Transition to a Sustainable Society: How can a Meatless Lifestyle be Facilitated? A Study on the Possible Antecedents of the Intention of the Consumption of Meatless Meals

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Abstract

An increase in the execution of pro-environmental behaviour is highly necessary in order to limit global warming, as stated in the Paris Agreement. An environmental self-identity was found to be a main predictor of pro-environmental behaviour (Van der Werff et al., 2014). Following the compatibility theory by Ajzen (1996), vegetarian self-identity seems to predict the intention of the consumption of meatless meals (Romo & Donovan-Kick, 2012). Schwarz et al. (1991) successfully manipulated perceived assertiveness with the Ease of Retrieval manipulation. In the current study, it was hypothesised that the ease of retrieval manipulation could influence the participant's perceived vegetarian self-identity. Furthermore, a positive effect of both vegetarian self-identity and animal welfare concern on the intention of the consumption of meatless meals was expected. The role of animal welfare concern on vegetarian self-identity and on the relationship between vegetarian self-identity and the intention of the consumption of meatless meals was explored. The conduction of the online experiment resulted in a sample of mostly university students (N=70). The manipulation check showed that the manipulation did not work as intended. Also, manipulated ease of retrieval did not have a significant positive effect on vegetarian self-identity. For vegetarian self-identity and animal welfare concern there was a significant positive effect on intention of the consumption of meatless meals. Animal welfare concern seems to be positively correlated with vegetarian self-identity and a significant negative interaction effect of animal welfare concern on the relationship between vegetarian self-identity and intention of the consumption of meatless meals was suggested. Regarding future studies, it is advised to explore the role of animal welfare concern to a greater extent. Animal welfare concern could be an alternative variable to manipulate in order to stimulate the intention of the consumption of meatless meals.

Introduction

Rice milk, plant-based spare ribs, McDonald's McPlant, vegan tuna, everything seems to be possible in the plant-based world nowadays. A friend, a colleague, your favourite Formula One driver, your favourite singer, everyone can name someone who is vegan these days. Sexton, Garnett, and Lorimer (2022) noticed the rise in popularity and even mentioned that veganism has gone mainstream.

The food sector plays a substantial role when it comes to climate change. Green House Gases (GHG) are considered to be the main contributor to global warming (Moiceanu & Dinca, 2021). The EIPRO found in 2006 that in Europe 29% of all consumption-derived GHG are related to food. An analysis by the CEDA EU-25 indicated that the GHG of 4 to 12% of all products or 19 to 38% of the consumption area CP01+02 can be ascribed to meat and meat products only. Globally, Steinfeldt et al. (2006) reported that 18% of the GHG emissions are directly linked to animal products. The Intergovernmental Panel on Climate Change [IPCC] (2022) has highly urged governments to reduce CO_2 emissions before 2030 to reach the Paris Agreement to limit global warming to 1.5ºC (Pörtner et al., 2022). Until now, global warming has already led to a rise in droughts, floods and cyclones which in turn negatively affected the agricultural sector (Arora, 2019). Combined with an ever growing population, it can become difficult to meet all the demand. The IPCC emphasized that action should be taken now because otherwise the consequences will be devastating and irreversible. The contribution of the live stock sector to global warming is extensive and thus exactly this sector could be key to saving the planet.

Since the consequences of global warming have become more evident over the past decades, people have become more aware of the problem, which is the first step towards behavioural change. Whitmarsh and O'Neill (2010) showed that self-identity is crucial when understanding pro-environmental behaviour. Especially a behaviour-specific self-identity influences the intention to this certain behaviour, compared to a more general pro-environmental self-identity. For example, Schenk, Rössel, and Scholz (2018) showed that a vegetarian self-identity is a great motivation for the eschewal of meat for young and educated consumers. In turn, environmental self-identity is influenced by past behaviour, or the perception of it (van der Werff et al., 2014). The greater the belief that a person behaved in a pro-environmental way in the past, the more this person proclaims behaving pro-environmental as being part of their self-identity.

The extent to which an individual is concerned about the welfare of animals could impact the relationship that a vegetarian self-identity has on the eschewal of meat. Schwarz et al. (1991) has shown that manipulating a certain part of one's self-identity by means of an ease or retrieval experiment was successful. This encourages the exploration of the use of the ease of retrieval manipulation for other desired changes in self-identity as well.

To save the world from the destruction that will be caused by climate change, obtaining more information about the behaviour around pro-environmental food consumption is of high importance. That is where the present research comes into play as we try to close the information gap by answering the following research question: *Can an ease of retrieval manipulation facilitate a vegetarian self-identity and hence stimulate the consumption of meatless meals and what is the role of animal welfare concern?*

Theoretical framework

Consumption of Meatless Meals. Pro-environmental behaviour [PEB], as defined by Kollmuss and Agyeman (2002), refers to behaviour that 'consciously seeks to minimize the negative impact of one's actions on the natural and built world (e.g. minimize resource and energy consumption, use of non-toxic substances, reduce waste production).' (p.240). There are certain factors that determine whether individuals would partake in pro-environmental behaviour, ranging from internal factors (personality traits, knowledge, values, etc.) to external factors (economic situation, politics, infrastructure, etc.) (Kollmuss and Agyeman, 2002).

Van der Werff et al. (2013) included the reduction of meat consumption as one example of pro-environmental behaviour. Changing one's food intake to a vegetarian or a plant-based one contributes to the rising demand of more plant based food. This way meat, which is extremely high in GHG emissions, is substituted by other products, which is better for the environment. So, eschewing meat and other animal products is confirmed to be one of the pro-environmental behaviours one can execute. The main reasons people opt for a vegetarian diet are health, animal rights and the environment (Hopwood et al., 2020).

Vegetarian Self-Identity. An important predictor of pro-environmental behaviour is environmental self-identity. Self-identity can be defined as "the label used to describe oneself, which relates to a particular behaviour" (Van der Werf et al., 2013). This certain personal identity is found in one's goals and values, traits, characteristics and attributes and ways of being (Oyserman, Elmore, & Smith, 2012). This encompasses the way people view

themselves, the actual self, and the way they would like to see themselves, the ideal self (Stryker & Burke, 2000).

