Justifying a meat diet as necessary: An informative approach towards the reduction of meat consumption.

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Abstract

A troublesome aspect of our modern society is the dietary habit of consuming animals. The apparent disconnection between love and empathy towards animals, yet killing them for food, has been termed the meat-paradox. Morally motivated vegetarians, although a minority, may serve as a source of implicit moral reproach for many omnivores, eliciting behaviours designed to defend against such moral condemnation. One defensive behaviour mechanism used to reduce experienced cognitive dissonance, is the reliance on meat-consumption justifications captured by the perceived Normality, Naturality, Niceness and Necessity of consuming meat, also referred to as the 4Ns. This study aims to manipulate participants' reliance on such justifications, in particular the 'Necessary N'. The manipulation is created with an animated informational video, presenting scientific counter-argumentative information to the participants. A convenience sample of participants filled in the 4N Scale, pre- and post- informational video manipulation, measuring their reliance on the 4Ns and change in scores across time. Results indicate a significant reduction in scores from pre- to post- informational video across all Ns (except 'Nice N'). Additionally, the analysis indicates a significant difference in score changes across time between the 4Ns. These findings further indicate that omnivores tend to endorse the 4Ns, frequently used to reduce experienced cognitive dissonance and justify meat-consumption. Furthermore, this study presents a possible method to persuade individuals' beliefs and analyses the importance of the cognitive dissonance theory in the meat-paradox research.

Keywords: Meat-paradox, cognitive dissonance, 4Ns, informational video

The relationship between humans and animals is very complex. Animals provide humans with support in sickness and in health, substitute for humans when testing medical experiments, and feed and clothe humans on a daily basis (Amiot, Sukhanova, & Bastian, 2020). According to Panagiotou and Kadianaki (2019), most individuals hold positive attitudes (loving care and respectful treatment) towards animals and perceive unethical behaviour towards animals (the suffering and killing of animals) as an act of cruelty. Still, a troublesome aspect of our modern society, is the dietary habit of consuming animals. The apparent disconnection between love and empathy towards animals yet killing them for food, has been termed the meat-paradox (Buttlar & Walther, 2018; Dowsett, Semmler, Bray, Ankeny, & Chur-Hansen, 2018; Camilleri, Gill, & Jago, 2020). The present study will analyse the justifications people hold to justify their meat-consumption and will try to manipulate them.

Society's development indicates that a healthier, often plant-based diet is a habit that progressively more individuals strive for (Graça, Truninger, Junqueira, & Schmidt, 2019; Corrin & Papadopoulos, 2017). As such, there have been increasing calls in adopting or maintaining a plant-based or vegetarian diet, since they, amongst other things, lead to better physical health (Lavallee, Zhang, Michalak, Schneider, & Margraf, 2019; Graça et al., 2019). Still, humans consume a lot of animal meat each year (i.e., approximately 9 billion animals only in the US; Joy, 2010) and experience it as a necessity to stay healthy, as it provides humans with important proteins and vitamins that would otherwise not be consumed (Piazza et al., 2015). Furthermore, Godfray and colleagues (2018) claim that the global meat consumption is on the rise, due to an increase in average income and population growth. In addition, adding to the problem of climate change, a study by Fiala (2008) found that the production process for meat products accounts for around 20% of greenhouse emissions. Nevertheless, the majority of individuals still regularly eat meat without interferences from

moral or health concerns, despite the numerous advantages animals provide us humans with. In hindsight, how can it be that humans hold animals close to their heart (Bratanova, Loughnan, & Bastian, 2011) but at the same time indirectly kill them for food (Dowsett et al., 2018) while knowing that it might harm the individual and climate in the long run (Moore et al., 2015)?

This study will first look at possible psychological theories that have been previously researched to explain the meat-paradox. Followed by research on the 4Ns, a common solution used by omnivores to resolve experienced cognitive inconsistencies. Before trying to manipulate one of the Ns into persuading beliefs often held by omnivores when consuming animal meat.

Meat-paradox & 4Ns to resolve cognitive dissonance

In general, the meat-paradox is about observing the inconsistency in people's attitudes and behaviours towards animals and trying to understand how people navigate it. The area of research on dietary habits is relatively new and began to grow within the past five years. Due to its novelty, various studies have tried to explain the meat-paradox and the defending mechanisms omnivores tend to elicit as defence against implicit moral condemnation from morally motivated vegetarians (Minson & Monin, 2012). Conceptualisations explaining the consumption of meat, such as speciesism (Caviola, Everett, & Faber, 2019), social dominance orientation (Pratto, Sidanius, Stallworth, & Malle, 1994), cognitive dissonance theory (Rothgerber (2020); Panagiotou & Kadianaki (2019)), moral disengagement strategies (Buttlar & Walther, 2018), and the so-called 4Ns (Normal, Nice, Natural & Necessary) (Piazza et al., 2015; Hopwood & Bleidorn, 2019), have been researched independently, amongst others to provide insights into meat-eating justifications people hold. Some of these concepts are individual difference measures that aim to capture aspects of attitudes or meat consumption and others are general established theories applied

to explain the psychology of eating meat. Important for the present research, omnivores generally tend to experience ambivalence from meat-eating behaviour (Berndsen & Van der Pligt, 2004) which leads them to rely on moral disengagement strategies to reduce their cognitive conflict (Buttlar & Walther, 2018). This conflict in thoughts and behaviour is more commonly referred to as cognitive dissonance (Festinger, 1964), which is an essential psychological aspect in the meat-consumption dilemma and the point of focus this study will try to effectively reduce.

The theory of cognitive dissonance seeks to explain this cognitive-behavioural inconsistency by overlooking the social context individuals find themselves in and their respective experiences of consuming meat (Panagiotou & Kadianaki, 2019). Research has demonstrated that there are several strategies to reduce the cognitive dissonance people hold towards meat-eating behaviour. One, is the deliberate increased use of moral disengagement strategies as shortly mentioned above. Individuals scoring high on moral disengagement often refer to meat eating as means to end justifications explained by factors such as desensitisation, denial of negative consequences, diffused responsibility, and reduced perceived choice (Camilleri, Gill, & Jago, 2020). Second, and more important in relation to this study, people largely resolve their cognitive dissonance and defend their meat-eating behaviour via rationalizations that can be captured by the so-called 4Ns of meat consumption (Piazza et al., 2015). Initially there were only the 'Three Ns of Justification' (Natural; Normal; Necessary) as termed by Joy (2010), but these failed to consider the tasteful enjoyment that people derive from eating meat. Thus, a fourth 'N' (Nice) was added to the list (Piazza et al., 2015), to explain the major barriers for reducing meat consumption. Presenting some examples, individuals explain their meat-eating behaviour by claiming: That consuming meat is part of everyday lives (Normal); That meat simply tastes good (Nice); That our ancestors ate meat to evolve (Natural); That meat consumption is necessary to stay

healthy (Necessary).

