Alleviating misconceptions about animals – investigating the effects of a video that aims to decrease speciesist attitudes and behaviours

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Abstract

Activating mind attribution is a strategy to alleviate common misconceptions about farm animals, raised for human consumption. As denying animals' emotional and mental capabilities is a crucial part of speciesism, reducing those could potentially influence our speciesist attitudes and behaviours. While the consequences of meat consumption are already present in anthropogenic climate change, changing our eating habits seems complex and difficult to achieve. The study assesses the effectiveness of an intervention that aims to alter speciesist attitudes and behaviours. Therefore, a video about mistreatment and common misconceptions about animals was shown. Part of the participants watched the whole video in one sequence while others watched smaller parts of the same video over a longer period (one week). It was hypothesized that multiple times exposures would affect speciesist attitudes and behaviours more than a 1-time exposure. In total, 102 participants were recruited for the pre-test using multiple sampling methods. 50 participants completed the pre-and post-test, which included watching the video(s), filling out the speciesist attitude scale pre-and post and reporting animal product consumption frequencies for the previous week. The statistical tests did not find significant effects of either intervention on speciesist attitudes or speciesist behaviours. Contrary to previous research, where an effect of the 1-time intervention was found within conditions, it seems plausible that the small sample size (n = 50) did not provide sufficient statistical power. To increase the power of the intervention, while using a small sample size, multiple components and a prolonged time frame are recommended. Further research could additionally investigate the justifications and actual learning processes that take place.

Introduction

"Again, I really like the aim of this study. It already made me aware of how much meat I eat in a week and that I do not really like meat if I think about it..." - anonymous participant

Our relationship with animals can be described as a paradox. While we treat most of our pets with empathy, love, and respect, some others are mistreated for entertainment, experiments, or consumption (Caviola et al., 2019). Negative impacts on the environment and animal welfare follow this discrimination (Bonnet et al., 2020; Machovina et al., 2015). Therefore, it is crucial to change our attitudes and behaviours towards animals. In this regard, it is essential to understand the psychological mechanisms and, finally alter them. Often, people underestimate the mental and emotional capabilities of animals (Leach et al., 2023). However, without this knowledge, people may not relate their discriminatory attitudes and behaviours to a moral issue (Loughnan et al., 2010). In previous studies, it was advised to implement multiple exposures to an intervention to increase its effectiveness (Mathur et al., 2021; Rice et al., 2020; Tonsor & Olynk, 2011) Therefore, this study explores whether a multiple-times exposure intervention consisting of a video that educates participants about the mistreatment of animals and common misconceptions can decrease participants' speciesist attitudes and behaviours more than the 1-time exposure intervention consisting of the same video.

Speciesism is the concept that aims to explain this inconsistency in the moral treatment of different animals. This concept generally refers to unjustified discrimination based solely on the individual's species membership (Singer, 1975; Singer & Mason, 2007). When consuming animals, we favour our species over members of other species. Conclusively, when consuming animal products, we discriminate unjustly against other species.

However, the discrimination does not only affect another species, at some point, it threatens our species. The results of animal product consumption can be seen in our anthropogenic climate change which involves heatwaves, wildfires, floods, tropical storms, and agricultural damage (World Health Organization: WHO, 2023). Thus, reducing the consumption of animal products is one effective strategy to counter biodiversity loss and climate change in our developed countries (Stoll-Kleemann & Schmidt, 2017). Therefore, reducing animal product consumption has beneficial effects for animals and humans.

Despite the urgency to act and change consumption patterns, most people still consume animal products while arguing that they do not want to hurt animals (Bastian et al., 2011). This discrepancy between attitudes and behaviours is named *meat-related cognitive dissonance* (Rothgerber & Rosenfeld, 2021). To reduce the tension between conflicting attitudes and behaviours, people apply different coping mechanisms such as avoidance of information, distancing themselves from the moral implications or claiming that animals do not have emotions and cognitive abilities like humans. On the other hand, vegetarians argue that they do not eat meat because of their moral concern for animals(Loughnan et al., 2010). Thus, questioning common misconceptions by providing evidence about animals 'emotional and mental capabilities could impact the coping mechanisms and potentially alter existing speciesist attitudes and behaviours.

The denial of moral concerns for farm animals supports speciesist attitudes and behaviours by limiting the experience of pain, suffering, and emotions (Rothgerber & Rosenfeld, 2021). Without animals' capabilities to suffer, slaughtering animals for consumption and eating meat may not be portrayed as a moral problem (Bastian et al., 2011). Contrary, in modern research these thoughts have been eliminated and there is evidence from animal cognition that animals have complex minds (Singer, 1975). However,

people still underestimate the emotional and mental capabilities of animals, especially those of pigs. According to Loughnan et al. (2010) and Leach et al. (2023), most people attribute fewer complex minds to animals and underestimate their higher mental capabilities such as empathy, planning, and goal-achieving. This results in the existence of common misconceptions regarding animals' capabilities.