Van der Werff et al. (2013) describe environmental self-identity as the degree to which people identify themselves as someone who behaves in a environmental friendly way. The higher an individual rates oneself in environmental self-identity, the higher the chances for someone to behave pro-environmentally. Oyserman et al. (2012) state that when a choice is linked to one's identity, the choice becomes automated. This suggests that an individual who does not consume meat might call oneself a vegetarian, and therefore basing one's future food consumption on this identity. Research has shown that biospheric values and environmental self-identity are the main predicters of pro-environmental behaviour (Balundė, Perlaviciute, & Steg, 2019; van der Werff et al., 2013). Environmental self-identity directly influences pro-environmental behaviour and mediates the correlation between biospheric values and pro-environmental behaviour (van der Werff et al., 2014). This makes environmental self-identity an important predictor of an individual's pro-environmental behaviour.

As in this study not general PEB is of interest, but specifically the consumption of meatless meals, the independent variable should be adjusted accordingly. Following the compatibility principle by Ajzen (1996), which states that two variables correlate stronger when they are measured on the same degree of specificity, the environmental self-identity is specified to vegetarian self-identity. Rosenfeld and Burrow (2017) conceptualised the term 'vegetarian identity' in their Unified Model of Vegetarian Identity (UMVI) as "an individual's thoughts, feelings, and behaviours regarding being vegetarian" (p. 91). Vegetarianism means that one eschews the consumption of meat (including red meat, poultry, and fish). Rosenfeld and Burrow (2017) used the definition 'vegetarian' for both vegetarians and vegans, since both exclude meat from their diet or life style.

Many vegetarians state that being a vegetarian is an important part of one's identity (Romo & Donovan-Kick, 2012). Avoiding meat can be seen as going against the current of society's norms and can cause conflict or friction when talking to people that do not support or follow the same diet or life style. This is one of the reasons for some people to not strictly avoid meat, therefore there is a discrepancy between self-identifying as vegetarian and strictly following the diet or life style (Rosenfeld & Burrow, 2017). For vegans it is even more difficult to communicate with others about their life style, compared to vegetarians. However,

they also see being vegan as a bigger part of their identity than vegetarians (Fiestas-Flores & Pyhälä, 2017; Rosenfeld, 2018).

Biospheric Values. Biospheric values relate to people's morals and the idea that it includes environmental contemplation, adding that values are not only considered of humans, but of nature too (Lindenberg and Steg (in press)). Steg and de Groot (2012) suggest that a person high in biospheric value is more likely to recognise this value as part of one's self-identity, compared to a person low in biospheric value. This in turn results in a stronger environmental identity, ultimately increasing pro-environmental behaviour of the individual. However, values stay rather the same, and trying to change them is rather inefficient (van der Werff, 2013).

Past Behaviour. Yet a more efficient angle to change a PEB is to look at past behaviour as it also influences environmental self-identity and shows more flexibility. Concretely, the chances that one acknowledges that eschewing meat is part of their identity are higher if one has actively avoided meat in their life before. Although, it is not the actual past behaviour that is regarded as true, but the perception of it (Lauren et al., 2019).

Ease of Retrieval. This perception is exactly what Schwarz et al. (1991) were able to manipulate. When making a judgement about something, people do not only take into account the actual thoughts and ideas that come to mind, but are sub-consciously also inclined to consider the ease or difficulty with which these thoughts and ideas come to mind (Schwarz et al., 1991; Tversky & Kahneman, 1973). This latter is described as 'the Ease of Retrieval' (Schwarz et al., 1991). A judgement is often made quicker when it is made on the base of an availability heuristic.

Schwarz et al. (1991) have succeeded in manipulating this ease of retrieval from participants by differentiating between the level of difficulty of recollection regarding ratings of assertiveness. In this study, the participants were firstly asked to name six or twelve acts of assertiveness, depending on the group. Then, they were asked to rate their own assertiveness. The result was that the group who only had to name six examples rated themselves notably higher in assertiveness than the group who had to name twelve examples. According to the researchers, this is due to the fact that people tend to follow their subjective experience of the difficulty of the? task, perceived ease of retrieval. Was the subjective experience of naming the examples easy (few examples), then the content of the examples was more strongly followed in the final judgment. The result obtained was reversed after a difficult subjective experience. The ease of retrieval effect is confirmed in multiple studies regarding different

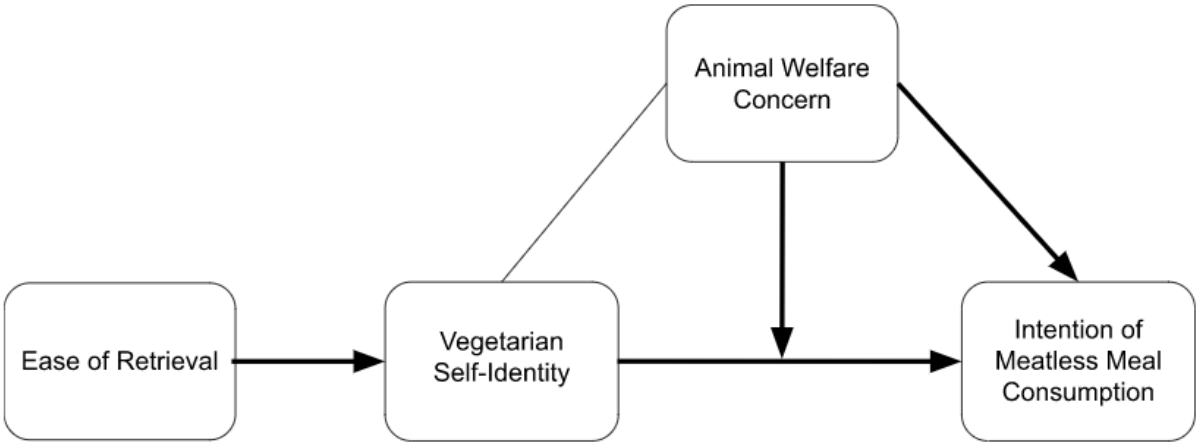
fields, for example attitudes (Menon & Raghubir, 2003), autobiographical knowledge (Winkielman & Schwarz, 2001) and depression (Greifeneder & Bless, 2008). This could hint at the possibility that an ease of retrieval manipulation could be effective on vegetarian self-identity as well.