In a series of studies, Piazza and colleagues (2015) strengthen the idea of omnivores relying on the 4Ns. First, they show that the justifications people naturally display to defend against the consumption of meat products, can be captured by a vast majority (approximately 85%) by the 4N classification. Second, to reduce feelings of guilt, the researchers concluded that individuals who endorsed the 4Ns tend to perceive animals more as objects and display moral concern to far fewer animals. Third, regarding behavioural decisions, Piazza and colleagues. (2015) found that individuals who highly relate to the 4Ns are less motivated by ethical concerns when making food decisions, less inclined to subtract animal products from their diet, less involved in animal welfare policies, and thus more likely to consume animal products. These findings stipulate first important insights on the meat-paradox and explain why omnivores who endorse the 4Ns tend to experience lower levels of guilt (Piazza et al., 2015) when consuming animal products, highlighting the solution the 4Ns hold to alleviate the guilt omnivores experience due to consuming animal meat (Wang & Basso, 2019).

In summary, the cognitive dissonance experienced by most omnivores is largely internally justified or resolved by perceiving meat consumption as Normal, Nice, Natural and Necessary. The present study will further explore participants' reliance on the 4Ns with particular focus on the 'Necessary N'. More precisely, we will try to manipulate the belief of perceiving meat-consumption as something necessary to survive, with the use of an educational intervention (here in form of an informational video). I hypothesize that the informational intervention will effectively reduce individuals' reliance on the 4N justifications, especially the 'Necessary N', shown by a significant reduction in scores from pre to post manipulation.

Informational interventions on dietary habits

Even though there have been increasing calls for adopting and sustaining healthier food systems (Graça et al., 2019; Moore et al., 2015), only a handful of research has focused on the attitudes and perceptions on vegetarian diets (Corrin & Papadopoulos, 2017; Rosenfeld & Burrow, 2017). There are several barriers (unwillingness to make dietary changes or the enjoyment of meat; Corrin & Papadopoulos, 2017) and enablers (capability, opportunity, and motivation; Graça et al., 2019) that hinder a potential transition to a healthier, often plant-based diet instead of cholesterol rich meat diets (Moore et al., 2015).

Corrin and Papadopoulos (2017), Moore and colleagues (2015) and Vaino and colleagues (2018) have all conducted extensive research on persuasion method requirements, necessary for informational interventions, which were included here. Congruent with a paper from Weiss and Tschirhart (1994) on general pros and cons of informational interventions, they claim that for an informational intervention to have its desired effect, humans must experience the tackled problem to be personally relevant. If an individual does not feel accountable, he or she will not care and choose to not spend cognitive effort on it, which in return leads to no active change in behaviour. For example, when focusing arguments on losing weight and not on changing one's diet, Moore et al., (2015) learned that more participants adapted a vegan or vegetarian diet, leading to reduced animal product intake and weight loss. Similarly, Vainio et al., (2018) manipulated the framing of messages in favour of body health versus against animal cruelty and determined that the framing of a message was effective in persuading respondents to reduce their meat consumption. These ideas are in line with a study by Corrin and Papadopoulos (2017) on persuading individuals to establish new goals, who have tried to summarize public attitudes towards a vegetarian diet before attempting to persuade individuals towards such a healthier diet. Their data has revealed generally positive perceptions of vegetarian diets, as such eating behaviour was associated with being healthy (Lea & Worsley, 2001), thoughtful, hipster and animal lovers (Burgess,

Carpenter, & Henshaw, 2014).

Corrin and Papadopoulos (2017) used the 'Health Belief Model' as informational intervention to shape people's attitudes and beliefs on future health promotion initiatives. Without going into too much dept of the Health Belief Model, it postulates that an individual must perceive that they are susceptible to develop a specific health issue, such as increased cholesterol levels due to abusive meat-consumption, to a severe and dangerous health stadium when failing to change current eating habits (Edberg, 2007). Furthermore, Corrin and Papadopoulos (2017) claim that it is more efficient for an informational intervention to focus on decreasing or eliminating the barriers of consuming less meat as opposed to promoting its benefits. More specifically removing the stigma that plant-based diets lack on protein and iron nutritional intake. To summarize, for an informational video to have its desired effect and actively influence individuals exposed to it, it must be perceived as relevant by the target population, tackle a specific and severe problem, be given by recognized individuals or organisations and preferably focus on reducing barriers or promote enablers that hinder individuals to undergo a change in eating behaviour.

The present study

These research findings built a promising starting point for the creation of the present informational video, which tries to effectively change beliefs individuals hold towards the necessity aspect of eating meat, via refuting one of the barriers keeping humans from changing dietary habits. The short but therefore attention-capturing educational video will target dietary habits of omnivores and try to refute the belief of experiencing meat-consumption as necessary to survive, by presenting them with challenging information. Considering the inclusion of general strengths and avoidance of weaknesses of informational persuasion attempts, taken from an extensive research by Weiss and Tschirhart (1994), I expect participants to be effectively manipulated by the present informational video. Inspired

by their literature, I made sure that the goal of the informational intervention leaved no freedom for interpretation by participants, to not influence them in a wrong or non-planned way and thus increase perceived relevance. Furthermore, participants were chosen carefully, as keeping peer-relations can impact the degree of the informational interventions perceived relevance and to expose the targeted population to the informational intervention. In turn, a successful intervention should lead participants to present lower scores on the Necessary N justifications and higher reliance on the remaining 3Ns, as these should provide participants with non-refuted beliefs, suited to reduce their experienced cognitive dissonance. However, given the high correlation coefficients between the 4Ns, a common reduction or increase of scores on all the 4Ns, post manipulation, can also be expected.