Interventions that encourage *mind attribution* to farm animals could disarm the coping strategies that arise from eating meat by relating it to a moral issue. In a previous study done by Loughnan et al. (2010) those subjects who were randomly assigned to eating beef stated afterward that cows are less capable of suffering and showed less moral concern compared to participants who were randomly assigned to eating nuts. Thus, alleviating common misconceptions by mind attribution could reduce the willingness to eat animal products (Amiot et al., 2018).

Previously, two studies assessed the effectiveness of interventions that aim to alleviate common misconceptions about animals and their effect on speciesist attitudes and behaviours. Firstly, Isfort (2024) tested whether a video that educates about common misconceptions could reduce speciesist attitudes and influence behavioural intentions which leads to less harmful behaviour towards animals. The results showed that there was no significant difference in speciesist attitudes or behavioural intentions between the control and the intervention conditions. Secondly, Hehn (2024) assessed the effects of the same video on participants' animal-product consumption, their behavioural intentions and their justifications. The results indicated that people in the intervention condition do intend more strongly to reduce the hurting of animals. Surprisingly, in both conditions, participants did significantly change their animal product consumption, however, no significant effect was found between the two conditions. It was argued that to reduce speciesist attitudes,

possibly multiple interventions are needed since attitudes do not change quickly over time (Rice et al., 2020; Tonsor & Olynk, 2011). This aligns with Mathur et al. (2021) proposing repeated exposure to an intervention to increase its effectiveness. To reduce animal product consumption, Rees et al. (2018) proposed that due to the strong habituation of the behaviour, it takes a longer time to elicit change. Thus, showing a video once may not have the power to change a habit. The element of time may play a vital role in changing actual behaviour and attitudes.

The important role of time in the learning process, such as by spacing learning units over a longer time, is rooted in the 19th century. At this time, the psychologist Herrmann Ebbinghaus coined the term *spaced learning* (SL). Hereby, materials are repeatedly exposed. He argued that learning and retention depend on the quantity of exposure (Ebbinghaus, 1885). Until today, SL is an effective method used to learn i.e. educational materials (Kornell & Bjork, 2008). The underlying mechanisms started to be of interest to neuroscience. This resulted in the knowledge of an inverted U-pattern i.e. memory performance increases with increasing spacing interval durations up to a certain spacing interval duration. Spacing interval simply refers to the time between the successive learning units. However, a general best spacing interval could not be found (Kornmeier et al., 2022). Conclusively, repeated exposure to new learning materials is assumed to influence long-term memory.

Intervention and hypothesis

An intervention that alleviates common misconceptions about farm animals could reduce the discrepancy between attitudes and behaviours by questioning the suppression of moral concerns for farm animals. Moreover, the attribution of mind to farm animals may lead to a reduction in animal product consumption. In sum, the focus on alleviating misconceptions through multiple exposures could potentially reduce speciesist attitudes and

behaviours. Therefore, it is hypothesized that *an intervention -consisting of three short educational videos that question common misconceptions results in lower speciesist attitudes* than a 1-time exposure to the same video. Second, it is hypothesized *that an intervention - consisting of three short educational videos that question common misconceptions - results in lower speciesist behaviours (animal product consumption) than a 1-time exposure to the same video.*

Methods

The research was approved by the Ethics Committee of the University of Twente., Netherlands (IRB approval code 240931). All participants gave written consent following the guidelines of the BMS Ethics Committee (Appendix A).

Participants and Design

The sample size was determined a priori using G*Power 3.1.9.7. Previous studies that aimed to foster changes in animal product consumption (Amiot et al., 2018; Carfora et al., 2017) revealed a small-medium effect size (f^2=.37). Due to the difference in design (length of the intervention, online, focusing on mind attribution), less power and a small effect size is assumed. The power analysis with f=0.15, 95% power, and α=0.05, revealed that 148 participants are needed for a mixed ANOVA with repeated measures and a within-between interaction. Consequently, two stop criteria were determined: reaching 184 participants or reaching the end date of data collection (17.12.2024).

In total, 102 participants took part in the pre-test between 11.11.2024 and 01.12.2024. In the post-test, 50 participants participated between 26.11.2024 and 17.12.2024. They were recruited via non-probability sampling, snowball sampling, and convenience sampling. Students who signed up via the test subject pool BMS received study credits after completion. Participants who did not provide data (speciesist attitude, animal

product consumption), indicated that they did not watch the video attentively and/or until the end were excluded, leaving 85 participants. Moreover, 35 participants were lost to follow-ups, 16 in the 1-time exposure condition and 19 in the multiple-times exposure condition. Thus, the final data set resulted in 50 complete cases (33 females, 16 males, and 1 defined as other). The age ranged between 18 and 63 years (*M* = 26.06; *SD* = 9.75). Most participants were German (38), followed by Dutch (8) and other Nationalities (4). Most participants indicated that they are omnivores (34), followed by pescatarians (8), vegetarians (5) and vegans (3).

The current study used a quantitative methodology with a mixed-factor design. Participants were randomly assigned to either a 1-time exposure intervention or to a multiple-times exposure intervention, representing the independent variable. Moreover, the participants were asked to complete the pre-and post-test, thus time represents the second independent variable. The dependent variables were speciesist attitude and speciesist behaviour (animal product consumption).