Animal Welfare Concern. There has been found a discrepancy between self-identifying as vegetarian and strictly following the diet or life style (Rosenfeld & Burrow, 2017). A variable that is related to both vegetarian self-identity and to the intention to eat meatless meals is animal welfare concern. An organization that is highly concerned with the welfare of animals is the World Organisation for Animal Health [WOAH]. The WOAH specifies animal welfare as the way an animal deals with the conditions it lives in. A good welfare state includes the animal being healthy, comfortable, well-fed, protected from harm or danger, able to express innate behaviour and exclude the animal suffering from unpleasant states such as pain, fear, and distress. In this paper, animal welfare concern is conceptualized as the extent to which a human is concerned about the welfare of a non-human animal.

A high score on animal welfare concern is positively correlated with the willingness to become vegetarian (Díaz, 2016). It is useful to know the reasons that people have for eschewing meat from their diet as this is an important indication for their actual behaviour. In a comparison between the two most common motivations to become vegetarian, Hoffman et al. (2013) found that for ethical-vegetarians vegetarianism played a greater role in their lives than for vegetarians with a health motivation. This suggests that ethical-vegetarians more strongly identify themselves as vegetarian, compared to vegetarians with a health motive. Besides the fact that ethical-vegetarians are stricter in their diet (Arora et al., 2017), evidence also shows that they have greater chances of keeping up their diet compared to health-vegetarians (Hoffman et al. (2013), or even turn to veganism (Rosenfeld, 2018). Compared to vegetarians, vegans are found to show stronger convictions about the consumption of meat, animal welfare and the environment (Ruby, 2012).

All in all, vegetarians with an ethical motive, who take the life of the animal in consideration, seem to take the vegetarian self-identity and the consumption of meatless meals more seriously. Concluding, it is plausible that animal welfare concern has a direct positive effect on the consumption of meatless meals. Additionally, exploring the correlation between animal welfare concern and vegetarian self-identity would be beneficial, plus a possible moderation of animal welfare concern on the relationship between vegetarian self-identity and the intention of the consumption of meatless meals.

Figure 1. Conceptual framework.



The current study

In the current study the relationships between ease of retrieval, vegetarian self-identity, animal welfare concern and the intention of meatless meal consumption will be investigated. This study follows up a similar structure and goal as Schwarz et al. (1991), also attempting to find a manipulation effect. Whereas in Schwarz et al.'s (1991) study, the 'few versus many' manipulation will be used to influence one's perception of assertiveness, in the present study it is attempted to influence one's vegetarian self-identity. Secondly, a more in-depth examination of van der Werff et al.'s study will be conducted. Environmental self-identity is specified to vegetarian self-identity and in line with Ajzen's (1996) compatibility theory, the specific pro-environmental behaviour to be tested is the intention of the consumption of meatless meals. A positive effect of vegetarian self-identity on the intention of the consumption of meatless meals is expected. Moreover, a higher animal welfare concern is also expected to positively affect the intention of consumption of meatless meals (Díaz, 2016). Lastly, previous findings have sparked the idea that the role of animal welfare concern is more complex, and thus exploring further the relationship of that variable on vegetarian self-identity and on the relationship between the two dependent variables is of interest (Arora et al., 2017; Hoffman et al., 2013). The hypotheses are therefore as follows:

H1: A higher ease of retrieval increases vegetarian self-identity.

H2: A higher vegetarian self-identity increases the intention of consumption of meatless meals.

H3: A higher animal welfare concern increases the intention of consumption of meatless meals.

In addition to the hypotheses above, the perhaps more complex relationship of animal welfare concern with vegetarian self-identity and the intention of the consumption of meatless meals will be explored. Apart from the direct effect of animal welfare concern on the intention of the consumption of meatless meals, previous literature also sparked the idea of investigating the relationship between animal welfare concern and vegetarian self-identity, and a potential moderating role of animal welfare concern on the relationship between vegetarian self-identity and the intention of the consumption of meatless meals (Arora et al., 2017; Hoffman et al., 2013). Possibly, vegetarian self-identity only predicts the intention of the consumption of meatless meals when animal welfare concern is low, rather than when animal welfare concern is high.

Method

Participants and Design

The participants were randomly allocated to one of two conditions in a one-factor between participants design with manipulated ease of retrieval (few vs. many) as independent variable and vegetarian self-identity as dependent variable. Intention of the consumption of meatless meals was used as another dependent variable. Furthermore, two moderators in subjective norm and enjoyment were measured. Animal welfare concern was tested for the correlations with the two dependent variables. Data collection was done in a group and therefore the two moderators were included in the study, but for this paper only the variable animal welfare concern is relevant. Lastly, demographics were also collected.

The participants have been recruited through the participant gathering tool ‘Sona-Systems’ under the University of Twente licence. This type of sampling leads to the participants being mostly young students of the University of Twente. Additionally, convenience sampling was used to increase the number of participants.

The link to the study was distributed among social circles and social media groups and participants from the University of Twente were compensated for their time with 0.25 Sona Credits. Other participants were not paid in any way.

In total, 102 people started the questionnaire and after cleaning the dataset, 70 responses were left to analysis, resulting in a completion rate of 68,6%. 32 participants have been deleted due to exclusion criteria. First, participants were deleted as they did not complete the questionnaire until the end (n=28). Most participants that stopped, stopped at the ease of retrieval task. Ultimately, there were 38 participants in the high ease of retrieval condition and 32 in the low ease of retrieval group. Secondly, some participants had withdrawn their consent (n=3). And lastly it was concluded that one person did not understand the task at hand (n=1).

Of the 70 participants, most people identified themselves as female (46 F, 22 M, 1 non-binary/third gender, 1 transmasculine), the mean age is 22.08 (SD = 2.83, range = 18 – 35 y) and the participants mostly originated from the Netherlands (40 Dutch, 19 German, 11 Other). The details can be found in table 1.

Table 1

Frequencies and Descriptive Statistics for the Demographic Variables

Participant characteristics	Frequencies		Descriptive	
	n	*%*	*M*	*SD*
Age			22.08	2.83
Gender				
Female	46	65.7		
Male	22	31.4		
Other	2	2.9		
Nationality				
Dutch	40	57.1		
German	19	27.1		
Other	11	15.7		
Ease of Retrieval condition				
Few (7 meals)	38	54.3		
Many (14 meals)	32	45.7		

Note. n = 70. Other nationalities included Colombian, Ecuadorian, Mexican, Egyptian, Indian,

Procedure and Measures

The study was conducted online through survey tool Qualtrics. A link to the first page was shared with the participants, which contained a welcoming message including the

participant's rights and a general description of the study (Appendix A). At the end of the page consent of participation was asked which could be given by checking a box. Followed by the informed consent, a small demographic questionnaire was to be filled out, asking for the age, gender, nationality, occupation and educational-level of the participant.