Method

Participants

Via convenience sampling 150 participants were recruited via social media to participate in the following study. Participation was voluntary, no reward was given, and they were free to stop the survey at any time. To increase the degree of specificity of the informational video, participants were told that the survey would measure eating habits, more specifically meat consumption. A total of 27 data points were excluded from the data set. Some due to non-completion of the survey whereas others were excluded to meet the requirements for an effective informational video. Only 3 individuals were excluded because they exceeded the maximum age-range of 35, to maintain a peer relation between participants and researcher, as previous literature has shown that this might impact the effectiveness of the informational intervention. In addition, the study design included a question indicating the dietary habit of the participants (e.g., Omnivore; Pescatarian; Vegetarian) and participants' English proficiency. Since we aim to reduce meat-consumption, we excluded everything but

omnivores (N= 103) and pescatarians (N= 18) for the main analysis. Nevertheless, for additional exploratory purposes, a separate analysis will included on vegetarians and vegans (N= 24) to analyse and compare the effect difference in non-omnivores. Additionally, since the questionnaire and the short but complex educational video were in English, participants who indicated their English language skills as 'poor' were also excluded. This study retains a total of 121 meat-consuming individuals (M_{age} = 23,91, *SD* = 2.28) that have the proficiency to be manipulated by the informational video. The sample consisted out of 30.6% females and 69.4% males, ranging from the age of 18 to 34 with a mode of 24 (24.8%).

Design and Procedure

With the use of Qualtrics, an online questionnaire was set up and distributed to the participants. Survey completion took approximately five minutes and contained one scale which was presented prior to and post manipulation. After participants were informed about the survey and gave their consent, they had to complete a 4N Scale for the first time, measured on a 7-point Likert Scale (1 = strongly disagree; 7 = strongly agree). High scores would indicate strong reliance on the 4Ns as meat-consumption justifications and vice versa. Previous research has demonstrated the effectiveness and reliability of the 4N Scale (Hopwood & Bleidorn, 2019; Piazza et al., 2015) in measuring participants' belief of the 4Ns. Adhering to the previous studies, the statistical analysis has shown high reliability coefficients for each of the 16 items (4 items per N) of this study. Nice ('Meat is delicious', 'Meals without meat would just be bland and boring'; Cronbach's α = .94, Normal ('It is normal to eat meat', 'Most people eat meat, and most people can't be wrong'; α = .88), Natural ('Our ancestors ate meat all the time', 'Human beings are natural meat-eaters – we naturally crave meat'; α = .82) and Necessary ('It is necessary to eat meat in order to be healthy'. 'You cannot get all the protein, vitamins and minerals you need on an all plant-based diet'; α = .84), have each shown to be reliable excuses for individuals to solve their

cognitive dissonance on meat-eating behaviour. As a next step, participants faced the manipulation in form of a short but educative 2-minute informational video, serving as a manipulation on the 'Necessary' argument of meat-consumption.

The informational video was created by 'Life Noggin', a YouTube channel educating individuals on science. The video made clear that including meat in your daily diet is no longer necessary and may even lead to severe negative consequences in the long-term, such as coronary heart diseases (Heys et al., 2011). More precisely the animated video informed viewers about why meat-consumption was necessary for our ancestors, as it provided nutrients that promote brain and body development (Fessler et al., 2002), before introducing modern plant-based diet products that can substitute for meat products. Post manipulation, participants were again presented with the 4N Scale to measure the change in scores, before filling out the demographic questions. Note that a question was included measuring present dietary habits of participants, to exclude non-omnivores from the data set before conducting the statistical analysis.

Statistical Analysis

The data was collected online via Qualtrics and downloaded via Excel, before being analysed with the statistical program SPSS. A correlation matrix (Table 1) between averaged sum scores on each of the 4Ns will be included. Next paired samples t-tests will be performed for each 'N' to measure whether the change between pre- and post- manipulation test scores of participants is significant. If significant, we can conclude that the informational video had its desired effect and led individuals to rely less on the 4N justifications for meat-consumption (especially the 'Necessary N') or perceived them as being less fitting. Furthermore, a within-subjects ANOVA design will be performed to measure the interaction effect between the independent variables 'N-type' (4Ns) and 'Time' (pre- and post-manipulation) as well as post hoc simple effects.

Results

Descriptives

Cronbach's reliability checks given above, indicate a high internal consistency of the 4N scale items. Below, a correlation matrix (Table 1) is set up to estimate how much the four items between each N measure the same characteristic. The correlations between all 4Ns are in line with their face validity. Each of the 4N justifications of meat-consumptions are significantly and positively correlated with each other as depicted in Table 1 below. Meaning, if participants score high on one N, they are likely to score high on the remaining three Ns as well.

Table 1

	Normal	Nice	Natural	Necessary
Normal	1			
Nice	.57**	1		
Natural	.54**	.58**	1	
Necessary	**.68****	**.65****	**.74****	1

Note. All variables have been averaged.
**. Correlation is significant at the 0.01 level (2-tailed).

Since the present study aims to change the idea or belief of perceiving meat consumption as something 'Necessary', the correlations with the 'Necessary N' are most relevant and thus highlighted. The smallest positive correlation can be found between the 'Necessity N' and 'Nice N' of consuming meat ($r(121) = 0.65$, $p < .001$). Similar correlations can be found regarding the 'Normal N' ($r(121) = 0.68$, $p < .001$) and 'Natural N' ($r(121) = 0.74$, $p < .001$). These correlations are intuitive, because if omnivores believe that consuming meat is necessary for survival, they should also be inclined to perceive meat-consumption as something normal, natural, and nice.

Intervention Effectiveness

A series of paired samples t-tests was performed to analyse whether the average decrease between pre- and post- manipulation scores, was significant across all 4Ns. Based on the theory of cognitive dissonance, I tested the prediction that scores on the 'Necessary N' scale would decrease significantly across time, whereas scores on the remaining 3Ns would not decrease. One pair is composed of the average sum scores of all the items per N, before and after the presentation of the informational video. Omnivores' scores on the 4N Scale generally tended to be higher prior to the manipulation, rather than post. The omnivore sample participants were most in accordance with the perceived niceness of consuming meat (pre: $M = 3.97$, $SD = 1.33$; post: $M = 3.88$, $SD = 1.37$) condition; $t(120) = 1.51$, $p = .135$, followed by the perceived normality (pre: $M = 3.85$, $SD = .92$; post: $M = 3.61$, $SD = .90$) condition; $t(120) = 4.51$, $p < .001$, the perceived naturality (pre: $M = 3.64$, $SD = 1.23$; post: $M = 3.10$, $SD = 1.26$) condition; $t(120) = 6.09$, $p < .001$, and the perceived necessity (pre: $M = 3.31$, $SD = 1.45$; post: $M = 2.70$, $SD = 1.37$) condition; $t(120) = 6.32$, $p < .001$, of consuming meat.

