

Department of Psychological and Behavioural Science

COURSEWORK SUBMISSION FORM AND PLAGIARISM/GENERATIVE AI/ACADEMIC HONESTY DECLARATION

Please ensure that a completed copy of this form is uploaded as part of your coursework submission.

Candidate Number: 45317

Course code: PB4D7

Word-count: 10 902

Date: 17 August 2023

The Department wishes to draw your attention to the School Calendar Regulations on Assessment Offences and Plagiarism:

<https://info.lse.ac.uk/Staff/Divisions/Academic-Registrars-Division/Teaching-Quality-Assurance-and-Review-Office/Assets/Documents/Calendar/RegulationsAssessmentOffences-Plagiarism.pdf>

All work submitted as part of the requirements for any assessment of the School (e.g., examinations, essays, dissertations, and any other work, including computer programs), whether submitted for formative or summative assessment, must be expressed in your own words and incorporate your own ideas and judgments. Plagiarism must be avoided in all such work.

Plagiarism can involve the presentation of another person's thoughts or words as if they were your own. However, please note that plagiarism also includes self-plagiarism, which is where you as the author re-use your own previously submitted work or data in a "new" written piece of work without letting the reader know that this material has appeared elsewhere. The definition of "your own work" also includes work produced by collaboration or group-work expressly permitted by the Department.

Furthermore, it is prohibited to use any form of generative artificial intelligence in an unauthorised way when working on a summative assessment.

Please also note that plagiarism as defined by the School above, need not be deliberate or intentional for it to constitute an assessment offence.

Declaration (without signature, to preserve anonymity): Having read and understood LSE's guidelines on plagiarism/academic honesty, I hereby confirm by completing and attaching this form that the work submitted is my own. By submitting this form I hereby confirm I understand the Department's policy on summative assessment, and that I have read the relevant parts of the MSc programme handbook.

**The Consumption of Animal Products:
A System Justification Perspective**

Candidate Number: 45317



Department of Psychological and Behavioural Science
London School of Economics and Political Science
MSc Behavioural Science
August 2023

Acknowledgements

Thank you to my supervisor, Ganga Shreedhar. Her profound dedication to address environmental challenges assisted me in choosing this topic. As this topic has received little attention from both researchers and the public, I am sincerely grateful for her support.

I am also grateful to Liam Delaney and Bradley Franks for their invaluable guidance, advice, and feedback. Furthermore, my gratitude goes to the PhD students Dallas O'Dell and Sharon Raj for their consistent support.

Thank you to the London School of Economics for the incredibly inspiring year. It has made me realise my purpose is to make the world a better place. I will try my best to make the most of my privilege.

Abstract

The consumption of animal products produces a high level of animal suffering. To reduce animal suffering, it is necessary for people to give up or reduce their consumption of animal products. However, many people continue to defend and justify the consumption of animal products as normal, natural, necessary, and nice. In this research, I argue that this tendency can be explained by people being motivated to justify the current economic system and that counteracting this motivation is essential to reduce animal product consumption. To support this argument, I conducted an online study ($N = 355$) that utilised both a correlational and an experimental design. I used a correlational design to investigate the relationship between economic system justification (ESJ), social dominance orientation (SDO), ecological dominance orientation (EDO) and justification for animal product consumption. In line with my hypothesis, I found a positive relationship between the tendency to justify the consumption of animal products and ESJ. In addition, ESJ was shown to mediate the relationship between a preference for hierarchically organised worldviews, measured as SDO and EDO, and the justification for animal product consumption. Using an experimental design to test the effectiveness of a message framing intervention building on the concept of “system sanctioned change” (Feygina et al., 2010), I found that, contrary to my hypothesis, reframing the reduction of animal product consumption as preserving vs. threatening the system did not increase acceptance towards a plant-based dietary change among people high in ESJ. Although the results of this study cannot be considered definitive, it can be concluded that interrupting system justification tendencies remains a challenge and that the problems associated with animal product consumption are unlikely to be solved at the individual level without addressing the system level.

Keywords: system justification theory, animal product consumption, social dominance orientation, ecological dominance orientation, framing intervention

Table of Content

1. Introduction	7
2. Literature Review.....	9
2.1. Theoretical Reasoning	9
2.2. System Justification Theory	9
2.3. The Case of Justifying Animal Product Consumption	10
2.4. Individual Differences in Justifying the Consumption of Animal Products	12
2.5. The Possibility of “System Sanctioned Change”	13
2.6. Research Questions and Hypotheses	15
3. Methodology.....	17
3.1. Research Design	17
3.2. Procedure.....	17
3.3. Sample Size Calculation and Recruitment Strategy	18
3.4. Framing Intervention	19
3.5. Instruments	20
3.6. Statistical Analysis	22
3.6.1. Preliminary Exploratory Analysis	23
3.6.2. Main Analysis.....	23
4. Results.....	25
4.1. Sample Characteristics	25
4.2. Preliminary Exploratory Analysis	25
4.3. Main Analysis.....	26
4.3.1. Hypothesis 1	26
4.3.2. Hypothesis 2	27
4.3.3. Hypothesis 3	28
4.3.4. Hypothesis 4	29
5. Discussion	31

5.1. Limitations and Future Research.....	33
5.2. Contribution.....	34
6. Conclusion.....	35
References	37
Appendix A: Statistical Analysis Equation Models	48
Appendix B: Descriptive Statistics and Balance Tests	49
Appendix C: Robustness Analysis Results	50
Appendix D: Further Exploratory Analysis	54
Appendix E: G*Power Analyses	57
Appendix F: Qualtrics Survey	58
Appendix G: Stata Code.....	71

1. Introduction

Every year, 70 billion farm animals are raised and slaughtered for human consumption worldwide (Sanders, 2018). Alongside the environmental and health issues related to this (Godfray et al., 2018), come serious ethical issues. As animal farming systems and production methods are focused on efficiency and profit, they often disregard the natural needs and behavioural tendencies of animals and treat animals more as machines in a production process than as sentient-beings (Lin-Schilstra & Fischer, 2022; Mitchell, 2013; Rochlitz & Broom, 2017; Sumner et al., 2018). When confronted with the ethics of consuming animal products, a large proportion of the population expresses concerns about farm animal welfare and is critical of traditional animal farming systems (Cornish et al., 2016; Fonseca & Sanchez-Sabate, 2022; Kupsala et al., 2015; Yunes et al., 2017). Consequently, it could be assumed that this belief that farm animals should not be harmed would predict the decision to eat less or no animal products. However, this does not seem to be the case. Even though the desire for farm animal welfare seems to be widespread, most people continue to justify and defend the consumption of products. The most commonly advanced justifications have come to be known as the “4Ns”: eating animal products is natural, normal, necessary, and nice (Graça et al., 2015; Piazza et al., 2015, 2020).

With this research paper, I aim to explain the justification for the consumption of animals by adopting a system justification perspective. System Justification Theory holds that people are motivated to defend, bolster, and justify the status quo, that is the existing social, economic, and political arrangements that affect them (Jost & Banaji, 1994). As the mistreatment of farm animals for the consumption of animal products is, inter alia, a case of economic arrangement (in which domination of nonhuman animals is perceived as legitimate and acceptable) (Hoffarth et al., 2019), I argue that people are motivated to justify the consumption of animal products due to a tendency to justify the existing economic arrangement. To test this assumption, I conducted an online study ($N = 355$) of which the first aim was to investigate whether an underlying tendency to justify the economic system (economic system justification (ESJ); Jost & Thompson, 2000) is positively associated with the justification for the consumption of animal products.

The second aim of this study was to investigate whether ESJ can explain the relationship between a preference for hierarchically organised worldviews and the justification for the

consumption of animal products. A desire for hierarchically organised worldviews has been found to be positively associated with beliefs providing ideological support for the societal status quo of consuming animal products (Dhont & Hodson, 2014a; Hyers, 2006; Vesper et al., 2015). By including ESJ as a potential mediator, deeper insights into the psychological processes involved in justifying the consumption of animal products could be gained, while also opening up the possibility of interrupting these psychological processes.

Lastly, I tested the effectiveness of an under-researched message framing intervention building on the concept of “sanctioned system change” (Feygina et al., 2010), to reduce animal product consumption. The intervention aims to address the negative impact of system justification on animal product consumption by encouraging people high in ESJ to view the reduction of animal product consumption as consistent with the protection of the status quo value system which emphasises the welfare of farm animals (i.e. as a case of “system sanctioned change”). The findings of this study have practical relevance for strategic communication on reducing the consumption of animal products.

Overall, my aim was to gain a comprehensive understanding of ESJ related to the justification of animal product consumption, which can be drawn upon in the future, both in theory and practice, to respond to the wide-ranging consequences of high animal product consumption. Thus, my main contribution with this research is to explore the justification for animal product consumption from a perspective that has – to the best of my knowledge – not been explored before.

The rest of this paper is structured as follows: Section 2 provides a review of the existing literature and a theoretical derivation leading to the research questions and hypotheses. Section 3 outlines the methodology used including the study design, the procedure, and a framework for the statistical analysis. Section 4 presents the results of the statistical analysis and Section 5 discusses the findings, their relevance, and limitations. Section 6 concludes the paper.

2. Literature Review

2.1. Theoretical Reasoning

In the literature, the justification for consuming animal products has been mostly explained with the Theory of Cognitive Dissonance (Festinger, 1957).¹ According to this theory, justifying the consumption of animal products is a strategy to reduce the aversive state (i.e. the state of cognitive dissonance) that people feel when confronted with a discrepancy between their behaviour and their beliefs (choosing a diet that causes suffering to animals and simultaneously wishing not to cause suffering to animals) (Loughnan et al., 2014; Hartmann & Siegrist, 2020; Rothgerber, 2020). In this research, I assume that Cognitive Dissonance Theory does not fully explain people's justification for the consumption of animal products. Cognitive Dissonance Theory is often interpreted as an ego justification theory, meaning that efforts to reduce cognitive dissonance are seen as a drive to maintain a positive self-image (Aronson, 1992). Moreover, most dissonance theorists hold that people must feel responsible for the negative consequences of their behaviour in order to justify it (Jost & Hunyady, 2003). Since people do not necessarily feel responsible for the consequences of their animal product consumption (Te Velde et al., 2002), it can be assumed that Cognitive Dissonance Theory does not fully explain the justification for animal product consumption. I argue that people justify their consumption not only because they perceive a threat to their self-image and want to maintain a positive self-image (i.e. personal interests), but also because they perceive a threat to the broader social system and want to maintain a positive image of that system (i.e. system interests) (Jost & Hunyady, 2003).

2.2. System Justification Theory

System Justification Theory states that individuals and groups are motivated to hold beliefs that defend and justify aspects of the societal status quo, including the social, economic, and political institutions and arrangements on which they depend (Jost et al., 2004). In this, the term

¹ The Theory of Cognitive Dissonance (Festinger, 1957) is often referred to when explaining the so-called meat paradox (the paradox of loving and exploiting animals at the same time). In this study, the meat paradox is understood more broadly and applied to the consumption of animal products in general. This approach seems reasonable as the way people think about the use of animals for food, be it for the consumption of meat or the consumption of animal products in general, has been found to be very similar (Autio et al., 2023; Piazza et al., 2020).

“system” refers to any social, economic, or political arrangements in which multiple individuals or groups are embedded (Van der Toorn & Jost, 2014). Maintaining the perception that one’s social systems are legitimate and stable has an adaptive value and fulfils multiple human needs, including epistemic, existential, and relational needs (Jost et al., 2008; Hennes et al., 2012).² Contexts that facilitate the motivated defence of systems are system threat, system dependence, system inescapability and lack of control (Kay & Friesen, 2011).

Over the past 30 years, System Justification Theory has provided a generative perspective on many paradoxical phenomenon, including why people often resist injustice, resist social change, rationalise inequality or disadvantage, and favour the concerns of another group at the expense of their own group interests (Jost et al., 2004; Jost, 2019). The theory explains these paradoxes in that system justification motivation facilitates phenomena such as the endorsement of oppressive belief systems, stereotyping and the denial or rationalisation of injustice, which in turn leads to ignoring, denying or justifying problems related to the socio-economic system (Hoffarth et al., 2019; Jost & Kay, 2005; Kay & Jost, 2003; Napier & Jost, 2008; Wakslak et al., 2007).

2.3. The Case of Justifying Animal Product Consumption

To my best knowledge there is only one study conducted by Hoffarth et al. (2019) exploring the mistreatment of animals from the perspective of System Justification Theory. Their reasoning for taking a system justification perspective was that the mistreatment of nonhuman animals by humans is, among other things, a case of intergroup domination. Therefore, there may be psychological similarities in the way people rationalise the unequal treatment of human and nonhuman groups. If so, System Justification Theory could shed additional light on problems related to animal welfare. Indeed, in three survey studies involving more than 4000 participants in the U.S., they found that both general system justification (GSJ) and economic system justification (ESJ) are negatively associated with support for animal rights, and that system justification mediates the relationship between conservatism and support for animal rights. Stronger effects were found for ESJ than for GSJ, which may reflect the central role that businesses play in the exploitation of animals.

² Epistemic needs are for seeing the world as consistent, structured, and ordered. Existential needs serve to reduce threat and anxiety. Relational needs cause people to see the world in the same way as others.

This study aimed to extend this literature and explore whether ESJ is also related to the justification for animal product consumption. Based on the findings of Hoffarth et al. (2019), it was assumed that people high in ESJ also tend to justify and defend the system of exploiting animals for food production in particular, which in turn leads to them being more inclined to adopt system-compliant attitudes or actions, such as justifying the consumption of animal products. As will be shown in the following, further evidence from the literature supports this assumption.

As outlined above, people adopt oppressive belief systems to maintain the status quo. In relation to the present topic, it has been found that people who hold more oppressive beliefs that legitimise and justify the use and mistreatment of animals for food are more likely to justify their consumption of animal products (Piazza et al., 2015; Salmen & Dhont, 2023). Also, System Justification Theory holds that people use stereotypes to justify status differences between groups such that these differences appear natural and fair. In relation to the present topic, there is evidence that people actively change their attitudes to conform to the hierarchical belief system of human superiority over farm animals. For example, as soon as animals are declared “edible”, they are ascribed both a lower cognitive capacity and a lower emotional inner life, such as a lower sensitivity to pain (Bratanova et al., 2011). This resulting moral devaluation of animals classified as “edible” cannot be prevented by contrasting information (Piazza & Loughnan, 2016), supporting the finding that people hold stereotypes not only towards other humans, but also towards nonhuman animals (Costello, 2013). In addition, people who have stronger stereotypes towards farm animals have been found to be more inclined to adopt strategies to justify their consumption of animal products such as denying the negative consequences of their consumption (Dhont et al., 2014; Hyers, 2006).

In summary, these findings suggest that the manifestations fostered by system justification tendencies such as oppressive belief systems, stereotypes, denial, and rationalisation of injustice serve to justify and defend the current system of exploiting animals for food and the consumption of animal products. In this regard, system justification motivation can be seen as an underlying motivational process that seeks to maintain the societal status quo in which animal exploitation, and thus animal consumption, is an integral part. As stronger effects have been observed for ESJ than for GSJ with regards to attitudes towards animal welfare (Hoffarth et al., 2019), the present study focused on the relationship between ESJ and the justification for the consumption of animal products.

2.4. Individual Differences in Justifying the Consumption of Animal Products

Using a correlational research design, Hoffarth et al. (2019) showed that conservatism is negatively associated with support for animal rights and that this relationship is mediated by system justification. Building on this, the present study investigated whether ESJ can also explain the relationship between a preference for hierarchically organised worldviews – closely linked to conservatism (Napier & Jost, 2008; Wilson & Sibley, 2013) and measured as social dominance orientation (SDO; Pratto et al., 1994) and ecological dominance orientation (EDO; Uenal et al., 2022) – and the justification for the consumption of animal products.