Ease of Retrieval. After the demographic questionnaire, participants received instructions for the upcoming task: '*In the following page you are asked to fill out a task that requires you to name meatless meals you have eaten in the last 30 days. Additionally, you will be given a definition of what meatless meals are. It is important that your answers are honest, complete and given without any help from the internet.*' As the definitions of meat differ, it is specified that in this study the definition from Cambridge is used, reading 'the flesh of an animal when it is used for food*, in other words, fish is also included*.' (Cambridge University Press, n.d.).

Subsequently, randomly assigned to one of the two experimental conditions, participants in the high ease of retrieval condition (high ease paired with the more easy task) were instructed: *'Please name 7 examples of meatless meals you have eaten in the last 30 days [you can only mention one type of dish once]'.* And subjects of the low ease of retrieval condition (low ease paired with the more difficult task) were instructed: *'Please name 14 examples of meatless meals you have eaten in the last 30 days [you can only mention one type of dish once]'.* All participants were asked to write down the examples from memory into empty fields provided, differing from 7 to 14 fields, depending on the ease of retrieval condition.

Lastly, as part of the ease of retrieval, a manipulation check was done with the perceived ease of retrieval. Here, participants were asked to rate the difficulty of the task by answering the following statement: *'I found the task…'* and the question *'How difficult was it for you to name these meals?.* Answers could be given on a seven-point Likert scale from 'Very easy' (1) to 'Very difficult' (7).

Vegetarian Self-Identity. On the next page, the vegetarian self-identity of the participants was measured. The Vegetarian Self-Identity questionnaire was derived from Van der Werff et al.'s (2013) Environmental Self-Identity questionnaire, replacing the focus from the environment to meat replacement. The statements participants had to respond to included to what extent a person feels like meat replacement is part of their life and identity. The 3 statements consisted of the next three statements: *'Eating meatless meals is an important part of who I am', 'I am the type of person who eats meatless meals', 'I see myself as a person who eats meatless meals',* all of which could be rated on a 7 point-scale (Strongly disagree -

Strongly agree). Higher scores indicated higher vegetarian self-identity. The Cronbach's alpha and lambda-2 showed excellent internal consistency α = .92 and λ = .92 (George & Mallery, 2003).

After the Vegetarian Self-Identity measurement, Animal Welfare Concern was measured. Subjective norm and enjoyment are other moderators that were measured, however that goes beyond the scope of this paper.

Animal Welfare Concern. Animal Welfare Concern was measured via the 20-item scale called '*the Composite Respect for Animals Scale-Short*' ([CRAS-S] Randler, Binngießer, & Vollmer, 2018; Appendix B). The list contains 10 different themes of attitudes towards animal welfare, each with two questions. The teams covered are (1) use of animals in research, (2) use of animals for food, (3) farm animal husbandry, (4) animals as pets, (5) animal use for recreation, (6) humans as superior, (7) conservation of animals, (8) animal use for clothing, (9) hunting/angling, and (10) commitment (emotional affection). All the 20 items use a 5-point Likert scale (Fully Agree - Fully disagree, including an 'undecided' response option). Seven out of 20 items are reverse coded. After recoding the reversed items, adding all the mean scores together results in the total score in which a higher score means a higher animal welfare concern. The Cronbach's alpha and lambda-2 showed good internal consistency α = .88 and λ = .88 (George & Mallery, 2003).

Intention of the Consumption of Meatless Meals. Finally, the participants had to give information about their future behaviour regarding meatless meal consumption. Again, three statements were to be rated on a 7-point scale (Strongly disagree - Strongly agree), namely: '*The chance that I eat meatless meals in the next 2 weeks is high', 'I am planning to eat meatless meals in the next 2 weeks', 'My willingness to eat meatless meals is large'.* The statements were taken from Verbeke and Vackier (2005), following the Theory of Planned Behaviour, and adapted to our specific variables. Higher scores indicated higher behavioural intention to the consumption of meatless meals. The Cronbach's alpha and lambda-2 showed good internal consistency α = .89 and λ = .89 (George & Mallery, 2003).

Since information about the actual goal of the study was withheld from the participants, participants were made aware of the situation through a debriefing page displayed after completion of the questionnaires (Appendix C). They were subsequently asked if they would like to withdraw from the study after being informed about the study's true nature. Regardless of their choice, they are provided with a message in which they are thanked for their participation.

Data Analysis

IBM SPSS Statistics 28 was used as a statistical tool to analyse the data. First, the data was cleaned regarding the exclusion data.

First, it was checked whether the manipulation worked as intended with an independent- samples t-test. This way it can be determined whether the different ease of retrieval conditions were indeed perceived as being of different difficulties.

Secondly, the first hypothesis was tested. Of the four assumptions only normality was not met, however research concludes that this violation was to be expected with a small sample size and thus can be neglected (Duncan & Layard, 1973). Therefore a linear regression analysis was performed to test the relationship of ease of retrieval on vegetarian self-identity. Subsequently, it was tested whether perceived ease of retrieval affected vegetarian self-identity. This was also done with a simple regression analysis.

Before testing the second hypothesis, the assumptions were checked. In the relationship between vegetarian self-identity and the intention of the consumption of meatless meals the data turned out to be heteroscedastic and not normally distributed. Due to the violated assumptions, a Kendall Rank and a Spearman Rho analysis were performed instead of a Pearson Correlation (van den Berg, 2019).

Before testing the third hypothesis, the assumptions were checked. In the relationship between animal welfare concern and the intention of the consumption of meatless meals, the assumptions of independence of residuals and normally were violated. Due to the violated assumptions, a Kendall Rank and a Spearman Rho analysis were performed instead of a Pearson Correlation (van den Berg, 2019).

Lastly, the exploratory theories were tested. The correlation between animal welfare concern and vegetarian self-identity were explored by conducting a Pearson correlation test. A moderation analysis was done using the extension tool PROCESS v4.2 by Andrew F. Hayes, which makes use of bootstrapping (Hayes, n.D.). Bootstrapping was set to 5000 to counteract the non-parametric data and increase statistical power. For making judgements about statistical significance, $p > .05$ was used as a cut-off point. A potential moderator effect from animal welfare concern on the relationship of vegetarian self-identity on the intention of the consumption of meatless meals was explored.

