The steaks have never been higher:

The Influencing Role of Motivations on the Relationship between Values and Reducing Meat Consumption Behaviour

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Abstract

In many ways, a diet containing less animal protein and more plant-based protein is a more sustainable diet. Although much effort is being made worldwide to reduce meat consumption, figures show that meat consumption in the Netherlands has stagnated. Previous studies applied the Value-Belief Norm Theory to show that self-transcendence values are positively and self-enhancement values are negatively related to reducing meat consumption. Other studies focussed on motivations for reducing meat consumption, i.e., animal welfare, environment and health. Building on this knowledge, the current study used quantitative data from the Dutch LISS Panel to investigate the relationship between values and motivations and how this influences reducing meat consumption. Results confirm the positive effects of the altruistic and biospheric values and the negative effect of egoistic values on meat replacement product consumption (MRPC). Furthermore, although some effects were small, this study demonstrated that moral motives (animal welfare and environment) appeared to completely mediate the relationship between altruistic values and MRPC, and these motives partially mediated the relationship between biospheric values and MRPC. Furthermore, results also showed that the self-interested motive (health) potentially positively influences individuals with egoistic and hedonic values to reduce their meat consumption as well, through a small moderating effect on this association. The results implicate how motivations explain the relationship between values and the pro-environmental behaviour of reducing meat consumption. More importantly, the self-enhancing values could potentially not undermine sustainable meat consumption by increasing health motives. In practice, these insights aid in linking more effective interventions to groups with specific value profiles by targeting their associated motivations and helping reduce their meat consumption.

Key words: Reducing meat consumption, values, motivations, Value-Belief Norm Theory

Introduction

The western diet contains a lot of meat, which has various adverse effects. Not only did studies show that eating meat, and especially red meat, has various detrimental health effects, such as cardiovascular disease (Koeth et al., 2013) and risks for different forms of cancer (Anand et al., 2008). The production of meat also requires a lot of land use and causes significant emissions of greenhouse gases (Westhoek et al., 2014; Sun et al., 2022). Additionally, some scholars argue that meat consumption violates animal rights, such as discrimination in terms of life value (Singer, 2015). Finally, scholars argue that besides animal rights, meat consumption also violates human rights. Due to the resource-intense production of meat, large amounts of resources are used for animal feed instead of human food (Shepon et al., 2018). Besides this, the increased risk of infectious diseases from meat consumption, such as Toxoplasma gondii, also violates human rights (Tenter et al., 2000). These examples highlight that, in many ways, a diet containing less animal protein and more plant-based protein is a more sustainable diet. Correspondingly, the Dutch protein strategy now aims for a ratio of animal and plant proteins of 50/50 in 2030 instead of the current ratio of 60/40 (Ministry of Agriculture, Nature and Food Quality, 2022).

Worldwide, much ambition and effort have been put into reducing consumer meat consumption. This becomes apparent, for instance, in documentaries that have been released that explain the consequences of meat consumption, e.g., Cowspiracy (Andersen & Kuhn, 2014) and The Game Changers (Psihoyos, 2018) and the increase in meat substitutes that is projected to triple between 2018 and 2026 (Thomas & Deshmukh, 2021). Despite these examples to reduce meat consumption, the many interventions have so far proved unsuccessful, given that meat consumption in the Netherlands has stagnated (Dagevos et al., 2018).

A lot of social-scientific research is being done to investigate how we can effectively achieve this reduction in meat consumption behaviour. Three lines of research can be distinguished in this regard. There is a field of research focusing on descriptive segmentation of socio-demographic factors of the population already reducing their meat consumption, for instance, showing that female sex, higher educational attainment and older age are positively related to reducing meat consumption (Pfeiler & Egloff, 2018). Secondly, there is research on the motivations why this population reduces their meat consumption. Ample studies have shown that these motivations correspond with the previously mentioned consequences of meat consumption, namely health, the environment and animal welfare (e.g., Amiot et al., 2018; Zur & A. Klöckner, 2014; De Boer et al., 2007). Finally, a broad theoretical field within the Value-Belief Norm Theory (Stern, 1999) examines which values are associated with people who perform sustainable behaviour like reducing meat consumption (De Boer et al., 2007). The three research lines are explained in more detail in the background section.

While some studies have looked at intersections between these three largely separate fields, such as studies on motivations for reducing meat consumption of specific socio-demographic groups, what has yet to be investigated is how motivations are linked explicitly to values. The current study aims to investigate this important correlation to link more effective interventions to groups with specific value profiles by targeting their associated motivations.

Socio-demographic factors of meat-reducers

In the first line of research, literature on population segmentation focuses mainly on socio-demographic factors such as age and gender, as this information is often known and readily available. For instance, some studies show that higher education, female sex, older age, and city-dwelling are associated with a pescetarian, vegetarian or flexitarian diet (Guenther et al., 2005; Pfeiler & Egloff, 2018; Kloosterman et al., 2021). Although socio-demographic

segmentation provides more information about the target population, this segmentation is rather descriptive and does not address underlying explanatory factors of reducing meat consumption behaviour.

Motivations for reducing meat consumption

Moreover, due to the increased prosperity and individualisation, population segmentation for socio-demographic factors are even less explanatory for our behaviour, and it has become essential to look at deeper aspects. Sargisson and colleagues (2020) argue that more archetypal population segmentation, such as culture, is more defining for pro-environmental aims. This is why motivations for reducing meat consumption can be considered an example of explanatory segmentation. The three most predictive motivations correspond with the previously mentioned effects of high meat consumption (Amiot et al., 2018; Zur & A. Klöckner, 2014; De Boer et al., 2007). For instance, one study showed that vegetarians score higher on concerns for animal welfare than flexitarians (De Backer & Hudders, 2015). Another study demonstrated that environmental concerns are an important motivator among flexitarians, more than vegetarians and vegans, for change in eating habits (Sanchez-Sabate et al., 2019). Lastly, some scholars demonstrated that health concerns are an important motivator for avoiding meat consumption in people who believe that reducing meat consumption puts them in better health (Malek et al., 2018; Cheah et al., 2020).

In some literature, scholars have mapped out the motivations for reducing meat consumption onto socio-demographic groups. For example, highly educated people, city dwellers and students mainly reduce their meat intake for environmental considerations (Kloosterman et al., 2021; Arnaudova et al., 2022). Women are more concerned about animal welfare (Ruby, 2012; Blanc et al., 2020), and families with children living at home are mainly concerned with health (Kemper, 2020). The relationship of this intersection offers essential

insights for tailored interventions that target specific motivations that are, in these examples, more predominant in certain groups, such as city dwellers or young families.

In addition to socio-demographics, the existing motives to reduce meat consumption can also be mapped onto the different values underlying sustainable behaviour. Specifically, the reasons to reduce meat consumption out of environmental considerations or animal welfare seem more altruistically motivated than the motive of personal health. The final motive, in contrast, might be more closely related to egoistic values, as wanting to eat more healthily primarily benefits the self (Carfora et al., 2020).

Value-Belief Norm Theory and reducing meat consumption

The outlined subdivision of altruistically (or moral) versus egoistically driven (or self-interested) motivations underlying sustainable behaviour aligns with the broad theoretical field within and around the Value-Belief Norm Theory (VBN) (Stern, 1999). The basis of the theory lies in the theoretical studies by Schwartz, where he used a personal value dimension on self-transcendence versus self-enhancement to construct personality scales (Schwartz, 1992; 1994). This specific dimension distinguished between altruistic and egoistic values and was later supplemented by other researchers with biospheric and hedonic values — resulting in two types of self-transcendence values (altruistic and biospheric) and two types of self-enhancement values (egoistic and hedonic)— (Stern et al., 1993; Stern & Dietz, 1994; Stern et al., 1998; Stern, 2000; Steg et al., 2012). Accordingly, several studies have integrated these values into a theoretical model of the VBN Theory and argued that self-transcendence values are more likely to predict pro-environmental behaviour through personal norms based on beliefs and attitudes about consequences and responsibility, whereas self-enhancement values are more likely to predict the opposite through beliefs, attitudes and norms (Schwartz, 1992; 1994; Stern et al., 1993; Stern & Dietz, 1994; Stern, 1995; Stern et al., 1998; Stern, 2000; Steg et al., 2005; 2012; Oreg & Katz-Gerro, 2006). For instance, more specifically with

regard to meat consumption, several studies showed that universalism and other self-transcendence values lead to higher intentions to reduce meat consumption, whereas self-enhancement values were negatively associated with reducing meat consumption (De Boer et al., 2007; Graham & Abrahamse, 2017).