System justification is positively related to the idea that people view their social system through hierarchical worldviews: While system justification tends to represent resistance to a system change and acceptance of the current system, hierarchically organised worldviews represent views about the system in general (Brandt & Reyna, 2012; Jylhä & Akrami, 2015). Individuals with a preference for hierarchically organised social systems tend to have high scores on the trait variable of social dominance orientation (SDO) (Sidanius et al., 2017). SDO is a relatively stable and highly predictive variable for a variety of antisocial attitudes and behaviours such as sexism, racism, and support for intergroup exploitation, and is closely linked to conservatism (Fischer et al., 2012; Kunst et al., 2017; Napier & Jost, 2008; Wilson & Sibley, 2013). While the theory describing social dominance orientation was developed with a primary focus on human intergroup relationships, more recently a growing number of studies have shown that a general preference for hierarchically organised social arrangements, as captured by SDO, is also negatively associated with attitudes and harmful behaviours towards the environment and nonhuman animals (Dhont et al., 2014; Hyers, 2006; Sidanius et al., 2017). Thereby, research showed that individuals high in SDO are more inclined to justify the consumption of animal products (Piazza et al., 2015; Veser et al., 2015).

Conceptually similar to SDO, Uenal et al. (2022) defined ecological dominance orientation (EDO) as a general preference for a hierarchical arrangement between humans, nonhuman animals, and the natural environment. EDO is closely related to anthropocentrism and the belief in human dominance. People with a high EDO orientation are more likely to believe that the hierarchical order between humans, animals, and the environment is justified or even “good” (cf. Cutright et al., 2011). Because of its more holistic orientation, EDO lends itself to being an independent psychological predictor next to SDO. Overall, EDO is still a relatively new

construct in research and has been little explored. As far as I know, no study has yet directly linked EDO to system justification tendencies nor to the consumption of animal products. However, given that individuals with high EDO are less likely to support efforts aimed at mitigating animal exploitation (Uenal et al., 2022), it seems conceivable that EDO plays a key role in predicting justification for animal product consumption. To complement the limited literature on EDO at this point, this variable, in addition to SDO, was included in this research.

2.5. The Possibility of “System Sanctioned Change”

Although system justification motivation is often a barrier to the acceptance of social change, there is a growing body of research showing that system justification can also be used to promote change. The present study aimed to take up this line of research and tested the effectiveness of an under-researched message framing intervention building on the concept of “system sanctioned change” (Feygina et al., 2010), in relation to the consumption of animal products.

As described above, the consumption of animal products is linked to a dominant value system – a system of beliefs that justify the consumption of animal products. The literature suggests that people who strongly endorse this value system (e.g. those high in SDO) feel a threat to the normative dietary customs and economy when animal products are challenged as the default diet (Dhont & Hodson, 2014b; MacInnis & Hodson, 2017a; Stanley, 2022). Carnivores seem to respond to this threat by becoming more defensive of the status quo that endorses the consumption of animal products, for example, by devaluing people who abstain from eating animal products. In particular, they tend to do so with people who avoid consuming animal products for animal welfare reasons rather than for health or environmental reasons (see veganism threat; MacInnis & Hodson, 2017a). System Justification Theory explains this response by suggesting that when people with high system justification tendencies perceive a threat to their value system, their status quo justification motive activates and manifests itself in justifying and supporting the status quo (Jost & Kay, 2005).

For those trying to convince people to reduce their consumption of animal products, this poses a particular challenge, as explicitly asking people to reduce their consumption of animal products – especially when animal welfare reasons are put forward – can lead to people

becoming more defensive and justifying, rather than reducing, their consumption of animal products (Graça et al., 2014). To address such challenges, Feygina et al. (2010) developed an approach aimed at reducing “threat perceptions” among people high in system justification, as they assumed that targeting changes in this “threat perception” could lead to a mitigation of the negative consequences of system justification. Their proposed intervention consisted of a message framing intervention in which social change was communicated as consistent with rather than threatening the status quo. In their study, participants in the treatment and control condition were exposed to a general passage. The paragraph emphasised that people depend on the land they live in, to highlight their attachment to the socio-economic system and activate their system justification motive. Next, they had participants read a passage stating that researchers have always been interested in the state of the natural environment and that today they are particularly interested in the relationship between people and the environment. However, in the treatment condition (“system preserving” condition), they added the paragraph “Being pro-environmental allows us to protect and preserve the American way of life. It is patriotic to conserve the country’s natural resources”. What they found was that individuals high in system justification were more likely to take environmentally friendly actions in the system preserving condition compared to in the control condition. In contrast, for individuals low in system justification, support for the environment in the system preserving condition did not differ significantly from the control condition, suggesting that system justification moderates the effect of the intervention. However, whether the results of the study can be generalised remains questionable. Since Feygina et al. (2010) used a relatively small homogenous sample in their study (41 undergraduate students), the likelihood of finding an effect that does not actually exist can be considered high (Faber & Fonseca, 2014).

Recent research suggests that the concept of system sanctioned change is also applicable to other domains, such as the topic of immigration: Using a correlational design, Gaucher et al. (2018) found that when system authorities states that migration supports the status quo (e.g. that being welcoming is the “Canadian way”) citizens were more positive towards migrants. As in the study by Feygina et al. (2010), the effect was only observed in individuals with higher tendency to justify their system, and not in individuals with lower tendency. Moreover, it has been found that high system-justifying tendencies are negatively correlated with collective action challenging the system (i.e. protest marches and demonstrations) but positively correlated with system-supporting collective action (i.e. willingness to enlist in the military) (Osborne et al., 2019). This again indicates that when change is linked to system-level values,

a context can be produced, where people high in system justification become more supportive of, rather than resistant to change.

To apply the concept of “system sanctioned change” in relation to animal mistreatment, Hoffarth et al. (2019) proposed framing the protection of farmed animals as “patriotic” and as preserving traditional cultural values and practices. They suggested doing this by highlighting the ways in which relatively new industrial practices, such as factory farming, are less humane than agricultural practices used in previous centuries. In this study, I aimed to expand on this idea: I examined whether reframing the appeal to reduce the consumption of animal products in a way that works with, rather than against, the motivation of system justification would increase the acceptance of a dietary shift towards a plant-based diet among British people high in ESJ. Acceptance was measured both as the willingness to change individual dietary behaviour and the willingness to support system-level change. This distinction was made because people may shift the responsibility for the consequences of their behaviour to (political or industrial) systems (Graça et al., 2014; Rothschild & Keefer, 2017; Timm, 2016), making them less inclined to change their own behaviour and more inclined to support a change in the system.

2.6. Research Questions and Hypotheses

Research Question 1: Is ESJ associated with the tendency to justify the consumption of animal products?

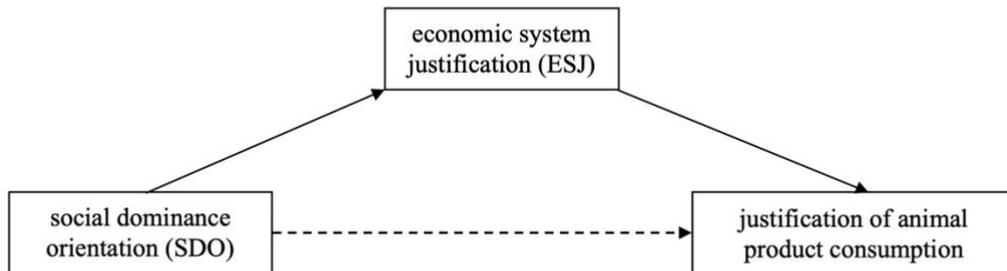
Hypothesis 1: ESJ will be positively associated with the tendency to justify the consumption of animal products.

Research Question 2: Does ESJ mediate the relationship between SDO and the tendency to justify the consumption of animal products?

Hypothesis 2: The relationship between SDO and the tendency to justify the consumption of animal products will be partially mediated by ESJ, with higher levels of SDO and ESJ reflecting significantly higher levels of animal product consumption justification.

Figure 1

Mediation effect model – Hypothesis 2

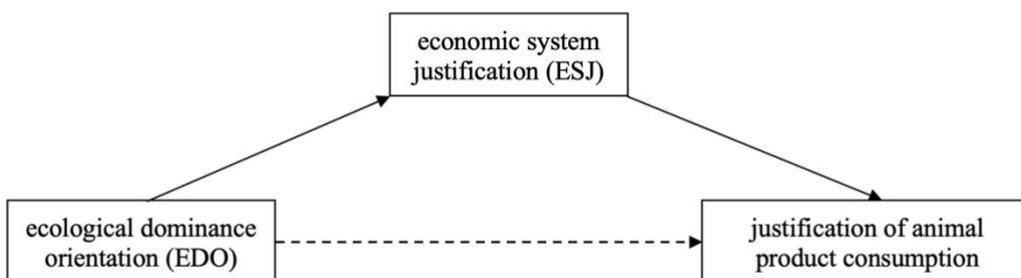


Research Question 3: Does ESJ mediate the relationship between EDO and the tendency to justify the consumption of animal products?

Hypothesis 3: The relationship between EDO and the tendency to justify the consumption of animal products will be partially mediated by ESJ, with higher levels of EDO and ESJ reflecting significantly higher levels of animal product consumption justification.

Figure 2

Mediation Effect Model – Hypothesis 3



Research Question 4: Can a “system sanctioned” approach increase acceptance towards a plant-based dietary shift among people high in ESJ?

Hypothesis 4: Reframing reducing animal product consumption as a means of preserving (vs. threatening) the cultural value of caring for farmed animals and emphasizing that reducing animal product consumption is aligned with the system (vs. challenging the system) will increase acceptance towards a plant-based dietary shift among people high in ESJ.

3. Methodology

3.1. Research Design

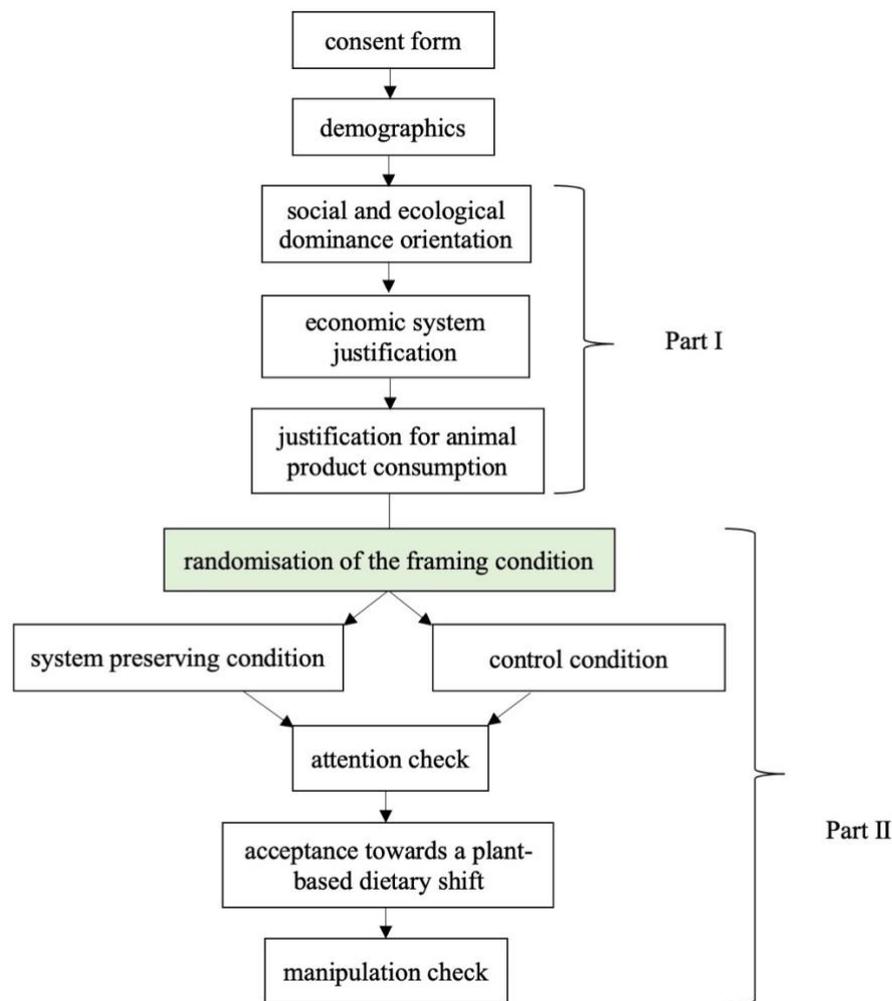
To test the above hypotheses, an online study was conducted. The study was pre-registered on the Open Science Framework (<https://osf.io/mtzpu>) and received approval from the LSE Research Ethics Committee. The procedure and the design of the study can be divided into two parts: Part I aimed to answer research questions 1, 2 and 3, and Part II aimed to answer research question 4. Part I had a correlational research design, to examine the relationships between the variables SDO, EDO, ESJ, and the tendency to justify animal product consumption. Part II resembled a randomised controlled experiment using a between-subjects design, to draw causal inference about the effectiveness of the framing intervention on the acceptance towards a plant-based dietary shift.

3.2. Procedure

The online study was conducted over a period of one day at the end of June 2023. Participants were able to access the questionnaire, which was created using Qualtrics, via a link. After opening the link, participants were given an introduction on the first page informing them about the purpose of the study and clarifying the data protection guidelines. In addition, participants were asked to complete an informed consent form to confirm their participation. After giving their consent, participants were asked demographic questions. Then, the first part of the study began, in which participants were asked to complete a series of scales: This started with the social and ecological dominance orientation scales and was followed by questions on economic system justification and on the justification for the consumption of animal products. In the second part of the survey, participants were first asked to list three aspects making them proud to be British. This step served to make participants aware of their attachment with their socio-economic system and thus to activate their system justification motivation. Participants were then randomly assigned to one of two conditions, which are explained in more detail in Section 3.4. This was followed by attention check questions. The next step involved questions on the acceptance towards a plant-based dietary shift. Lastly, participants answered manipulation check questions. Figure 3 gives a graphical overview of the study procedure.

Figure 3.

Study procedure



3.3. Sample Size Calculation and Recruitment Strategy

To address the methodological limitation of Feygina et al. (2010) regarding their small sample size, the present study aimed to achieve a sample size that carries sufficient power to detect a moderation effect. An *a priori* sample analysis with G*Power was conducted to determine the minimum sample size required (Faul et al., 2007). Since the average effect size in tests for moderation has been shown to be small (Hair et al., 2021), the effect size for the moderation effect was assumed to be small (.02; Cohen, 1988). Following standard conventions, the significance was set at 0.05 and the power at 0.8 (Maier & Lakens, 2022). The resulting minimum sample size was 395. To avoid exclusions leading to too small a sample, the sample

size was increased by 20%. Thus, the final minimum sample size had to be 474. As there were two conditions, this corresponded to a breakdown of about 228 participants per condition.

Participants were recruited through Prolific Academic. Screening criteria involved participants being UK residents and not following a specific diet. This was to ensure that only people who ate an omnivorous diet took part in the study, as the intervention was targeted at those not yet reducing their consumption of animal products. The survey took an average of 10 minutes to complete, and participants received compensation of approximately £1 for their participation.

3.4. Framing Intervention

Following the approach of Feygina et al. (2010), this study employed a message framing manipulation. The manipulation consisted of framing the reduction of animal product consumption as either “system-preserving” or “system-threatening” to the status quo cultural value system. Thereby, I assumed that the system-threatening condition serves as the control group. Participants were assigned to these two conditions using simple randomisation. Following previous studies on system perception manipulation (e.g. Kay et al., 2009; Osborne et al., 2019), participants in both conditions were asked to read a paragraph. The paragraph was introduced as a newspaper article excerpt that was presented as coming from a British magazine and written by a British journalist to highlight the participant’s attachment to their socioeconomic system. In both conditions the excerpt described farm animal welfare as having played a significant cultural role in British history. The article excerpts from both conditions were identical, except for the last paragraph:

- In the system-preserving condition, the last paragraph emphasised that a reduction in the consumption of animal products was necessary to preserve the cultural value of protecting the welfare of farm animals. In this way, it was intended to give the impression that reducing the consumption of animal products would be aligned with the cultural value system. It was assumed that individuals high in ESJ would be motivated to preserve this cultural value and would therefore be more accepting towards changing their own dietary behaviour as well as towards system-level changes.
- In the system-threatening condition, the article concluded by merely saying that a reduction in the consumption of animal products was necessary to reduce animal

suffering. It was assumed that this statement would be perceived as a threat by people, given the general tendency of omnivores to perceive calls for a reduction in the consumption of animal products as a threat (see Section 2.5). Since the system-threatening condition reflects a scenario of how a large part of the population perceives calls for a reduction in the consumption of animal products in reality – when no intervention is implemented – the condition appeared to be a suitable counterfactual condition for the system-preserving condition.