Results

Table 2

Means (M), Standard Deviations (SD) and Correlation between the Variables

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Ease of Retrieval[a] (0,1)	.46	.50	1						
2. Perceived ease of retrieval (1-7)	3.69	1.80	.33	1					
3. Vegetarian self-identity (1-7)	4.62	1.82	.51	-.36**	1				
4. Meatless meal consumption (1-7)	5.80	1.59	-.08	-.40**	.81**	1			
5. Animal welfare concern (1-5)	3.65	0.60	-.04	-.21**	.52**	.44**	1		
6. Age	22.07	2.85	.02	-.13	.15	.13	-.04	1	
7. Gender*	1.71	.52	-.05	.36	.14	.04	.28	-.32	1

Note. *Male (1), Female (2), Other (3)
**p < .001; *n* = 70
[a] 0 = High Ease of Retrieval condition; 1 = Low Ease of Retrieval condition

Manipulation Check

An independent-samples t-test was conducted to compare the perceived ease of retrieval for low ease of retrieval and high ease of retrieval conditions. There was no significant difference in the scores for high manipulated ease of retrieval (*M*=3.71, *SD*=1.86) and low manipulated ease of retrieval (*M*=3.78, *SD*=1.74). conditions; t(68) = -0.16, p = .870. This means that the manipulation check did not work as intended as a significant difference between the groups cannot be confirmed. For both groups, the ratings of difficulty are rather in the middle of the range (1-7), this implies that there is no ceiling effect. The difficult task was not seen as highly difficult, neither was the easy task seen as extremely easy. The amount of meals filled in per condition can be found in table 3.

Table 3

Meals filled in per condition ease of retrieval task

High Ease of Retrieval			Low Ease of Retrieval		
Meals filled in	Frequency	Valid Percent	Meals filled in	Frequency	Valid Percent
14/14	23	71.9	7/7	32	84.2

7/14	25	78.1	4/7	34	89.5
4/14	29	90.6	2/7	37	97.4

[a] $n = 32$
[b] $n = 38$

Regression Analysis

A simple linear regression was used to test if a higher manipulated ease of retrieval corresponds with a higher vegetarian self-identity. All assumptions except normality were met, but there was still chosen to do a regression analysis as this is not problematic in this case (Duncan & Layard, 1973). The analysis revealed no significant positive relationship of manipulated ease of retrieval on vegetarian self-identity (β = 0.29; p = .510; $t(1)$ = 0.66; 95%-CI [-0.59, 1.17]). This means that vegetarian self-identity was not significantly different for people in the 'low' ease of retrieval group compared to the 'high' ease of retrieval condition. Concluding, hypothesis 1 had to be rejected.

Although there was no significant positive effect of manipulated ease of retrieval on vegetarian self-identity, perceived ease of retrieval could still affect vegetarian self-identity. This was again tested with a simple linear regression analysis. The analysis interestingly showed a significant negative relationship (β = -0.41; p = <.001; t(1) = -3.59; 95%-CI [-0.63, -0.18]). In other words, when people perceived the task as more difficult, they identified themselves less strongly with a vegetarian self-identity. In the same way, when participants found the task to be easy, they more strongly identified themselves with a vegetarian self-identity.

Spearman's Rho and Kendall Rank Analyses

To test for H2 '*a higher vegetarian self-identity increases the intention of consumption of meatless meals.*', first the assumptions were checked. Both the assumptions of normality and homoscedasticity were violated, therefore a Spearman's Rho and a Kendall Rank analysis were performed. Spearman's Rank correlation showed a significant positive effect of vegetarian self-identity on the intention of the consumption of meatless meals, r(68) = .80, p = <.001. The Kendall Rank Correlation also indicated a significant positive effect of vegetarian self-identity on the intention of the consumption of meatless meals (τb = .67, p = <.001). Therefore, the second hypothesis was accepted.

To test for H3 '*a higher animal welfare concern increases the intention of consumption of meatless meals*', first the assumptions were checked. Both the assumptions of normality and independence of residuals were violated, therefore a Spearman's Rho and a

Kendall Rank analysis were performed. Spearman's Rank correlation showed a significant positive effect of animal welfare concern on the intention of the consumption of meatless meals, $r(68) = .42$, $p = <.001$. The Kendall Rank Correlation also indicated a significant positive effect of animal welfare concern on the intention of the consumption of meatless meals ($\tau_b = .32$, $p = <.001$). Therefore, the third hypothesis was accepted.

Correlation Analysis

To explore whether animal welfare concern is correlated with vegetarian self-identity, a Pearson correlation test was conducted. The result, together with the correlations between all other variables, can be found in table 2. Animal welfare concern and vegetarian self-identity were found to be strongly correlated, $r(68) = .52$, $p < .001$.

Exploration Analysis

Here, a potential moderation effect of animal welfare concern on the relationship between vegetarian self-identity and the intention of the consumption of meatless meals was explored. Process was used to test main and interaction effects. The results can be seen in Table 3. The overall model was significant, $R^2 = .69$, $p < .001$. With the interaction effect added to the model, vegetarian self-identity ($\beta = 1.58$, $t(66) = 4.32$, $p < .001$) and animal welfare concern ($\beta = 1.28$, $t(66) = 2.43$, $p = .012$) still showed a significant positive effect on the intention of the consumption of meatless meals. This confirms the results of the Spearman's Rho and Kendall Rank analyses.

The effect of animal welfare concern as a moderator was also significant, $\beta = -.25$, $t(66) = -2.47$, $p = .02$ (Figure 2). Figure 3 shows that when animal welfare concern is high, the positive effect of vegetarian self-identity on the intention of the consumption of meatless meals is weaker. When animal welfare concern is low, the positive effect of vegetarian self-identity on the intention of the consumption of meatless meals is stronger.

Table 3

Results of a moderator model with parameter estimates for DV Intention of the Consumption of Meatless Meals, IV Vegetarian Self-Identity, and moderator Animal Welfare Concern

Parameter	β	*SE**	*t*	*p*
Constant	-1.77	2.22	-1.00	.032
Vegetarian self-identity	1.58	0.38	4.32	<.001
Animal welfare concern	1.28	0.63	2.43	.018

Vegetarian self-identity*Animal welfare concern	-0.25	0.11	-2.47	.016

Note. R^2 = .69 * Statistics from bootstrapping.