Literature knowledge gap

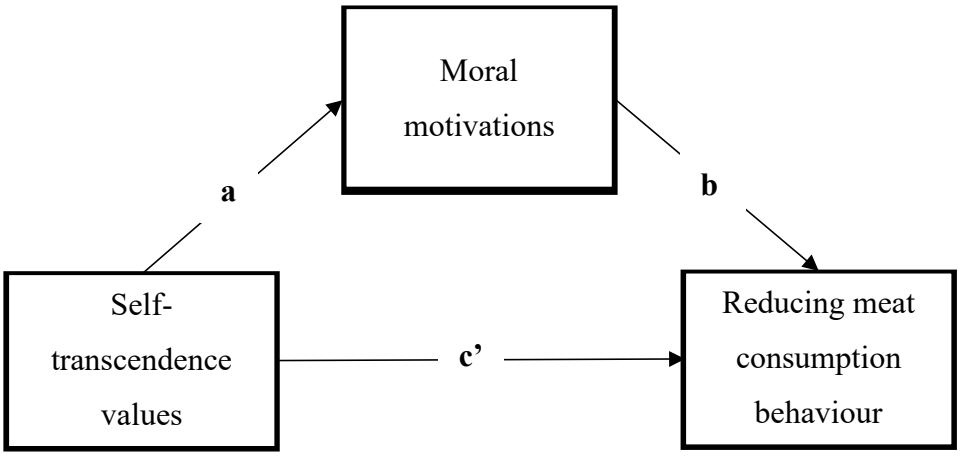
Previous studies have already demonstrated relationships between values and reducing meat consumption behaviour and the important role of motivation in reducing meat consumption. However, there is a knowledge gap on the intersection between values and motivations. Demonstrating this relationship would be of additional value to the VBN Theory in predicting pro-environmental behaviour.

Hypotheses

To find answers to this knowledge gap, four hypotheses were formed. Since self-transcendence values imply values beyond personal boundaries, as outlined in the VBN Theory, it is hypothesised that these values are positively associated with reducing meat consumption behaviour (H1). Subsequently, these values are expected to lead to moral motives (i.e., environment and animal welfare) for reducing meat consumption. Hence, the following is hypothesised: moral motivations mediate the relationship between self-transcendence values and reducing meat consumption behaviour (H2) (see Figure 1).

Figure 1

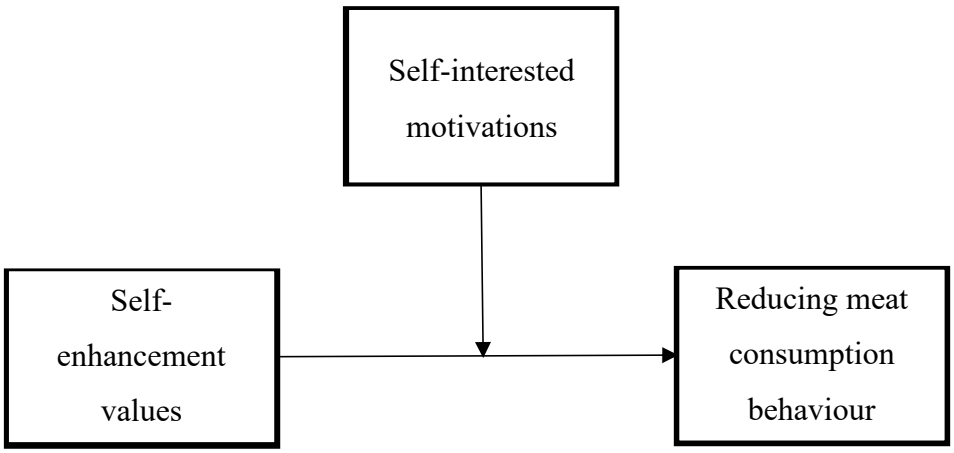
Mediation model for hypothesis 2



According to the VBN Theory, self-enhancement values have the opposite effect on pro-environmental behaviour. Therefore, it is hypothesised that these values are negatively associated with reducing meat consumption behaviour (H3). However, the self-interested motive (i.e., health) reduces meat consumption behaviour for some people. It is for those individuals that it can be reasoned that self-enhancement values can be related to reducing meat consumption behaviour as well. Hence, the last hypothesis was formed: self-interested motivations moderate the relationship between self-enhancement values and reducing meat consumption behaviour (H4) (see Figure 2).

Figure 2

Moderation model for hypothesis 4



Method

Design and Procedure

This study has a quantitative cross-sectional design using five existing datasets collected by the Longitudinal Internet Studies of the Social Sciences (LISS) Panel, administered by CentERdata, to perform between-subjects analyses. Mediation analyses were chosen to demonstrate the relationship between self-transcendence values and reducing meat consumption behaviour, as well as the possible explanatory role of moral motivations for this relationship. Moderation analyses were chosen to demonstrate the relationship between self-

enhancement values and reducing meat consumption behaviour, as well as the possible interaction of self-interested motivation in this relationship.

The LISS Panel is a Dutch panel consisting of over 5,000 households and 7,500 voluntary individuals. The scientific institute recruited the members through a random sample from the population registers and sent brochures explaining the nature of the panel study. The panel members had to give informed consent at the initiation of the membership (file openly accessible). All LISS Panel questionnaires were administered online and were sent via e-mail. Households that would otherwise not be able to participate were provided with a computer and internet connection. Panel members fill in several questionnaires each month with an average duration of 30 minutes and are offered financial incentives of fifteen euros per hour, based on the estimated average completion time. Furthermore, the researchers ended every questionnaire with reflective questions to increase confidentiality by allowing the respondents to acknowledge uncertainties.

Sample

The collection date of the questionnaire selected for the mediator and moderator variables determined the selected wave of the *Personality* and the *Background Variables* questionnaires. Missing values of three cases were extracted from a previously collected dataset of Background Variables. See Table 1 for an overview of the datasets used for this study.

Table 1

Overview of the datasets used

Dataset	Collection date	Frequency	Completed response	Participants	Variables and characteristics	Reference
Background Variables	May 2018	Monthly	11,001	All panel members	Gender, Year of birth, Level of education	Das & Elshout, 2022

Background Variables	June 2019	Monthly	9,670	All panel members	Gender, Year of birth, Level of education	Das & Elshout, 2022
Personality, wave 11	May and June 2019	Yearly	5,021	Panel members aged 16 years and older	Altruistic values, Egoistic values, Hedonic values	Marchand, 2019
Consumer heterogeneity with respect to morality in consumption decisions and perceptions of animal welfare (part 1)	October 2012	Single wave	3,038	One person per household responsible for daily groceries	Biospheric values, Meat replacement product consumption (MRPC)	Elshout, 2013
Reasons to eat less meat	July and August 2018	Single wave	5,742	Panel members aged 16 years and older	Animal welfare motive, Environmental motive, Health motive	Bleidorn & Hopwood, 2019

Before use, the questionnaires were merged based on panel member number, providing a sample of 10,886 participants. Because of the differences in collection dates and complete response rates of the questionnaires, there were many cases with missing values for one of the items used for the variables. To obtain a complete image of the variance in the outcome, cases were filtered for response to all questionnaires and 9,284 cases were excluded because they did not meet this inclusion criterium. The final analytic sample included 1,602 cases (see Table 2). Although educational levels are equally distributed, the sample consists primarily of women and people born between 1950 and 1974.

Table 2

Frequencies of sample characteristics

	Frequency	%	Cumulative %
Sex			
Male	477	29.8	29.8
Female	1,125	70.2	100.0
Total	1,602	100.0	
Range of year of birth			
1923-1949	485	30.3	30.3
1950-1974	925	57.7	88.0
1975-1993	192	12.0	100.0
Total	1,602	100.0	
Level of education categories			
Low level of education (primary school or intermediate secondary education)	535	33.4	33.4
Moderate level of education (higher secondary education or intermediate vocational education)	526	32.8	66.2
High level of education (higher vocational education or university)	541	33.8	100.0
Total	1,602	100.0	

Ethical considerations

Before conducting this research, the research project was registered to the Student Ethics Review & Registration site and reviewed by the faculty ethical review board. An account was requested to access the LISS Panel's data archive. CentERdata anonymised the data using pseudonyms. Only CentERdata has access to panel members' personal data and stores the data abiding by the European General Data Protection Regulation (GDPR) (CentERdata Research Institute, 2022). Following the faculty's protocol, during the study, the data was saved on a personal U-drive where only the researcher could access it. After

completion of the project, files will be deleted from the U-drive and archived on an online faculty server in the form of a data package where only the researcher, master project supervisor, and the master thesis coordinator (or their delegate) have access to.

Materials

Due to the difference in scale sizes of the items, the variables were calculated using sum scores for better interpretability.