Online materials are typically relatively uninvolved, and participants may rush through the study without paying much attention (Peer et al., 2017). Thus, participants were asked to respond to two attention questions after reading the article excerpt. The attention questions were designed to be easily answerable after reading the paragraph. Participants were only included in the statistical analysis if they answered both attention questions correctly.

To ensure that participants had read the last paragraph and thus been exposed to the treatment, participants were asked whether they recognised two sentences from the last paragraph. Participants answered either “yes, I recognise that sentence” or “no, I do not recognise that sentence”. People were only included in the statistical analysis if they indicated they recognised the last sentence of the paragraph they were asked to read.

All materials, including the article excerpts, the attention check questions, and the manipulation check questions can be found in Appendix F.

3.5. Instruments

Confounding variables

To account for potential confounding variables, I included the following questions and items: age, gender, highest educational qualification attained, household income (pre-tax) and political orientation. As suggested by Kroh (2007), political orientation was measured using a single ideological self-classification item ranging from 1 (*extremely liberal*) to 11 (*extremely conservative*). These potentially confounding variables were chosen as there is evidence suggesting they have an influence on the justification for animal product consumption (Bryant, 2019; Guenther et al., 2005; Hartmann & Siegrist, 2017; Neff et al., 2018). For example, in a

survey of 1000 UK meat eaters about their beliefs about a vegetarian and vegan diet, Bryant (2019) observed significant differences in perceptions of vegan and vegetarian diets by gender, age, level of education, income, and political orientation.

Economic system justification

Motivation to justify the economic system (ESJ) was measured using the 17-item ESJ scale, capturing individual differences in justification of the current economic system as well as its degree of inequality (Jost & Thompson, 2000). Responses were given on a 7-point scale (1 = *strongly disagree*, 7 = *strongly agree*).

Social dominance orientation

Following Hoffarth et al. (2019), social dominance orientation (SDO) was assessed using the shortened 8-item SDO7 scale by Ho et al. (2015). All items were measured on a Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

Ecological dominance orientation

Ecological dominance orientation (EDO) was measured with a single item, as suggested by Uenal et al. (2022). The less hierarchical (ecocentric) perspective is represented on one side in the form of a non-hierarchical and egalitarian arrangement between humans, nonhuman animals, and the natural environment. The more hierarchical (anthropocentric) perspective is represented on the other side in the form of a hierarchically organised pyramid arrangement in which humans are above nonhuman animals and nature. Participants were asked to indicate under the images on a Likert Scale whether they preferred a less hierarchical (1) or more hierarchical (7) arrangement between the different species. Overall, the scale can be classified as intuitive, efficient, short, and reliable.

Justification for the consumption of animal products

Justification for the consumption of animal products was measured with the 4N scale developed by Piazza et al. (2015). The scale was originally developed to measure people's tendency to justify their meat consumption as natural, normal, necessary, and nice. However, Piazza et al.

(2020) established that the 4Ns generally apply to other animal uses as well. Therefore, for the purposes of this study, the scale was adapted to measure not only the justification of meat consumption, but of animal products in general. In total, the scale included 16 items (4 items per subscale), and participants rated their level of agreement or disagreement with each item on a Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The scale was chosen for the purposes of this study as it encompasses most of the real-world justifications omnivores use to defend animal product consumption. Furthermore, the 4N scale correlates strongly overall with motivation to continue eating animal products and with actual consumption of animal products, confirming its predictive validity (Piazza et al., 2015).

Dependent variable: Acceptance towards a plant-based dietary shift

Acceptance towards a plant-based dietary shift was measured with three variables. To examine willingness to change one's behaviour, the first variable involved the intention to reduce the consumption of animal products. Respondents were asked to indicate on a scale of 1 (*definitely*) to 7 (*definitely not*) whether they intended to reduce their consumption of meat and animal products in the future. Higher scores indicated a stronger intention to reduce consumption of animal products. To investigate the acceptance of change at the system level, the second variable inquired about support for policies to promote widespread plant-based dietary change. Participants were asked to indicate on a Likert scale from 1 (*not at all*) to 5 (*very much*) to what extent they support three policies (e.g. "increased innovation, growth, marketing for plant-based products"). Due to the so-called intention-behaviour gap (Sheeran & Webb, 2016), a third variable was used to more closely reflect the actual behaviour of participants. Participants were asked if they would take the opportunity to donate 25 pence of their compensation for participating in the study to the non-profit organisation ProVeg International. ProVeg International is an organisation that works to transform the global food system by working with relevant system-level stakeholders to replace animal products with plant-based and cultured foods. There were two response options: "yes, I would like to donate 25 pence to ProVeg International" vs. "no, I would not like to donate 25 pence to ProVeg International".

3.6. Statistical Analysis

The following section describes the statistical analysis. All statistical analyses were conducted using the data analysis program STATA. It must be noted that for all statistical analyses Likert

scales were assumed to be interval-scaled. Even though strictly speaking “the response categories have a rank order but the intervals between values cannot be presumed equal” (Jamieson, 2004, p.2), I referred to the argument that since I summarised items to weighted means, they could be considered interval scaled (Carifio & Perla, 2008, 2007). The measurement instruments for political orientation and EDO were composed of only one item. However, since items with at least five categories in length can be treated as interval scaled (Harte, 2015), I likewise treated these variables as interval scaled. Furthermore, all models and coefficients were tested for two-sided significance at a significance level of 95% ($p < 0.05$).

3.6.1. Preliminary Exploratory Analysis

To assess the reliability of the measurements, Cronbach’s alpha (α) was calculated for each scale. Furthermore, correlations were calculated between the variables SDO, EDO, ESJ, and animal product consumption justification. As indicated by a Shapiro-Wilk test (Shapiro & Wilk, 1965), the data was not normally distributed. Thus, Spearman rank-order correlations were conducted instead of Pearson (Bishara & Hittner, 2012). Based on previous research (see Section 2.4), it was expected to find positive correlations among the variables.

3.6.2. Main Analysis

Regarding Hypothesis 1, it was expected that both the Spearman correlation and simple linear regression results would indicate ESJ to be positively associated with the justification for animal product consumption. To test the robustness of this relationship, an additional multiple linear regression modelling was conducted including age, education, gender, income, and political orientation as covariates.³ Gender, income, and education were dummy coded in advance due to the nominal nature of these variables, with “male”, “less than £13,000” and “no formal qualification” as reference categories.

To test Hypotheses 2 and 3, two mediation analyses were conducted using structural equation modelling (SEM), with SDO or EDO as predictor X , ESJ as mediator M , and justification for

³ The assumptions for calculating the regressions regarding the independence of the residuals (autocorrelation), the equality of the residual variances (homoscedasticity), the absence of multicollinearity, the normal distribution of the residuals and the linearity between the metrically scaled independent variables and the dependent variable were met.

consumption of animal products as outcome Y .⁴ To test for mediation, the three necessary conditions identified in the work of Baron and Kenny (1986) to claim mediation were tested: X is significantly related to Y (path c); X is significantly related to M (path a); M is significantly related to Y , controlling for X (path b). To establish a partial mediation effect, the relationship between X and Y had to decrease significantly when both X and M were included as predictors in the regression model. To determine whether the mediation effect was statistically significant, the indirect path from X to M to Y ($a*b$; indirect effect) was examined using 5000 bootstrap samples.⁵ To check the robustness of the results, the same covariates as listed for testing Hypothesis 1 were included in the models.

Two multiple linear and one logistic regression were calculated to explore whether the relationship between the treatment condition and the acceptance towards a plant-based dietary change depending on the degree of ESJ (Hypothesis 4).⁶ For these calculations, participants' scores on the ESJ scale were centred around the mean. These two variables and their interaction term were included as independent variables in the linear regression analysis. It was expected that the interaction between the condition and ESJ would significantly predict acceptance towards a plant-based dietary shift, as measured first by the intention to reduce consumption of animal products and second by the support for policies promoting a plant-based dietary change. Due to the nominal nature of the third dependent variable, a logistic regression using maximum likelihood estimation was calculated to examine the impact on donation intention. For this purpose, the variable for donation intention was dummy coded (1 = willing to donate vs. 0 = not willing to donate). The interaction between the condition and ESJ was expected to significantly predict the likelihood of donating. To test the robustness of the results for Hypothesis 4, the analysis on Hypothesis 4 was replicated, excluding those participants who spent an implausibly short amount of time on reading the article (< 64.58 seconds; the rationale

⁴ The assumptions for conducting SEM were fulfilled regarding the absence of systematic missing data and sufficient large sample size. However, the assumption for multivariate normality of observations was not fulfilled. To account for violation of this assumption, Browne's (1984) asymptotic distribution free (ADF) method was used.

⁵ Contrary to the pre-registration plan, the bootstrapping method was carried out with STATA sem command instead of SPSS Macro.

⁶ The assumptions of the linear regressions were fulfilled except for the assumption of the normal distribution of the residuals. The Shapiro-Wilk test showed that for both analyses that the residuals were not normally distributed. Since parametric methods are robust to this violation due to the central limit theorem for larger samples (Lumley et al., 2002), it was decided to perform linear regressions, nevertheless. For the logistic regression, the assumption of no multicollinearity and of the independence of observations was fulfilled. Likewise, the assumption regarding the linearity between the logit of the dependent variable and the continuous predictors was met.

behind this is given in the limitations section).⁷ Furthermore, the estimation of the probability of intending to donate was also done by a probit regression model.

4. Results

4.1. Sample Characteristics

In total, 489 participants agreed to take part in the study. In accordance with the pre-registration plan, participants were excluded from the analysis if they did not have a British citizenship, had not passed the attention check, or had not passed the manipulation check. In total, 134 participants were excluded from the analysis, resulting in a final sample size of 355. Of these, 176 participants were assigned to the system preserving group and 179 to the control group. Overall, the study had fewer participants than required to be sufficiently powered. However, a sensitivity analysis in G*Power showed that the critical effect size at this sample size was .022, still very close to the assumed effect size of .02. No significant differences between the two conditions in terms of ESJ could be found ($t(353) = 1.03, p = .305$) (system preserving condition: $M = 3.71, SD = .09$; control condition: $M = 3.84, SD = .09$), reducing the risk of systematic bias (Miller et al., 2016). Furthermore, the sample was balanced with respect to all baseline characteristics. The overview of the sample characteristics by treatment group and the results of the balance tests are summarised in Appendix B.

4.2. Preliminary Exploratory Analysis

Overall, the individual scales could be classified as reliable. The alpha reliability of the scales for SDO and ESJ was found to be acceptable (SDO: $\alpha = .87$; ESJ: $\alpha = .82$). The internal

⁷ To determine the critical score for reading time, I followed the Buchanan and Scofield's (2018) approach using research by Trauzettel-Klosinski et al. (2012), which indicated the reading aloud speeds of English speaking participants. Mean character reading speed per minute according to Trauzettel-Klosinski et al. (2012) was 987 ($SD = 118$). In the system preserving condition, the article extract consisted of 1116 characters, and in the control condition, 1082 characters, giving a mean character count of 1099. The mean character count from our study was divided by the mean character count from Trauzettel Kosinski and Dietz (2012) and then multiplied by 60 to determine a time in seconds that should be minimally spent reading the article excerpt. Participants were excluded if the time spent reading the article extract was below this critical value of 64.58, which was very close to the mean value of time spent on reading the article excerpt in the overall sample ($M = 65.57$).

consistency of the scale measuring justification for consumption of animal products was $\alpha = .93$, which could be considered close to the reliability of the original scale ($\alpha = .95$; Piazza et al., 2015). In addition, correlations between the individual scales were computed. Thereby, I found that the scales had a significant positive correlation with each other. The exact statistical parameters can be found in Table 1. Based on the table below, it can be concluded that the individual scales mostly show a small to moderate positive correlation, indicating the validity of the testing.

Table 2

Sample Size, Mean, Standard Deviation, and Correlations among Variables.

	<i>N</i>	<i>M</i>	<i>SD</i>	1	2	3	4
SDO	355	2.51	1.03	1			
EDO	355	3.15	1.78	.21**	1		
ESJ	355	3.78	1.24	.75**	.18**	1	
4Ns	355	4.46	1.15	.27**	.24**	.33**	1

Note. ** indicates the correlation is significant at the .001 level (2-sided test). *N* = number of observations, *M* = mean, *SD* = standard deviation.

The reliability of the scales measuring the dependent variable, acceptance towards a plant-based dietary shift, could also be considered acceptable. While the scale measuring the intention to reduce the consumption of animal products had a reliability of $\alpha = .91$, the scale measuring the support for policies promoting plant-based dietary change had an internal consistency of $\alpha = .89$.

4.3. Main Analysis

4.3.1. Hypothesis 1

In line with Hypothesis 1, a significant correlation was found between ESJ and the justification for animal product consumption ($r(355) = .33, p < .001$). Furthermore, the F-test showed a significant regression model for the influence of ESJ on the justification for animal product consumption ($F(1, 346) = 42.69, p < .000, R^2 = .11$) and the regression coefficient for ESJ was significantly different from zero ($\beta = .33, p < .001$). To assess the robustness of this result, a

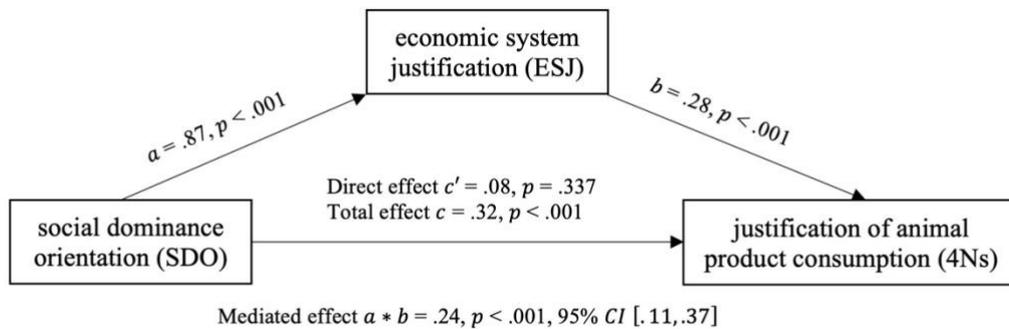
multiple linear regression analysis including the covariates was conducted (Appendix B, Table 1). The analysis showed a significant regression model for the influence of ESJ on the reduction of animal product consumption when the covariates were included as predictors ($F(18, 329) = 5.02, p < .001, R^2 = .17$). Approximately 17 % of the variance in the justification for animal product consumption could be explained by the predictors (vs. 11% if only ESJ was entered as a predictor). Again, the slope of the regression model for ESJ was significantly different from zero ($\beta = .30, p < .001$), confirming a significant positive influence of ESJ on the justification of animal product consumption.

4.3.2. Hypothesis 2

A simple mediation analysis was conducted to analyse whether SDO predicts the justification for animal product consumption and whether the direct pathway is mediated by ESJ (Hypothesis 3). A total effect of SDO on justification for animal product consumption was observed ($\beta = .32, p < .001, \text{path c}$). In addition, SDO significantly predicted the mediator ESJ ($\beta = .87, p < .001, \text{path a}$) and ESJ significantly predicted justification of animal product consumption when controlling for SDO ($\beta = .28, p < .001, \text{path b}$). Thus, the conditions according to Baron and Kenny (1986) could be fulfilled. Moreover, the relationship between SDO and justification for animal product consumption became insignificant when both SDO and ESJ were included as predictors in the regression ($\beta = .08, p = .364, \text{path c'}$). Furthermore, the indirect effect results showed that the relationship between SDO and justification for animal product consumption was mediated by ESJ (indirect effect $ab = .24, p < .001$ 95% CI [.11, .37]). Hence, it was found that the relationship between SDO and justification of consumption for animal products was mediated by ESJ. However, contrary to Hypothesis 2, the mediation was a full and not a partial mediation

Figure 3

Mediation model – Hypotheses 2



To assess the robustness of these findings, the same analysis was run with age, gender, income, education, and political orientation as covariates.⁸ The effect was robust to adjusting for these covariates (see Appendix C, Table 2).