Procedure & Materials

The study was conducted online. Participants received a link that led them to Qualtrics, an online survey tool (Appendix A). The pre-test took 15 minutes to complete. At the beginning, participants were asked to give consent. Within the informed consent, participants were informed that all participants would watch a video that may elicit concern and create discomfort. After participants provided consent, they were asked about their demographic information: Age, gender, nationality, and dietary category (i.e. plant-based, vegetarian, pescetarian, omnivore). Afterwards, they were randomly distributed over conditions. Depending on the condition they were assigned to, participants either received one follow-up survey (1-time exposure intervention) or two follow-up surveys (multiple-

times exposure intervention. In the 1-time exposure intervention, the follow-up survey included the complete 7-minute video and control questions. In the multiple-times exposure intervention, each follow-up survey included parts of the same video, resulting in the exposure of the complete 7-minute video after completing the pre-test and both follow-up surveys. The follow-up surveys and the post-test were received by mail (Appendix B).

Independent variables. In both conditions, people watched the same video which aims to educate about mistreatment and refute common misconceptions such as the feelings of pain, and the cognitive and emotional abilities of different animals. In the 1-time exposure intervention, participants watched the 7-minute video, one week after the pre-test. In the multiple-times exposure intervention, participants were exposed to the same content, however, it was shown in three short videos. The first video (mistreatment and misconceptions about pain) was shown immediately after the pre-test, the second (mental capabilities) part three days after completion of the pre-test, and the third part (emotional capabilities) four days after completion of the second part. Thus, the videos were considered as a between-subject factor. In both conditions, the post-test was conducted one week after the complete video was watched. Thus, the pre-and post-tests were considered as a within-subject factor.

Dependent variables. Both variables, participants' speciesist attitude, and their speciesist behaviour were assessed pre-and-post. The pre-test was conducted in the first survey, before any exposure. The post-test was conducted in the final survey. To measure the speciesist attitude, the Speciesism Scale from (Caviola et al., 2019) was used. It is of use because of its high validity, high internal consistency, and test-retest reliability. The scale consists of six items with answers on a 7-point scale ranging from "strongly disagree" to

"strongly agree". One item was re-coded so that for all items a higher score represents a higher speciesist attitude towards animals.

To measure participants' speciesist behaviour, participants were asked about their animal product consumption during the previous 7 days. This included the consumption of meat, dairy, and eggs for breakfast, lunch, dinner, and snacks. In total, 12 items were asked about three consumption categories (meat, eggs, dairy) for each of the different meals (i.e. "How many days in the past week was dairy part of your lunch?"). The questions were answered on an 8-point Likert scale, ranging from 0 (days) to 7 (days). A higher mean score indicates more animal product consumption.

In both conditions, participants answered control questions after watching the video (s). They were asked if they watched the video until the end *(yes vs. no),* and if they watched the video attentively (*1=strongly disagree to 7=strongly agree*). Seven days after the intervention, the same scales were used in the post-test, measuring the effects of the intervention on both variables. Moreover, after each part of the study, they could give remarks regarding the study and comments about the remembered content of the video.

At the end, all participants were debriefed, and the aim of the study was further explained. It was pointed out that the study intended to decrease speciesist attitudes and animal product consumption.

Results

Speciesist attitude

To answer the research question, if a multiple-times exposure intervention results in a decrease in speciesist attitude compared to a 1-time exposure intervention, a complete case analysis was conducted.

Table 1

Mean scores and standard deviation for speciesist attitude

Condition		Pre-test		Post-test	
	n	*M*	*SD*	*M*	*SD*
1-time exposure	29	3.01	0.73	3.03	0.86
Multiple-times exposures	21	2.75	0.53	2.66	0.52

Note. The scores represent the average speciesist attitude differentiated by condition. A higher score presents a higher speciesist attitude.

After the calculation of the descriptives, the parametric assumptions were checked. To assess the assumption of normality, the Shapiro-Wilk Test has been used. The pre-test met the assumption of normality, $W = .96$, $p = .09$. However, the post-test violated normality, $W = .90$, $p < .001$. Secondly, the homogeneity of variance between conditions was calculated, using Levene's test. Based on the assumption, the homogeneity of variance was met in the pre-test; $F(1,48) = 2.38$, $p = .129$. However, in the post-test the homogeneity of variance was violated, $F(1,48) = 4.01$, $p = .051$. Therefore, non-parametric tests were performed because the assumption of normality and the homogeneity of variance were violated in the post-test.