Independent variables: Values

Participants were asked to rate which values from the Rokeach value survey (Rokeach, 1973) act as a guiding principle in their life and which values were less important to them on a 7-point Likert-type scale (1 = extremely unimportant, 7 = extremely important). The values were used to construct the altruistic, egoistic and hedonic value scales. The distribution of the values among the three value scales was confirmed with a principal components analysis with oblimin rotation (see Appendix A). Reliability tests showed a Cronbach's alpha of .642 for altruism, .771 for egoism and .626 for hedonism. Due to a lack of suitable items, the biospheric values scale was constructed using the following item: ''Which of the following aspects do you think applies to the consumption of meat that is produced in the conventional [broiler chickens/pigs] farm? Environmentally unfriendly'' on a 7-point Likert-type scale (-3 = very negative, +3 = very important).

Dependent variable: Meat Replacement Product Consumption

Participants were asked the following questions: ''Do you ever eat meat replacement products? By meat replacement products we mean vegetarian balls or burgers (for example from Vivera, Goodbite, Tivall, Valess), tofu, soy, tempé, or quorn.'' on a 7-point Likert-type scale (1 = never, 2 = tasted it once, 3 = less than 1 time per month, 4 = 1 time per month or more often, but less than 1 time per week, 5 = 1 – 2 times per week, 6 = 3 – 4 times per week, 7 = 5 times per week or more often); and: ''To what extent would you personally eat a meat

replacement product instead of meat at least once a week?'' on a 5-point Likert-type scale (1 = definitely not, 5 = definitely). Combining the items showed a Cronbach's alpha of .830 and formed the dependent variable Meat Replacement Product Consumption (MRPC).

Mediator and moderator variables: Motivations for reducing meat consumption

Respondents had to rate the importance of multiple reasons to eat less meat or animal products, even if they did not intend to change their diet, on a 7-point Likert-type scale (1 = not important, 7 = very important). Examples of reasons were: "I want to be healthy", "It does not seem right to exploit animals", and "Plants have less of an impact on the environment than animal products" (see Appendix B for a complete list of questionnaire items). Combining the items showed a Cronbach's alpha of .942 for animal welfare motive, .912 for environmental motive and .885 for health motive.

Data analyses

All analyses were carried out using IBM SPSS Statistics 27. Descriptive and correlation analyses of the variables were performed. Hereafter, the assumptions were checked. Standardised residuals and Cook's distance did not show any outliers, collinearity diagnostics did not show multicollinearity, the models were linear, residuals were normally distributed, and homoscedasticity of variance was shown. Mediation and moderation analyses were performed using PROCESS v3.5 by Andrew F. Hayes with models 4 and 1, respectively.

Results

Descriptive statistics

On average, the participants attach importance to the values, except for the biospheric values, where statistics show a low average sum score. Participants also adhere to all the motivations to reduce meat consumption. On average, participants consume little meat replacement products. See Table 3 for an overview of the descriptive statistics of the variables.

Table 3

Descriptive statistics of variables

	Min.	**Max.**	**M (*SD*)**	**Median**
Altruistic values	4.00	21.00	18.29 (*2.39*)	19.00
Biospheric values	0	1	.27 (*.45*)	.00
Egoistic values	2.00	14.00	9.28 (*2.45*)	9.00
Hedonic values	3.00	14.00	11.36 (*1.79*)	12.00
Animal welfare motive	6.00	42.00	32.02 (*7.91*)	33.00
Environmental motive	5.00	35.00	24.32 (*6.19*)	25.00
Health motive	4.00	28.00	23.75 (*4.22*)	24.00
Meat replacement product consumption	2.00	12.00	5.00 (*2.68*)	4.00

The results of the Pearson correlation analysis (see Table 4) reveals a surprising positive correlation between altruistic values and egoistic values ($r=.271$, $p<.001$), as well as hedonic values ($r=.373$, $p<.001$), whereas the correlation between the self-transcendence values is non-significant ($r=.020$, $p=.435$). Another surprising correlation is shown between egoistic values and the animal welfare motive ($r=.101$, $p<.001$) and hedonic values and animal welfare motive ($r=.170$, $p<.001$) and environmental motive ($r=.058$, $p=.021$). Lastly, the Pearson correlation analysis shows a non-significant correlation between the health motive and MRPC ($r=.028$, $p=.271$).

Table 4

Pearson correlation analysis of variables

	1.	**2.**	**3.**	**4.**	**5.**	**6.**	**7.**	**8.**
1. Altruistic values	-							
2. Biospheric values	.020	-						
3. Egoistic values	.271**	-.085**	-					
4. Hedonic values	.373**	-.071**	.497**	-				
5. Animal welfare motive	.320**	.110**	.101**	.170**	-			
6. Environmental motive	.232**	.232**	.040	.058*	.589**	-		
7. Health motive	.322**	.007	.227**	.248**	.453**	.404**	-	
8. Meat replacement product consumption	.068**	.264**	-.104**	-.038	.200**	.366**	.028	-

Note. Two-sided test ** p<0.01, * p<0.05.

Mediation of moral motives

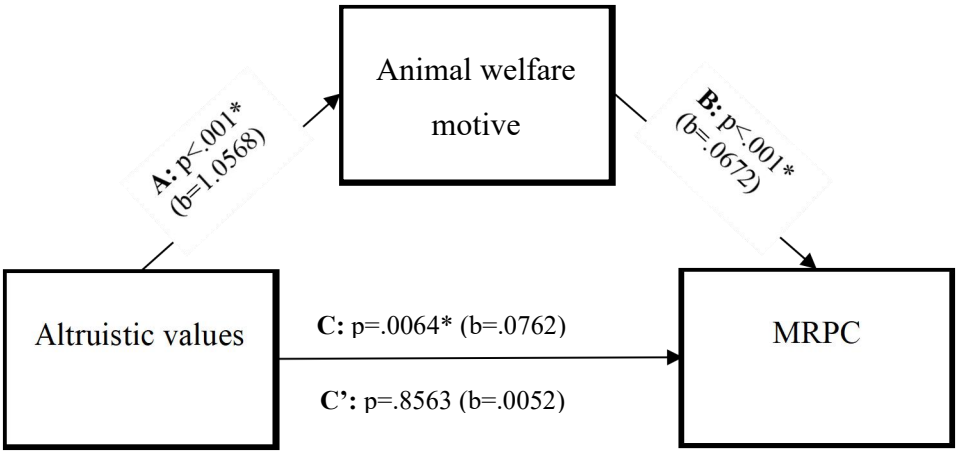
All models presented used MRPC as the outcome variable.

Altruism and animal welfare

The model with altruistic values as the independent variable shows a significant main effect of altruistic values on MRPC (b=.0762, p=.0064), such that people who endorsed these values more strongly show higher consumption of meat replacement products. Furthermore, this effect is fully mediated by the animal welfare motive (Figure 3). Results further show that the model in which altruistic values and animal welfare motive were added explains 4% of the variance in MRPC, R^2=.04, $F(2,1599)$=33.311, p<.001, which is a small effect. The indirect effect of altruistic values on MRPC is found to be statistically significant, effect=.071, 95% C.I. [.0495, .0962].

Figure 3

Mediation of Animal welfare motive on the effect of Altruistic values on Meat replacement product consumption

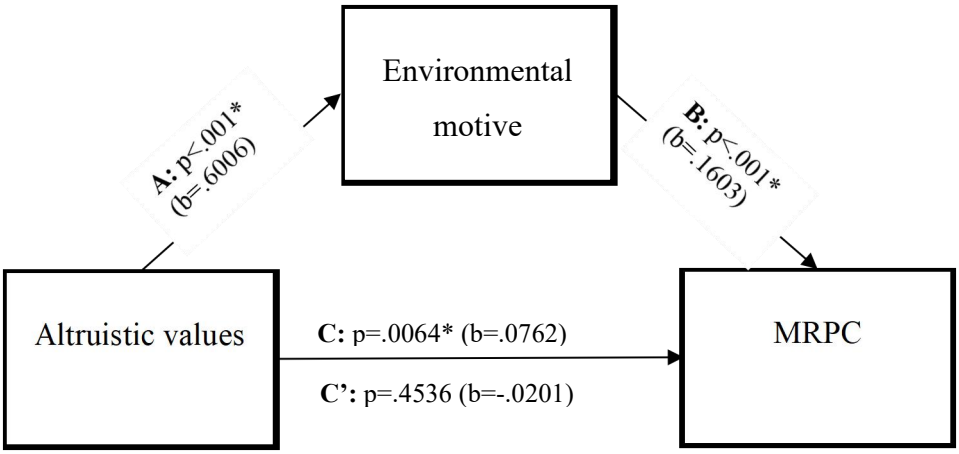


Altruism and environment

Furthermore, the main effect is also fully mediated by the environmental motive (Figure 4). Results further show that the model in which altruistic values and the environmental motive were added explains 13.44% of the variance in MRPC, R^2=.1344, F(2,1599)=124.1839, p<.001, which is a medium effect. The indirect effect of altruistic values on MRPC is found to be statistically significant, effect=.0963, 95% C.I. [.0712, .1245].

