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Prejudice Across Species Lines: Testing for a Link Between the Devaluation of Humans and Non-Human Animals

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Abstract

People who are prejudiced against one social group also tend to be prejudiced against other social groups, that is, they show generalized prejudice. Many scholars have noted parallels between the devaluation and exploitation of certain human groups (e.g., racism, sexism, and other forms of prejudice) and the treatment of non-human animals (often referred to as speciesism), suggesting that generalized prejudice may even extend across species lines. I tested this hypothesis using panel data with large and demographically diverse participant samples and different operationalizations of the devaluation of humans and animals. Study 1 (56,759 participants from 46 European countries) revealed a positive association between human-directed prejudice and human supremacy beliefs and this association was still observed when controlling for various socio-demographic factors (e.g., gender, educational attainment, religiosity, political orientation). Study 2 (1,566 Dutch participants) revealed positive associations between human-directed prejudice and a host of attitudes, beliefs, emotional responses, and behaviors related to meat consumption. For the majority of tests, this positive association was still observed when controlling for socio-demographic factors. Thus, both studies suggest that people who devalue human groups also tend to devalue the welfare and interests of animals. The current findings support recent theorizing on the common psychological roots of human-directed and animal-directed prejudice and attest to the generality of generalized prejudice.

Keywords

generalized prejudice, speciesism, social dominance, human-animal relations

Non-Technical Summary

Background

For decades, scientists, philosophers, and animal advocates have pointed out parallels between the derogation and exploitation of certain human groups (e.g., racism, antisemitism), and the derogation and exploitation of non-human animals (i.e., speciesism). For example, for a long time, slaves were treated as property, experimented upon, and exploited for manual labor. They had few rights and were seen as inherently inferior. Although most people today condemn these beliefs and practices, the same is not true with regard to non-human animals. More recently, researchers have proposed that similarities between the devaluation of humans and the devaluation of non-human animals not only exist at the surface. Psychological theories, like the Social Dominance Human-Animal Relations Model, propose that the same psychological mechanism that underlie racism, sexism, and other forms of prejudice also give rise to speciesism (i.e., prejudice towards non-human animals). This theory therefore predicts that individuals who are more prejudiced towards humans are also more prejudiced towards non-human animals.

Why was this study done?

The main goal of the current studies was to test this proposed link between prejudice towards humans and non-human animals. Previous work already found evidence for this hypothesis. However, these studies also had some important limitations. Most of the work was conducted with people from English-speaking countries (e.g., the United States and the United Kingdom) or with university students who tend to be much younger, more liberal, and more educated than the general population. It is unclear whether the same results would be observed in more representative samples from different countries. There are also many different ways in which prejudice towards humans and non-human animals can be measured. For example, researchers often measure speciesism by asking people about their attitudes and beliefs concerning non-human animals (e.g., whether the use of animals in experiments, entertainment, or food production is morally justifiable). But there are also emotional and behavioral responses that are indicative of the devaluation of non-human animals that have received less attention in previous work. The present studies tested for a link between prejudice towards humans and non-human animals across various measures of prejudice using existing panel data with large and demographically diverse samples of participants.

What did the researchers do and find?

Study 1 relied on nationally representative samples from the European Values Survey. The data set contained responses from 56,759 participants from 46 European countries spanning Northern Europe (e.g., Sweden, Iceland), Western Europe (e.g., France, Ireland), Eastern Europe (e.g., Russia, Azerbaijan), and Southern Europe (e.g., Turkey, Portugal). People who scored higher on human-directed prejudice (e.g., indicating that they would not like to have a person from another race as their neighbor) were also more likely to endorse human

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supremacy beliefs (i.e., "human were meant to rule over nature"), which is a key component of speciesist ideology. Study 2 relied on data from 1,566 Dutch participants. Again, people who expressed more prejudice towards immigrants were also more likely to endorsed a host of attitudes (e.g., a positive evaluation of meat consumption), beliefs (e.g., that meat production is morally acceptable), emotional responses (e.g., guilt or shame when thinking about meat production), and behaviors (e.g., how often and how frequently they consume meat) related to the devaluation of animals.

What do these findings mean?