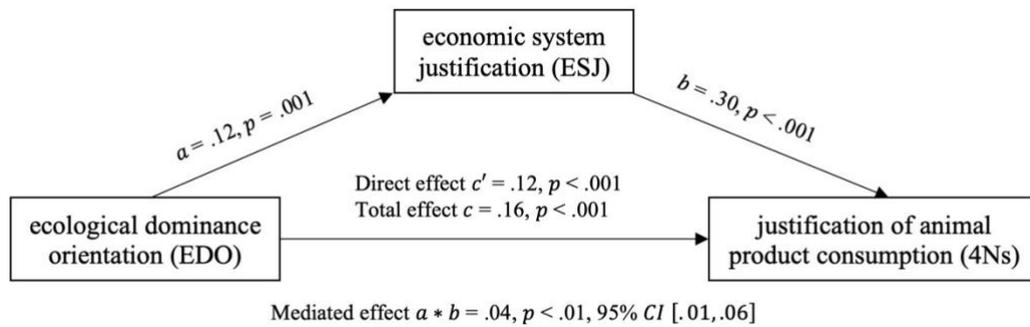
4.3.3. Hypothesis 3

To determine if EDO predicts the justification for animal product consumption and whether the direct path is mediated by ESJ, a second simple mediation was carried out. Again, the conditions according to Baron and Kenny (1986) were met: The analysis revealed a total effect of EDO on the justification of animal product consumption ($\beta = .16, p < .001$, path c). Furthermore, EDO significantly predicted the mediator ESJ ($\beta = .12, p = .001$, path a) and ESJ significantly predicted the justification of animal product consumption while controlling for EDO ($\beta = .29, p < .001$, path b). The relationship between EDO and justification for animal product consumption decreased but remained significant when both EDO and ESJ were included as predictors in the regression ($\beta = .12, p < .001$, path c'). In addition, the analysis of the indirect effect suggested that ESJ mediated the relationship between EDO and the justification of animal product consumption (indirect effect $ab = .04, p < .01$ 95% CI [.01, 0.06]). Thus, it could be concluded that, in line with Hypothesis 3, the relationship between EDO and justification of consumption of animal products was partially mediated by ESJ.

⁸ Since path analysis does not allow for dummy-variables, categorical covariates were treated as continuous.

Figure 4

Mediation model – Hypothesis 3



For robustness checking, the same analysis was run with the same covariates as for Hypothesis 2. Again, the effect was robust to adjusting for covariates (see Appendix C, Table 3).

4.3.4. Hypothesis 4

Hypothesis 4 was not supported by the results. Individuals high in ESJ did not report higher acceptance towards a plant-based dietary shift following the intervention. While the F-test showed a significant regression model for the predictor variables on the intention to reduce the consumption of animal products ($F(3, 344) = 6.09, p < .01, R^2 = .04$), the interaction between condition and ESJ did not turn out to be a significant predictor variable in the model ($\beta = .03, p = .741$). The results were robust to the approach of excluding those who were below the critical score for time reading the article excerpt (see Appendix B, Table 4.1). Another F-test showed a significant regression model for the influence of the predictor variables on support for policies proposing plant-based dietary shift ($F(3, 344) = 17.37, p < .001, R^2 = .12$). However, again, the coefficient of the interaction effect between the condition and ESJ did not turn out to be significant ($\beta = .18, p = .197$). When those below the critical score for time reading the article excerpt were excluded, the analysis showed similar results, confirming the robustness of the results (see Appendix B, Table 4.2). Lastly, the binomial logistic regression performed to determine the effect of the predictor variables on the likelihood of donating to ProVeg International showed the model was not statistically significant ($\chi^2(3) = 2.75, p = .432, R^2 = .01$). Also, the coefficient of the interaction effect between the condition and ESJ was not significantly different from zero ($\beta = .13, p = .573$). Similar results were obtained in the model specified as a probit regression and, when those below the critical value of time spent reading

the article excerpt were excluded, indicating the robustness of the results (see Appendix C, Table 4.3, Table 5). All regression and model coefficients, including those for the main effects, can be found in Table 3.

Table 3

Regression analysis results – Hypothesis 4

	β	<i>SE</i>	<i>t/z</i>	<i>p</i>	95% CI	
					LL	UL
Dependent Variables:						
<i>Intention to consumption</i>						
Constant	2.00	.06	31.23	.000	1.88	2.13
ESJ	– .18	.05	– 3.34	.001	– .29	– .07
Condition	– .06	.09	– .66	.512	– .24	– .12
ESJ*condition	.03	.08	.35	.741	– .13	.18
Obs. = 348, $F(5, 344) = 6.09$, $p < .001$, $R^2 = 0.04$						

<i>Support for policies</i>						
Constant	4.84	.11	42.94	.000	4.62	5.06
ESJ	– .58	.10	– 6.07	.000	– .77	.39
condition	– .11	.16	– .69	.488	– .43	.20
ESJ*condition	.18	.14	1.29	.197	– .09	.46
Obs. = 348, $F(3, 344) = 17.37$, $p < .001$, $R^2 = 0.12$						

<i>Intention to donate</i>						
Constant	– 1.08	.18	– 6.17	.000	– 1.42	– .74
ESJ	– .24	.16	– 1.52	.128	– .55	.07
Condition	.01	.25	.03	.975	– .48	.50
ESJ*condition	.13	.23	.56	.573	– .32	.58
Obs. = 348, $X^2 = 2.75$, $p = .432$, $R^2 = 0.01$						

Note. β = regression coefficient, *SE* = standard errors of the coefficient, *t* = t-statistic, *z* = z-statistic, *p* = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower limit, UL = upper limit. For logistic regression results, robust standard errors are reported.

5. Discussion

In line with Hypothesis 1 and the study of Hoffarth et al. (2019), the analysis revealed that ESJ was positively associated with the justification for animal product consumption. This supports the assumption that justification for the consumption of animal products not only serves the need to justify one's own behaviour, but also the need to justify the entire economic system. Moreover, it is aligned with the finding of other studies that system justification predicts resistance to system-challenging attitudes (Azevedo et al., 2017). Consistent with Hypotheses 2 and 3, it was found that ESJ mediated the relationship between SDO or EDO and the justification for animal product consumption. This supports the findings of previous studies (Martin et al., 2015), most notably of Hoffarth et al. (2019) who found that system justification mediated the relationship between conservatism – closely linked to SDO (Napier et al., 2010; Wilson & Sibley, 2013) – and support for animal rights. Furthermore, it can be interpreted as confirming the idea that the consumption of animal products is not only justified because people high in SDO or EDO prefer hierarchies, but because they share system-justifying beliefs that make these hierarchies particularly accepting (Kay & Zanna, 2009).

Altogether, the results for Hypothesis 1, 2 and 3 shed light on why people often refuse to reduce their consumption of animal products. Based on the results, it can be assumed that people, especially those with a preference for socially hierarchical worldviews, have a strong tendency to legitimise the current system of consuming animal products due to ESJ. This tendency may have become strengthened by a long-standing tradition of animal product consumption that reinforced people's perceived dependence on animal farming over time and in turn their perception of the legitimacy of associated practices (as the consumption of animal products) (Blanchard & Eidelman, 2013; Eckhardt et al., 2010). For practitioners, these psychological processes lead to challenges in trying to reduce the consumption of animal products, as interrupting these psychological mechanisms seems necessary to induce behavioural change. Interrupting or shifting these psychological mechanisms can be achieved, for example, if social change is framed as preserving, rather than supplanting the ideals of traditional cultural forms (Feygina et al., 2010). In fact, the effectiveness of this strategy was tested in this study. This was done by reframing the reduction of animal product consumption as a means of preserving (as opposed to threatening) the cultural value of caring for farm animals.

However, the analysis for Hypothesis 4 showed that the framing intervention did not increase acceptance towards a plant-based dietary change among people high in ESJ. Individuals high in ESJ reported neither a change in intention to reduce consumption of animal products nor a change in support for policies promoting plant-based dietary change at the system level in the system preserving condition compared to the control condition. Furthermore, there were no significant differences in the willingness to donate to an organisation advocating for the plant-based transformation of the food system. Overall, these findings are in contradiction with the findings of Feygina et al. (2010), Gaucher et al. (2018), and Osborne et al. (2019).

At a first glance, these results extend and support the findings of the literature on the ineffectiveness of message framing interventions. While it is important to distinguish between the types of framing effects, studies generally show that framing effects have little or no impact on people's attitudes, intentions, or behaviour (Florence et al., 2022; Gallagher & Updegraff, 2012). However, the ineffectiveness of the approach can also be explained by the general difficulty of increasing acceptance towards a plant-based dietary shift: On the one hand, the consumption of animal products is a strongly habitualised and identity-linked behaviour (Nguyen & Platow, 2021; Rees et al., 2018), explaining why the behaviour may be more indirectly linked to justification of the economic systems and more directly linked to nonideological variables such as habits (Hoffarth et al., 2019). On the other hand, people consider animals and animal products separately (Kunst, 2019). Because of this, the influence of attitudes towards farm animal welfare may only have limited influence on behavioural outcome measures such as behavioural intentions (Hartmann & Siegrist, 2020). In fact, this is in line with the evidence that, when purchasing products, factors such as price and taste are often more important and have a greater impact on behaviour than animal welfare considerations (Font-i-Furnols & Guerrero, 2014; Grunert, 2006; Holm & Møhl, 2000).

The findings suggest that applying the concept of “system sanctioned change” as a communication strategy to promote plant-based diets is likely to have little or no impact on the acceptance towards a plant-based dietary shift. Since the effectiveness of the method could not be proven, it stands to reason to conclude that interrupting ESJ tendencies remains a challenge for practitioners. Even if ESJ is only one of multiple concepts involved in maintaining the consumption of animal products (e.g. next to cognitive dissonance and social identity; Nezelek & Forestell, 2020; Rothgerber, 2020) – given the difficulty of interrupting ESJ – it can be

argued that the problems associated with animal farming are unlikely to be solved at the individual level without addressing the system level (i.e. changing the status-quo itself).

5.1. Limitations and Future Outlook

In the following I will discuss methodological limitations of the study to assess the validity of the results. First, it should be noted that due to the correlational design of the first part of this study, no conclusions can be drawn about the causality of the relationships between the variables (Jo, 2008). Furthermore, the results of the experimental study should be viewed with caution and should not be considered definitive due to important limitations of the study: First, the effectiveness of the framing intervention was conditional on the difference in the perception of a threat to the system among individuals high in ESJ in the system-preserving vs. control condition. However, it remains unclear whether the intervention had achieved this desired effect. This is because participants in both conditions were exposed to a text addressing the cultural value of animal welfare in British history, which may have implicitly conveyed in both conditions that animal welfare is an integral part of the cultural value system that must be preserved. Future research therefore would be well advised to check perceived system threat manipulations (see Cutright et al., 2011). Furthermore, it can be argued that the system-threatening condition may not have represented an appropriate control condition for the system-preserving condition. Despite the literature on veganism threat, a plant-based diet as a term and concept has become increasingly evident in the media and in public consciousness in recent years (Bryant, 2019b; Pendergrast, 2016). Thus, it seems conceivable that adopting a plant-based diet has become more socially acceptable, so that calls for a reduction in the consumption of animal product consumption are perceived as less threatening. With regards to the results it is therefore important to note that any causal inferences regarding the effectiveness of the “system sanctioned change” concept should not be made with certainty (Eide & Showalter, 2012). Lastly, it must be said that this study, in contrast to the study by Feygina et al. (2010), was conducted as an online experiment. An online experiment was preferred in this study as it gives access to a larger and diverse group of participants. Moreover, online experiments are by definition automated, minimising experimenter and demand effects (Reips, 2000). Nevertheless, the literature provides evidence that an online format leads to significantly higher rates of distraction, consistent with the idea that researchers lose control over important aspects of an experiment when a study takes place outside the laboratory (McDermott, 2002; Morton & Williams, 2010). In the present study, therefore, there are grounds to believe that participants

were more distracted than in the Feygina et al. (2010) study, suggesting that this could have had an impact on the effectiveness of the intervention. To address this, a robustness check was conducted re-running the analysis on Hypothesis 4, excluding those participants who spent an implausible amount of time on reading the article. The results regarding effectiveness did not change significantly, confirming the method was ineffective. Nevertheless, future research would be well advised to replicate the present study, while addressing its methodological limitations.

In addition to addressing the methodological limitations, future research may also consider changes in the implementation of the intervention. For example, one could also have examined the relationship between ESJ and each subscale of Piazza et al.'s (2015) 4N scale to get a more nuanced understanding of how ESJ relates to the justification for animal product consumption.⁹ Moreover, one could investigate whether addressing other value systems such as environmentalism is more effective in increasing people's acceptance towards a reduction in animal product consumption. In fact, reinterpreting the need to reduce consumption as a means to preserve the cultural value of environmentalism may be more likely to encourage people to be more accepting towards a plant-based dietary shift, as shifting towards a plant-based diet for environmental reasons is in general perceived as socially more acceptable (MacInnis & Hodson, 2017b). Furthermore, the ineffectiveness of the framing intervention underlines the results of previous studies (Florence et al., 2022), suggesting that framing interventions in general have little to no effect on consumption behaviour. Focusing less on communication strategies and more on interventions directly changing the status quo may therefore be seen as a more promising direction for future research (e.g. defaults, Reisch & Sunstein, 2021).

5.2. Contribution

A strength of my study was that it provided another example of how system justification can be applied to better understand social problems. It contributed to the literature on System Justification Theory and (animal product) consumption behaviour by showing how system justification theory serves as a theoretical lens to explain the justification of animal product consumption. While previous research has examined how system justificatory tendencies relate

⁹ This was done as an exploratory analysis in this study (Appendix D).

to the justification for the overall poor treatment of animals (Hoffarth et al., 2019), this study showed that these system justification tendencies also translate to a measure that is only indirectly related to the poor treatment of animals. Furthermore, the study contributed to the expansion of the rather limited research on the relationship between SDO, EDO and ESJ. By investigating the relationship among these variables, theoretical and practical implications for behaviour intervention research could be derived. Finally, the present study contributed to the expansion of research on the concept of “system sanctioned change”. While researchers have proposed the application of this concept to change a wide range of behaviours (Hoffarth et al., 2019; Jost, 2019), no study is known to have applied the concept directly to topics other than environmentalism (Feygina et al., 2010). Even if the effectiveness of the intervention remains unclear, the present study provides a starting point for future intervention research to further consider system justifying processes when identifying and implementing interventions.

6. Conclusion

For thousands of years, nonhuman animals and humans have lived together in the same habitat, sharing the same resources, and therefore depending on each other. Humans learned to domesticate animals and use them for the consumption of animal products. Today, animal products are considered a mass product that is cheap and accessible to all. To satisfy the hunger for animal products in industrialised countries, animal farming systems and production methods have become increasingly intensive, leading to major ethical problems. Despite these problems, the issue continues to receive inadequate attention from both researchers and the public (Arcari, 2017). This research addressed this reality by giving evidence that an underlying tendency to justify and maintain the current economic status quo is linked to the justification of animal product consumption. Furthermore, clear evidence could be obtained that ESJ mediates the negative effect of SDO and EDO on the justification for animal product consumption. Interrupting ESJ may therefore be essential to achieving widespread reductions in animal product consumption. However, interrupting ESJ is a complex challenge. No support could be found regarding the effectiveness of applying the concept “system-sanctioned change” to increase acceptance towards a plant-based dietary shift. Although the results of this study cannot be considered final, it can be concluded from this that the problems associated with high levels of animal consumption worldwide are unlikely to be solved at the individual without changing the system. Scientists as well as practitioners are therefore advised to increasingly

address the system level in addition to the individual level, without losing sight of the potential ethical concerns that arise from this.