A Mann-Whitney U test and a Wilcoxon Signed-Ranked test have been conducted to test the hypothesis if the multiple-exposure intervention results in reduced speciesist attitude, with speciesist attitude (recorded on a 7-point scale from "strongly disagree to strongly agree") as the outcome variable and 1-time exposure intervention or multiple-times exposure intervention as the predictor variable. The Mann-Whitney U test resulted in no significant difference a priori in speciesist attitudes between the 1-time exposure intervention (*MeanRank* = 26.88, $M = 3.43$, $SD = 0.71$) and the multiple-times exposure intervention *(MeanRank* = 23.60, $M = 3.30$, $SD = 0.47$), $U = 264.50$, $p = .434$. The same accounts for the post-test, with no significant difference in speciesist attitudes between the

1-time exposure intervention (*MeanRank* = 27.22, *M* = 2.44, *SD* = 0.93) and the multiple-times exposure intervention *(MeanRank* = 23.12, *M* = 2.10, *SD* = 0.64), *U* = 254.50, *p* = .329. Further, the effects within groups were investigated. A Wilcoxon-signed-rank test was conducted. Participants in the 1–time exposure intervention did not differ in speciesist attitudes before (*MeanRank* = 15.00, *M* = 3.01, *SD* = 0.73) and after the intervention (*MeanRank* = 15.00, *M* = 3.03, *SD* = 0.86), W = 203.5, *p* = 1; *r* = 0. Participants in the multiple-time exposure intervention did not differ in speciesist attitudes before (*MeanRank* = 11.00, *M* = 2.75, *SD* = 0.53) and after the intervention (*MeanRank* = 11.00, *M*=2.66, *SD* = 0.52), *W* = 70.5, *p* = .526; *r* = .137.

Animal product consumption

Secondly, it was answered whether a multiple-times exposure intervention resulted in a decreased animal product consumption compared with a 1-time exposure intervention.

Table 2

Mean scores and standard deviations for speciesist behaviour (animal product consumption)

Condition	Product		Pre-test		Post-test	
		n	*M*	*SD*	*M*	*SD*
1-time exposure	meat	29	1.98	1.87	1.79	1.77
Multiple-times exposures	meat	21	1.49	1.14	1.21	0.88
1-time exposure	dairy	29	2.51	1.65	2.43	1.29
Multiple-times exposures	dairy	21	2.51	1.40	2.51	1.40
1-time exposure	eggs	29	1.22	1.05	.99	0.97
Multiple-times exposures	eggs	21	0.62	0.70	.85	0.86
1-time exposure	Total	29	1.90	1.27	1.74	1.04
Multiple-times exposures	Total	21	1.54	0.73	1.52	0.81

Note. The scores represent the average consumption across all meals (breakfast, lunch, dinner, snack) in days. A higher score presents a higher speciesist behaviour.

To assess the assumption of normality, the Shapiro-Wilk Test was applied. Hereby, it was concluded that the pre-test data are normally distributed, $W = .965$, $p = .142$. However, the post-data violate the assumption of normality, $W = .947$, $p = .026$. Secondly, the homogeneity of variance was calculated, using Levene's test. The results indicate a significant difference in variance between conditions in pre-and po-test ($p < .05$).

A Mann-Whitney U test and a Wilcoxon Signed-Ranked test have been conducted to test the hypothesis if the multiple-times exposure intervention results in reduced animal product consumption, with animal product consumption (recorded on a score from 0 to 7 and including meat, dairy, and eggs for breakfast, lunch, dinner, and snack) as the outcome variable and 1-time exposure intervention or multiple-times exposure intervention as the predictor variable.

The Mann-Whitney U test resulted in no significant difference a priori in speciesist behaviours between the 1-time exposure intervention (*MeanRan*k = 26.81*, M* = 1.90, *SD* = 1.27) and the multiple-time exposure intervention *(MeanRank* = 23.69 *M* = 1.54, *SD* = 0.73), *U* = 342.5, *p* = .461. The same accounts for the post-test, with no significant difference in speciesist behaviours between the 1-time exposure intervention (*MeanRan*k = 27.33*, M* = 1.74, *SD* = 1.04) and the multiple-time exposure intervention *(MeanRank* = 22.98, *M* = 1.52, *SD* = 0.81), *U* = 357.5, *p* = .302. Further, the effects within groups were investigated. A Wilcoxon-signed-rank test was conducted. Participants in the 1–time exposure intervention did not differ in speciesist behaviours before (*MeanRank* = 29.50, *M* = 1.90, *SD* = 1.27) and after the intervention (*MeanRank* = 29.50, *M* = 1.74, *SD* = 1.04), W = 213.5, *p* = .820; *r* = .042 Participants in the multiple exposure intervention did not differ in speciesist behaviours before (*MeanRank* = 21.50, *M* = 1.54, *SD* = 0.73) and after the intervention (*MeanRank* = 21.50, *M*=1.52, *SD* = 0.81), *W* = 112.5, *p* = .794; *r* = .057.

Discussion

The study investigated whether a video that educates about animals´ mental and emotional capabilities would reduce speciesist attitudes and behaviours. Moreover, it was investigated whether a multiple-times exposure intervention would result in lower speciesist attitudes and animal product consumption compared to a 1-time exposure intervention. This was based on recommendations of previous research in the field, which concluded that multiple exposures may contribute to reduced speciesist attitudes and behaviours (Amiot et al., 2018; Banach & Stel, 2024; Mathur et al., 2021; Rees et al., 2018; Isfort, 2024; Hehn, 2024). More support was found in Ebbinghaus's spaced learning theory which underlined the presentation of smaller learning sequences to foster change. However, the main findings of the current study are not in line with the hypothesis, that the multiple-time exposure intervention did not significantly reduce speciesist attitudes or animal product consumption. In addition, neither the multiple-time exposure intervention nor the 1-time exposure intervention showed a reduction in speciesist attitudes or behaviours, which contradicts earlier findings (Hehn, 2024).