As hypothesized, the largest significant effect or decrease from pre- to post- scores was found on the 'Necessary N' items (decreased on average by 61%; $d = 1.06$). Furthermore, the educative video might have had some carry-over effects seeing how the 4Ns share high correlation coefficients. Even though there was no specific manipulation, similar results can be found for the remaining three Ns. Scores on the 'Natural N' significantly decreased on average by 54.13% post-manipulation ($d = 0.98$), while scores on the 'Nice N' and 'Normal N' decreased on average by 8.68% ($d = 0.63$) and 24.59% ($d = 0.98$) respectively. In line with the manipulation, the largest effect (decrease in scores) was found on the 'Necessary N' items. Additionally, the decrease percentage similarity between 'Necessary' and 'Natural' can be explained by their high positive correlation, presented above in Table 1. Nevertheless, the analysis presented no significant decrease in scores for

justifying meat-consumption as ‘Nice’. Possible explanations for such findings will be tackled in the discussion section. To summarize, there is a significant decrease from pre- to post- manipulation scores for all Ns except the ‘Nice N’ and this effect was the largest for the ‘Necessary N’ items.

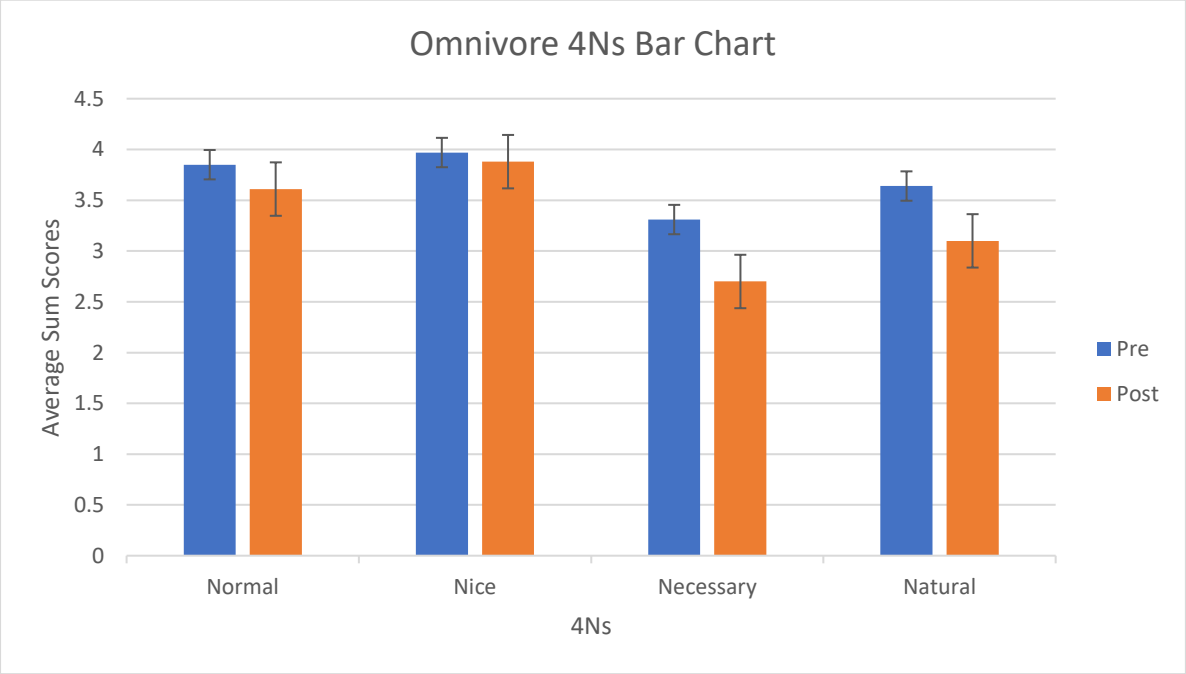
Interaction effect

So far, the results indicate a lower reliance on the 4N justifications for meat-consumption after the introduction of the informational video. Still, the question remains whether there is an interaction effect between the two independent variables ‘N-type’ (4Ns) and ‘Time’ (pre and post manipulation). If an interaction effect is present, the manipulation had its desired effect and there was a significant difference in score changes across all Ns between pre- and post- measurement. A two factor within-subjects ANOVA, with a Bonferroni correction, estimates the effect of time on each N and measures the interaction effect between the independent variables. Congruent with the hypothesis, the ANOVA also showed that the negative change in scores was the highest on the ‘Necessary N’. These numbers further indicated a successful manipulation of the ‘Necessary’ aspect of meat-consumption in our informational video. Furthermore, the two factor within-subjects ANOVA displayed a significant interaction effect between ‘N-type’ and ‘Time’ $F(3) = 14.39$, $p < .001$, $\eta_p^2 = .107$. Therefore, a post hoc analysis on simple effects of the two independent variables ‘N-type’ and ‘Time’ was required. The condition ‘N-type’ violated the assumption of sphericity (Mauchly’s $p < .05$), thus a Huynh-Feldt correction was applied. The ANOVA revealed that there was a significant simple effect of N-type on change in scores $F(2.78) = 36.99$, $p < .001$, $\eta_p^2 = .236$. The variable ‘Time’ however, is in line with the ANOVA assumptions, thus there is no need for a correction. The within-sample ANOVA revealed a significant simple effect for the condition ‘Time’ on score reduction $F(1) = 50.67$, $p < .001$, $\eta_p^2 = .297$. In other words, following the two factor within-subjects ANOVA, participants

significantly relied less on the Natural, Normal, and especially the Necessary N justifications but not on the Nice N justification, after the introduction of the counter-argumentative informational video.

The bar chart on the 4Ns included below (Figure 1), presents a visual representation of average decreases in scores given by omnivores for each of the 4Ns before and after the presentation of the informational video. As hypothesized, post informational video intervention, the biggest decrease in scores can be found on the 'Necessary N' scale items. Similar score changes on the 'Natural N' scale items can be explained by the high positive correlation between the two Ns. If people believe that consuming meat is necessary for survival, it makes sense to think of meat-consumption as something natural and part of the human culture to ensure survival and proper evolution. These results boost confidence for researchers that try to change strong perceptions, attitudes, or beliefs of individuals, as they show that these human aspects can be significantly influenced, changing individuals' point of view, with a well-established manipulation (here an informational video).

Figure 1



To summarize, in line with the hypothesis, the informational video had the largest impact on the 'Necessary N' item scale. Post-manipulation, omnivores perceived meat-consumption as less normal, less nice, less natural, and especially less necessary than prior.