References

- Anthis, J. R. (2017). Survey of US Attitudes Towards Animal Farming and Animal-Free Food. *Sentience Institute*. <https://www.sentienceinstitute.org/animal-farming-attitudessurvey-2017>
- Arcari, P. (2017). Normalised, human-centric discourses of meat and animals in climate change, sustainability and food security literature. *Agriculture and Human Values*, 34(1), 69–86. <https://doi.org/10.1007/s10460-016-9697-0>
- Aronson, E. (1992). The Return of the Repressed: Dissonance Theory Makes a Comeback. *Psychological Inquiry*, 3(4), 303–311. https://doi.org/10.1207/s15327965pli0304_1
- Autio, M., Sekki, S., Autio, J., Peltonen, K., & Niva, M. (2023). Towards de-dairyfication of the diet? Consumers downshifting milk, yet justifying their dairy pleasures. *Frontiers in Sustainability*, 4(1), 975679. <https://doi.org/10.3389/frsus.2023.975679>
- Azevedo, F., Jost, J. T., & Rothmund, T. (2017). “Making America great again”: System justification in the US presidential election of 2016. *Translational Issues in Psychological Science*, 3(3), 231. <https://doi.org/10.1037/tps0000122>
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173. <https://doi.org/10.1037/0022-3514.51.6.1173>
- Bishara, A. J., & Hittner, J. B. (2012). Testing the significance of a correlation with nonnormal data: Comparison of Pearson, Spearman, transformation, and resampling approaches. *Psychological Methods*, 17(3), 399. <https://doi.org/10.1037/a0028087>
- Braithwaite, J., & Braithwaite, V. (1982). Attitudes toward animal suffering: An exploratory study. *International Journal for the Study of Animal Problems*, 3(1), 42–49. <http://hdl.handle.net/10822/792995>
- Brandt, M., & Reyna, C. (2012). Social Dominance or System Justification?—The Acceptance of Inequality and Resistance to Social Change as Unique System-Relevant Motivations. *SSRN*. <http://dx.doi.org/10.2139/ssrn.2165690>
- Bratanova, B., Loughnan, S., & Bastian, B. (2011). The effect of categorization as food on the perceived moral standing of animals. *Appetite*, 57(1), 193–196. <https://doi.org/10.1016/j.appet.2011.04.020>
- Browne, M. W. (1984). Asymptotically distribution-free methods for the analysis of covariance structures. *British Journal of Mathematical and Statistical Psychology*,

- 37(1), 62–83. <https://doi.org/10.1111/j.2044-8317.1984.tb00789.x>
- Bryant, C. J. (2019). We Can't Keep Meating Like This: Attitudes towards Vegetarian and Vegan diets in the United Kingdom. *Sustainability*, *11*(23), 6844. <https://doi.org/10.3390/su11236844>
- Bryant, C. J. (2022). Plant-based animal product alternatives are healthier and more environmentally sustainable than animal products. *Future Foods*, *6*(1), 100174. <https://doi.org/10.1016/j.fufo.2022.100174>
- Buchanan, E. M., & Scofield, J. E. (2018). Methods to detect low quality data and its implication for psychological research. *Behavior Research Methods*, *50*(1), 2586–2596. <https://doi.org/10.3758/s13428-018-1035-6>
- Carifio, J., & Perla, R. (2008). Resolving the 50-year debate around using and misusing Likert scales. *Medical Education*, *42*(12), 1150–1152. doi: 10.1111/j.1365-2923.2008.03172.x.
- Carifio, J., & Perla, R. J. (2007). Ten Common Misunderstandings, Misconceptions, Persistent Myths and Urban Legends about Likert Scales and Likert Response Formats and their Antidotes. *Journal of Social Sciences*, *3*(3), 106–116. doi: 10.3844/jssp.2007.106.116
- Cornish, A., Raubenheimer, D., & McGreevy, P. (2016). What We Know about the Public's Level of Concern for Farm Animal Welfare in Food Production in Developed Countries. *Animals*, *6*(11), 74. <https://doi.org/10.3390/ani6110074>
- Costello, K. (2013). Determinants and Consequences of Dehumanization: An Interspecies Model of Prejudice. *Brock University*. <http://hdl.handle.net/10464/4180>
- Cutright, K. M., Wu, E. C., Banfield, J. C., Kay, A. C., & Fitzsimons, G. J. (2011). When Your World Must Be Defended: Choosing Products to Justify the System. *Journal of Consumer Research*, *38*(1), 62–77. <https://doi.org/10.1086/658469>
- Dhont, K., & Hodson, G. (2014a). Why do right-wing adherents engage in more animal exploitation and meat consumption? *Personality and Individual Differences*, *64*(1), 12–17. <https://doi.org/10.1016/j.paid.2014.02.002>
- Dhont, K., Hodson, G., Costello, K., & MacInnis, C. C. (2014b). Social dominance orientation connects prejudicial human–human and human–animal relations. *Personality and Individual Differences*, *61*(1), 105–108. <https://doi.org/10.1016/j.paid.2013.12.020>
- Eckhardt, G. M., Belk, R., & Devinney, T. M. (2010). Why don't consumers consume ethically? *Journal of Consumer Behaviour*, *9*(6), 426–436. <https://doi.org/10.1002/cb.332>
- Eide, E. R., & Showalter, M. H. (2012). Methods matter: Improving causal inference in

- educational and social science research: A review article. *Economics of Education Review*, 31(5), 744–748. <https://doi.org/10.1016/j.econedurev.2012.05.010>
- Faber, J., & Fonseca, L. M. (2014). How sample size influences research outcomes. *Dental Press Journal of Orthodontics*, 19(4), 27–29. <https://doi.org/10.1590/2176-9451.19.4.027-029.ebo>
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G* Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175–191. <https://doi.org/10.3758/BF03193146>
- Festinger, L. (1957). *A theory of cognitive dissonance* (Ed. 2). Stanford University Press.
- Feygina, I., Jost, J. T., & Goldsmith, R. E. (2010). System Justification, the Denial of Global Warming, and the Possibility of “System-Sanctioned Change”. *Personality and Social Psychology Bulletin*, 36(3), 326–338. <https://doi.org/10.1177/0146167209351435>
- Fischer, R., Hanke, K., & Sibley, C. G. (2012). Cultural and institutional determinants of social dominance orientation: A cross-cultural meta-analysis of 27 societies. *Political Psychology*, 33(4), 437–467. <https://doi.org/10.1111/j.1467-9221.2012.00884.x>
- Florence, E. S., Fleischman, D., Mulcahy, R., & Wynder, M. (2022). Message framing effects on sustainable consumer behaviour: A systematic review and future research directions for social marketing. *Journal of Social Marketing*, 12(4), 623–652. <https://doi.org/10.1108/JSOCM-09-2021-0221>
- Fonseca, R. P., & Sanchez-Sabate, R. (2022). Consumers’ Attitudes towards Animal Suffering: A Systematic Review on Awareness, Willingness and Dietary Change. *International Journal of Environmental Research and Public Health*, 19(23), 16372. <https://doi.org/10.3390/ijerph192316372>
- Font-i-Furnols, M., & Guerrero, L. (2014). Consumer preference, behavior and perception about meat and meat products: An overview. *Meat Science*, 98(3), 361–371. <https://doi.org/10.1016/j.meatsci.2014.06.025>
- Gallagher, K. M., & Updegraff, J. A. (2012). Health Message Framing Effects on Attitudes, Intentions, and Behavior: A Meta-Analytic Review. *Annals of behavioral medicine*, 43(1), 101–116. <https://doi.org/10.1007/s12160-012-9446-6>
- Gaucher, D., Friesen, J. P., Neufeld, K. H., & Esses, V. M. (2018). Changes in the positivity of migrant stereotype content: How system-sanctioned pro-migrant ideology can affect public opinions of migrants. *Social Psychological and Personality Science*, 9(2), 223–233. <https://doi.org/10.1177/1948550617746463>
- Godfray, H. C. J., Aveyard, P., Garnett, T., Hall, J. W., Key, T. J., Lorimer, J., Pierrehumbert,

- R. T., Scarborough, P., Springmann, M., & Jebb, S. A. (2018). Meat consumption, health, and the environment. *Science*, *361*(6399), eaam5324.
doi: 10.1126/science.aam5324
- Graça, J., Calheiros, M. M., & Oliveira, A. (2014). Moral Disengagement in Harmful but Cherished Food Practices? An Exploration into the Case of Meat. *Journal of Agricultural and Environmental Ethics*, *27*(1), 749–765.
<https://doi.org/10.1007/s10806-014-9488-9>
- Graça, J., Oliveira, A., & Calheiros, M. M. (2015). Meat, beyond the plate. Data-driven hypotheses for understanding consumer willingness to adopt a more plant-based diet. *Appetite*, *90*(1), 80–90. <https://doi.org/10.1016/j.appet.2015.02.037>
- Grunert, K. G. (2006). Future trends and consumer lifestyles with regard to meat consumption. *Meat Science*, *74*(1), 149–160.
<https://doi.org/10.1016/j.meatsci.2006.04.016>
- Guenther, P. M., Jensen, H. H., Batres-Marquez, S. P., & Chen, C.-F. (2005). Sociodemographic, Knowledge, and Attitudinal Factors Related to Meat Consumption in the United States. *Journal of the American Dietetic Association*, *105*(8), 1266–1274.
<https://doi.org/10.1016/j.jada.2005.05.014>
- Hair, J. F., Hult, G. T. M., Ringle, C. M., Sarstedt, M., Danks, N. P., & Ray, S. (2021). Moderation Analysis. In J. F. Hair Jr., G. T. M. Hult, C. M. Ringle, M. Sarstedt, N. P. Danks, & S. Ray (Eds.), *Partial Least Squares Structural Equation Modeling (PLS-SEM) Using R: A Workbook* (pp. 155–172). Springer International Publishing.
https://doi.org/10.1007/978-3-030-80519-7_8
- Harpe, S. E. (2015). How to analyze Likert and other rating scale data. *Currents in pharmacy teaching and learning*, *7*(6), 836-850. <https://doi.org/10.1016/j.cptl.2015.08.001>
- Harper, G., & Henson, S. (2001). Consumer concerns about animal welfare and the impact on food choice. *EU FAIR CT98-3678, Centre for Food Economics Research, The University of Reading*.
- Hartmann, C., & Siegrist, M. (2017). Consumer perception and behaviour regarding sustainable protein consumption: A systematic review. *Trends in Food Science & Technology*, *61*(1), 11–25. <https://doi.org/10.1016/j.tifs.2016.12.006>
- Hartmann, C., & Siegrist, M. (2020). Our daily meat: Justification, moral evaluation and willingness to substitute. *Food Quality and Preference*, *80*(1), 103799.
<https://doi.org/10.1016/j.foodqual.2019.103799>
- Hennes, E. P., Nam, H. H., Stern, C., & Jost, J. T. (2012). Not All Ideologies are Created Equal:

- Epistemic, Existential, and Relational Needs Predict System-Justifying Attitudes. *Social Cognition*, 30(6), 669–688. <https://doi.org/10.1521/soco.2012.30.6.669>
- Ho, A. K., Sidanius, J., Kteily, N., Sheehy-Skeffington, J., Pratto, F., Henkel, K. E., Foels, R., & Stewart, A. L. (2015). The nature of social dominance orientation: Theorizing and measuring preferences for intergroup inequality using the new SDO₇ scale. *Journal of Personality and Social Psychology*, 109(6), 1003. <https://doi.org/10.1037/pspi0000033>
- Hoffarth, M. R., Azevedo, F., & Jost, J. T. (2019). Political conservatism and the exploitation of nonhuman animals: An application of system justification theory. *Group Processes & Intergroup Relations*, 22(6), 858–878. <https://doi.org/10.1177/1368430219843183>
- Holm, L., & Møhl, M. (2000). The role of meat in everyday food culture: An analysis of an interview study in Copenhagen. *Appetite*, 34(3), 277–283. <https://doi.org/10.1006/appe.2000.0324>
- Hyers, L. L. (2006). Myths used to legitimize the exploitation of animals: An application of Social Dominance Theory. *Anthrozoös*, 19(3), 194–210. <https://doi.org/10.2752/089279306785415538>
- Jacob, C. (1988). *Statistical power analysis for the behavioral sciences*. Academic Press Inc. (London) Ltd.
- Jamieson, S. (2004). Likert scales: How to (ab) use them? *Medical education*, 38(12), 1217–1218. <https://doi.org/10.1111/j.1365-2929.2004.02012.x>
- Jo, B. (2008). Causal inference in randomized experiments with mediational processes. *Psychological Methods*, 13(4), 314. <https://doi.org/10.1037/a0014207>
- Jost, J., & Hunyady, O. (2003). The psychology of system justification and the palliative function of ideology. *European Review of Social Psychology*, 13(1), 111–153. <https://doi.org/10.1080/10463280240000046>
- Jost, J. T. (2019). A quarter century of system justification theory: Questions, answers, criticisms, and societal applications. *British Journal of Social Psychology*, 58(2), 263–314. <https://doi.org/10.1111/bjso.12297>
- Jost, J. T., & Banaji, M. R. (1994). The role of stereotyping in system-justification and the production of false consciousness. *British Journal of Social Psychology*, 33(1), 1–27. <https://doi.org/10.1111/j.2044-8309.1994.tb01008.x>
- Jost, J. T., Banaji, M. R., & Nosek, B. A. (2004). A Decade of System Justification Theory: Accumulated Evidence of Conscious and Unconscious Bolstering of the Status Quo. *Political Psychology*, 25(6), 881–919. <https://doi.org/10.1111/j.14679221.2004.00402.x>

- Jost, J. T., & Kay, A. C. (2005). Exposure to Benevolent Sexism and Complementary Gender Stereotypes: Consequences for Specific and Diffuse Forms of System Justification. *Journal of Personality and Social Psychology*, 88(3), 498–509. <https://doi.org/10.1037/0022-3514.88.3.498>
- Jost, J. T., & Thompson, E. P. (2000). Group-Based Dominance and Opposition to Equality as Independent Predictors of Self-Esteem, Ethnocentrism, and Social Policy Attitudes among African Americans and European Americans. *Journal of Experimental Social Psychology*, 36(3), 209–232. <https://doi.org/10.1006/jesp.1999.1403>
- Jylhä, K. M., & Akrami, N. (2015). Social dominance orientation and climate change denial: The role of dominance and system justification. *Personality and Individual Differences*, 86(1), 108–111. <https://doi.org/10.1016/j.paid.2015.05.041>
- Kay, A. C., & Friesen, J. (2011). On Social Stability and Social Change: Understanding When System Justification Does and Does Not Occur. *Current Directions in Psychological Science*, 20(6), 360–364. <https://doi.org/10.1177/0963721411422059>
- Kay, A. C., Jimenez, M. C., & Jost, J. T. (2002). Sour Grapes, Sweet Lemons, and the Anticipatory Rationalization of the Status Quo. *Personality and Social Psychology Bulletin*, 28(9), 1300–1312. <https://doi.org/10.1177/01461672022812014>
- Kay, A. C., & Jost, J. T. (2003). Complementary Justice: Effects of "Poor but Happy" and "Poor but Honest" Stereotype Exemplars on System Justification and Implicit Activation of the Justice Motive. *Journal of Personality and Social Psychology*, 85(5), 823–837. <https://doi.org/10.1037/0022-3514.85.5.823>
- Kay, A. C., & Zanna, M. P. (2009). A contextual analysis of the system justification motive and its societal consequences. In T. Jost, A.C. Kay, & H. Thorisdottir (Eds.), *Social and psychological bases of ideology and system justification* (pp. 158–181). Oxford University Press.
- Kroh, M. (2007). Measuring Left–Right Political Orientation: The Choice of Response Format. *Public Opinion Quarterly*, 71(2), 204–220. <https://doi.org/10.1093/poq/nfm009>
- Kunst, J. R. (2019). Dissociating meat from its animal origins: A systematic literature review. *Appetite*, 147(1), 104554. <https://doi.org/10.1016/j.appet.2019.104554>
- Kunst, J. R., Fischer, R., Sidanius, J., & Thomsen, L. (2017). Preferences for group dominance track and mediate the effects of macro-level social inequality and violence across societies. *Proceedings of the National Academy of Sciences*, 114(21), 5407–5412. <https://doi.org/10.1073/pnas.1616572114>
- Kupsala, S., Vinnari, M., Jokinen, P., & Räsänen, P. (2015). Citizen Attitudes to Farm Animals