The non-significant results can be attributed to insufficient statistical power. The power analysis that was conducted a priori recommended a higher sample size (n = 184) to gain sufficient statistical power. The results showed that providing participants with multiple exposures did not result in differences in speciesist attitudes and behaviours compared with the 1-time exposure. Importantly, both interventions did not show a change in speciesist attitudes and behaviors before and after the intervention. These nonsignificant results may likely be due to a low sample size (n = 50). This is supported by the results of Hehn (2024) that were sufficiently powered showing that the 1-time exposure intervention did reduce speciesist behaviours. Thus, the limitation of statistical power may not detect true effects.

Secondly, the intensity of the intervention may not have been sufficient to foster change. In a previous study, done by Amiot et al. (2018), a significant decrease in meat consumption and positive emotions towards eating meat were detected in a comparable small sample (*n* = 32). However, the intervention consisted of multiple components (social norms, education, mind attribution, and goal setting) and was partly done in person and online. The sample consisted of male students who needed to attend an information session, received further information by text messages, and filled out a dietary journal. The intervention ended after 4 weeks. Interestingly, a significant decrease was found between the second and third week after the intervention. Therefore, the duration of the intervention (approximately 2 weeks) may not have been sufficient to establish a sustainable habit change. As explored by Rees et al. (2018) and Rice et al. (2020) eating behaviours and attitudes have a strong habitual character which asks for longer and more intensive interventions. Thus, adding more components to the intervention and increasing the timeframe may be beneficial (Mathur et al.,2021; Amiot et al.,2018).

The design of both interventions assumed that educating about mistreatment and common misconceptions would result in an attitudinal and behavioural change. However, the learning process that needed to take place was not monitored during the experiment. Instead, participants may have intensified their justifications for eating animal products. Additional items that ask about participants' justification could be added to gain further insight into the psychological mechanisms.

The measurement of the dependent variables was based on self-reported answers. This has the potential to include incorrect answers due to recall errors which question the accuracy of the given answers. To prevent inaccuracy of results direct behavioural outcome

measures such as purchase data (Anderson, 2024), or clinical biomarkers could be used (Piernas et al., 2021).

Animal product consumption was measured as frequencies of consumption per meal. However, to be able to be translated into direct measures of societal impact it is more accurate to report the numerical volume of actual consumption or purchase. When using a finer-grained number of servings, changes can be considered that are not reported in the current scale (Mathur et al., 2021). Moreover, qualitative aspects of consumption could be considered when participants can report on the purchased quality (organic, conventional, regional). Interventions may have the power to not only influence the quantity but also the quality of purchased and/or eaten products.

Conclusion

In conclusion, the multiple-times exposure intervention which aimed to alleviate common misconceptions and reduce participants' speciesist attitudes and speciesist behaviours (animal product consumption), did not facilitate significant change compared to the 1-time exposure intervention. The main explanation can be found in the small sample size which prevented sufficient statistical power. Besides, future interventions could consider in-person interventions consisting of multiple components to increase the intensity and measure data in terms of purchase data and/or biomarkers which consider fine-grained quality aspects of products to improve accuracy.

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Appendix A

Questionnaire of the pre-test

Start of Block: Introduction

Q69 Welcome and thank you for wanting to participate in this study! The following provides information about the study, which you are asked to read carefully.

Research purpose
You are invited to participate in a research study to gain insights into people's attitudes and behaviours towards animals.

Taking part in the study
You are only allowed to participate in the study if you are 18 or older. The research consists of several surveys. The quantity of surveys will differ depending on the condition to which you will be randomly assigned. Participants in the **first condition** are asked to complete **three surveys**. **The first today, the second follows in a week, and the third follows in two weeks**. It takes **approximately 45 minutes to complete all three surveys.** However, you will receive e-mail invitations for the follow-up surveys. For this, we ask you to fill in your e-mail in a separate form at the end of the study. However, this mail cannot be linked to your answers. Note that you will receive your SONA credits only when and after you finish both parts!
The participants assigned to the **second condition** are asked to complete **four surveys. The first has to be completed today, the second follows in three days, the third follows in a week, and the last survey follows in two weeks.** It takes **approximately 45 minutes to complete all four surveys**.
However, you will receive e-mail invitations for the follow-up surveys. For this, we ask you to fill in your e-mail in a separate form at the end of the study. However, this mail cannot be linked to your answers. Note, that you will receive your SONA credits only when and after you finish all four parts. Your data is handled with utmost confidentiality. Personal or confidential data is not issued forth in such a manner that it could be traced back to you. Research results are therefore solely issued as a summation of all gathered data. We will minimize any risks by not asking for any personal information that could be used to identify you (e.g. your name, your home address, etc.) and delete any such data that might arise.