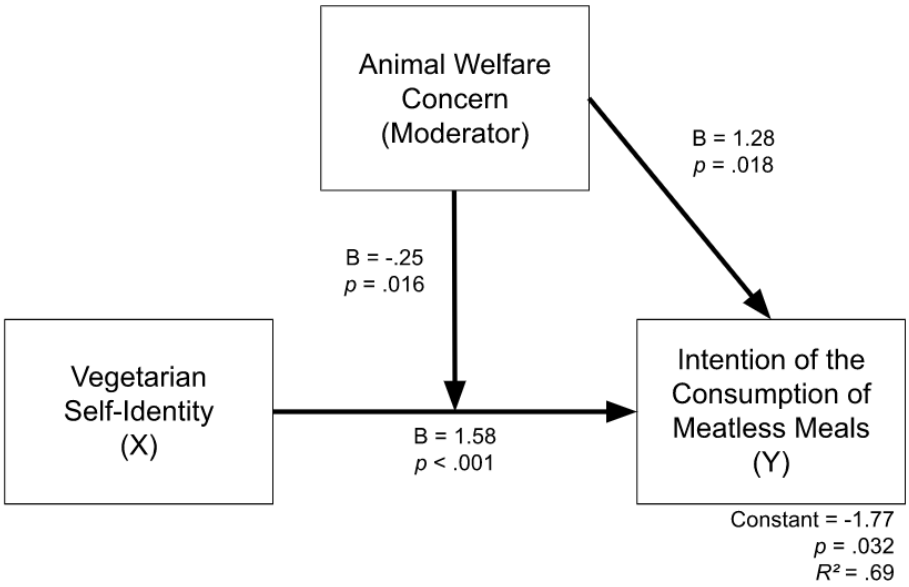


Figure 2. Moderating Effect of Animal Welfare Concern on the Relationship between Vegetarian Self-Identity and the Intention of the Consumption of Meatless Meals

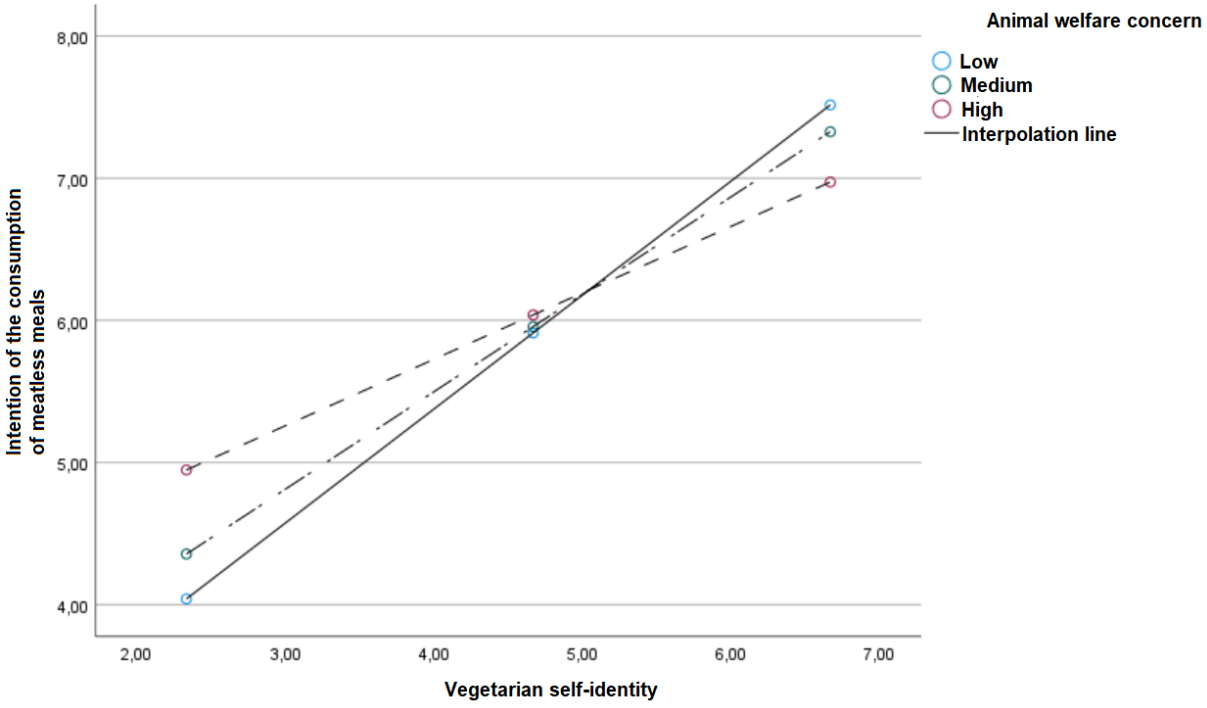


Figure 3. Line graph representing the moderation (interaction) effect of Animal Welfare Concern on the relationship between Vegetarian Self-Identity and the Intention of the Consumption of Meatless Meals. Conditioning values on the 16^{th}, 50^{th}, and 84^{th} percentiles.

Conclusions and Discussion

Main Findings

The present study focused on the relationship between vegetarian self-identity and the intention of the consumption of meatless meals. Additionally, it was investigated whether one's ease of retrieval could be manipulated in order to find out whether people in the easy condition would also identify themselves stronger with a vegetarian self-identity. It was also checked whether a higher animal welfare concern increases the intention of consumption of meatless meals. Lastly, an exploration was done on the role of animal welfare concern on vegetarian self-identity and on the relationship between vegetarian self-identity and the intention of the consumption of meatless meals.

First, the results of the manipulation check showed insufficient evidence to indicate that there was a difference between the manipulated high ease of retrieval and the manipulated low ease of retrieval group. In other words, the manipulation did not work as intended. However, perceived ease of retrieval did have a significant negative effect on vegetarian self-identity. Secondly, a linear regression analysis was used to test H1 *'a higher ease of retrieval increases vegetarian self-identity'*. There was no significant difference found, so the first hypothesis was rejected. For the second hypothesis *'a higher vegetarian self-identity increases the intention of consumption of meatless meals*'. There was a significant effect of vegetarian self-identity on the intention of the consumption of meatless meals, so H2 was accepted. H3 '*a higher animal welfare concern increases the intention of consumption of meatless meals*' was also accepted, because there was a significant positive effect of animal welfare concern on the intention of the consumption of meatless meals.