Together, the present results support the hypothesis that individuals who are more prejudiced towards humans are also more prejudiced towards non-human animals, which may be due to common underlying psychological mechanisms (e.g., social dominance orientation). In comparison to most previous work on this topic, the presents studies relied on larger and more diverse samples of participants and broader sets of measures of prejudice towards humans and non-human animals. Thus, the present results can strengthen our confidence in the proposed psychological mechanisms underlying the devaluation of animals, as suggested, for example, by the Social Dominance Human-Animal Relations Model. Ultimately, a detailed understanding of these psychological mechanisms can inform interventions aimed at combatting prejudice. For example, if prejudice towards humans and non-human animals share common causes, then interventions that tend to be successful in reducing the former (e.g., positive intergroup contact) may also succeed in reducing the latter.

In its most general form, prejudice can be defined as a devaluing sentiment towards a specific group (Bergh & Brandt, 2022, 2023). This devaluation can express itself in the form of different beliefs, emotional responses, or behaviors (e.g., unfavorable stereotypes, discounting others' intrinsic worth, unfair or even exploitative treatment). Prejudice research has mostly focused on how people devalue various human groups (Akrami et al., 2011; Bergh & Brandt, 2023). However, many philosophers and scientists have noted similarities between the unjust treatment of certain social groups (e.g., racism, sexism, and other forms of prejudice) and the treatment of non-human animals (e.g., Dhont et al., 2019; Singer, 1975). In other words, the devaluing sentiment that characterizes human-directed prejudice also characterizes how some people think about and treat non-human animals. Beliefs, emotional responses, and behaviors related to the devaluation of animals are often subsumed under the label of "speciesism", a term that intends to highlight parallels with racism and sexism (Horta, 2010; Ryder, 2011; Singer, 1975). Building on these observed parallels, researchers have proposed that the same psychological processes give rise to various forms of prejudice, leading to the prediction that people who hold more prejudiced attitudes towards human groups should also hold more prejudiced attitudes towards animals (Dhont et al., 2016; Dhont & Hodson, 2014). Here, I draw on data from two panels with large, demographically diverse participant

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samples to test this prediction (Study 1: 56,759 participants from 46 countries, Study 2: 1,566 participants from the Netherlands).

Prejudice Against Humans and Animals

Decades of research have shown that people who devalue one group also tend to devalue others, an individual tendency that is referred to as *generalized prejudice* (Akrami et al., 2011; Allport, 1954; Dhont et al., 2016). One explanation for why different forms of prejudice come as a package deal is that they are underpinned by the same beliefs and ideologies. Two traits in particular are often invoked to explain the causes of generalized prejudice: *right-wing authoritarianism* (RWA), a preference for conformity, traditional values, and deference to authority (Altemeyer, 1981), and *social dominance orientation* (SDO), a preference for group-based dominance hierarchies and social inequalities (Ho et al., 2015).

Building on this work, recent theoretical models have proposed that generalized prejudice and the devaluation of animals—as indicated, for example, by support for factory farming, animal experimentation, and recreational hunting—share the same underlying psychological mechanisms (Costello & Hodson, 2010, 2014; Dhont et al., 2016). SDO in particular has been highlighted as a proximate cause of prejudice against humans and animals alike (Dhont & Hodson, 2014; Sibley & Duckitt, 2008). According to the social dominance human-animal relations model (SD-HARM), preferences for group-based hierarchy and inequality, as captured by measures of SDO, motivated prejudice towards both humans and non-human animals (Dhont et al., 2016). Moreover, the interspecies model of prejudice posits that beliefs about the fundamental divide between humans and animals, and human superiority in particular, facilitate the devaluation of human outgroups by likening them to lower-status animals (Costello & Hodson, 2010, 2014).

There is considerable empirical support for the proposed links between prejudice against humans and animals. Individual differences in speciesism (i.e., attributions of lower moral worth to animals) are positively related to measures of racism and sexism (Caviola et al., 2019; Dhont et al., 2016). For example, a study by Jackson (2019) showed that participants who scored higher on speciesism also indicated more negative attitudes towards a host of social groups (measured with feeling thermometers), and this association was particularly strong for groups that are typically marginalized (e.g., racial outgroups). The killing and consumption of animals is perhaps the most common manifestation of the devaluation of animal lives. Evidence suggests that meat eaters show higher levels of prejudice against human groups than vegetarians and vegans (Veser et al., 2015). Lay people may even be aware that generalized prejudice extends to non-human groups: Participants expected that a person with speciesist attitudes would be less supportive of gay, Black, and women's rights (Everett et al., 2019).