Figure 4

Mediation of Environmental motive on the effect of Altruistic values on Meat replacement product consumption

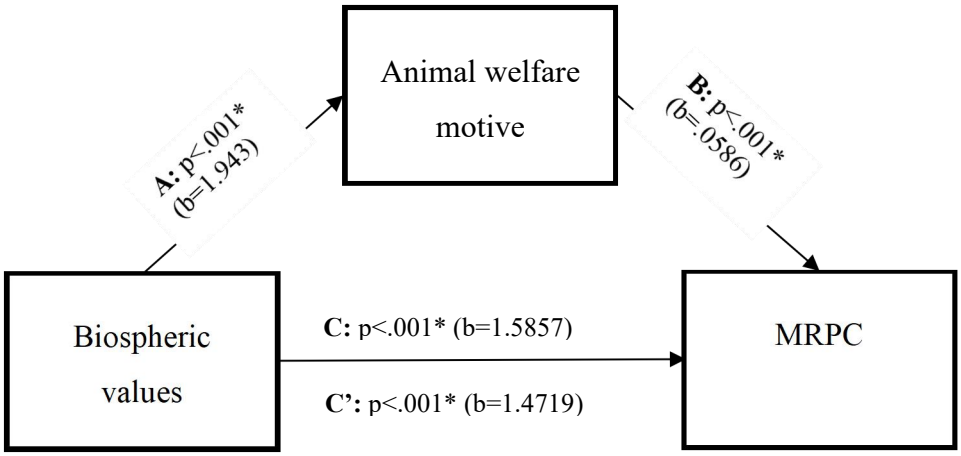


Biospheric and animal welfare

The model with biospheric values as the independent variable shows a significant main effect of biospheric values on MRPC (b=1.5857, p<.001), such that people who endorsed these values more strongly show higher consumption of meat replacement products. Furthermore, this effect is partially mediated by the animal welfare motive (Figure 5). Results further show that the model in which biospheric values and animal welfare motive were added explains 9.95% of the variance in MRPC, R^2=.0995, F(2,1599)=88.3085, p<.001, which is a medium effect. The indirect effect of biospheric values on MRPC is found to be statistically significant, effect=.1138, 95% C.I. [.0583, .1756].

Figure 5

Mediation of Animal welfare motive on the effect of Biospheric values on Meat replacement product consumption

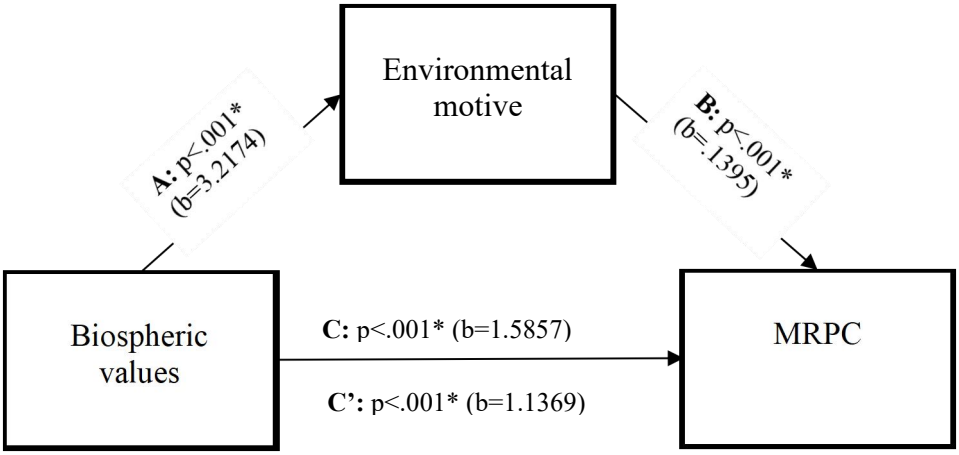


Biospheric and environment

Furthermore, the main effect is also partially mediated by the environmental motive (Figure 6). Results further show that the model in which biospheric values and environmental motive were added explains 16.81% of the variance in MRPC, R^2=.1681, F(2,1599)=161.5855, p<.001, which is a medium effect. The indirect effect of biospheric values on MRPC is found to be statistically significant, effect=.4488, 95% C.I. [.3466, .5555].

Figure 6

Mediation of Environmental motive on the effect of Biospheric values on Meat replacement product consumption



Moderation of self-interested motives

All models presented used MRPC as the outcome variable.

Egoism and health

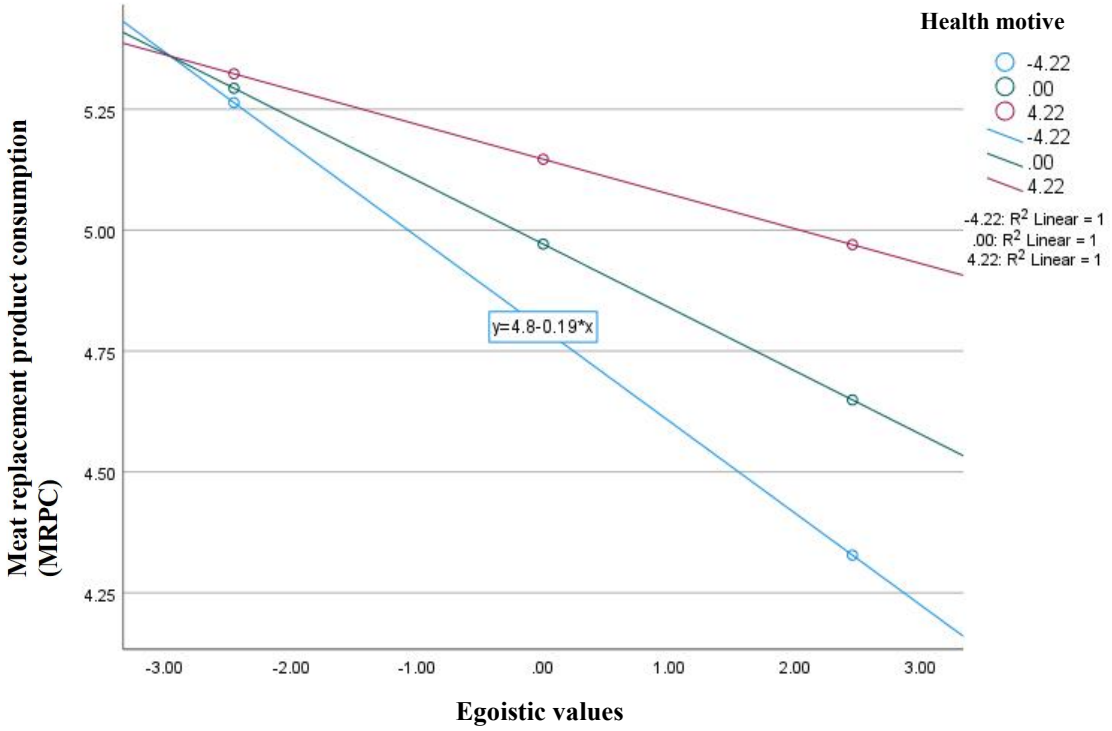
The model with egoistic values as the independent variable shows a significant main effect of egoistic values on MRPC (b=-.1313, p<.001), such that people who endorsed these values more strongly show lower consumption of meat replacement products. Furthermore, this effect is moderated by the health motive, and results show that the model in which egoistic values, health motive and the interaction effect were added explains a small 1.66% of the variance in MRPC, R^2=.0166, F(3,1598)=8.9956, p<.001, with a significant interaction effect between egoistic values and health motive, b=.0141, p=.0291,

The difference between the explained variance in the model without interaction effect and the explained variance of the model with the interaction effect is 0.29%, R^2-change=.0029, F(1,1598)=4.7709, p=.0291, which is a very small effect. The conditional effect is strongest for those with a low score on health motivation (1 SD below the mean), effect=-.1906, p<.001) and weakest for those with a high score on health motivation (1 SD

above the mean), effect=-.0720, p=.0558 (see Figure 7). The model suggests a less negative association for a higher degree of health motivation.