Raffle
There will also be a raffle where participants have the chance to win a 25€, a 15€, and a 10€ Amazon gift voucher. For this, we will ask you to fill in your e-mail in a separate form in the **last survey.** However, this mail can not be linked to your answers.

Risks associated with participating in the study
Taking part in the study involves a risk of feeling uncomfortable. All participants will be watching a video that starts with images of how animals are being treated which may elicit discomfort and/or distress. You are not obligated to finish the video, answer questions, or read information that causes any discomfort and you can stop any time you prefer. Your participation in this study is entirely out of free will and you can withdraw at any time. You are

free to omit any question. If you withdraw your consent, your data will be deleted from the data set. The study has been approved by the BMS ethics committee. Questions or remarks regarding this research can be emailed directly to the leading researcher Nina Vieth (n.vieth@student.utwente.nl). Objections or concerns about the setup or method of this research can be emailed to the secretary of the Behavioural Management and Social Sciences Ethics Committee of the University of Twente (ethicscommittee-bms@utwente.nl). For any questions feel free to contact me at any time.

Nina Vieth
n.vieth@student.utwente.nl

Q98 Hereby, I declare that I

- o I agree to participate in the study and have read the above information, including that all participants will receive information about how animals are being treated that may elicit discomfort and/or distress, and that I must complete all parts of the study to receive SONA credits and take part in the raffle. (4)
- o do not consent (5)

End of Block: Introduction

Start of Block: Sona ID

Q96 If you are a student at the University of Twente please write your SONA ID number.

_____

End of Block: Sona ID

Start of Block: Demographics

Q91 First we would like to know your demographics. In the following, please indicate your gender, nationality, age, education, employment status, and consumption pattern.

Page Break

Q75 What is your gender?

- o Female (1)
- o Male (2)
- o Other (4) _____
- o Prefer not to say (3)

Page Break

Q76 What is your nationality?
- o Dutch (1)
- o German (2)
- o Other (3) _____

Page Break

Q74 How old are you in years?

_____

Page Break

Q77 What is the highest education that you have acquired?
- o Highschool diploma (1)
- o Bachelor's degree (2)
- o PHD (6)
- o Master's degree (7)
- o HBO (3)
- o Other: (4) _____

Page Break

Q78 What is your current employment status?
- o Student (1)
- o Employed (2)
- o Unemployed (3)

Page Break

Q83 How would you describe your diet?
- o Omnivore (eating everything) (1)
- o Pescetarian (vegeterian who eats fish) (2)
- o Vegetarian (not eating meat) (3)
- o Vegan (not consuming any animal products) (4)
- o Do not know (6)
- o Do not prefer to share (7)

End of Block: Demographics

Start of Block: Unique ID

Unique ID We kindly ask you to think about **a unique ID** that only you are aware of. This is needed **to match your responses throughout the different surveys, however, keeping anonymity!** The ID should consist of the month of your birthday (in numbers), the first two letters of your mum's name, and the last two digits of your zip code. **As an example:** If someone's **birthday is in May, has a mother named Mary, and lives in 48164**, then their **unique ID is 05MA64.**

_____

End of Block: Unique ID

Start of Block: Speciesist attitude

Attitude Now we are interested in your ideas about animals. Please indicate below to what extent you agree or disagree.

Speciesist attitude It is morally acceptable to perform medical experiments on animals that we would not perform on any human.
- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

Page Break

Speciesist attitude It is morally acceptable to keep animals in circuses for human entertainment.

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

Speciesist attitude Humans have the right to use animals however they want to.

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

Speciesist attitude Morally, animals always count for less than humans.

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Page Break

Speciesist attitude Chimpanzees should have basic legal rights such as a right to life or a prohibition of torture.

- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

Page Break

Speciesist attitude It is morally acceptable to trade animals like possessions.

- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

End of Block: Speciesist attitude

Start of Block: Condition 0

Consumption

Below, please fill in **how many days in the past 7 days** you had meat, dairy, and eggs included in your breakfast, lunch, dinner, and in between snacks.

Note that meat, dairy, and eggs could also be used in products like sandwitch spreads, cookies, and pancakes. Count these as well.

If you are not sure, please give an estimation.

	0 (0)	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
How many days in the past week	o	o	o	o	o	o	o	o

was meat part of your breakfast? (1)								
How many days in the past week was dairy part of your breakfast? (2)	o	o	o	o	o	o	o	o
How many days in the past week were eggs part of your breakfast? (3)	o	o	o	o	o	o	o	o
How many days in the past week was meat part of your lunch? (4)	o	o	o	o	o	o	o	o
How many days in the past week was dairy part of your	o	o	o	o	o	o	o	o

lunch? (5)								
How many days in the past week were eggs part of your lunch? (6)	o	o	o	o	o	o	o	o
How many days in the past week was meat part of your dinner? (7)	o	o	o	o	o	o	o	o
How many days in the past week was dairy part of your dinner? (8)	o	o	o	o	o	o	o	o
How many days in the past week were eggs part of your dinner? (9)	o	o	o	o	o	o	o	o

How many days in the past week was meat part of your in between snack(s)? (10)	o	o	o	o	o	o	o	o
How many days in the past week was dairy part of your in between snack(s)? (11)	o	o	o	o	o	o	o	o
How many days in the past week were eggs part of your in between snack(s)? (12)	o	o	o	o	o	o	o	o

End of Block: Condition 0

Start of Block: Remarks

Q95 Do you have any remarks about this part of the study?

