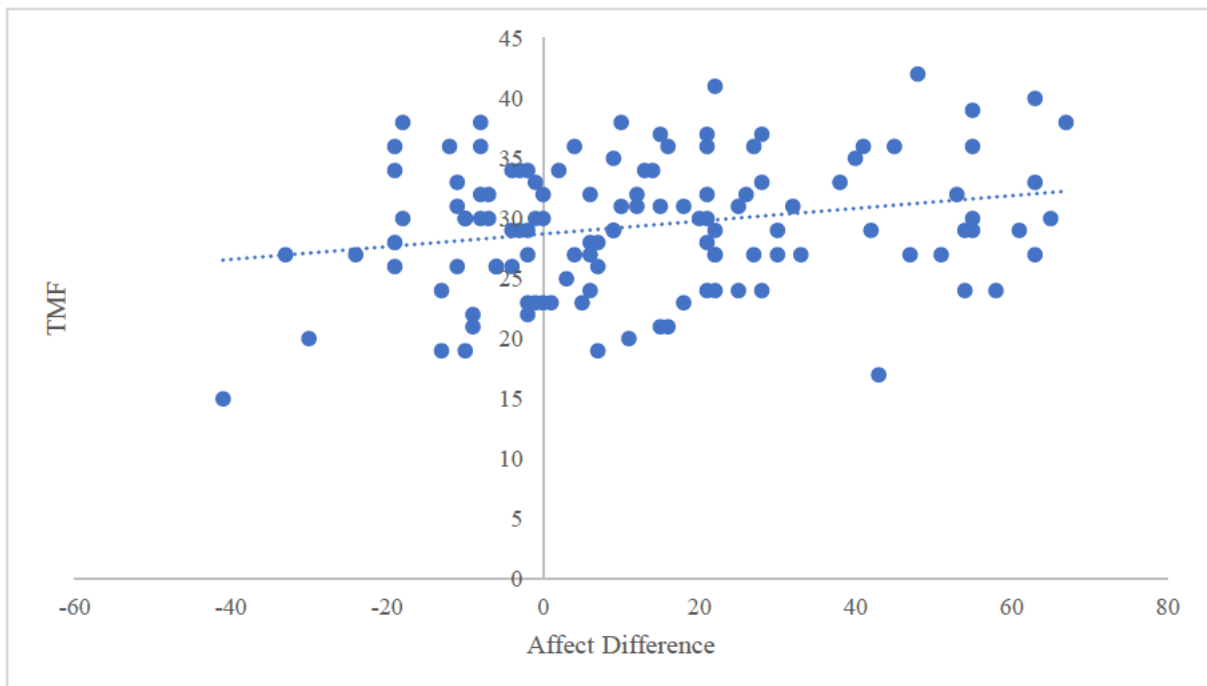
Empathy
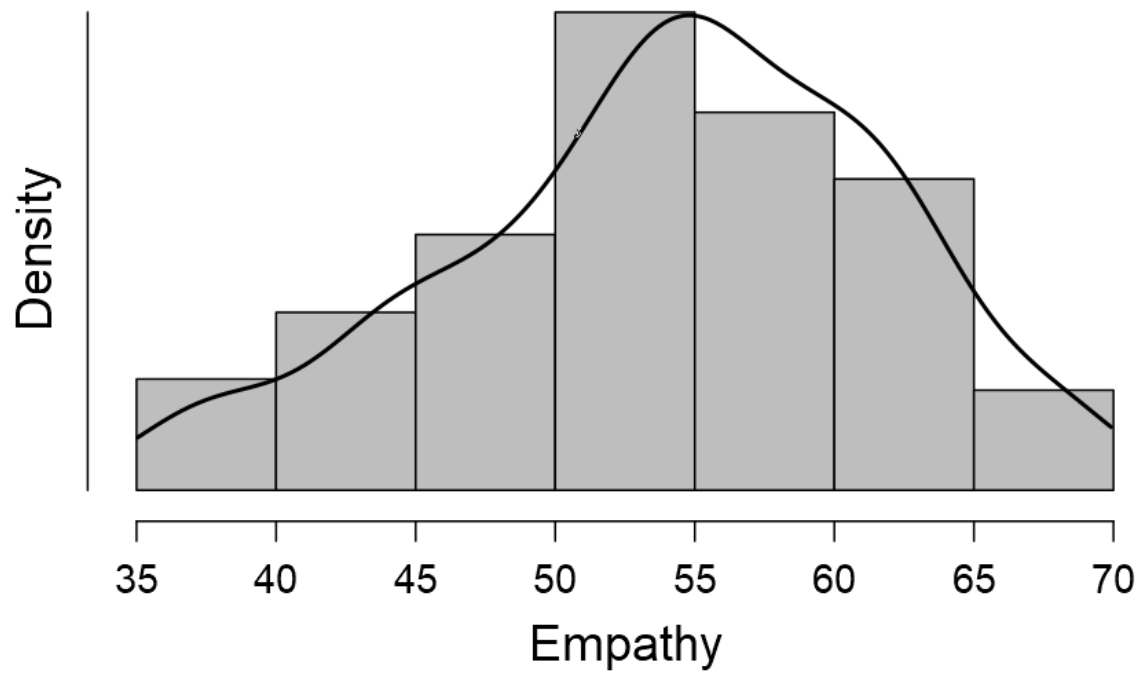
Distribution plot

Gender role orientation