Figure 7

Moderation of Health motive on the effect of Egoistic values on Meat replacement product consumption



Hedonism and health

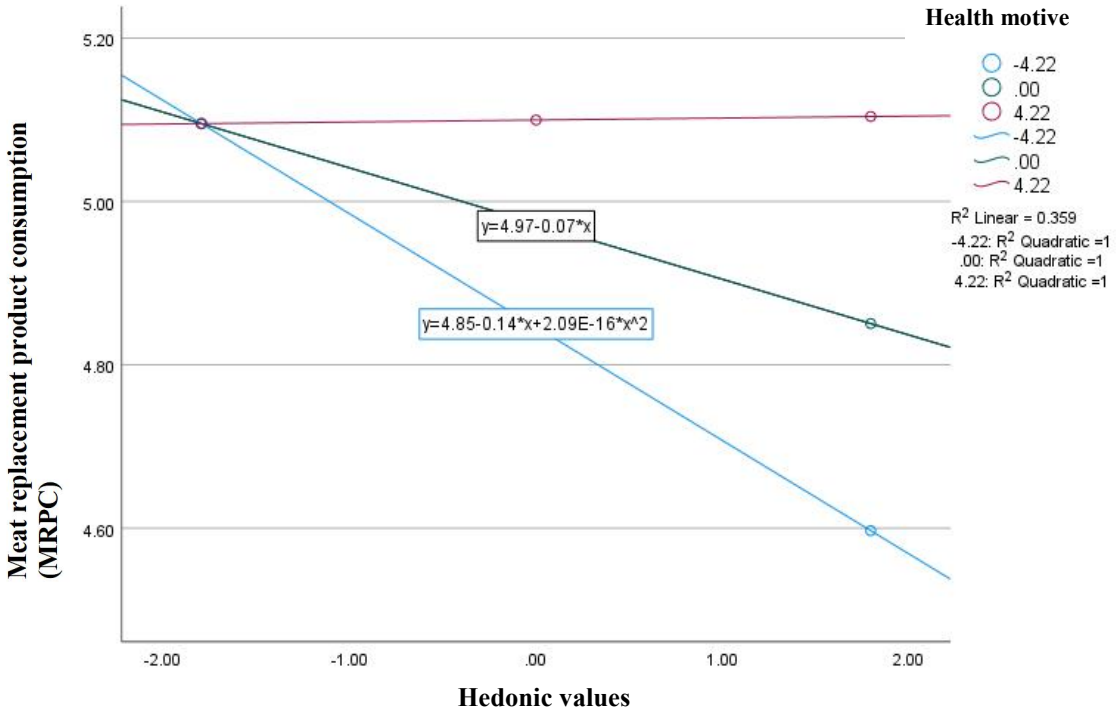
The effect of hedonism on MRPC is moderated by the health motive. Results show that the model in which hedonic values, health motive and the interaction effect were added explains a very small 0.54% of the variance in MRPC, R^2=.0054, F(3,1598)=2.868, p=.0354, with a significant interaction effect, b=.0167, p=.0466.

The difference between the explained variance in the model without interaction effect and the explained variance of the model with the interaction effect is 0.25%, R^2-change=.0025, F(1,1598)=3.9653, p=.0466, which is a very small effect. The conditional effect is strongest for those with a low score on health motivation (1 SD below the mean), effect=-.1388, p=.0069) and weakest for those with a high score on health motivation (1 SD above the mean), effect=.0024, p=.9639 (see Figure 8). The model suggests that for people

with a high degree of health motivation, the effect of hedonic values on MRPC turns slightly positive.

Figure 8

Moderation of Health motive on the effect of Hedonic values on Meat replacement product consumption



Discussion

Based on previous research about motivations for eating less meat and the theoretical framework of the VBN Theory, the current study aimed to confirm the relationships between values and reducing meat consumption and additionally how motivations for eating less meat influence this relationship. It was expected that moral motives, i.e., animal welfare and environment, mediate this relationship for self-transcendence values and that the self-interested motive, i.e., health, moderates the negative effect for people with self-enhancement values. This study found results that broadly corroborate the expectations.

Consistent with the literature and hypothesis 1, the results found that participants who scored high on self-transcendence values behave more sustainably, with higher consumption of meat replacement products. According to the VBN Theory and its further elaboration, self-

transcendence values are associated with beliefs, attitudes, and preferences to act pro-environmentally (Stern et al., 1995; Stern et al., 1998; Stern, 2000). The results show a positive correlation between both altruistic and biospheric values and higher consumption of meat replacement products, although the association with biospheric values seems to be stronger. This finding was also reported by previous studies and can be related to the fact that biospheric values consist of the personal conviction of the importance of nature, whereas altruistic values also consist of pro-social aspects (De Groot & Steg, 2007, 2008; Nilsson et al., 2004; Steg et al., 2005). These studies show that the saliency of altruistic values could hinder environmentally friendly purchases, like meat replacement products, when a trade-off has to be made with a humanitarian choice, e.g., organic versus fair-trade products.

Additionally, the results show a mediating effect of moral motives for the relationship with altruistic and biospheric values (hypothesis 2). These results align with expectations and reflect the idea of moral motives being linked to self-transcendence values. In altruistic values, this relationship is completely mediated by moral motives to reduce meat consumption. It indicates that the variance in MRPC can be attributed entirely to the occurrence of one of the moral motivations. For biospheric values, this relationship is partially mediated by these moral motives. It indicates that the variance in MRPC can be partially attributed to the occurrence of these motivations, thus leaving an unexplained residual effect. This finding was unexpected. The environmental motivation was expected to fully explain the variance in the consumption of meat replacement products, especially when theorising that the personal conviction of nature's importance conceptualises biospheric values. This difference may be explained by the structure and robustness of the variable for biospheric values, which will be further described under the study’s limitations. The results showed no explicit differences between the overall mediating effects of animal welfare motive versus environmental motive.

The third hypothesis was partly confirmed. The results only showed a significant negative main effect of egoistic values on consuming meat replacement products. This difference in significance between egoistic and hedonic values was striking since several studies reported a strong negative relationship between hedonic values and pro-environmental behaviour (Steg et al., 2014; Lee et al., 2021) and, more specifically, reducing meat consumption, as this behaviour seems to have more salient hedonic consequences than egoistic consequences (Steg et al., 2012). Because not every type of pro-environmental behaviour has hedonic consequences to the same extent, and little research has been done on the additional role of hedonic values in reducing meat consumption behaviour specifically, it is difficult to explain this difference in results.

Lastly, the results showed a significant moderation of the health motive in the relationship between both self-enhancement values and MRPC, supporting the fourth hypothesis. Only the moderation analysis with hedonic values showed a slight turning point at which a higher degree of health motive would increase MRPC instead decrease it. This influences the relationships as established in the VBN Theory. However, for people who score high on egoistic values, the health motive merely weakens the negative relationship with MRPC. Because literature shows that reducing meat consumption has more salient hedonic consequences than egoistic consequences (Steg et al., 2012), it is striking that it is this group that shows a turning point at which the relationship between the values and MRPC becomes positive. This may be related to the fact that the main effect of hedonic values on MRPC was not significant. Moreover, the literature indicates that egoistic values focus on choices that affect one's resources, such as wealth and power (De Groot & Steg, 2007, 2008; Nordlund & Garvill, 2002), whereas hedonic values focus on choices that affect pleasure and comfort (Steg et al., 2012). Because health can be seen as a personal resource rather than something that provides immediate pleasure or comfort, health motivation seems to fit better with the

conceptualisation of egoistic values than hedonic values. As with the main effect, this discrepancy is also difficult to explain.

Strengths and limitations

The results give direction to the knowledge gap about the relationship between values and motivations to eat less meat and indicate that the different motivations for eating less meat are related to other value profiles. This provides an important understanding of how different values (can) lead to the sustainable behaviour of eating more meat replacement products. Moreover, results indicate that self-enhancing values could potentially not undermine sustainable meat consumption by increasing health motives, in contrast to what the VBN Theory theorises.

Despite complementing existing literature, these findings may be somewhat limited by some uncertainties. Reliability analyses of altruism and hedonism revealed questionable Cronbach's alpha values. Moreover, to avoid overlap with the variable for environmental motivation, only one item seemed suitable to fit the biospheric value scale. The selected item asked participants about their view on the environmental impact of the livestock industry and not about their general personal interest in the environment. Therefore, it was not possible to assemble a broader scale of biospheric values, which may have influenced the mediation analysis. Although partial mediation does indicate that part of the relationship between the biospheric item and the consumption of meat replacement products is explained through moral motives, it is difficult to estimate how the mediation would proceed with a broader biospheric value scale. The uncertainty of the validity of these variables may have been the cause of some striking Pearson correlations between variables. Despite these correlations, the table also shows correlations that align with expectations. Considering the other three literature-based value scales (confirmed with factor analysis) and the restrictions of existing data, this design is the most valid way of measurement.

Moreover, the dependent variable of MRPC needs to be interpreted with caution. Ultimately, items that involved the consumption of meat replacement products were chosen for the conceptualisation of meat consumption as an outcome. The questionnaire contained other possible items (e.g., type of diet, frequency of meat consumption in the past four weeks), but these items showed no association with values. This could be related to a skewed distribution of diet types due to a small proportion of vegetarians and vegans. Also, the variation in meat consumption could depend on the moment of measurement, for example, due to high temperatures and barbecuing activities. Cross-tabulation analyses did confirm that the items on the consumption of meat replacement products are negatively associated with the other two possible items (i.e., the higher the frequency of meat in the past four weeks, or the more meat in one's diet, e.g., meat-eater vs pescatarian, the lower the consumption of meat substitutes). Despite this, the measure of MRPC might influence construct validity, considering that the consumption of meat substitutes only captures an important but limited part of the concept of reducing meat consumption behaviour.