There is also evidence suggesting that social dominance orientation can explain correlations between human-directed and animal-directed prejudice. Decades of research

have shown a positive relation between individual differences in SDO and prejudice against various social groups (e.g., Sibley & Duckitt, 2008) and recent work has found similar associations for prejudice against animals. People who score higher on SDO also score higher on speciesist attitudes (Caviola et al., 2019; Dhont et al., 2016; Dhont & Hodson, 2014; Graça et al., 2018). They are more likely to think that hunting and fishing are justified (Hopwood & Bleidorn, 2021), they more strongly endorse the use of animals by humans (Hyers, 2006), and they are less likely to condemn acts of animal cruelty (Jarmakowski-Kostrzanowski & Radkiewicz, 2021). Several studies have shown that meat eaters score higher on SDO than vegetarians or vegans (Dhont & Hodson, 2014; Krings et al., 2021; Veser et al., 2015) and high-SDO individuals are less motivated to reduce their meat consumption because of animal welfare concerns (Hopwood & Bleidorn, 2021).

Research by Dhont and colleagues (2014, 2016) directly tested whether SDO can account for the links between prejudice towards humans and animals. Across multiple studies, they found that speciesist attitudes were positively correlated with ethnic prejudice (i.e., more negative attitudes towards immigrants and various ethnic minorities). SDO was positively related to both forms of prejudice and, crucially, the positive association between speciesism and ethnic prejudice was non-significant when controlling for SDO. These findings were replicated by Jackson (2019), who found positive associations between SDO, speciesism, and prejudice towards marginalized social groups (although there was still a significant link between speciesism and prejudice towards humans when controlling for SDO). Most prior studies on the role of SDO relied on correlational analyses of individual differences measures, but some experimental studies have yielded similar results. Participants showed more moral concern for animals after reading or writing an essay on how animals are similar (vs. dissimilar) to humans (Bastian et al., 2012). Thus, accumulating evidence supports the notion that generalized prejudice also extends to animals and that individual differences in SDO can explain this link.

The Present Studies

Result of prior studies mostly support the notion that human- and animal-directed prejudice are linked, but they also share a number of limitations. Previous studies overwhelmingly relied on participants from a few English-speaking countries who were recruited from university participant pools or online platforms, such as Amazon Mechanical Turk or Prolific (e.g., Caviola et al., 2019; Dhont et al., 2016; Everett et al., 2019). That is, evidence from demographically diverse samples outside of the Anglosphere is scarce, raising questions about the generalizability of results. To address this issue, I draw on large panel data sets with demographically diverse participant samples (Study 1: 56,759 European participants recruited for the European Values Survey, Study 2: 1,566 Dutch participants recruited for the LISS panel). Specifically, Study 1 relies on data from 46 countries, spanning Northern Europe (e.g., Sweden, Iceland), Western Europe (e.g.,

France, Ireland), Eastern Europe (e.g., Russia, Azerbaijan), and Southern Europe (e.g., Turkey, Portugal).

It is also unclear whether socio-demographic factors, rather than SDO, can explain the positive association between human- and animal-directed prejudice. For example, men and conservatives often show higher levels of prejudice against marginalized groups and prejudice against animals (Caviola et al., 2019; Hodson & Dhont, 2015) and it seems like these associations are not only due to differences in SDO (Dhont & Hodson, 2014; Graça et al., 2018). The present studies explore, (a) how various socio-demographic variables (i.e., gender, age, educational attainment, income, rural vs. urban living environment, religiosity, and political orientation) are related to attitudes, beliefs, emotions, and behaviors related to the devaluation of animals and, (b) whether the link between human- and animal-directed prejudice still emerges when controlling for these variables.

Finally, the present studies test whether the link between human- and animal-directed prejudice generalizes across a diverse set of measures. Although, the scope of the tests that are reported here is restricted by the measures that were available in the panel data sets (meaning that more direct operationalizations of the key constructs certainly exist), the panels were chosen as a data source precisely because they include a diverse set of relevant measures related to the devaluation of animals' welfare and interests. Study 1 focuses on human supremacy beliefs ("humans are meant to rule over nature"), which can be seen as a devaluation of animals' interests and agency. Study 2 focuses on a diverse set of beliefs, emotional responses, and behaviors related to the killing of animals for food (the perceived ethicality of animal agriculture, feelings of shame and guilt when thinking about meat consumption, frequency and quantity of meat consumption), which can be seen as a devaluation of animals' welfare. Study 1 also examines different forms of prejudice directed towards various human groups, including racial and religious minorities.