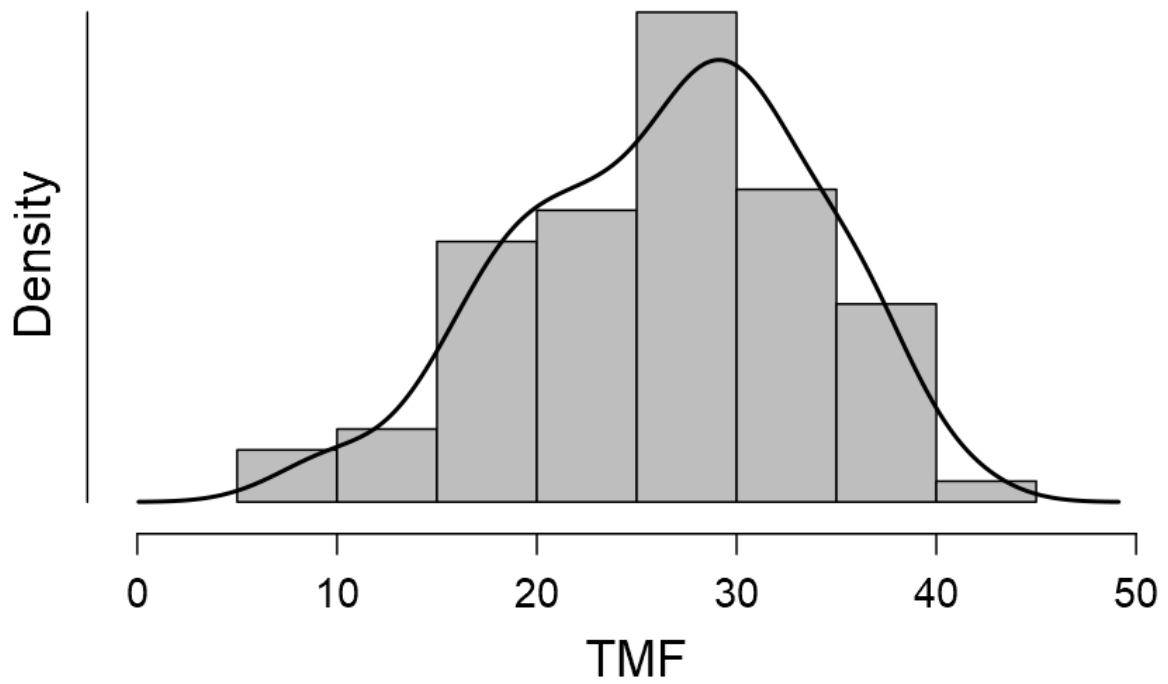
Appendix O

Correlations

Affect Difference and TMF – Total
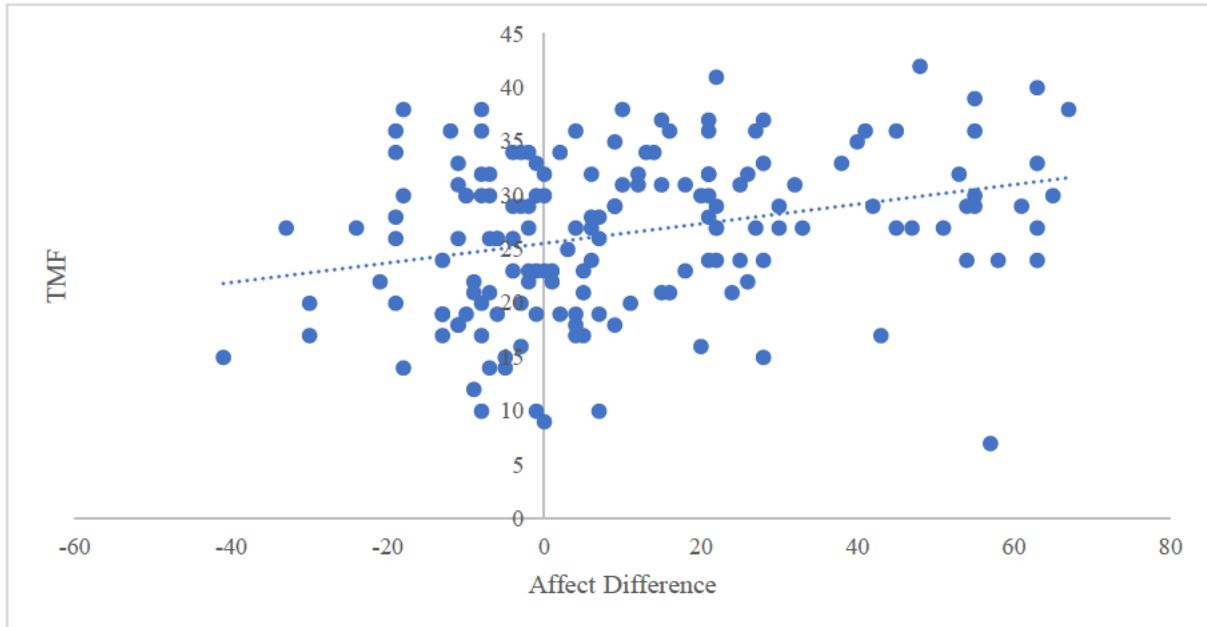
Note. A higher TMF score indicates a more feminine/less masculine gender role orientation, and higher Affect Difference indicates greater dissonance.