Lastly, some effect sizes should be interpreted with caution. Especially the moderation effects of the health motivation are small. The significance of these small effects may be attributed to the large sample size.

Despite the small effects and some notable unexpected results, the study demonstrated promising relationships between values and motivations and offers the possibility of designing interventions that affect the motivation of groups with specific value profiles. For example, when a population of consumers or neighbourhood residents largely adhere to an altruistic value profile, intervention targeted at environmental motives, such as informing about environmental impact, can be deployed to reduce their meat consumption, as these motives significantly account for a medium proportion of variance explained. A tailored

intervention is important for the effectiveness of the desired outcome, in this case, a lower meat consumption.

In future investigations, studies should use more robust variables closer to the desired measures to increase validity. This involves using validated scales for the self-transcendence and self-enhancement values and an outcome variable that more accurately measures meat consumption. More robust variables and a design with broader scores on health motive should be used to explore the point at which the health motive turns the negative association between egoistic values and MRPC into a positive association. Given the conflicting results and the lack of more previous research, it is recommended to conduct more correlational studies on the additional role of hedonic values in reducing meat consumption. Besides this, to develop a complete picture of how the implications of this study can be applied to practice, additional studies will be needed on how to target populations with specific value profiles by analysing how these profiles relate to socio-demographic factors, geographic locations, cultures, and store formulas.

In sum, this study demonstrated that people with an altruistic, biospheric, egoistic and hedonic value profile could be targeted to reduce their meat consumption behaviour through tailored interventions aimed at animal welfare, environment or health motivations, respectively. This adds to the literature knowledge gap on the relationship between values and motivations to eat less meat and to the established model of the VBN Theory. It emphasises that responding in the right way can encourage more people to reduce their meat consumption and diminish the multidimensional effects of a meat-based diet. The steaks have never been higher!

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Appendix A

Results of Principal Component Analysis for value scale variables

The construction of the altruistic, egoistic and hedonic value scales is based on the values used by Steg and colleagues (2012) in the eponymous value scales (see Table B1). A Principal Component Analysis with Oblimin rotation and three fixed factors to extract confirmed the distribution of the values among the three value scales (see Table B2), and in combination, explained 70.30% of the variance. Sampling adequacy was verified with the Kaiser-Meyer-Olkin measure, KMO=.751.

Table B1

Overview of the used Rokeach values and the values used by Steg et al. (2012), sorted by value scale

Value scale (Cronbach's alpha)	**Values used by Steg et al. (2012)**	**Rokeach values used in this study**
Egoistic	Social power	Social recognition
	Ambitious	Sense of accomplishment
Altruistic	Equality	Equality
	A world at peace	A world at peace
	Helpful	Helpful
Hedonic	Pleasure	Pleasure
	Enjoying life	Comfortable life

Table B2

Principal Component Analysis of the altruistic, egoistic and hedonic value scales

	Component		
	1	**2**	**3**
Altruistic values			
Helpful		.594	
Equality		.842	
World at peace		.802	
Egoistic values			
Sense of accomplishment	.880		
Social recognition	.884		
Hedonic values			
Pleasure			-.906
Comfortable life	.419		-.561

Note. Principal Component Analysis with Oblimin Rotation. Suppress small coefficients absolute value below .4.

Appendix B

Questionnaire items used for motivations for reducing meat consumption and sample characteristics

Questionnaire *Reasons to eat less meat*

oi18a001 ‘’I want to be healthy’’

oi18a002 ‘’Plant-based diets are better for the environment’’

oi18a003 ‘’Animals do not have to suffer’’

oi18a004 ‘’Animals’ rights are respected’’

oi18a005 ‘’I want to live a long time’’

oi18a006 ‘’Plant-based diets are more sustainable’’

oi18a007 ‘’I care about my body’’

oi18a008 ‘’Eating meat is bad for the planet’’

oi18a009 ‘’Animal rights are important to me’’

oi18a010 ‘’Plant-based diets are environmentally-friendly’’

Categories: 1 = not important – 7 = very important

oi18a011 ‘’It does not seem right to exploit animals’’

oi18a012 ‘’Plants have less of an impact on the environment than animal products’’

oi18a013 ‘’I am concerned about animal rights’’

oi18a014 ‘’My health is important to me’’

oi18a015 ‘’I don’t want animals to suffer’’

Categories: 1 = not important – 7 = very important

Questionnaire Background Variables

gebjaar ‘’Year of birth’’

geslacht ‘’Gender’’

oplcat ‘’Level of education in CBS (Statistics Netherlands) categories’’

Appendix C

IBM SPSS Statistics 27 Analyses Syntax

```
* Encoding: UTF-8.

*MAKING DATASET.

*Open questionnaire 1 Personality.

GET
  FILE='U:\My Documents\Thesis\Datasets\Personality\cp19k_EN_1.0p\cp19k_EN_1.0p.sav'.

DATASET NAME DataSet2 WINDOW=FRONT.


*Merge with questionnaire 2 Reasons to eat less meat.

DATASET ACTIVATE DataSet2.

GET FILE='U:\My Documents\Thesis\Datasets\Reasons to eat less
meat\oi18a_EN_1.0p\oi18a_EN_1.0p.sav'.

DATASET NAME DataSet3.

DATASET ACTIVATE DataSet2.

SORT CASES BY nomem_encr.

DATASET ACTIVATE DataSet3.

SORT CASES BY nomem_encr.

DATASET ACTIVATE DataSet2.

MATCH FILES /FILE=*
  /FILE='DataSet3'
  /BY nomem_encr.

EXECUTE.


*Merge with questionnaire 3 Consumer heterogeneity with respect to morality in consumption
decisions and perceptions of animal welfare.
DATASET ACTIVATE DataSet2.
GET FILE='U:\My Documents\Thesis\Datasets\Consumer heterogeneity with respect to
morality in '+
```

```
    'consumption decisions and perceptions of animal
welfare\hq12a_1.0p_EN\hq12a_1.0p_EN.sav'.

DATASET NAME DataSet9.

DATASET ACTIVATE DataSet2.

SORT CASES BY nomem_encr.

DATASET ACTIVATE DataSet9.

SORT CASES BY nomem_encr.

DATASET ACTIVATE DataSet2.

MATCH FILES /FILE=*

  /FILE='DataSet9'

  /BY nomem_encr.

EXECUTE.

*Merge with background variables.

GET FILE='U:\My Documents\Thesis\Datasets\Background '+

    'Variables\avars_201906_EN_1.0p\avars_201906_EN_1.0p.sav'.

DATASET NAME DataSet10.

DATASET ACTIVATE DataSet2.

SORT CASES BY nomem_encr.

DATASET ACTIVATE DataSet10.

SORT CASES BY nomem_encr.

DATASET ACTIVATE DataSet2.

MATCH FILES /FILE=*

  /FILE='DataSet10'

  /BY nomem_encr.

EXECUTE.

*Save dataset.

SAVE OUTFILE='U:\My Documents\Thesis\Datasets\Merged version 4 fout met
background.sav'
```

```
 /COMPRESSED.

*Delete unnecessary variables.
DELETE VARIABLES
cp19k010
cp19k011
cp19k012
cp19k013
cp19k014
cp19k015
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```

cp19k033

cp19k034

cp19k035

cp19k036

cp19k037

cp19k038

cp19k039

cp19k040

cp19k041

cp19k042

cp19k043

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cp19k198

cp19k199

cp19k200

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cp19k202

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cp19k204

cp19k205

cp19k206

cp19k207

hq12a001

hq12a002

hq12a003

hq12a004

hq12a005

hq12a006

hq12a007

hq12a008

hq12a009

hq12a010

hq12a011

hq12a012

hq12a013

hq12a014

hq12a015

hq12a016

hq12a017

hq12a018

hq12a019

hq12a020

hq12a021

hq12a022

hq12a023

hq12a024

hq12a025

hq12a026

hq12a027

hq12a028

hq12a029

hq12a030

hq12a031

hq12a032

hq12a033

hq12a034

hq12a035

hq12a036

hq12a037

hq12a038

hq12a039

hq12a040

hq12a041

hq12a042

hq12a043

hq12a044

hq12a045

hq12a046

hq12a047

hq12a048

hq12a049

hq12a050

hq12a051

hq12a052

hq12a053

hq12a054

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hq12a056

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hq12a071

hq12a078

hq12a079

hq12a080

hq12a081

hq12a082

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hq12a104

hq12a105

hq12a106

hq12a107

hq12a108

hq12a109

hq12a110

hq12a111

hq12a112

hq12a113

hq12a114

hq12a115

hq12a116

hq12a117

hq12a118

hq12a119

hq12a120

hq12a121

hq12a122

hq12a123

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hq12a126

hq12a127

hq12a128

hq12a129

hq12a130

hq12a131

hq12a132

hq12a133

hq12a134

hq12a135

hq12a136

hq12a139

hq12a141

hq12a142

positie

leeftijd

lftdcat

lftdhhh

aantalhh

aantalki

partner

burgstat

woonvorm

woning

sted

belbezig

brutoink

brutoink_f

nettoink

netinc

nettoink_f

brutocat

nettocat

brutohh_f

nettohh_f

```
oplzon
oplmet
doetmee
herkomstgroep
simpc.