Exploratory Analyses

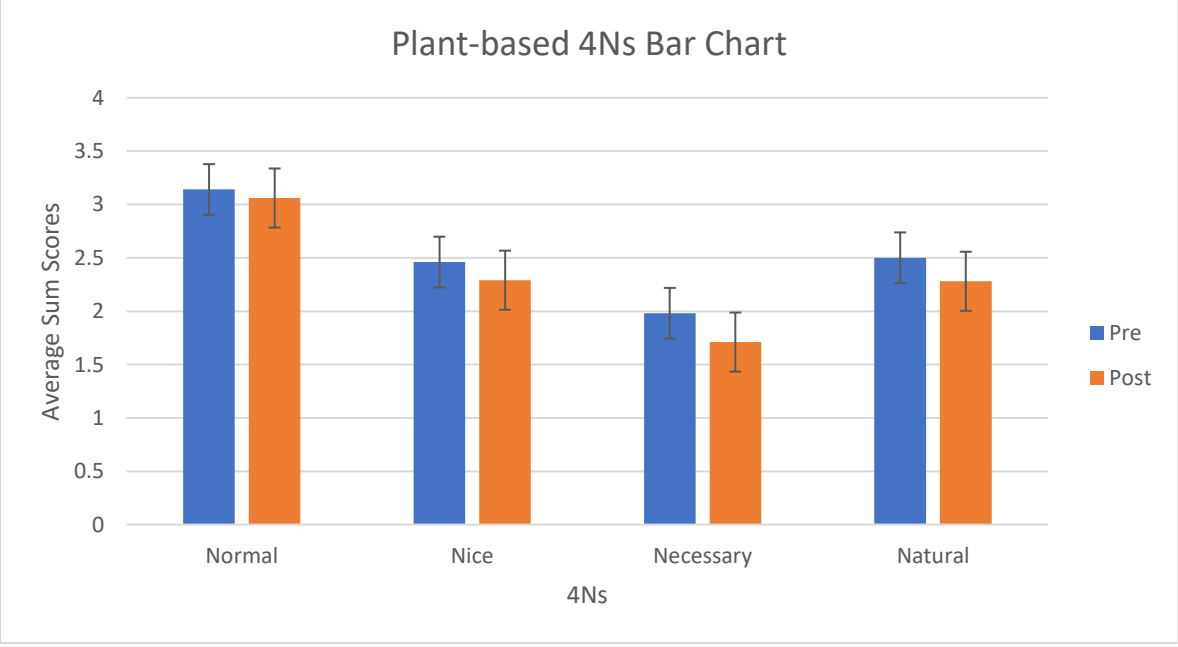
First, the same statistical procedure is used to estimate effects and find insights of the non-omnivore sample participants. Furthermore, both the omnivore and plant-based samples will be checked for gender effects, as past literature has highlighted potentially important gender differences when it comes to consuming meat (Dowsett et al., 2018; Ruby and Heine, 2012; Piazza et al., 2015).

The non-omnivore sample (N = 24) includes participants who have selected a vegetarian, vegan, or simply plant-based diet. In terms of method, the same 4N Scale and manipulation was used as well as the same statistical analysis was performed later. The paired-samples t-tests revealed, differing from the omnivore sample, that the change in scores did not vary significantly for two (Normal and Nice) out of the 4Ns. Strengthening the manipulation, there was a significant change in scores on the 'Necessary N' items (pre: M = 1.98, SD = 1.25; post: M = 1.71, SD = 1.04) condition; $t(23) = 2.22$, $p = .037$, after the introduction of the manipulation (d = 0.60), even among non-omnivores. Indicated by the low scores, the vegetarian sample perceived the 'Necessary N' justifications to be the least justifiable. The plant-based diet participants were most in accordance with the perceived normality of consuming meat (pre: M = 3.14, SD = .80; post: M = 3.06, SD = .85; d = 0.47) condition; $t(23) = 0.76$, $p = .454$, followed by the perceived naturality (pre: M = 2.50, SD = .94; post: M = 2.28, SD = .95; d = 0.50) condition; $t(23) = 2.16$, $p = .041$, and perceived niceness (pre: M = 2.46, SD = 1.37; post: M = 2.29, SD = 1.36; d = 0.45) condition; $t(23)$ = 1.83, $p = .080$, of consuming meat. These results are self-explanatory since vegetarians or vegans feed mainly on plant-based nutrients instead of meat and are still healthy and able to

survive. Nevertheless, they should be treated with care due to such a low sample size. The bar chart on the 4Ns included below (Figure 2), presents a visual representation of average decreases in scores given by non-omnivores for each of the 4Ns before and after the presentation of the informational video.

The within-samples ANOVA revealed a non-significant interaction effect (p = .567) between the two independent variables for the non-omnivore sample. This indicates a partial effect by the manipulation and no significant difference in score changes across all the Ns between pre- and post- measurement. In addition, in line with Piazza and colleagues (2015) paper, on average male (N = 10) participants endorsed the 4Ns more (pre: M = 3.01, SD = 1.16; post: M = 2.81, SD = 1.08) than did their female (N = 14) counterparts (pre: M = 2.17, SD = 0.52; post: M = 2.00, SD = 0.58). To summarize, the informational video only showed significant effects on thoughts or beliefs of the plant-based diet participants on the perceived necessity and naturality of consuming meat.

Figure 2



Furthermore, previous literature has shown that gender affects the meat-paradox and the reliance on the 4Ns (Piazza et al. 2015). Men eat meat to increase perceived masculinity

and exert traditional male roles, whereas women tend to avoid animal-meat associations and even under-report their meat-consumption to reduce dissonance (Mackenzie and Rothberger (2013). The findings of the present research confirm such ideas as male (N = 84) participants endorsed the 4Ns on average more (pre: M = 3.87, SD = 1.00; post: M = 3.51, SD = 0.95) than did their female (N = 37) counterparts (pre: M = 3.27, SD = 1.02; post: M = 2.89, SD = 1.03). Women generally gave lower scores pre- and post-manipulation, indicating a higher distance towards a meat-consumption association and general lower levels of meat-attachment (Dowsett et al., 2018).

General Discussion

The cognitive dissonance experienced by many omnivores resulting from animal meat consumption, can arise due to receiving a backlash by an increasing amount of morally motivated minorities (here vegetarians) who may serve as a source of implicit moral reproach (Minson & Monin, 2012). One method commonly used by omnivores to reduce such cognitive dissonance, is the reliance on the 4Ns of meat consumption justification examined here. The present research was constructed on the exploratory nature of amongst others Piazza and colleagues (2015) paper on the 4Ns and the meat-paradox as well as general psychological interest on how individuals cope with meat consumption and whether it is possible to influence their underlying attitudes and beliefs. One method to manipulate such attitudes and beliefs is the use of an informational intervention. Here, participants were confronted with a manipulation in form of a short educative informational video. The animated video displayed counter-argumentative information on the perceived necessity of eating animals to survive and evolve as human beings. In turn, the manipulation should influence individuals to rely less on meat-consumption justifications captured by the 'Necessary N'. Even though earlier literature has shown that following a plant-based diet is becoming more popular (Lea & Worsley, 2001), for an informational video to effectively

change attitudes and beliefs of individuals, several conditions mentioned in the introduction should be met. Foremost, humans must experience the problem in question to be personally relevant (Moore et al., 2015), so that they care and feel accountable (Vainio et al., 2018) and thus susceptible to develop a health issue, to a severe level, in case of behavioural continuation (Corrin & Papadopoulos, 2017). With the adoption of such characteristics, the current intervention successfully reduced individuals' reliance on the 4N justifications.