- in Finland: A Population-Based study. *Journal of Agricultural and Environmental Ethics*, 28(1), 601–620. <https://doi.org/10.1007/s10806-015-9545-z>
- Laurin, K. (2018). Inaugurating Rationalization: Three Field Studies Find Increased Rationalization When Anticipated Realities Become Current. *Psychological Science*, 29(4), 483–495. <https://doi.org/10.1177/095679761773881>
- Lin-Schilstra, L., & Fischer, A. R. (2022). Paradoxical consumers in four European countries: Meat-eating justification and willingness to pay for meat from animals treated by alternatives to surgical castration. *Meat Science*, 188(1), 108777. <https://doi.org/10.1016/j.meatsci.2022.108777>
- Loughnan, S., Bastian, B., & Haslam, N. (2014). The Psychology of Eating Animals. *Current Directions in Psychological Science*, 23(2), 104–108. <https://doi.org/10.1177/0963721414525781>
- Lumley, T., Diehr, P., Emerson, S., & Chen, L. (2002). The Importance of the Normality Assumption in Large Public Health Data Sets. *Annual Review of Public Health*, 23(1), 151–169. <https://doi.org/10.1146/annurev.publhealth.23.100901.140546>
- MacInnis, C. C., & Hodson, G. (2017a). It ain't easy eating greens: Evidence of bias toward vegetarians and vegans from both source and target. *Group Processes & Intergroup Relations*, 20(6), 721–744. <https://doi.org/10.1177/1368430215618253>
- Maier, M., & Lakens, D. (2022). Justify Your Alpha: A Primer on Two Practical Approaches. *Advances in Methods and Practices in Psychological Science*, 5(2). <https://doi.org/10.1177/251524592210803>
- Martin, D., Seppala, E., Heineberg, Y., Rossomando, T., Doty, J., Zimbardo, P., Shiue, T.-T., Berger, R., & Zhou, Y. (2015). Multiple Facets of Compassion: The Impact of Social Dominance Orientation and Economic Systems Justification. *Journal of Business Ethics*, 129(1), 237–249. <https://doi.org/10.1007/s10551-014-2157-0>
- McDermott, R. (2002). Experimental Methods in Political Science. *Annual Review of Political Science*, 5(1), 31–61. <https://doi.org/10.1146/annurev.polisci.5.091001.170657>
- Miller, P., Henry, D., & Votruba-Drzal, E. (2016). Strengthening Causal Inference in Developmental Research. *Child Development Perspectives*, 10(4), 275–280. <https://doi.org/10.1111/cdep.12202>
- Mitchell, L. (2013). Farming: Animals or machines? *Southern African Linguistics and Applied Language Studies*, 31(3), 299–309. <https://doi.org/10.2989/16073614.2013.837606>
- Morton, R. B., & Williams, K. C. (2010). *Experimental political science and the study of*

- causality: From nature to the lab*. Cambridge University Press.
- Napier, J. L., & Jost, J. T. (2008). Why Are Conservatives Happier Than Liberals? *Psychological Science*, *19*(6), 565–572.
<https://doi.org/10.1111/j.1467-9280.2008.02124.x>
- Napier, J. L., Thorisdottir, H., & Jost, J. T. (2010). The Joy of Sexism? A Multinational Investigation of Hostile and Benevolent Justifications for Gender Inequality and Their Relations to Subjective Well-Being. *Sex Roles*, *62*(1), 405–419.
<https://doi.org/10.1007/s11199-009-9712-7>
- Neff, R. A., Edwards, D., Palmer, A., Ramsing, R., Righter, A., & Wolfson, J. (2018). Reducing meat consumption in the USA: a nationally representative survey of attitudes and behaviours. *Public Health Nutrition*, *21*(10), 1835–1844.
 doi:10.1017/S1368980017004190
- Nezlek, J. B., & Forestell, C. A. (2020). Vegetarianism as a social identity. *Current Opinion in Food Science*, *33*(1), 45–51. <https://doi.org/10.1016/j.cofs.2019.12.005>
- Nguyen, A., & Platow, M. J. (2021). “I’ll eat meat because that’s what we do”: The role of national norms and national social identification on meat eating. *Appetite*, *164*(1), 105287. <https://doi.org/10.1016/j.appet.2021.105287>
- Osborne, D., Sengupta, N. K., & Sibley, C. G. (2019). System justification theory at 25: Evaluating a paradigm shift in psychology and looking towards the future. *British Journal of Social Psychology*, *58*(2), 340–361. <https://doi.org/10.1111/bjso.12302>
- Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology*, *70*(1), 153–163. <https://doi.org/10.1016/j.jesp.2017.01.006>
- Pendergrast, N. (2016). Environmental concerns and the mainstreaming of veganism. In T. Raphaely, & D. Marinova (Eds.), *Impact of meat consumption on health and environmental sustainability* (pp. 106–122). IGI Global.
 doi: 10.4018/978-1-4666-9553-5.ch006
- Piazza, J., Cooper, L., & Slater-Johnson, S. (2020). Rationalizing the many uses of animals: Application of the 4N justifications beyond meat. *Human-Animal Interaction Bulletin. CABI International*. <https://doi.org/10.1079/hai.2020.0004>
- Piazza, J., & Loughnan, S. (2016). When Meat Gets Personal, Animals’ Minds Matter Less: Motivated Use of Intelligence Information in Judgments of Moral Standing. *Social Psychological and Personality Science*, *7*(8), 867–874.
<https://doi.org/10.1177/194855061666015>

- Piazza, J., Ruby, M. B., Loughnan, S., Luong, M., Kulik, J., Watkins, H. M., & Seigerman, M. (2015). Rationalizing meat consumption. The 4Ns. *Appetite*, *91*(1), 114–128. <https://doi.org/10.1016/j.appet.2015.04.011>
- Pratto, F., Sidanius, J., Stallworth, L. M., & Malle, B. F. (1994). Social dominance orientation: A personality variable predicting social and political attitudes. *Journal of Personality and Social Psychology*, *67*(4), 741–763. <https://doi.org/10.1037/0022-3514.67.4.741>
- Rees, J. H., Bamberg, S., Jäger, A., Victor, L., Bergmeyer, M., & Friese, M. (2018). Breaking the Habit: On the Highly Habitualized Nature of Meat Consumption and Implementation Intentions as One Effective Way of Reducing it. *Basic and Applied Social Psychology*, *40*(3), 136–147. <https://doi.org/10.1080/01973533.2018.1449111>
- Reips, U.-D. (2000). The Web experiment method: Advantages, disadvantages, and solutions. In M. H. Birnbaum (Eds.), *Psychological experiments on the Internet* (pp. 89–117). Elsevier. <https://doi.org/10.1016/B978-012099980-4/50005-8>
- Reisch, L. A., & Sunstein, C. R. (2021). Plant-Based by Default. *One Earth*, *4*(9), 1205–1208. <https://doi.org/10.1016/j.oneear.2021.08.007>
- Rochlitz, I., & Broom, D. (2017). The welfare of ducks during foie gras production. *Animal Welfare*, *26*(2), 135–149. doi:10.7120/09627286.26.2.135
- Rothgerber, H. (2020). Meat-related cognitive dissonance: A conceptual framework for understanding how meat eaters reduce negative arousal from eating animals. *Appetite*, *146*(1), 104511. <https://doi.org/10.1016/j.appet.2019.104511>
- Rothschild, Z. K., & Keefer, L. A. (2017). A cleansing fire: Moral outrage alleviates guilt and buffers threats to one’s moral identity. *Motivation and Emotion*, *41*(2), 209–229. <https://doi.org/10.1007/s11031-017-9601-2>
- Salmen, A., & Dhont, K. (2023). Animalizing women and feminizing (vegan) men: The psychological intersections of sexism, speciesism, meat, and masculinity. *Social and Personality Psychology Compass*, *17*(2), e12717. <https://doi.org/10.1111/spc3.12717>
- Sanders, B. (2018). Global animal slaughter statistics and charts. *Faunalytics*. [https:// faunalytics.org/global-animal-slaughter-statistics-and-charts/](https://faunalytics.org/global-animal-slaughter-statistics-and-charts/)
- Shapiro, S. S., & Wilk, M. B. (1965). An Analysis of Variance Test for Normality (Complete Samples). *Biometrika*, *52*(3/4), 591–611. <https://doi.org/10.2307/2333709>
- Sheeran, P., & Webb, T. L. (2016). The Intention–Behavior Gap. *Social and Personality Psychology Compass*, *10*(9), 503–518. <https://doi.org/10.1111/spc3.12265>
- Sidanius, J., Cotterill, S., Sheehy-Skeffington, J., Kteily, N., & Carvacho, H. (2017). Social

- dominance theory: Explorations in the psychology of oppression. In J. Sidanius, S. Cotterill, J. Sheehy-Skeffington, N. Kteily, & H. Carvacho (Eds.), *The Cambridge Handbook of the Psychology of Prejudice* (pp. 149–187). Cambridge University Press.
- Stanley, S. K. (2022). Ideological bases of attitudes towards meat abstention: Vegetarianism as a threat to the cultural and economic status quo. *Group Processes & Intergroup Relations*, 25(6), 1534–1554. <https://doi.org/10.1177/13684302211020356>
- Sumner, C. L., von Keyserlingk, M. A., & Weary, D. M. (2018). Perspectives of farmers and veterinarians concerning dairy cattle welfare. *Animal Frontiers*, 8(1), 8–13. <https://doi.org/10.1093/af/vfx006>
- Te Velde, H., Aarts, N., & Van Woerkum, C. (2002). Dealing with Ambivalence: Farmers' and Consumers' Perceptions of Animal Welfare in Livestock Breeding. *Journal of Agricultural and Environmental Ethics*, 15(2), 203–219. <https://doi.org/10.1023/A:1015012403331>
- Timm, S. C. (2016). Moral Intuition or Moral Disengagement? Cognitive Science Weighs in on the Animal Ethics Debate. *Neuroethics*, 9(3), 225–234. <https://doi.org/10.1007/s12152-016-9271-x>
- Trauzettel-Klosinski, S., Dietz, K., & IReST Study Group. (2012). Standardized Assessment of Reading Performance: The New International Reading Speed Texts IReST. *Investigative Ophthalmology & Visual Science*, 53(9), 5452–5461. <https://doi.org/10.1167/iovs.11-8284>
- Uenal, F., Sidanius, J., & van der Linden, S. (2022). Social and ecological dominance orientations: Two sides of the same coin? Social and ecological dominance orientations predict decreased support for climate change mitigation policies. *Group Processes & Intergroup Relations*, 25(6), 1555–1576. <https://doi.org/10.1177/1368430221101092>
- Van der Toorn, J., & Jost, J. T. (2014). Twenty years of system justification theory: Introduction to the special issue on “Ideology and system justification processes”. *Group Processes & Intergroup Relations*, 17(4), 413–419. <https://doi.org/10.1177/136843021453150>
- Veser, P., Taylor, K., & Singer, S. (2015). Diet, authoritarianism, social dominance orientation, and predisposition to prejudice: Results of a German survey. *British Food Journal*, 117(7), 1949–1960. <https://doi.org/10.1108/BFJ-12-2014-0409>
- Wakslak, C. J., Jost, J. T., Tyler, T. R., & Chen, E. S. (2007). Moral Outrage Mediates the Dampening Effect of System Justification on Support for Redistributive Social Policies.

Psychological Science, 18(3), 267–274.

<https://doi.org/10.1111/j.1467-9280.2007.01887>

Wilson, M. S., & Sibley, C. G. (2013). Social Dominance Orientation and Right-Wing Authoritarianism: Additive and Interactive Effects on Political Conservatism. *Political Psychology*, 34(2), 277–284. <https://doi.org/10.1111/j.1467-9221.2012.00929.x>

Yunes, M. C., Von Keyserlingk, M. A., & Hötzel, M. J. (2017). Brazilian Citizens' Opinions and Attitudes about Farm Animal Production Systems. *Animals*, 7(10), 75.

<https://doi.org/10.3390/ani7100075>

Appendix A: Statistical Analysis Equation Models

To test Hypothesis 1, a linear regression was run with and without covariates:

$$\text{Justification}_i = \beta_0 + \beta_1 \text{ESJ}_i (+\beta_2 \text{Controls}_i) + \varepsilon_i$$

To test Hypotheses 2 and 3, two mediation analyses were conducted using structural equation modelling (SEM):

- *X* is significantly related to *Y* (path c)

$$\text{Justification}_i = \beta_0 + \beta_1 \text{SDO}_i (+\beta_2 \text{Controls}_i) + \varepsilon_i$$

$$\text{Justification}_i = \beta_0 + \beta_1 \text{EDO}_i (+\beta_2 \text{Controls}_i) + \varepsilon_i$$

- *X* is significantly related to *M* (path a)

$$\text{ESJ}_i = \beta_0 + \beta_3 \text{SDO}_i + \varepsilon_i$$

$$\text{ESJ}_i = \beta_0 + \beta_3 \text{EDO}_i + \varepsilon_i$$

- *M* is significantly related to *Y*, controlling for *X* (path b)

$$\text{Justification}_i = \beta_0 + \beta_4 \text{ESJ}_i + \beta_5 \text{SDO}_i (+\beta_6 \text{Controls}_i) + \varepsilon_i$$

$$\text{Justification}_i = \beta_0 + \beta_4 \text{ESJ}_i + \beta_5 \text{EDO}_i (+\beta_6 \text{Controls}_i) + \varepsilon_i$$

To test Hypotheses 4, two multiple and one logistic regression were calculated:

$$\text{Intention to reduce}_i = b_0 + b_1 \text{Condition}_i + b_2 \text{ESJ}_i + b_3 \text{Condition} * \text{ESJ}_i + \varepsilon_i$$

$$\text{Support for policies}_i = b_0 + b_1 \text{Condition}_i + b_2 \text{ESJ}_i + b_3 \text{Condition} * \text{ESJ}_i + \varepsilon_i$$

$$\text{Probability (donation intention} = 1) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 \text{Condition}_i + \beta_2 \text{ESJ}_i + \beta_3 \text{Condition} * \text{ESJ}_i + \varepsilon_i)}}$$

Appendix B: Descriptive Statistics and Balance Tests

Table 1

Demographic Characteristics of Sample and Balance Tests

Baseline characteristics	Mean (SD)/ Obs. (%)			Balance Checks	
	Full Sample (<i>N</i> = 355)	System- Preserving (<i>N</i> = 176)	Control (<i>N</i> = 179)	Results	<i>p</i> -value
Age	43.24 (13.94)	43.42 (14.37)	43.05 (13.53)	$t(353) = .26$	$p = .80$
Gender				$X^2(2) = 1.90,$	$p = .39$
Female	178 (50.1%)	84 (46.9 %)	92 (54.3 %)		
Male	176 (49.6%)	94 (52.5 %)	84 (47.7 %)		
Non-Binary	1 (0.3%)	-	1 (0.6 %)		
Income				$X^2(8) = 7.02$	$p = .53$
Less than £13,000	24 (6.8%)	10 (5.6 %)	14 (8.0 %)		
£13,000 to less than £19,000	32 (9.0%)	16 (8.9 %)	16 (9.1 %)		
£19,000 to less than £26,000	36 (10.1%)	15 (8.4 %)	21 (11.9 %)		
£26,000 to less than £32,000	42 (11.8%)	22 (12.3 %)	20 (11.4 %)		
£32,000 to less than £48,000	82 (23.1%)	46 (25.7%)	36 (20.5 %)		
£48,000 to less than £64,000	67 (18.9%)	33 (18.4 %)	34 (19.3 %)		
£64,000 to less than £96,000	50 (14.1%)	22 (12.3 %)	28 (15.9 %)		
More than £96,000	21 (5.92%)	14 (7.8 %)	7 (4.0 %)		
Education Level				$X^2(5) = 8.89$	$p = .11$
No formal qualifications	0	0	0		
Secondary school	83 (23.38%)	36 (20.1 %)	47 (26.7 %)		
Technical qualification	70 (19.72%)	38 (21.2 %)	32 (18.2 %)		
Undergraduate degree	145 (40.85%)	82 (45.8 %)	63 (35.8 %)		
Master's degree	42 (11.83%)	16 (8.9 %)	26 (14.8 %)		
Doctorate degree	13 (3.7%)	7 (3.9 %)	6 (3.4 %)		
Political Orientation	4.37 (2.06)	4.53 (2.13)	4.21 (1.98)	$t(353) = 1.47$	$p = .14$

Note. There was one missing value for income and two missing values for education. X^2 -test and t-test were used to test for differences between the two groups.