*Remove missing values.
USE ALL.
COMPUTE filter_$=(NMISS(cp19k133,oi18a005,hq12a137) < 1).
VARIABLE LABELS filter_$ 'NMISS(cp19k133,oi18a005,hq12a137) < 1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.

OUTPUT SAVE NAME=Document3
 OUTFILE='U:\My Documents\Thesis\Output everything.spv'
 LOCK=NO.

*Count selected cases.
DESCRIPTIVES VARIABLES=nomem_encr
  /STATISTICS=MEAN STDDEV MIN MAX.

*Add missing values for cases 817950, 823529, 851840 from other background dataset.
GET
  FILE='U:\My Documents\Thesis\Datasets\Background '+
    'Variables\avars_201805_EN_1.0p\avars_201805_EN_1.0p.sav'.
DATASET NAME DataSet8 WINDOW=FRONT.
```

```
*Make range for birth year.

DATASET ACTIVATE DataSet1.

RECODE gebjaar (1923 thru 1949=1) (1950 thru 1974=2) (1975 thru 1993=3) INTO
GebjaarR.

VARIABLE LABELS  GebjaarR 'Geboortjaar range'.

EXECUTE.


*Sample characteristics.

FREQUENCIES VARIABLES=oplcat GebjaarR geslacht

  /STATISTICS=STDDEV MAXIMUM MEAN MEDIAN

  /ORDER=ANALYSIS.


*MAKING M VARIABLES SUM SCORES.

*Reliability for animal welfare motive.

RELIABILITY

  /VARIABLES=oi18a004 oi18a003 oi18a009 oi18a011 oi18a013 oi18a015

  /SCALE('ALL VARIABLES') ALL

  /MODEL=ALPHA

  /STATISTICS=CORR

  /SUMMARY=TOTAL MEANS.


*Sum score for animal welfare motive.

COMPUTE AnimaSum=oi18a003 + oi18a004 + oi18a009 + oi18a011 + oi18a013 + oi18a015.

EXECUTE.


*Reliability for environmental motive.

RELIABILITY

  /VARIABLES=oi18a002 oi18a006 oi18a008 oi18a010 oi18a012

  /SCALE('ALL VARIABLES') ALL
```

```
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL MEANS.

*Sum score for environment motive.
COMPUTE EnvirSum=oi18a002 + oi18a006 + oi18a008 + oi18a010 + oi18a012.
EXECUTE.

*Reliability for health motive.
RELIABILITY
  /VARIABLES=oi18a001 oi18a005 oi18a007 oi18a014
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL MEANS.

*Sum score for health motive.
COMPUTE HealtSum=oi18a001 + oi18a005 + oi18a007 + oi18a014.
EXECUTE.

*Variable label for animal welfare motive.
VARIABLE LABELS
    AnimaSum 'Sum score for animal welfare motive'.

*Variable label for environment motive.
VARIABLE LABELS
    EnvirSum 'Sum score for environment motive'.

*Variable label for health motive.
```

```
VARIABLE LABELS

   HealtSum 'Sum score for health motive'.


*MAKING DEPENDENT VARIABLE SUM SCORES.

*crosstabs for correlation between hq12a137 and hq12a140 for validity of meat replacement as outcome variable.

CROSSTABS

  /TABLES=hq12a137 BY hq12a140

  /FORMAT=AVALUE TABLES

  /STATISTICS=CHISQ CORR

  /CELLS=COUNT EXPECTED COLUMN RESID

  /COUNT ROUND CELL.


*crosstabs for correlation between hq12a137 and hq12a076 for validity of meat replacement as outcome variable.

CROSSTABS

  /TABLES=hq12a137 BY hq12a076

  /FORMAT=AVALUE TABLES

  /STATISTICS=CHISQ CORR

  /CELLS=COUNT EXPECTED COLUMN RESID

  /COUNT ROUND CELL.


*checking statistical correlation between hq12a137 and hq12a138 for continuous outcome variable.

CORRELATIONS

  /VARIABLES=hq12a137 hq12a138

  /PRINT=TWOTAIL NOSIG FULL

  /MISSING=PAIRWISE.

NONPAR CORR
```

```
  /VARIABLES=hq12a137 hq12a138
  /PRINT=SPEARMAN TWOTAIL NOSIG FULL
  /MISSING=PAIRWISE.

*Reliability for meat replacement.
RELIABILITY
  /VARIABLES=hq12a137 hq12a138
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL MEANS.

*Sum score for meat replacement.
COMPUTE MeatRepl=hq12a137 + hq12a138.
EXECUTE.

*Variable label for MeatRepl.
VARIABLE LABELS
    MeatRepl 'Sum score for Meat Replacement by combining hq12a137 and hq12a138'.

*MAKING INDEPENDENT VARIABLES SUM SCORES.
*Factor analysis Hedonism, Altruism, Egoism.
DATASET ACTIVATE DataSet1.
FACTOR
  /VARIABLES cp19k105 cp19k117 cp19k120 cp19k127 cp19k133 cp19k132 cp19k129
  /MISSING LISTWISE
  /ANALYSIS cp19k105 cp19k117 cp19k120 cp19k127 cp19k133 cp19k132 cp19k129
  /PRINT INITIAL CORRELATION KMO EXTRACTION ROTATION
  /FORMAT BLANK(.4)
```

```
  /PLOT EIGEN
  /CRITERIA FACTORS(3) ITERATE(25)
  /EXTRACTION PC
  /CRITERIA ITERATE(25) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.

*Reliability for altruism.
DATASET ACTIVATE DataSet1.
RELIABILITY
  /VARIABLES=cp19k105 cp19k120 cp19k117
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL MEANS.

*Sum score for Altruism variable.
COMPUTE Altru=cp19k105 + cp19k120 + cp19k117.
EXECUTE.

*Reliability for hedonism.
RELIABILITY
  /VARIABLES=cp19k132 cp19k129
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL MEANS.
```

```
*Sum score for Hedoism variable.
COMPUTE Hedo=cp19k129 + cp19k132.
EXECUTE.

*Reliability for egoism.
RELIABILITY
  /VARIABLES=cp19k127 cp19k133
  /SCALE('ALL VARIABLES') ALL
  /MODEL=ALPHA
  /STATISTICS=CORR
  /SUMMARY=TOTAL MEANS.

*Sum score for Egoism variable.
COMPUTE Ego=cp19k127 + cp19k133.
EXECUTE.

*Variable label for Altru.
VARIABLE LABELS
    Altru 'Sum score for altruism by combining helpful, equality, world at peace'.

*Variable label for Hedo.
VARIABLE LABELS
    Hedo 'Sum score for hedoism by combining pleasure, comfortable life'.

*Variable label for Ego.
VARIABLE LABELS
    Ego 'Sum score for egoism by combining sense of accomplishment, social recognition'.


*Correlation analyses of variables.
```

```
CORRELATIONS
  /VARIABLES=Altru hq12a083 Ego Hedo AnimaSum EnvirSum HealtSum MeatRepl
  /PRINT=TWOTAIL NOSIG FULL
  /STATISTICS DESCRIPTIVES
  /MISSING=PAIRWISE.

*Descriptives of variables.
DESCRIPTIVES VARIABLES=Altru hq12a083 Ego Hedo AnimaSum EnvirSum HealtSum
MeatRepl
  /STATISTICS=MEAN SUM STDDEV MIN MAX.

*Frequencies of variables.
DATASET ACTIVATE DataSet1.
FREQUENCIES VARIABLES=AnimaSum EnvirSum HealtSum Altru Ego Hedo MeatRepl
hq12a083
  /STATISTICS=STDDEV MINIMUM MAXIMUM MEAN MEDIAN
  /ORDER=ANALYSIS.