In sum, the present studies draw on large, demographically diverse panel data sets with different operationalizations of human- and animal-directed prejudice to provide a stronger test of the hypothesis that people who tend to devalue human groups also tend to devalue animals. All data and analysis scripts are available in Jaeger (2024).

Study 1

In Study 1, I tested whether people who are more prejudiced towards human groups are also more prejudiced against non-human animals in a large, demographically diverse, multi-national data set with 56,759 participants from 46 European countries. Specifically, associations between human-directed prejudice and human supremacy beliefs (operationalized as the extent of agreement with the statement that "humans are meant to rule over nature") were examined. Human supremacy beliefs represent a devaluation of animals' interests and agency and are key in legitimizing the exploitation of animals

(Becker et al., 2019; Dhont & Hodson, 2014; Krings et al., 2021; Leite et al., 2019). Thus, human supremacy beliefs can be regarded as a specific component of a broader speciesist belief system. This view is also supported by the content overlap of measures that assess speciesism (e.g., "morally, animals always count for less than humans"; Caviola et al., 2019) and human supremacy beliefs (e.g., "the life of an animal is just not of equal value as the life of a human being"; Dhont & Hodson, 2014).

Recent work has explored whether there are distinct dimensions of generalized prejudice (e.g., Bergh & Brandt, 2022, 2023). Although factor analyses provided some evidence for a general negativity component (i.e., "misanthropy") across a large and diverse set of target groups, results also suggest that there may be three somewhat distinct prejudice types (at least in the United States), representing prejudice against marginalized groups (e.g., immigrants, racial minorities), prejudice against unconventional groups (e.g., atheists), and prejudice against privileged groups (e.g., rich people, politicians). In the present study, prejudice towards various human social groups was measured, allowing for operationalizations of prejudice that differed in breadth. Specifically, the present study tested if human supremacy beliefs are positively associated with, (a) prejudice against people from another race, which may be psychologically closest to prejudice against animals (Caviola et al., 2019; Singer, 1975), (b) generalized prejudice against various groups that are typically marginalized in society (e.g., immigrants, homosexuals, drug addicts) and (c) generalized prejudice against an even larger set of social groups, including groups that are typically not marginalized (e.g., large families, Christians).

Method

Participants

Study 1 used data from the fourth wave of the European Values Survey, which was administered in 2008. The EVS is a European cross-national, longitudinal survey, which is administered approximately every ten years to understand trends in values, attitudes, beliefs, and other indicators. Data from a total of five waves are currently available (1981, 1990, 1999, 2008, 2017). Data from the fourth wave was chosen because it was the only wave in which human supremacy beliefs were assessed. The integrated data set across all countries was downloaded from gesis.org. The data set contains responses from 66,280 participants in 46 European countries. After excluding participants with missing data on the two key variables (human supremacy beliefs and racial prejudice), a sample of 56,759 participants was retained for analysis (M_{age} = 46.21, SD_{age} = 17.83; 54.81% female, 45.19% male). For more detailed descriptive statistics, see Table S1 in the Supplemental Materials in Jaeger (2024). Sample sizes per country ranged from 355 (Great Britain) to 1,961 (Switzerland) with a median sample size of 1,276 (M = 1,234, SD = 297).

Measures

Human supremacy beliefs were measured with a single item. Participants indicated their agreement with the statement "Humans were meant to rule over nature" on a four-point scale (agree strongly, agree, disagree, disagree strongly). The item was reverse-coded so that higher scores reflect stronger human supremacy beliefs.

Individual differences in prejudice were measured in three ways. Participants were shown a list of fifteen diverse social groups (people from another race, immigrants, Muslims, Jews, gypsies, homosexuals, people with AIDS, drug addicts, criminals, emotionally unstable people, left wing extremists, right wing extremists, large families, Christians, heavy drinkers) and they were asked to indicate which of the groups they "would not like to have as a neighbor". Groups were coded as 1 if they were mentioned and as 0 if they were not mentioned. For the present study, three different measures were constructed based on participants' responses.