_____

_____

_____

_____

_____

End of Block: Remarks

Start of Block: Conclusion

Q72 Thank you for taking the time to participate in the first survey! As mentioned earlier, you will be redirected to another survey asking you to enter your email address. This is needed to receive the follow-up surveys. You will receive an e-mail with the link **for the second survey in 7 days. Please continue with the survey** to be redirected. Kind regards, Nina

Page Break

End of Block: Conclusion

Start of Block: Speciesist attitude-Experimental

Q161 Now we are interested in your ideas about animals. Please indicate below to what extent you agree or disagree.

Q162 It is morally acceptable to perform medical experiments on animals that we would not perform on any human.

- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

Page Break

Q163 It is morally acceptable to keep animals in circuses for human entertainment.
- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

Page Break

Q164 Humans have the right to use animals however they want to.
- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

Page Break

Q165 Morally, animals always count for less than humans.
- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

Page Break

Q166 Chimpanzees should have basic legal rights such as a right to life or a prohibition of torture.
- o Strongly disagree (1)
- o Disagree (2)

- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

Page Break

Q167 It is morally acceptable to trade animals like possessions.

- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

End of Block: Speciesist attitude-Experimental

Start of Block: Condition 1

Consumption

Below, please fill in **how many days in the past 7 days** you had meat, dairy, and eggs included in your breakfast, lunch, dinner, and in between snacks.

Note that meat, dairy, and eggs could also be used in products like sandwitch spreads, cookies, and pancakes. Count these as well.

If you are not sure, please give an estimation.

	0 (0)	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
How many days in the past week was meat part of your breakfast? (1)	o	o	o	o	o	o	o	o

How many days in the past week was dairy part of your breakfast? (2)	o	o	o	o	o	o	o	o
How many days in the past week were eggs part of your breakfast? (3)	o	o	o	o	o	o	o	o
How many days in the past week was meat part of your lunch? (4)	o	o	o	o	o	o	o	o
How many days in the past week was dairy part of your lunch? (5)	o	o	o	o	o	o	o	o
How many days in the	o	o	o	o	o	o	o	o

past week were eggs part of your lunch? (6)								
How many days in the past week was meat part of your dinner? (7)	o	o	o	o	o	o	o	o
How many days in the past week was dairy part of your dinner? (8)	o	o	o	o	o	o	o	o
How many days in the past week were eggs part of your dinner? (9)	o	o	o	o	o	o	o	o
How many days in the past week was meat	o	o	o	o	o	o	o	o

part of your in between snack(s)? (10)								
How many days in the past week was dairy part of your in between snack(s)? (11)	o	o	o	o	o	o	o	o
How many days in the past week were eggs part of your in between snack(s)? (12)	o	o	o	o	o	o	o	o

Page Break

Q87 Timing
First Click (1)
Last Click (2)
Page Submit (3)
Click Count (4)

Q89 Now we would like to ask you to watch this 3-minute video showing the mistreatment of animals and common misconceptions. **Please put on the sound, in case it is turned off.** Watch the video carefully, as later there will be questions asked about it.

Video

Q90 If the video does not load, please visit this link: https://youtu.be/Ow-lyhhskTE?si=aEyQl6nWdGt2L_Zp

Page Break

Q56 Please answer the following questions relating to the content of the video you watched.

Q57 Did you watch the video until the end? (please answer honestly)
- o Yes (1)
- o No (2)
- o No, the video did not play (3)

Q60 Please indicate your agreement to this statement with Strongly disagree to Strongly agree.

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I watched the video attentively. (please answer	o	o	o	o	o	o	o

honestly) (1)

Q64 What stood out most from the video?

_____

_____

_____

_____

_____

Q65 What can you remember from the video

_____

_____

_____

_____

_____

End of Block: Condition 1

Start of Block: Conclusion Experimental condition

Q168 Thank you for taking the time to participate in the first survey! As mentioned earlier, you will be redirected to another survey that will ask you to enter your email address. This is needed to receive the follow-up surveys. You will receive an e-mail with the link **for the second survey in 3 days. Please continue with the survey** to be redirected. Kind regards, Nina Vieth

Page Break

End of Block: Conclusion Experimental condition

Appendix B

Post-test survey

Start of Block: Introduction

Q69 Welcome to the final part of the study! After finishing this part, you will be granted your SONA credits and are eligible for the raffle. However, it can take some time until you receive the SONA credits. Further information about the raffle will follow at the end of this survey. Today's part will take **approximately 15 minutes** to complete. For any questions feel free to contact me at any time. Nina Vieth n.vieth@student.utwente.nl

End of Block: Introduction

Start of Block: Sona ID

Q96 If you are a student at the University of Twente please write your SONA ID number.