Appendix C: Robustness Analysis Results

Table 1 – Hypothesis 1: Multiple regression analysis including covariates

Table 1

Regression analysis results including covariates. Dependent variable: 4N scale

	β	SE	t	p	95% CI	
					LL	UL
Constant	4.06	.35	11.74	.000	3.38	4.74
ESJ	.30	.06	5.18	.000	.18	.41
Age	– .02	.004	– 4.09	.000	– .03	– .01
Gender						
male			base			
female	– .34	.11	– 2.98	.003	– 0.57	– .12
binary	.06	1.07	.06	.95	– 2.04	2.17
Income						
less than £13,000			base			
£13,000 to less than £19,000	.09	.29	.32	.752	– .48	.66
£19,000 to less than £26,000	.26	.28	.91	.362	– .30	.81
£26,000 to less than £32,000	– .26	.27	– .96	.339	– .80	.28
£32,000 to less than £48,000	– .14	.25	– .54	.587	– .63	.35
£48,000 to less than £64,000	– .44	.26	– 1.73	.084	– .94	.06
£64,000 to less than £96,000	– .37	.27	– 1.37	.17	– .90	.16
More than £96,000	– .21	.33	– .64	.52	– .86	.43
Education						
No formal qualifications			no data			
Secondary school			base			
Technical qualification	.16	.18	.92	.361	– .18	.51
Undergraduate degree	.11	.15	.71	.481	– .19	.41
Master's degree	– .03	.20	–.15	.880	– .43	.37
Doctorate degree	.13	.32	.40	.690	– .51	.77
Political Orientation	.07	.03	1.99	.05	.00	.13

Note. Obs. = 348, $F(18, 329) = 5.02$, $p < .001$, $R^2 = .17$. β = regression coefficient, SE = standard errors of the coefficient, t = t-statistic, p = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower

limit, UL = upper limit. The regression coefficient for ESJ was significantly different from zero, confirming the robustness of the results.

Table 2 – Hypothesis 2: Structural equation modeling including covariates

Table 2

Mediation model results including covariates

	β	SE	z	p	95% CI	
					LL	UL
a path	.73	.03	21.82	.000	.66	.79
b path	.30	.08	3.97	.000	.15	.45
c' path	-.01	.08	-.16	.876	-.17	.14
c path	.21	.07	3.06	.002	.07	.34
a * b path	.22	.06	.06	.000	.11	.33

Note. Obs. = 355. β = regression coefficient, SE = standard errors of the coefficient, z = z-statistic, p = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower limit, UL = upper limit. Sobel test was used for estimating the significance of the indirect effect. Path a, b, and c remained significant and path c' remained insignificant. Furthermore, the indirect effect results showed that the mediation effect was significant, confirming the robustness of the results.

Table 3 – Hypothesis 3: Structural equation modeling including covariates

Table 3

Mediation model results including covariates

	β	SE	z	p	95% CI	
					LL	UL
a path	.11	.03	3.77	.000	.05	.16
b path	.31	.08	3.80	.000	.15	.48
c' path	.13	.03	4.16	.000	.07	.20
c path	.17	.03	5.39	.000	.11	.23
a * b path	.03	.01	2.65	.008	.01	.06

Note. Obs. = 355. β = regression coefficient, SE = standard errors of the coefficient, z = z-statistic, p = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower limit, UL = upper limit. Sobel test was used for estimating the significance of the indirect effect. The effect was robust to adjusting for covariates: path a, b, c, and c' remained significant. In addition, the indirect effect was significant.

Table 4.1 – 4.3 – Hypothesis 4: Excluding those participants who spent < 64.58 seconds on reading the article

Table 4.1

Multiple regression analysis results. Dependent variable: Intention to reduce consumption

	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
	(robust)				LL	UL
cons	2.27	.13	17.70	.000	2.02	2.53
condition	– .33	.15	– 2.29	.023	– .61	– .05
ESJ	– .32	.10	– 3.19	.002	– .53	.12
condition*ESJ	.17	.12	1.45	.149	– .06	– .40

Note. Obs. = 230, $F(3, 226) = 6.04$, $p < .001$, $R^2 = .08$. β = regression coefficient, *SE* = standard errors of the coefficient, *t* = t-statistic, *p* = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower limit, UL = upper limit. Analysis included only those participants who spent more than 65.58 seconds reading the article. The interaction term could not be identified as a significant predictor of the intention to reduce consumption of animal products, confirming the robustness of the results.

Table 4.2

Multiple regression analysis results. Dependent variable: Support for policies.

	β	<i>SE</i>	<i>t</i>	<i>p</i>	95% CI	
	(robust)				LL	UL
cons	5.01	.21	23.59	.000	4.59	5.43
condition	– .28	.24	– 1.15	.253	– .76	.20
ESJ	– .44	.16	– 2.82	.005	– .76	.13
condition*ESJ	.05	.19	.25	.806	– .32	– .42

Note. Obs. = 230, $F(3, 226) = 7.70$, $p < .000$, $R^2 = .08$. β = regression coefficient, *SE* = standard errors of the coefficient, *t* = t-statistic, *p* = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower limit, UL = upper limit. Analysis included only those participants who spend more than 65.58 seconds reading the article. The interaction term could not be identified as a significant predictor of the support for policies proposing a plant-based dietary shift, confirming the robustness of the results.

Table 4.3*Logistic regression analysis results. Dependent variable: Willingness to donate*

	β	<i>SE</i>	<i>z</i>	<i>p</i>	95% CI	
					LL	UL
		(robust)				
cons	-.73	.29	-2.54	.011	-1.30	-.17
condition	-.34	.34	-1.00	.317	-1.00	.32
ESJ	-.04	.27	-.15	.881	-.58	.50
condition*ESJ	-.06	.32	-.22	.828	-.70	-.56

Note. Obs. = 230, $X^2 = 1.34$, $p = 0.719$, $R^2 = .00$. β = regression coefficient, *SE* = standard errors of the coefficient, *z* = z-statistic, *p* = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower limit, UL = upper limit. Analysis included only those participants who spend more than 65.58 seconds reading the article. The interaction term could not be identified as a significant predictor of the support for the willingness to donate, confirming the robustness of the results.

Table 5 – Hypothesis 4: Probit regression analysis**Table 5***Probit regression analysis results. Dependent variable: Willingness to donate*

	β	<i>SE</i>	<i>z</i>	<i>p</i>	95% CI	
					LL	UL
		(robust)				
cons	-.66	.10	-6.42	.000	-.86	-.46
condition	.00	.15	0.02	.99	-.29	.29
ESJ	-.14	.09	-1.52	.13	-.32	.04
condition*ESJ	-.66	.10	-6.42	.573	-.86	-.46

Note. Obs. = 348, $X^2 = 2.74$, $p = 0.434$, $R^2 = .00$. β = regression coefficient, *SE* = standard errors of the coefficient, *z* = z-statistic, *p* = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower limit, UL = upper limit. The regression model was not statistically significant. Furthermore, no significant interaction effect between the treatment condition and the ESJ could be found, validating the results of the logistic regression model.

Appendix D: Further Exploratory Analysis

To get a more differentiated understanding of how ESJ relates to the justification of animal product consumption, I performed a further statistical analysis that was not included in the pre-registration plan for this study. The statistical analysis framework was identical to that for Hypothesis 1. The analysis consisted of four multiple linear regressions. Thereby, ESJ served as the independent variable and “natural”, “necessary”, “normal” and “nice” (subscales of the 4N scale developed by Piazza et al., 2015) as the dependent variables. As covariates, only age, gender and political orientation were included, since previous analyses provided evidence that income and education do not significantly influence the justification for the consumption of animal products (see Table 1, Appendix B).

Table 1

Regression analysis results. Dependent variables: 4N subscales

	β	<i>SE</i> (robust)	<i>t</i>	<i>p</i>	95% CI	
					LL	UL
Dependent Variables:						
<i>natural</i>						
Constant	4.33	.29	15.12	.000	3.77	4.90
ESJ	.26	.07	3.87	.000	.13	.39
Age	– .01	.00	– 3.28	.001	– .02	– .01
Gender						
male			base			
female	– .23	.13	– 1.81	.070	– .48	– .02
binary	1.10	.12	8.99	.000	– .86	1.34
Political Orientation	.08	.04	2.28	.023	.01	.15

Obs. = 348, $F(5, 342) = 9.99$, $p < .001$, $R^2 = .13$

necessary

Constant	3.05	.40	7.55	.000	2.26	3.85
ESJ	.39	.09	4.34	.000	.21	.57
Age	– .01	.00	– 2.89	.004	– .03	– .01

Gender						
male				base		
female						
binary	.96	.16	6.08	.000	.65	1.27
Political Orientation	.09	.05	1.73	.084	-.01	.19
<hr/>						
Obs. = 348, $F(5, 342) = 10.42, p < .001, R^2 = .13$						

normal

Constant	4.07	.23	17.66	.000	3.62	4.52
ESJ	.16	.05	3.00	.003	.06	.27
Age	-.01	.00	-3.75	.000	-.02	.00
Gender						
male				base		
female	-.30	.11	-2.86	.004	-.51	-.10
binary	-.73	.12	-5.94	.000	-.97	-.49
Political Orientation	.05	.03	1.39	.164	-.02	.11
<hr/>						
Obs. = 348, $F(5, 342) = 10.42, p < .001, R^2 = .13$						

nice

Constant	4.05	.31	13.03	.000	3.44	4.67
ESJ	.40	.08	5.09	.000	.24	.55
Age	-.02	.01	-3.63	.000	-.03	-.01
Gender						
male				base		
female	-.52	.15	-3.16	.000	-.81	-.24
binary	-1.24	.14	-8.68	.000	-1.53	-.96
Political Orientation	.05	.04	1.05	.295	-.04	.13
<hr/>						
Obs. = 348, $F(5, 342) = 13.34, p < .001, R^2 = .15$						

Note. β = regression coefficient, SE = standard errors of the coefficient, t = t-statistic, p = two-tail p-value, 95% CI = 95% confidence interval for the coefficient, LL = lower limit, UL = upper limit.

Given that the assumption of homoscedasticity of the regression residuals was violated, robust standard errors were reported.

The multiple regression analyses yielded significant regression models for the influence of ESJ on each of the subscales from the 4N scale while controlling for covariates. In addition, in each model the slope for ESJ was significantly different from zero. For each higher unit in ESJ, the tendency to justify the consumption of animal products as “natural” increased by .26 units, as “necessary” by .39 units, as “normal” by .16 units, and as “nice” by .40 units.

Appendix E: G*Power Analyses

A priori power analysis

F tests - Linear multiple regression: Fixed model, R² increase

Analysis: A priori: Compute required sample size

Input:	Effect size f^2	=	0,02
	α err prob	=	0,05
	Power (1- β err prob)	=	0,80
	Number of tested predictors	=	1
	Total number of predictors	=	3
Output:	Noncentrality parameter λ	=	7,9000000
	Critical F	=	3,8653513
	Numerator df	=	1
	Denominator df	=	391
	Total sample size	=	395
	Actual power	=	0,8006159

Sensitivity analysis

Analysis: Sensitivity: Compute required effect size

Input:	α err prob	=	0,05
	Power (1- β err prob)	=	0,80
	Total sample size	=	355
	Number of tested predictors	=	1
	Total number of predictors	=	3
Output:	Noncentrality parameter λ	=	7,8920326
	Critical F	=	3,8680881
	Numerator df	=	1
	Denominator df	=	351
	Effect size f^2	=	0,0222311

Appendix F: Qualtrics Survey

Consent form

Attitudes and Behaviours with regards to the Use of Farmed Animals for Food

Name

MSc Behavioural Science

Department of Psychological and Behavioural Science

London School of Economics and Political Science

Information for participants

Thank you for considering participating in this online study. This page outlines the purpose of the study and provides a description of your involvement and rights as a participant, if you agree to take part.

1. What is the study about?

This study examines the tendency of people to justify the use of farm animals for food production. In addition, this study investigates the impact of different messages on attitudes and behaviour with regards to a plant-based dietary shift.

2. Do I have to take part?

Participation is voluntary. It is up to you to decide whether or not to take part. There are no negative consequences for you if you decide not to take part.

3. What will my involvement be?

You will be asked to complete several questions on your attitudes and behaviour with regard to the use of animals for the production of animal products. In around halfway through the questionnaire, you will be asked to read a short fictitious news article about that topic. It should take you around 8 minutes to complete the study.

4. How do I withdraw from the study?

You can withdraw from the study at any point by closing your browser tab, without having to give a reason. If any questions during the survey make you feel uncomfortable, you do not have to answer them. Withdrawing from the study will have no effect on you. If you withdraw

from the study, I will not retain the information you have given thus far, unless you are happy for me to do so.

5. What will my information be used for?

The analyses of the collected data will be used for a Master's dissertation in LSE's MSc Behavioural Science programme.

6. Will my taking part and my data be kept confidential? Will it be anonymised?

The records from this study will be kept as confidential as possible. Only I will have access to the data. Your data will be anonymised – your name will not be used in any reports or publications resulting from the study.

7. Who has reviewed this study?

This study has undergone ethics review in accordance with the LSE Research Ethics Policy and Procedure.

8. Data Protection Privacy Notice

The LSE Research Privacy Policy can be found at:

https://info.lse.ac.uk/staff/divisions/Secretarys-Division/Assets/Documents/Information-Records-Management/Privacy-Notice-for-Research-v1.2.pdf?from_serp=1

The legal basis used to process your personal data will be “Public Task”. The legal basis used to process special category personal data (e.g. data that reveals racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, health, sex life or sexual orientation, genetic or biometric data) will be for scientific and historical research or statistical purposes. To request a copy of the data held about you please contact: glpd.info.rights@lse.ac.uk

9. What if I have a question or complaint?

If you have any questions regarding this study please contact me, *my name*, on my email address. If you have any concerns or complaints regarding the conduct of this research, please contact the LSE Research Governance Manager via research.ethics@lse.ac.uk.

If you are happy to take part in this study, please click the consent button below.

I consent, begin the study.

I do not consent.

Prolific ID

Please enter your **unique Prolific ID**.

Demographics

Before starting the experiment, please respond to the following questions. Recall that your answers are anonymous.

Age

What is your **age**? Please type in a number.

Gender

With what **gender** do you most identify?

Man

Woman

Other _____

Income

What is **your household's total gross annual income** before taxes?

- less than £13,000
- £13,000 to less than £19,000
- £19,000 to less than £26,000
- £26,000 to less than £32,000
- £32,000 to less than £48,000
- £48,000 to less than £64,000
- £64,000 to less than £96,000
- More than £96,000

Education

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

- No formal qualifications
- Secondary school
- Technical qualification
- Undergraduate degree
- Master's degree
- Doctorate degree

Political Ideology

Here is a 11-point scale on which the political views that people might hold are arranged from extremely liberal (left) to extremely conservative (right).

Where would you place yourself on this scale?

Extremely liberal Extremely conservative Prefer not to say

0 1 2 3 4 5 6 7 8 9 10 11

Political Ideology ()	
-----------------------	------------------------------------------------------------------------------------

Citizenship

Please choose your **primary citizenship**.

▼ Afghanistan (1) ... Other (196)

PART I

Social dominance orientation

Show how much you favor or oppose each idea below by selecting a number from 1 (strongly oppose) to 7 (strongly favor) on the scale below. You can work quickly; your first feeling is generally best.

- An ideal society requires some groups to be on top and others to be on the bottom.
- Some groups of people are simply inferior to other groups.
- Groups at the bottom are just as deserving as groups at the top.
- No one group should dominate in society.
- Group equality should not be our primary goal.
- It is unjust to try to make groups equal.
- We should do what we can to equalize conditions for different groups.
- It is unjust to try to make groups equal.