Primarily, high scores on the 4N scale confirmed that participants seemed to rely on the four meat consumption justification clusters. Furthermore, after being presented with the informational video, omnivores presented lower scores on all justifications encapsuled by the 4Ns, especially the 'Necessary N' justifications. In other words, the educational video has reduced participants' beliefs on meat consumption justifications. However, the largest reduction in scores over time was, as hypothesized, found in perceiving meat consumption as necessary for human survival and evolution. Regardless of the high correlation coefficients, the difference in reduction scores between the 4Ns confirmed the representativeness of different beliefs captured by each individual N. However, post informational video, each decrease of scores across the Ns was significant except for the 'Nice N'. Thus, results indicated that 3 out of the 4Ns seemed open for persuasive change.

As the informational video was specifically tailored to influence individuals' beliefs on the necessity of consuming animal meat, only scores on the 'Necessary N' items should have reduced over time. However, given the high inter-correlations between each N, present study results could have presented a common reduction of scores on all Ns. Furthermore, since the 'Necessary N' is simply one option to justify one's meat consumption, the cognitive dissonance theory would postulate a higher justification reliance (scores) on the non-manipulated 3Ns. Nevertheless, refuting the idea of cognitive dissonance theory, the present research measured carry-over effects of the manipulation on 4N scores. Post informational

video, participants average scores reduced for each N. In other words, instead of participants relying more on the Ns presenting themselves with non-manipulated and thus more valid perceived justifications to resolve the experienced cognitive dissonance, participants reduced their reliance on the other Ns as well. This reduction in scores was significant for all Ns except for the 'Nice N'. A similar decrease in scores on the 'Natural N' or 'Normal N' scale, compared to the manipulated 'Necessary N', is intuitive based on reasoning and the high positive correlations between the Ns. However, a question remains as for why participants significantly change their scores on each of the N justifications except for the idea of experiencing animal meat consumption as 'Nice'. One possible explanation for such a finding could be due to 'taste' being a purely subjective experience (Carroll, 1984). Some people just do not enjoy the taste of meat, even if they experience meat consumption as necessary, normal, or natural. In addition, the societal pressure emitted by vegetarian dieters might have kept participants from approving meat as tasting delicious, even though completion was anonymous.

As discussed above, since the 4Ns are simple means of justifying meat-consumption, when rendered less reliable, omnivores might simply rely on other reasonings or justifications to reduce their mental conflict and continue to consume meat. In line with this reasoning, results should have indicated lower scores on the 'Necessary N' items and higher scores on the remaining three Ns. However, this was neither the case for the omnivores, nor the vegetarian sample. Therefore, on the one hand, it could be that the amount of meat consumed by the participants will not change long-term, because of the reliance on other justifications or excuses to abstain from adapting a plant-based diet. However, on the other hand, it could be the case that the causal relationship between cognitive dissonance theory and the meat-paradox is not as strong as first thought. Not free of limitations the present findings create an

exploratory base for future researchers who aim to change, or influence held attitudes and beliefs of individuals.

Limitations

First and foremost, the present research did not measure gender effects on score reductions of participants, even though gender was found to be an important moderator of the meat-paradox, as there are gender differences on meat-attachment (Dowsett et al., 2018), reasoning behind meat-consumption (Mackenzie & Rothberger, 2013), and feelings of empathy towards animals (Kubberød, Ueland, Tronstad, & Risvik, 2002). Therefore, high scores on the 4Ns could have generally been demonstrated because of the high percentage of males represented in the omnivore sample (nearly 70%). Furthermore, the information presented by the educational video could have less of an impact on males rather than females as they show lower levels of empathy. This study had its focus on influencing the perceptions and beliefs of all omnivores on meat consumption, while neglecting possible gender differences. Thus, whether there are significant differences in meat consumption across males and females, post manipulation, remains questionable and should be the focus of future research.

Second, based on previous literature by Edberg (2007) and his use of the Health Belief Model, the present survey might lack personal relevance. Even though the informational video has significantly influenced the beliefs held by the participants, they might have failed to notice the severity of the problem as well as the individual benefits of such a change and the barriers hindering individuals to undergo such a nutritional change. The Health Belief Model postulates that, for an intervention to be effective, participants should feel susceptible to developing physical or mental health problems when not changing their behaviour. In addition, participants must believe that the consequences of developing these health issues are severe. Furthermore, it might be more beneficial for the informational

video to focus on eliminating or decreasing the barriers of consuming a vegetarian diet as opposed to highlighting the benefits. More precisely, this argument creates opportunities for health promotion campaigns and future researchers to focus on removing the stigma that vegetarian diets do not contain enough nutritional value (protein and iron).

Third, from a psychological point of view, informing participants that meat consumption is not in their best interest, could lead to reactance in individuals (Steindl, Jonas, Sittenthaler, Traut-Mattausch, & Greenberg, 2015) towards the experimenters. Humans fall trap to a series of cognitive and behavioural biases (Kahneman & Tversky, 1996) which can lead individuals to desire what they cannot have. Since the present study tried to influence individuals to consume less meat, participants may have felt their privacy being attacked which in turn led to a series of hurtful behaviours, such as negative word-of-mouth (Richins, 1983), towards the policy implementer. Thus, when trying to change someone's dietary habits, individuals might be counter-motivated to increase meat-consumption to remain authoritative. In addition, humans are habitual creatures that refrain from change (Wood, 2017). Individuals refrain from change because it costs extra cognitive and behavioural energy better spent otherwise. People are more motivated to make behavioural changes when they receive a "cue to action" (Edberg, 2007). This is generally an event that occurs which causes the person to make a change (e.g., moving to a new city). Furthermore, according to Edberg (2007), a person must believe that they can make a change before they can successfully do so. Providing people with the information and tools to prepare and eat vegetarian meals is key to improving a person's belief that they can make a positive change to their diet.