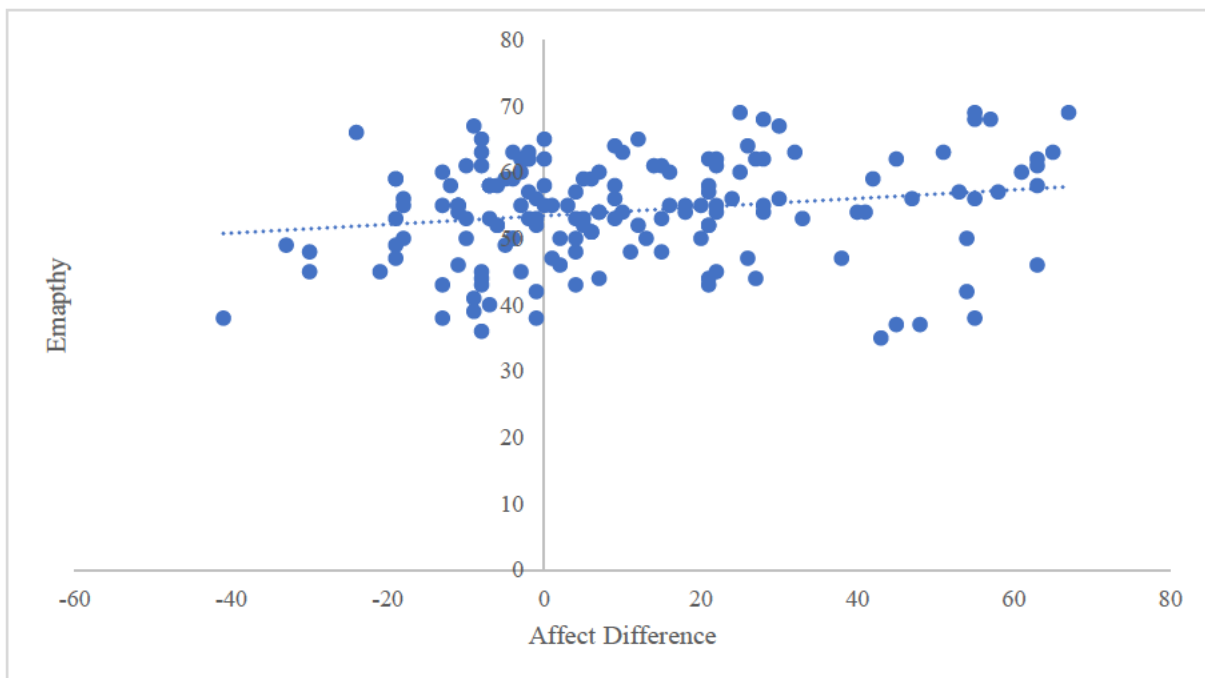
Affect Difference and TMF – Women
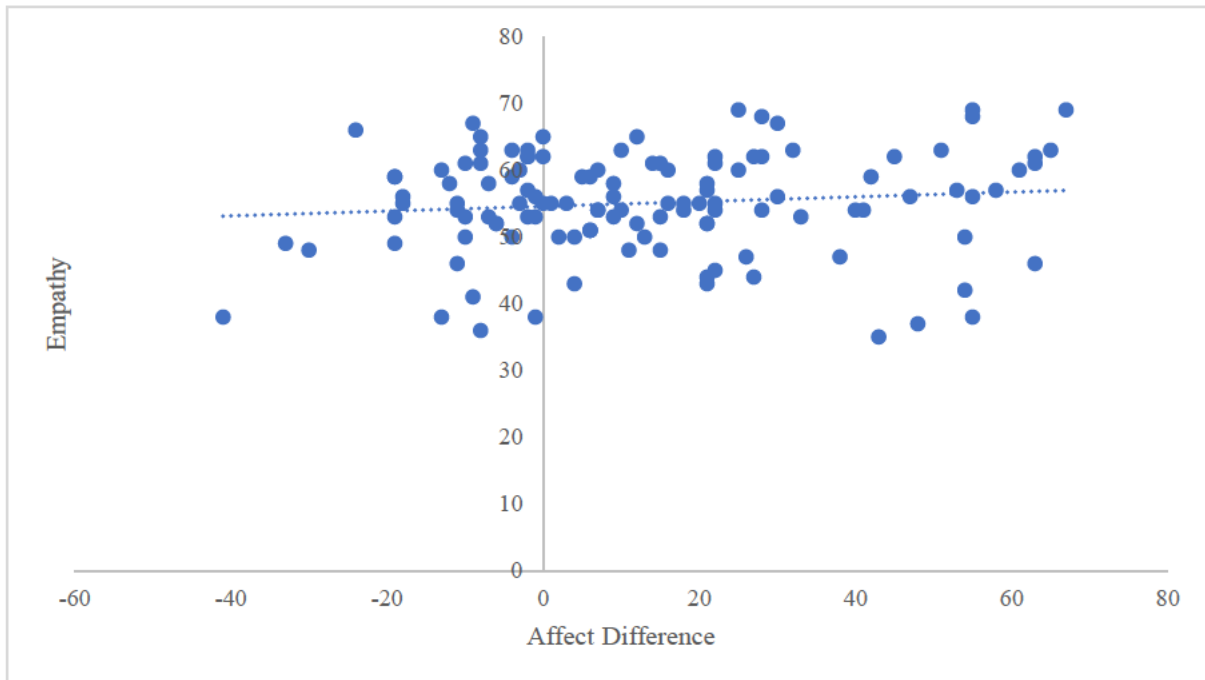
Affect Difference and TMF – Men
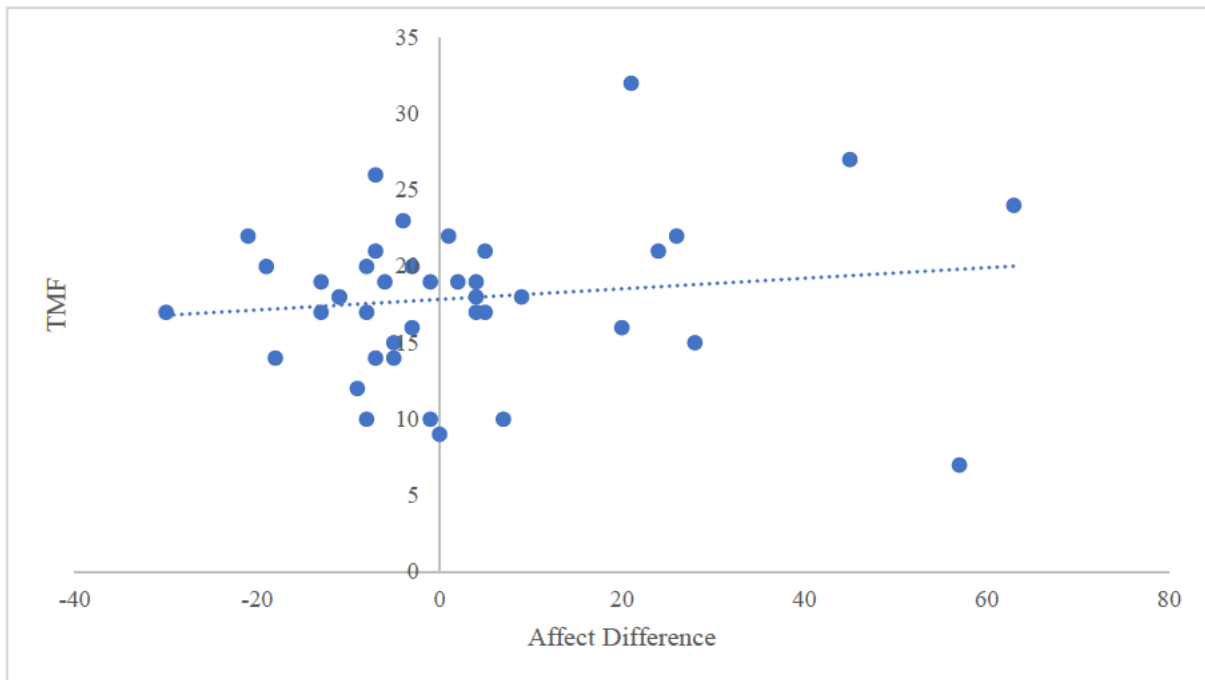
Affect Difference and Empathy – Total

Note. A higher Empathy score indicates greater empathy, and higher Affect Difference indicates greater dissonance.

Affect Difference and Empathy – Women

Affect Difference and Empathy – Men