_____

End of Block: Sona ID

Start of Block: Unique ID

Unique ID Please enter the unique ID that you created in your first survey! As mentioned before, it consists of the **month of your birthday, the first two letters of your mum's name, and the last two digits of your zip code.** As an example: If someone's birthday is in May, has a mother named Mary, and lives in 48164, then their unique ID is 05MA64.

_____

End of Block: Unique ID

Start of Block: Speciesist attitudes

Attitude Now we are interested in your ideas about animals. Please indicate below to what extent you agree or disagree.

Speciesist attitude It is morally acceptable to perform medical experiments on animals that we would not perform on any human.

- o Strongly disagree (1)
- o Disagree (2)

- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Speciesist attitude It is morally acceptable to keep animals in circuses for human entertainment.

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Speciesist attitude Humans have the right to use animals however they want to.

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Speciesist attitude Morally, animals always count for less than humans.

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)
- Agree (6)
- Strongly agree (7)

Speciesist attitude Chimpanzees should have basic legal rights such as a right to life or a prohibition of torture.

- Strongly disagree (1)
- Disagree (2)
- Somewhat disagree (3)
- Neither agree nor disagree (4)
- Somewhat agree (5)

- o Agree (6)
- o Strongly agree (7)

Speciesist attitude It is morally acceptable to trade animals like possessions.

- o Strongly disagree (1)
- o Disagree (2)
- o Somewhat disagree (3)
- o Neither agree nor disagree (4)
- o Somewhat agree (5)
- o Agree (6)
- o Strongly agree (7)

End of Block: Speciesist attitudes

Start of Block: Animal product consumption

Q2
Below, please fill in **how many days in the past 7 days** you had meat, dairy, and eggs included in your breakfast, lunch, dinner, and in between snacks.

Note that meat, dairy, and eggs could also be used in products like sandwitch spreads, cookies, and pancakes. Count these as well.

If you are not sure, please give an estimation.

	0 (0)	1 (1)	2 (2)	3 (3)	4 (4)	5 (5)	6 (6)	7 (7)
How many days in the past week was meat part of your breakfast? (1)	o	o	o	o	o	o	o	o
How many days in the past week was dairy	o	o	o	o	o	o	o	o

part of your breakfast? (2)								
How many days in the past week were eggs part of your breakfast? (3)	o	o	o	o	o	o	o	o
How many days in the past week was meat part of your lunch? (4)	o	o	o	o	o	o	o	o
How many days in the past week was dairy part of your lunch? (5)	o	o	o	o	o	o	o	o
How many days in the past week were eggs part of your lunch? (6)	o	o	o	o	o	o	o	o

How many days in the past week was meat part of your dinner? (7)	o	o	o	o	o	o	o	o
How many days in the past week was dairy part of your dinner? (8)	o	o	o	o	o	o	o	o
How many days in the past week were eggs part of your dinner? (9)	o	o	o	o	o	o	o	o
How many days in the past week was meat part of your in between snack(s)? (10)	o	o	o	o	o	o	o	o
How many	o	o	o	o	o	o	o	o

days in the past week was dairy part of your in between snack(s)? (11)								
How many days in the past week were eggs part of your in between snack(s)? (12)	o	o	o	o	o	o	o	o

End of Block: Animal product consumption

Start of Block: Remarks

Q95 Do you have any remarks about this part of the study?

_____

_____

_____

_____

_____

End of Block: Remarks

Start of Block: Conclusion

Q97 You have almost reached the end of the survey! Thanks so much for participating in all parts! Your valuable insights have contributed significantly to our research. We appreciate

your thoughtful responses and the effort you have put into providing us with candid feedback. As we noted in the informed consent we are interested in investigating people's behaviours and attitudes towards animals. More specifically their attitudes and behaviours towards **speciesism**. This concept explains the inconsistency in the moral treatment of different animals (Caviola et al.,2019). **Speciesism** assumes that unjustified discrimination happens solely based on the individual's species membership, thus we tend to love our pets and consume other animals (Singer, 1975). In previous research, it was concluded that common misconceptions regarding the capabilities of animals may affect speciesism. Therefore, this survey aimed to **reduce common misconceptions and decrease speciesist attitudes and behaviours.** On a macro level, reduced consumption of animal products is an **effective strategy to counter biodiversity loss and climate change in our developed countries** due to the massive amount of resources such as energy and the emissions that are used within the supply chain of animal products (Stoll-Kleemann & Schmidt, 2017). Hence, **participation** and possible changes in attitudes and behaviours are crucial. **Thank you! Please continue to reach the raffle and complete the survey!** Again, questions and remarks concerning this research can be sent to the leading researcher Nina Vieth. n.vieth@student.utwente.nl Kind regards, Nina Vieth

Page Break

Q112 If you would like to be considered for **the raffle** and have the chance to win an **Amazon voucher** of either **10€, 15€, or 25€, please answer yes**. This will redirect you to another questionnaire, so your email address cannot be linked to your answers.

- o Yes (1)
- o No (2)

End of Block: Conclusion