*ANALYSES.
* Chart Builder check for linearity ALTRU-MEAT REPLACEMENT.
GGRAPH
  /GRAPHDATASET NAME="graphdataset" VARIABLES=Altru MeatRepl
MISSING=LISTWISE REPORTMISSING=NO
  /GRAPHSPEC SOURCE=INLINE
  /FITLINE TOTAL=NO SUBGROUP=NO.
BEGIN GPL
  SOURCE: s=userSource(id("graphdataset"))
  DATA: Altru=col(source(s), name("Altru"))
  DATA: MeatRepl=col(source(s), name("MeatRepl"))
```

```
  GUIDE: axis(dim(1), label("Sum score for altruism by combining helpful, equality, world at
",

    "peace"))

  GUIDE: axis(dim(2), label("Sum score for Meat Replacement by combining hq12a137 and
hq12a138"))

  GUIDE: text.title(label("Scatter Plot of Sum score for Meat Replacement by combining
hq12a137 ",

    "and hq12a138 by Sum score for altruism by combining helpful, equality, world at peace"))

  ELEMENT: point(position(Altru*MeatRepl))

END GPL.


* Chart Builder check for linearity BIOSPH-MEAT REPLACEMENT.

GGRAPH

  /GRAPHDATASET NAME="graphdataset" VARIABLES=hq12a083 MeatRepl
MISSING=LISTWISE REPORTMISSING=NO

  /GRAPHSPEC SOURCE=INLINE

  /FITLINE TOTAL=NO SUBGROUP=NO.

BEGIN GPL

  SOURCE: s=userSource(id("graphdataset"))

  DATA: hq12a083=col(source(s), name("hq12a083"))

  DATA: MeatRepl=col(source(s), name("MeatRepl"))

  GUIDE: axis(dim(1), label("Which of the following aspects do you think applies to the
consumption of meat that is produced in the conventional [broiler chickens/pigs] farm?
Environmentally unfriendly"))

  GUIDE: axis(dim(2), label("Sum score for Meat Replacement by combining hq12a137 and
hq12a138"))

  GUIDE: text.title(label("Scatter Plot of Sum score for Meat Replacement by combining
hq12a137 ",

    "and hq12a138 by Which of the following aspects do you think applies to the consumption
of meat that is produced in the conventional [broiler chickens/pigs] farm? Environmentally
unfriendly"))

  ELEMENT: point(position(hq12a083*MeatRepl))
```

```
END GPL.


* Chart Builder check for linearity HEDO-MEAT REPLACEMENT.

GGRAPH

  /GRAPHDATASET NAME="graphdataset" VARIABLES=Hedo MeatRepl
MISSING=LISTWISE REPORTMISSING=NO

  /GRAPHSPEC SOURCE=INLINE

  /FITLINE TOTAL=NO SUBGROUP=NO.

BEGIN GPL

  SOURCE: s=userSource(id("graphdataset"))

  DATA: Hedo=col(source(s), name("Hedo"))

  DATA: MeatRepl=col(source(s), name("MeatRepl"))

  GUIDE: axis(dim(1), label("Sum score for hedoism by combining pleasure, comfortable
life"))

  GUIDE: axis(dim(2), label("Sum score for Meat Replacement by combining hq12a137 and
hq12a138"))

  GUIDE: text.title(label("Scatter Plot of Sum score for Meat Replacement by combining
hq12a137 ",

    "and hq12a138 by Sum score for hedoism by combining pleasure, comfortable life"))

  ELEMENT: point(position(Hedo*MeatRepl))

END GPL.


* Chart Builder check for linearity EGO-MEAT REPLACEMENT.

GGRAPH

  /GRAPHDATASET NAME="graphdataset" VARIABLES=Ego MeatRepl
MISSING=LISTWISE REPORTMISSING=NO

  /GRAPHSPEC SOURCE=INLINE

  /FITLINE TOTAL=NO SUBGROUP=NO.

BEGIN GPL

  SOURCE: s=userSource(id("graphdataset"))
```

```
  DATA: Ego=col(source(s), name("Ego"))

  DATA: MeatRepl=col(source(s), name("MeatRepl"))

  GUIDE: axis(dim(1), label("Sum score for egoism by combining sense of accomplishment,
social ",

    "recognition"))

  GUIDE: axis(dim(2), label("Sum score for Meat Replacement by combining hq12a137 and
hq12a138"))

  GUIDE: text.title(label("Scatter Plot of Sum score for Meat Replacement by combining
hq12a137 ",

    "and hq12a138 by Sum score for egoism by combining sense of accomplishment, social
recognition"))

  ELEMENT: point(position(Ego*MeatRepl))

END GPL.


*Check for assumptions altru - animal - meatrpl.

REGRESSION

  /MISSING LISTWISE

  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL

  /CRITERIA=PIN(.05) POUT(.10)

  /NOORIGIN

  /DEPENDENT MeatRepl

  /METHOD=ENTER Altru AnimaSum

  /SCATTERPLOT=(*ZRESID ,*ZPRED)

  /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)

  /SAVE COOK ZRESID.


*Save output.

OUTPUT SAVE NAME=Document3

 OUTFILE='U:\My Documents\Thesis\Output everything.spv'
```

```
 LOCK=NO.

*Process for mediation altru-animal-meatrpl:
    Y=MeatRepl
    X=Altru
    Mediator (M)=AnimaSum
    Model number=4
    Options=Show total effect model; Effect size.

*Check assumptions altru - environment - meatrpl.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT MeatRepl
  /METHOD=ENTER Altru EnvirSum
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /SAVE COOK ZRESID.

*Process for mediation altru-environment-meatrpl:
    Y=MeatRepl
    X=Altru
    Mediator (M)=EnvirSum
    Model number=4
    Options=Show total effect model; Effect size.

*Check assumptions bio - animal - meatrpl.
```

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT MeatRepl
  /METHOD=ENTER hq12a083 AnimaSum
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /SAVE COOK ZRESID.

*Process for mediation bio-animal-meatrpl:
    Y=MeatRepl
    X=hq12a083
    Mediator (M)=AnimaSum
    Model number=4
    Options=Show total effect model; Effect size.

*Check assumptions bio - environment - meatrpl.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT MeatRepl
  /METHOD=ENTER hq12a083 EnvirSum
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)
```

```
  /SAVE COOK ZRESID.
```

*Process for mediation bio-animal-meatrpl:

Y=MeatRepl

X=hq12a083

Mediator (M)=EnvirSum

Model number=4

Options=Show total effect model; Effect size.

*Checking assumptions hedo - health - meatrpl.

```
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT MeatRepl
  /METHOD=ENTER HealtSum Hedo
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)
  /SAVE COOK ZRESID.
```

*Process for moderation hedo-health-meatrpl:

Y=MeatRepl

X=Hedo

Moderator(W)=HealtSum

Model number=1

Options=Generate code for visualizing interactions; Mean center for construction of products -> All variables that define products; Probe interactions -> if p< .05; Conditioning values -> -1SD, Mean, +1SD; Johnson-Neyman output.

```
*Interaction plot from process.
DATA LIST FREE/
  Hedo       HealtSum   MeatRepl   .
BEGIN DATA.
   -1.7947    -4.2169     5.0953
    .0000    -4.2169     4.8462
   1.7947    -4.2169     4.5971
   -1.7947     .0000     5.0954
    .0000     .0000     4.9730
   1.7947     .0000     4.8506
   -1.7947     4.2169     5.0954
    .0000     4.2169     5.0998
   1.7947     4.2169     5.1041
END DATA.
GRAPH/SCATTERPLOT=
 Hedo     WITH     MeatRepl BY       HealtSum .

*Check assumptions ego - health - meatrpl.
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS R ANOVA COLLIN TOL
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT MeatRepl
 /METHOD=ENTER HealtSum Ego
 /SCATTERPLOT=(*ZRESID ,*ZPRED)
 /RESIDUALS HISTOGRAM(ZRESID) NORMPROB(ZRESID)
```

```
  /SAVE COOK ZRESID.


*Process for moderation ego-health-meatrpl:

    Y=MeatRepl

    X=Ego

    Moderator(W)=HealtSum

    Model number=1

    Options=Generate code for visualizing interactions; Mean center for construction of
products -> All variables that define products; Probe interactions -> if p< .05; Conditioning
values -> -1SD, Mean, +1SD; Johnson-Neyman output.


*interaction plot from process.

DATA LIST FREE/

   Ego        HealtSum    MeatRepl    .

BEGIN DATA.

    -2.4545    -4.2169     5.2638

      .0000    -4.2169     4.7959

     2.4545    -4.2169     4.3280

    -2.4545      .0000     5.2936

      .0000      .0000     4.9713

     2.4545      .0000     4.6491

    -2.4545     4.2169     5.3235

      .0000     4.2169     5.1468

     2.4545     4.2169     4.9701

END DATA.

GRAPH/SCATTERPLOT=

 Ego      WITH      MeatRepl BY       HealtSum .
```