Implications of current for future research

The present study added further insights onto meat-paradox research and formed a starting base on how to influence or nudge individuals towards a change in habits attitudes or

beliefs. Neglecting gender and long-term effects, this research does provide value regarding the use of informational interventions. Results have indicated that individuals were willing to change their attitudes and beliefs towards meat-consumption when presented with the right information and procedure. Congruent with previous literature, the correlations of the 4N Scale items are similar to the ones reported by Hopwood and Bleidhorn (2019). Additionally, this research strengthened the 4Ns as justifications of meat consumption, proven to be promising indicators to solve or reduce cognitive dissonance felt by individuals when consuming meat. With a convenient sample, this research presents ideas and characteristics on how an informational campaign can reach its goal and successfully persuade individuals. Even without gender or behavioural inferences, the present research structure remains practical oriented. This survey does not observe actual behavioural changes in meat-consumption but helps explain the human mind and how changing or persuading attitudes or beliefs can be difficult. The findings here indicate that a psychological theory that seems to have a strong impact on human behaviour (cognitive dissonance) and should thus be impudent to change, can be persuaded with the right measures and procedure.

Another interesting piece of observation following the present research is that, as omnivores try to solve their cognitive dissonance to defend themselves from morally motivated vegetarians (Buttlar & Walther, 2018), the results could have presented increased scores on the non-manipulated 3Ns. However, the reliance on the 4N justifications reduced overall which might indicate cognitive dissonance theory to be questionable and research should instead focus on a more global theory or attitude. Both scenarios (a decrease or increase in scores) could happen, however for this research, a common reduction across all 4Ns might indicate a lower degree of relevance of cognitive dissonance in the meat-paradox than first thought.

Regarding future research, this research has partially neglected gender effects, which

according to Dowsett and colleagues (2018), are rather important moderators of the meat-paradox. In their paper, they found significant gender effects on meat-attachment, decreasing in women, and increasing in men. Similarly, Mackenzie and Rothberger (2013), theorised that men eat meat because it provides them with perceived masculinity and traditional male roles, whereas women tend to avoid animal-meat associations and under-report meat consumption to reduce dissonance. Women experience a stronger sense of unease and disgust when reflecting on the consumption of animal meat (Ruby and Heine, 2012) and have been shown to feel more concerned about animal rights and ethics, as well as more troubled by the slaughter of animals (Kubberød et al., 2002). In addition, congruent to the present research, Piazza et al. (2015) found that men were more likely to endorse the 4Ns of justification when consuming meat. In other words, Piazza et al. (2015) manifest mean level gender differences on these items and on the educational method used to change attitudes. These findings highlight the importance of gender effects on meat-consumption research and on underlying individual moral defence mechanisms used to reduce feelings of guilt or dissonance when consuming animal meat. Future research could analyse whether these gender effects significantly influence the change of scores resulting from the informational intervention and how much this change differs between men and women.

Furthermore, future research needs to consider that achieving a reduction in cognitive dissonance when consuming meat, does not imply active less meat consumption by an individual. The informational video might have successfully reduced cognitive dissonance and led individuals to rely less on the 4N justifications but achieved no change in actual meat-eating behaviour. Therefore, it could be that the amount of meat consumed by the participants will not change long-term, as they could simply rely on other justifications or excuses to abstain from a plant-based diet. As a result, future researchers should examine a practical change across time periods and measure actual meat-consumption behaviour instead

of individuals' attitudes, beliefs, and perceptions. A change in attitudes does not necessarily imply a change in behaviour. Since individuals generally refrain from change (Wood, 2017), a more practical set-up, such as making participants fill out a daily diary, could lead to more precise and measurable outcomes. In addition, future researchers could focus on reducing barriers that hinder individuals from making a dietary change. Instead of promoting the benefits of a plant-based diet, experimenters should focus on lowering or eliminating the restrictions individuals hold towards such a change.

Conclusion

This paper adds to the literature on the meat-paradox and shows how people rely on the 4N justifications to reduce the cognitive conflict or dissonance they experience as a result of consuming animal meat. The results of this study indicate, that in order for an informational video or a manipulation to be effective, individuals must feel personally susceptible to a clearly stated problem and be presented with a possible solution. Once such characteristics are met and perceived by individuals, one can try to influence the beliefs, perceptions, or attitudes of individuals towards a better outcome. With the tailored informational video, the present research has found significant results on influencing participants to reduce scores on meat-consumption justifications. However, future research should adopt a more practical technique to measure actual meat-consuming reductions in male and female participants.

References

Adams, M. (2018). Towards a critical psychology of human–animal relations. *Social and Personality Psychology Compass*, *12*(4), 1–14. https://doi-org.tilburguniversity.idm.oclc.org/10.1111/spc3.12375

Amiot, C. E., Sukhanova, K., & Bastian, B. (2020). Social identification with animals: Unpacking our psychological connection with other animals. *Journal of Personality and Social Psychology*, *118*(5), 991–1017. https://doi-org.tilburguniversity.idm.oclc.org/10.1037/pspi0000199.supp (Supplemental)

Beavers, G. J. (2005). Defining the information campaign. *Military Review*, *85*(6), 80.

Berndsen, M., & Van der Pligt, J. (2004). Ambivalence towards meat. *Appetite*, *42*(1), 71-78.

Bratanova, B., Loughnan, S., & Bastian, B. (2011). The effect of categorization as food on the perceived moral standing of animals. *Appetite*, *57*(1), 193–196. https://doi-org.tilburguniversity.idm.oclc.org/10.1016/j.appet.2011.04.020

Burgess, S., Carpenter, P., & Henshaw, T. (2014). Eating on Campus: Vegan, Vegetarian, and Omnivore Stereotyping.

Buttlar, B., & Walther, E. (2018). Measuring the meat paradox: How ambivalence towards meat influences moral disengagement. *Appetite*, *128*, 152–158. https://doi-org.tilburguniversity.idm.oclc.org/10.1016/j.appet.2018.06.011

Buttlar, B., & Walther, E. (2019). Dealing with the meat paradox: Threat leads to moral disengagement from meat consumption. *Appetite*, *137*, 73–80. https://doi-org.tilburguniversity.idm.oclc.org/10.1016/j.appet.2019.02.017

Camilleri, L., Gill, P. R., & Jago, A. (2020). The role of moral disengagement and animal empathy in the meat paradox. *Personality and Individual Differences*, *164*. https://doi-org.tilburguniversity.idm.oclc.org/10.1016/j.paid.2020.110103

Cantor, J. R., Alfonso, H., & Zillmann, D. (1976). The persuasive effectiveness of the peer appeal and a communicator's first-hand experience. *Communication Research*, *3*(3),

293–310. https://doi-org.tilburguniversity.idm.oclc.org/10.1177/009365027600300304

Carroll, N. (1984). Hume's standard of taste. *the Journal of aesthetics and art criticism*, *43*(2), 181-194.