Further exploration of the data indicated that animal welfare concern and vegetarian self-identity were found to be strongly correlated. In another exploration, also a significant negative effect of animal welfare concern on the relationship between vegetarian self-identity and the intention of the consumption of meatless meals was found. When animal welfare concern is high, the positive effect of vegetarian self-identity on the intention of the consumption of meatless meals is weaker. When animal welfare concern is low, the positive

effect of vegetarian self-identity on the intention of the consumption of meatless meals is stronger.

Explanation of Results

Ease of Retrieval and Vegetarian Self-Identity. The fact that the manipulation check did not work as intended is not in line with the results from Schwarz et al. (1991), who found that ease of retrieval effectively impacted people's ratings of their own assertiveness. The current study, conducted in the context of vegetarian self-identity, could not contribute to the research stating that ease of retrieval was effective. Perhaps the easy of retrieval manipulation does work in many fields (Greifeneder & Bless, 2008; Menon & Raghubir, 2003; Winkielman & Schwarz, 2001), but not on vegetarian self-identity specifically.

One noteworthy outcome in the data was that most people that did not complete the questionnaire, stopped at the ease of retrieval task. Perhaps the introduction to this task was unclear, as we as researchers were already struggling with specifically naming the dependent variable 'meatless meal consumption'. The name 'vegetarian food' was rejected because we did not want to exclude people with other diets that also avoid the consumption of meat, like vegans for example. Additionally, it was not clearly mentioned whether this included that participants were also not allowed to mention vegetarian or plant based-meat. This could have caused confusion among the participants, resulting in some people perhaps specifically not naming dishes with vegetarian of plant based-meat, while others on purpose adding it to the list.

Another possible issue of the use of the ease of retrieval task is that it might not have investigated what is was intended for. In the difficult ease of retrieval task, participants were asked to name 14 different meals in the last 30 days. Yet, some people might not eat that diverse. For others it can be rather difficult to remember the meals they have eaten specifically in the past 30 days. The finding that more people dropped out of the difficult ease of retrieval task than did from the easy ease of retrieval task could imply that some people quit the questionnaire because the difficulty of the task was too high in the 'many' examples task. This might mean that people that actually found the task difficult are not in the study anymore, reducing variance in perceived difficulty.

To avoid this problem, some researchers investigating the ease of retrieval effect on environmental self-identity used a different type of 'few versus many' manipulation. They provided the participants with specific behaviours, for example 'selectively disposing of

household garbage', 'using the bike instead of the car when possible', plausibly reducing the strain people could experience while recalling certain situations without any probes. Cornellisen et al. (2008), Fanghella et al. (2019) and Lacasse (2016) for example manipulated perceived past behaviour of the participants by having them fill in a questionnaire in which they had to indicate for described pro-environmental behaviours (PEB) whether they participate in it or not. Lacasse (2016) divided the participants in two groups. One group was told that if they perform a behaviour "at least occasionally" they could note a certain PEB as "true", while the other group was told that they could only note a certain PEB as "true" if they performed the behaviour "a majority of the time". A consequence of this manipulation was that the first group could note many of the PEBs as "true", unlike the latter group who noted down a lower average of PEBs. Likewise, Fanghella et al. (2019) created one group in which participants received a questionnaire in which they had to indicate whether they performed certain PEBs, here on a scale from "Never" to "Always". However, in this study the other group had to indicate whether they performed certain behaviours that were unrelated to the environment. Even though in the context of the current study there is only one PEB of interest, namely the eschewal of meat, it could still be beneficial to implement a different type of ease of retrieval manipulation. In a certain way giving some examples to the participants to activate their memory could reduce the strain some people might experience when having to recall certain situations without any probes.

Vegetarian Self-Identity, Animal Welfare Concern, and the Intention of the Consumption of Meatless Meals. The result that a higher vegetarian self-identity indeed increased the intention of consumption of meatless meals is similar to previous research (Schenk et al., 2018). This study also extended the literature provided by Van der Werff et al. (2013, 2014) on pro-environment behaviour with the intention of the consumption of meatless meals as specific behaviour. Our independent variable, vegetarian self-identity, was adapted to our specific PEB as dependent variable, the intention of the consumption of meatless meals. The reason for this is the compatibility principle which proclaims that two variables correlate stronger when they are measured on the same degree of specificity (Ajzen, 1996). The result that a higher animal welfare concern increased the intention of consumption of meatless meals is also in line with existing literature (Díaz, 2016). The finding that both vegetarian self-identity and animal welfare concern positively affect the intention of the consumption of meatless meals, points out that both independent variables are important predictors of the intention of the consumption of meatless meals. This means that in order to

stimulate the eschewal of meat in people, not only one's vegetarian self-identity can be tried to influence, but manipulating one's animal welfare concern can also be a way.

Exploratory Analyses Regarding Vegetarian Self-Identity, Animal Welfare Concern, and the Intention of the Consumption of Meatless Meals. Besides having a positive effect on the intention of the consumption of meatless meals, animal welfare concern also seems to have a positive correlation with vegetarian self-identity. Finally, a third relationship with animal welfare concern was found, namely on the relationship between vegetarian self-identity and the intention of the consumption of meatless meals. When animal welfare concern is high, the positive effect of vegetarian self-identity on the intention of the consumption of meatless meals is weaker. When animal welfare concern is low, the positive effect of vegetarian self-identity on the intention of the consumption of meatless meals is stronger. These outcomes of these exploratory analyses should not be overestimated, however it does indicate that the role of animal welfare concern is more complex than found until now in literature. Further inclusion of this variable within tests is therefore advised.

Regarding future research, perhaps a look can be taken at possibilities to manipulate one's (perceived) animal welfare concern as an alternative to manipulating ease of retrieval. Research has shown that in general people are misinformed about animal welfare by the animal agriculture industry and also that people actively avoid the distressing information (Cornish et al., 2016; Rothgerber, 2020). In a recent article, Mathur et al. (2021) conducted a meta-analysis with 100 studies, checking interventions that were dedicated to reduce the consumption or purchase of meat that measured behavioural or self-reported outcomes in relation to the consumption of meat. They suggest that animal welfare interventions appear to be effective. One limitation is that only short-term results are known, while the literature on long-term results is scarce. Concluding, further research on animal welfare concern is an important step towards meat reduction.

Strengths, Limitations and Future Research

To avoid making similar mistakes and to ensure that powerful features of this research are reused in future studies, it is important to reflect on the current study.