Ecological dominance orientation

Ideas on how humans, animals, and the natural environment should relate to each other can differ for every person. Using the image below as a guide, indicate which arrangement you personally think represents your own preference. There are no right or wrong answers here: we are simply interested in your personal preference.

The more you move the slider to the right, the more you indicate a preference for a more hierarchical relationship between humans, animals, and the natural environment. The more you move the slider to the left, the more you indicate a preference for a less hierarchical relationship.



0 1 2 3 4 5 6 7

Click to write Choice



Economic system justification

Please rate to what extent you agree or disagree with the following statements.

Your answers can range from 1 (strongly disagree) to 9 (strongly agree).

- If people work hard, they almost always get what they want.
- The existence of widespread economic differences does not mean that they are inevitable.
- Laws of nature are responsible for differences in wealth in society.
- There are many reasons to think that the economic system is unfair.
- It is virtually impossible to eliminate poverty.
- Poor people are not essentially different from rich people.
- Most people who don't get ahead in our society should not blame the system; they have only themselves to blame.
- Equal distribution of resources is a possibility for our society.
- Social class differences reflect differences in the natural order of things.
- Economic differences in the society reflect an illegitimate distribution of resources.
- There will always be poor people, because there will never be enough jobs for everybody.
- Economic positions are legitimate reflections of people's achievements.
- If people wanted to change the economic system to make things equal, they could.
- Equal distribution of resources is unnatural.
- It is unfair to have an economic system which produces extreme wealth and extreme poverty at the same time.
- There is no point in trying to make incomes more equal.
- There are no inherent differences between rich and poor; it is purely a matter of the circumstances into which you are born.

Justification of animal product consumption

Natural

Please rate to what extent you agree or disagree with the following statements.

Your answers can range from 1 (completely disagree) to 7 (completely agree).

- It is only natural to eat animal products.
- It is unnatural to eat an all plant-based diet.
- Our human ancestors ate animal products all the time.
- Human beings naturally crave animal products.

Necessary

Please rate to what extent you agree or disagree with the following statements.

Your answers can range from 1 (completely disagree) to 7 (completely agree).

- It is necessary to eat animal products in order to be healthy.
- You cannot get all the protein, vitamins, and mineral you need on an all plant-based diet.
- Human beings need to eat animal products.
- A healthy diet requires at least some animal products.

Normal

Please rate to what extent you agree or disagree with the following statements.

Your answers can range from 1 (completely disagree) to 7 (completely agree).

- Not eating animal products is socially unacceptable.
- It is abnormal for humans not to eat animal products.
- Most people I know eat animal products.
- It is normal to eat animal products.

Nice

Please rate to what extent you agree or disagree with the following statements.

Your answers can range from 1 (completely disagree) to 7 (completely agree).

- Animal products are delicious.
- Animal products add so much flavor to a meal it does not make sense to leave it out.
- The best tasting food is normally an animal-based dish (e.g., steak, chicken breast, grilled fish).
- Meals without an animal product would just be bland and boring.

PART II

Please list **three aspects** that make you **proud of being a British citizen**.

If you are not a British citizen, please list three aspects that make you proud of being a citizen of the country of your citizenship.

Aspect no. 1 _____

Aspect no. 2 _____

Aspect no. 3 _____

System-preserving condition

The following text was taken from a British news magazine and written by a British Journalist.

Please **read it carefully**. There will be **questions afterwards** that relate to this text.

People in Britain depend on livestock farming for food production. Livestock farming dates back to around 11 000 years ago when people began to rear animals outdoors. From the 18th century, advances in science caused a shift in animal farming towards indoor rearing. In the years that followed, the number of animals kept on a farm steadily increased and animal farming became more and more mechanised and automated, reducing the labour input of farmers.

In response, the world's first animal welfare law was passed in 1822, inspired by the British philosopher Jeremy Bentham. Bentham stated that the morally right action is the one that produces the best outcome for the greatest number of individuals, including animals. This laid the philosophical foundation for animal welfare. The idea that farm animals should not suffer stress, fear, disease, or injury became an established guiding principle. Moreover, the concept of animal welfare has evolved in a direction that demands not only the avoidance of suffering, but also the presence of positive emotions.

However, at no other time in history have so many animals died and suffered as they do today. Therefore, opponents argue that reducing our animal product consumption allows us to protect and preserve the British way of animal farming, as it reduces animal suffering.

System-threat condition

The following text was taken from a British news magazine and written by a British Journalist.

Please **read it carefully**. There will be **questions afterwards** that relate to this text.

People in Britain depend on livestock farming for food production. Livestock farming dates back to around 11 000 years ago when people began to rear animals outdoors. From the 18th century, advances in science caused a shift in animal farming towards indoor rearing. In the years that followed, the number of animals kept on a farm steadily increased and animal farming became more and more mechanised and automated, reducing the labour input of farmers.

In response, the world's first animal welfare law was passed in 1822, inspired by the British philosopher Jeremy Bentham. Bentham stated that the morally right action is the one that produces the best outcome for the greatest number of individuals, including animals. This laid the philosophical foundation for animal welfare. The idea that farm animals should not suffer stress, fear, disease, or injury became an established guiding principle. Moreover, the concept of animal welfare has evolved in a direction that demands not only the avoidance of suffering, but also the presence of positive emotions.

Today, Britain still holds a leading position in the world in animal welfare. However, opponents argue that a reduction in our consumption of animal products from intensive farming is necessary to reduce animal suffering.

Attention Check Question 1

Please answer to the following question.

When did people start rearing livestock?

- Around 2000 years ago.
- Around 11 000 years ago.

Attention Check Question 2

Please answer the following question.

What has been the guiding principle in rearing farm animals in Britain?

- Farmed animals should not suffer stress, fear, disease, or injury.
- Whether farm animals suffer or not does not matter.

Intention to reduce animal product consumption

Do you intend to take the following actions in the future?

Your answers can range from 1 (definitely not) to 5 (definitely).

- Avoid buying meat products.
- Completely abstain from meat.
- Avoid buying animal products (e.g. milk).
- Completely abstain from animal products (e.g. milk).

Support for policies promoting plant-based dietary shift

To what extent do you support the following policy options?

Your answers can range from 1 (not at all) to 7 (very much).

- Increased innovation, growth, marketing for plant-based products.
- Increased availability and convenience of plant-based products (e.g. plant-based milk being the default in public canteens)
- Lowering of the value added tax consumers have to pay for plant-based products.

Willingness to donate to ProVeg International

Thank you so much for your time so far. We are almost done.

This question concerns **your reimbursement for participating in this study.**

Imagine you had the opportunity to donate 25 pence (30 Cents) from your reimbursement to a non-profit organisation.

The organisation is ProVeg International (<https://proveg.com/uk/>).

ProVeg successfully works with governments, public institutions, private companies, and the public. Its ambition is to enable the transition to a society that relies more on plant-based food.

Would you be willing to donate 25 pence from your reimbursement to ProVeg International?

- yes, I'd like to donate 25 pence to ProVeg International.
- no, I would not like to donate 25 pence to ProVeg International.

Manipulation Check Question 1

Do you recognise the following sentence from the paragraph you were asked to read?

"At no other time in history have so many animals died and suffered as they do today."

- Yes, I recognise that sentence.
- No, I do not recognise that sentence.

Manipulation Check Question 2

Do you recognise the following sentence from the paragraph you were asked to read?

"Britain still holds a leading position in the world in animal welfare."

- Yes, I recognise that sentence.
- No, I do not recognise that sentence.

Appendix G: Stata Code

* Balance Tests

```
ttest age, by(condition)
tabulate gender condition, chi2
tabulate income_n condition, chi2
tabulate education_n condition, chi2
ttest political_orientation, by(condition)
ttest ESJ, by(condition)
```

* Preliminary Analysis: Correlations between SDO, EDO, ESJ, Justification

** Detecting outliers

```
extremes SDO, iqr(3)
extremes EDO, iqr(3)
extremes ESJ, iqr(3) // outliers found
winsor2 ESJ, replace cut(1 99) trim
extremes justification, iqr(3)
```

** Test for normal distribution

```
swilk SDO EDO ESJ justification // no normal distribution
```

** Spearman-correlations

```
spearman SDO EDO ESJ justification
spearman EDO SDO
spearman ESJ SDO
spearman justification SDO
spearman ESJ EDO
spearman justification EDO
spearman ESJ justification
```

* Hypothesis 1

** Linear regression:

```
reg justification ESJ
```

** Assumptions

```

*** Homoscedasticity of the residuals
hettest // p-value > 0.05
*** Normal distribution of the residuals
predict res, resid // new variable for the residuals of the regression
swilk res // p-value > 0.05
*** No autocorrelation of the residuals
gen n=_n
tsset n
estat dwatson // value close to 2 (rule of thumb: value between 1.50 and 2.50)
*** Linear correlation between the dependent and the independent variable
graph twoway (scatter justification ESJ)

** Robustness Check: Multiple regression including covariates:
reg justification ESJ age i.gender i.income_n i.education_n political_orientation

** Assumptions
*** No multicollinearity of the independent variables
vif // VIF values < 10
*** Homoscedasticity of the residuals: Breusch-Pagan test
hettest // p-value > 0.05
*** Normal distribution of the residuals
predict res2, resid // new variable for the residuals of the regression
swilk res // p-value > 0.05
*** No autocorrelation of the residuals: Durbin-Watson test
tsset n
estat dwatson // value close to 2 (rule of thumb: value between 1.50 and 2.50)
*** Linear correlation between the dependent and the independent variables: scatter plots
graph twoway (scatter justification ESJ)
graph twoway (scatter justification age)
graph twoway (scatter justification political_orientation)

** Exploratory analysis:
** Multiple regression analysis:

```

```
reg natural ESJ age i.gender political_orientation
```

```
** Assumptions
```

```
*** Homoscedasticity of the residuals: Breusch-Pagan test
```

```
hettest // p-value < 0.05: assumption not met
```

```
** Multiple regression analysis:
```

```
reg necessary ESJ age i.gender political_orientation
```

```
** Assumptions
```

```
*** Homoscedasticity of the residuals
```

```
hettest // p-value < 0.05: assumption not met
```

```
** Multiple regression analysis:
```

```
reg normal ESJ age i.gender political_orientation
```

```
** Assumptions
```

```
*** Homoscedasticity of the residuals
```

```
hettest // p-value > 0.05
```

```
** Multiple regression analysis:
```

```
reg nice ESJ age i.gender political_orientation
```

```
** Assumptions
```

```
*** Homoscedasticity of the residuals
```

```
hettest // p-value > 0.05
```

```
* Hypothesis 2
```

```
** Assumptions-check: Test for multivariate normality
```

```
mvtest normality SDO ESJ justification // p-value < .05
```

```
** Mediation model
```

```
sem (SDO -> ESJ) (SDO -> justification) (ESJ -> justification), method(adf) nocapslatent
```

```
** Indirect effect significance testing
```

```
program indireff, rclass
```

```
    sem (SDO -> ESJ) (SDO -> justification) (ESJ -> justification), method(adf)  
    nocapslatent
```

```

estat teffects
mat bi = r(indirect)
mat bd = r(direct)
mat bt = r(total)
return scalar indir = el(bi,1,3)
return scalar direct = el(bd,1,3)
return scalar total = el(bt,1,3)
end

```

```

sem (SDO -> ESJ) (SDO -> justification) (ESJ -> justification), method(adf) nocapslatent
quietly estat teffects

```

```

matrix list r(indirect)
matrix list r(direct)
matrix list r(total)

```

```

set seed 358395

```

```

bootstrap r(indir) r(direct) r(total), reps(5000): indireff
estat bootstrap, percentile bc

```

```

** Robustness-check: Mediation analysis including covariates

```

```

sem (SDO -> ESJ, ) (SDO -> justification, ) (ESJ -> justification, ) (age -> justification, )
(c.income_n -> justification, ) (c.education_n -> justification, ) (political_orientation ->
justification, ) (c.gender -> justification, ), method(adf) nocapslatent
estat teffects

```

```

* Hypothesis 3

```

```

** Assumptions-check: Test for multivariate normality

```

```

mvtest normality EDO ESJ justification // p-value below .05

```

```

** Mediation Model

```

```

sem (EDO -> ESJ) (EDO -> justification) (ESJ -> justification), method(adf) nocapslatent

```

**** Indirect Effect-Significance Testing**

```
program indireff2, rclass
```

```
    sem (EDO -> ESJ) (EDO -> justification) (ESJ -> justification), method(adf)
```

```
    nocapslatent
```

```
    estat teffects
```

```
    mat bi = r(indirect)
```

```
    mat bd = r(direct)
```

```
    mat bt = r(total)
```

```
    return scalar indir = el(bi,1,3)
```

```
    return scalar direct = el(bd,1,3)
```

```
    return scalar total = el(bt,1,3)
```

```
end
```

```
sem (EDO -> ESJ, ) (EDO -> justification) (ESJ -> justification), method(adf) nocapslatent
```

```
quietly estat teffects
```

```
matrix list r(indirect)
```

```
matrix list r(direct)
```

```
matrix list r(total)
```

```
set seed 358395
```

```
bootstrap r(indir) r(direct) r(total), reps(5000): indireff2
```

```
estat bootstrap, percentile bc
```

**** Robustness-check: Mediation analysis including covariates**

```
sem (EDO -> ESJ, ) (EDO -> justification, ) (ESJ -> justification, ) (age -> justification, )
```

```
(c.income_n -> justification, ) (c.education_n -> justification, ) (political_orientation ->
```

```
justification, ) (c.gender -> justification, ), method(adf) nocapslatent
```

```
estat teffects
```

*** Hypothesis 4**

```
summarize ESJ
```

```
gen ESJ_centred = ESJ - r(mean)
```

```

** DV1: Intention to reduce animal product consumption
** Multiple regression analysis
reg intention_reduce condition c.ESJ_centred condition##c.ESJ_centred

** Assumption-Testing
*** No multicollinearity of the independent variables
vif // VIF values < 10
*** Homoscedasticity of the residuals
hettest // p-value > 0.05
*** Normal distribution of the residuals
predict res6, resid // new variable for the residuals of the regression
swilk res2 // p-value < 0.05 --> assumption not met
*** No autocorrelation of the residuals: Durbin-Watson test
tsset n
estat dwatson // value close to 2 (rule of thumb: value between 1.50 and 2.50)
*** Linear correlation between the dependent and the independent variables
graph twoway (scatter ESJ_centred intention_reduce)

** DV2: Support for policies promoting plant-based dietary change
** Multiple regression analysis
reg support_policies condition c.ESJ_centred condition##c.ESJ_centred

** Assumption-Testing
*** No multicollinearity of the independent variables
vif // VIF values < 10
*** Homoscedasticity of the residuals
hettest // p-value > 0.05
*** Normal distribution of the residuals
predict res7, resid // p-value < 0.05 --> assumption not met
swilk res3 // > .05 --> significant
*** No autocorrelation of the residuals: Durbin-Watson test
tsset n
estat dwatson // value close to 2 (rule of thumb: value between 1.50 and 2.50)
*** Linear correlation between the dependent and the independent variables

```

graph twoway (scatter ESJ_centered support_policies)

** DV3: Donation Intention

*** Logistic regression analysis

logit donation condition c.ESJ_centered condition##c.ESJ_centered, robust

** Assumption-Testing

*** No multicollinearity of the independent variables: correlation analysis

spearman intention_reduce condition

*** Assumption of linearity to the logit for the continuous independent variables

gen ln_ESJ = ln(c.ESJ_centered)

logit donation c.ESJ_centered c.ESJ_centered##c.ln_ESJ, robust // interaction not significant

gen ln_condition_ESJ = ln(condition*c.ESJ_centered)

logit donation c.ESJ_centered c.ESJ_centered##c.ln_condition_ESJ, robust //interaction not significant

** Robustness-check: Probit regression

probit donation condition c.ESJ_centered condition##c.ESJ_centered, robust

** Robustness-check: Excluding those

summarize time_spent, detail

drop if time_spent =< 65.58

reg intention_reduce condition c.ESJ_centered condition##c.ESJ_centered, robust

reg support_policies condition c.ESJ_centered condition##c.ESJ_centered, robust

logit donation condition c.ESJ_centered condition##c.ESJ_centered, robust