Caviola, L., Everett, J. A. C., & Faber, N. S. (2019). The moral standing of animals: Towards a psychology of speciesism. *Journal of Personality and Social Psychology*, *116*(6), 1011–1029. https://doi-org.tilburguniversity.idm.oclc.org/10.1037/pspp0000182

Dillard, J. P., Weber, K. M., & Vail, R. G. (2007). The relationship between the perceived and actual effectiveness of persuasive messages: A meta-analysis with implications for formative campaign research. *Journal of Communication*, *57*(4), 613–631. https://doi-org.tilburguniversity.idm.oclc.org/10.1111/j.1460-2466.2007.00360.x

Dowsett, E., Semmler, C., Bray, H., Ankeny, R. A., & Chur-Hansen, A. (2018). Neutralising the meat paradox: Cognitive dissonance, gender, and eating animals. *Appetite*, *123*, 280–288. https://doi-org.tilburguniversity.idm.oclc.org/10.1016/j.appet.2018.01.005

Edberg, M., & Edberg, M. C. (2007). *Essentials of health behavior: Social and behavioral theory in public health*. Jones & Bartlett Publishers

Festinger, L. (1964). Conflict, decision, and dissonance.

Fessler, D. T., Bayley, T., Dye, L., Brown, J., Flaxman, S., Leeners, B., ... & Fessler, D. T. (2002). Reproductive immunosuppression and diet: an evolutionary perspective on pregnancy sickness and meat consumption. *Current anthropology*, *43*(1), 19-61.

Fiala, N. (2008). Meeting the demand: An estimation of potential future greenhouse gas emissions from meat production. *Ecological economics*, *67*(3), 412-419.

Godfray, H. C. J., Aveyard, P., Garnett, T., Hall, J. W., Key, T. J., Lorimer, J., ... & Jebb, S. A. (2018). Meat consumption, health, and the environment. *Science*, *361*(6399).

Heys, M., Jiang, C., Cheng, K. K., Zhang, W., Lam, T. H., Leung, G. M., & Schooling, C. M. (2011). Does childhood meat eating contribute to sex differences in risk factors for ischaemic heart disease in a developing population? *Journal of Epidemiology and Community Health*, *65*(6), 522–528. https://doiorg.tilburguniversity.idm.oclc.org/10.1136/jech.2009.099143

Hopwood, C. J., & Bleidorn, W. (2019). Psychological profiles of people who justify eating meat as natural, necessary, normal, or nice. *Food Quality and Preference*, *75*, 10-14

Joy, M. (2010). Why We Love Dogs. *Eat Pigs, and Wear Cows: An Introduction to Carnism*, *96*.

Kahneman, D., & Tversky, A. (1996). On the reality of cognitive illusions.

Kubberød, E., Ueland, Ø., Tronstad, Å., & Risvik, E. (2002). Attitudes towards meat and meat-eating among adolescents in Norway: a qualitative study. *Appetite*, *38*(1), 53-62.

Lea, E., & Worsley, A. (2001). Influences on meat consumption in Australia. *Appetite*, *36*(2), 127-136.

Loughnan, S., Bastian, B., & Haslam, N. (2014). The psychology of eating animals. *Current Directions in Psychological Science*, *23*(2), 104–108. https://doi-org.tilburguniversity.idm.oclc.org/10.1177/0963721414525781

Mackenzie, J., & Rothberger, C. J. (2013). *Lehrbuch der Herzkrankheiten*. Springer-Verlag.

Minson, J. A., & Monin, B. (2012). Do-gooder derogation: Disparaging morally motivated minorities to defuse anticipated reproach. *Social Psychological and Personality Science*, *3*(2), 200-207.

Panagiotou, E., & Kadianaki, I. (2019). From cognitive dissonance to cognitive polyphasia: A sociocultural approach to understanding meat-paradox. *Journal for the Theory of Social Behaviour*. https://doi-org.tilburguniversity.idm.oclc.org/10.1111/jtsb.12201

Piazza, J., Ruby, M. B., Loughnan, S., Luong, M., Kulik, J., Watkins, H. M., & Seigerman, M. (2015). Rationalizing meat consumption The 4Ns. *Appetite*, *91*, 114–128. https://doi-org.tilburguniversity.idm.oclc.org/10.1016/j.appet.2015.04.011

Pribis, P., Pencak, R. C., & Grajales, T. (2010). Beliefs and attitudes toward vegetarian lifestyle across generations. *Nutrients*, *2*(5), 523-531.

Richins, M. L. (1983). Negative word-of-mouth by dissatisfied consumers: A pilot study. *Journal of marketing*, *47*(1), 68-78.

Robertson, K., Thyne, M., & Hibbert, S. (2017). Drinkers' perceived negative alcohol-related expectancies: Informing alcohol warning messages. *Drugs: Education, Prevention & Policy*, *24*(2), 197–205. https://doiorg.tilburguniversity.idm.oclc.org/10.1080/09687637.2016.1188880

Rodriguez-Sanchez, C., Sancho-Esper, F., & Casaló, L. V. (2018). Understanding adolescent binge drinking in Spain: How school information campaigns moderate the role of perceived parental and peer consumption. *Health Education Research*, *33*(5), 361–374. https://doi-org.tilburguniversity.idm.oclc.org/10.1093/her/cyy024

Rothgerber, H. (2020). Meat-related cognitive dissonance: A conceptual framework for understanding how meat eaters reduce negative arousal from eating animals. *Appetite*, *146*. https://doi-org.tilburguniversity.idm.oclc.org/10.1016/j.appet.2019.104511

Steindl, C., Jonas, E., Sittenthaler, S., Traut-Mattausch, E., & Greenberg, J. (2015). Understanding psychological reactance. *Zeitschrift für Psychologie*.

Syme, G. J., Nancarrow, B. E., & Seligman, C. (2000). The evaluation of information campaigns to promote voluntary household water conservation. *Evaluation Review, 24*(6), 539–578. https://doiorg.tilburguniversity.idm.oclc.org/10.1177/0193841X0002400601

Wang, F., & Basso, F. (2019). "Animals are friends, not food": Anthropomorphism leads to less favorable attitudes toward meat consumption by inducing feelings of anticipatory guilt. *Appetite, 138*, 153–173. https://doi-org.tilburguniversity.idm.oclc.org/10.1016/j.appet.2019.03.019

Wood, W. (2017). Habit in personality and social psychology. *Personality and social psychology review*, *21*(4), 389-403.