Starting with the shortcomings, it is important to be careful with the word 'vegetarianism' and the different meanings and the usage of it. A vegetarian is a person who avoid the consumption of meat. Although, at times in research it might be preferable to use the word vegetarians for people with for example a vegan diet as well, as they also avoid the consumption of meat (Rosenfeld and Burrow, 2017). Another complication regarding this

word is the difference in level of strictness. One might claim that they are high in vegetarian self-identity, but still eat meat once a week, or make an exception for the consumption of fish (Rosenfeld & Burrow, 2017). Therefore, it could be valuable to test one's strictness regarding the eschewal of meat as well.

The ease of retrieval manipulation did not work as intended and thus should be revised. Regarding the difficulties mentioned before, participants should have been given a more clear explanation of what is expected from them in the task. Perhaps some participants from the low ease of retrieval condition perceived the task as too difficult, which resulted in the low completion rate. The number of dishes to be named in this condition could be lowered, the range of the past 30 days could be extended to 'ever', or a completely different ease of retrieval manipulation could be used. The manipulation styles from Cornellisen et al. (2008), Fanghella et al. (2019) and Lacasse (2016) could be considered as the tasks ask less memory work from the participants.

There are also some clear strengths. The current research builds on existing literature of environmental self-identity and pro-environmental behaviour. An attempt was made to partly recreate the studies from van der Werff et al. (2013, 2014), but on a higher level of specificity. Just as environmental self-identity on pro-environmental behaviour, vegetarian self-identity has a positive effect on the pro-environmental behaviour of the consumption of meatless meals. Concluding, the current study was able to dive deeper into existing literature and study more specific variables.

The variable animal welfare concern has shown a direct effect on the intention of the consumption of meatless meals, but the role of this independent variable seems to be more complex than that. The finding of this complexity is an interesting addition to current literature. For future studies, it is suggested to further explore animal welfare concern. As people in general try to avoid distressing information surrounding animal welfare, it is recommended to see if animal welfare concern can be manipulated, for example with an ease of retrieval manipulation. This way, feelings of distress might be evaded.

Emphasizing and reminding people of one's concern for animal welfare could facilitate the process of one eating more dishes without meat, which could over time lead to identifying oneself as a vegetarian, which again stimulated the eschewal of meat. This pro-environmental behaviour contributes to the reduction of CO_2 emissions, which limits to some extent global warming, which is of high importance. Another benefit is that it reduces the exploitation of animals for humans and further opens up the debate about animal welfare.

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Appendix A

Online Consent Form

Thank you for your interest!
The purpose of this study is to measure and gain insight in the causes and expression of food consumption. This study is part of the Bachelor's Theses by third year students of the University of Twente. It has been reviewed and approved by the University of Twente BMS Ethics Committee.

The participation in this study is entirely voluntary. During participation you may choose to withdraw at any time without explanation by simply closing the window. Withdrawing consent will bring no repercussions and the data created by you thus far will be deleted.

The dataset is completely anonymous and no personally identifiable information will be collected. The anonymous data will be used for scholarly research purposes and may be shared with other research members of the University of Twente. The data will be retained for five years. After this time, all collected data related to this study will be deleted.

The study starts off with a basic demographic questionnaire, followed by a task which consists of questions regarding past and current behaviour of food consumption. All in all the questions should take approximately 5-10 minutes to complete. Please answer all questions and be as truthful as possible. This questionnaire can be filled in through most devices (laptop, mobile phone, tablet, etc.).

If there are any remaining questions, concerns, or otherwise, feel free to contact one of the researchers:

[Omitted]

- [ ] I have read and understood the study information listed above dated 08.11.2022 and confirm that I voluntarily participate.
- [ ] I am over the age of 16

Appendix B

Animal Welfare Concern Scale

AWC Matrix

The following questions refer to animals and our use of them. Please indicate to what extent you agree with the following statements.

	Fully disagree	Rather disagree	Undecided	Rather agree	Fully agree
As long as adequate food, warmth and light are provided, there is nothing really cruel about battery hen farming.	○	○	○	○	○
It is wrong to kill crocodiles to make shoes and handbags from their skins.	○	○	○	○	○
I would like being a veterinarian.	○	○	○	○	○
It is acceptable to test cosmetics/shampoos on animals, so that they will not harm humans.	○	○	○	○	○
There is nothing morally wrong with hunting wild animals for food.	○	○	○	○	○
In my opinion, animals are definitely inferior to humans.	○	○	○	○	○
All insects should be conserved.	○	○	○	○	○
	Fully disagree	Rather disagree	Undecided	Rather agree	Fully agree
I think it is perfectly acceptable for animals to be raised for human consumption.	○	○	○	○	○
I find my pet a source of emotional comfort (or would if I had one.)	○	○	○	○	○
It is wrong to keep animals in zoos.	○	○	○	○	○
I do not think that there is anything wrong with using animals in medical research.	○	○	○	○	○
Angling is cruel and inhumane to the animals.	○	○	○	○	○
It is wrong to kill animals to make fur coats.	○	○	○	○	○
It is wrong to keep chickens in battery cages.	○	○	○	○	○
	Fully disagree	Rather disagree	Undecided	Rather agree	Fully agree
I do not believe that humans are superior to animals.	○	○	○	○	○
I would like to spend some of my time telling people about the problems that face an endangered animal.	○	○	○	○	○
Hunting helps people appreciate natural processes.	○	○	○	○	○
All animals should be conserved.	○	○	○	○	○
It is wrong to use animals in circuses.	○	○	○	○	○
I think of my pet as a member of my family (or would if I had one).	○	○	○	○	○

Appendix C

Debrief

Debrief

Thank you for your participation in our study about transitioning into a sustainable society!

For this study to work, we had to make use of deception.

You have been randomly allocated to one of two groups, either having to recall 7 or 14 meatless meals. The amount of items you had to recall were supposed to steer you into a certain direction and influence your self-perception. Having to recall 7 items was supposed to influence you into believing that eating meals without meat is an important part of your identity. Having to recall 14 items was deemed more difficult to influence you into believing that eating meals without meat is not an important part of your identity.

Having been fully informed about the methods used to deceive you, you are free to withdraw your consent. If you wish to withdraw from the study, simply tick the box below. In that case we will delete all data generated from your participation. If you don't wish to withdraw, you can just click the arrow at the bottom of the page. This will officially end the questionnaire and there you are free to close the tab.

☐ I want to withdraw from this study