Speciesism may be psychologically closest to racial prejudice (Caviola et al., 2019; Singer, 1975). The first prejudice measure was therefore a binary variable indicating whether participants would not like to have a person from another race as a neighbor. The treatment of animals is often likened to the treatment of marginalized social groups. Therefore, a second measure of prejudice against marginalized groups was created (McDonald's ω = .84), which was the total number of marginalized groups (people from another race, immigrants, Muslims, Jews, gypsies, homosexuals, people with AIDS, drug addicts, criminals, emotionally unstable people) that participants would not like to have as a neighbor. Finally, a third measure of prejudice against all groups that were assessed was created (McDonald's ω = .84), which was the total number of groups that participants would not like to have as a neighbor, including groups that are typically not marginalized (left wing extremists, right wing extremists, large families, Christians, heavy drinkers).

Several socio-demographic variables were also recorded including participants' sex (male or female), age, level of education, income, religiosity, and political orientation. Educational attainment was measured by recoding participants' highest completed education to a cross-national eight-point scale ranging from 1 (preprimary school or no education) to 8 (second stage of tertiary education). Income was measured by recording participants' monthly household income in Euros (as multiples of 1000 Euros). To enable comparability across countries income was adjusted for purchasing power parity. Due to its right-skewed distribution, the income variable was $\log_{10}$-transformed. Religiosity was measured by asking participants if they would describe themselves as a religious person, not a religious person, or a convinced atheist (irrespective of whether they go to church). The last two response options were combined, creating a binary variable indicating whether participants are religious or not. Political orientation was measured by asking participants how they would place their political views on a ten-point scale

ranging from 1 (left) to 10 (right). All continuous predictors were *z*-standardized prior to analysis.

Results

The relation between human-directed prejudice and the measure of animal-directed prejudice (i.e., human supremacy beliefs) was examined by estimating a series of ordinal multilevel regression models with random intercepts per country using the *ordinal* package in R. In separate models, human supremacy beliefs were regressed on three different operationalizations of human-directed prejudice: prejudice against people from another race, prejudice against marginalized groups, and prejudice against all fifteen groups that were assessed, including groups that are typically not marginalized.

Regressing human supremacy beliefs on racial prejudice yielded a significant positive effect, β = 0.244, *SE* = 0.022, *OR* = 1.28, 95% CI [1.22, 1.33], *p* < .001 (see Table 1, Model 1). More prejudiced individuals expressed stronger human supremacy beliefs. Next, I tested whether this relationship still emerges when controlling for a host of demographic factors (i.e., sex, age, education, income, religiosity, and political orientation). Results showed that human supremacy beliefs were more strongly endorsed by men, by older participants, by less educated and lower-income participants, by religious participants, and by participants further to the political right. There was still a positive association between racial prejudice and human supremacy beliefs when controlling for these variables, β = 0.202, *SE* = 0.029, *OR* = 1.22, 95% CI [1.16, 1.30], *p* < .001 (see Table 1, Model 2).

I also examined the association between human supremacy beliefs and prejudice against human groups that are typically marginalized. There was a positive association between prejudice against marginalized groups and human supremacy beliefs, β = 0.133, *SE* = 0.009, *OR* = 1.14, 95% CI [1.12, 1.16], *p* < .001 (see Table 1, Model 3). This association remained significant when controlling for the set of socio-demographic variables, β = 0.113, *SE* = 0.012, *OR* = 1.12, 95% CI [1.09, 1.15], *p* < .001 (see Table 1, Model 4).

Finally, the association between human supremacy beliefs and prejudice against an even broader set of human groups (including groups that are typically not marginalized) was examined. Again, prejudice was positively associated with human supremacy beliefs, β = 0.107, *SE* = 0.010, *OR* = 1.11, 95% CI [1.09, 1.14], *p* < .001 (see Table 1, Model 5). This association remained significant when controlling for set of socio-demographic variables, β = 0.078, *SE* = 0.013, *OR* = 1.08, 95% CI [0.1.05, 1.11], *p* < .001 (see Table 1, Model 6).

Discussion

Relying on nationally representative data from the European Values Survey, Study 1 provided support for the hypothesized link between prejudice towards humans and animals. In a large sample of countries and participants (45 or 46 countries and 35,286 to 58,961 participants, depending on the exact analysis), more prejudiced individuals

Table 1

Associations Between Different Operationalizations of Human-Directed Prejudice (Racial Prejudice in Models 1 and 2, Prejudice Towards Marginalized Groups in Models 3 and 4, and Prejudice Towards a More Diverse Set of Social Groups in Models 5 and 6) and Human Supremacy Beliefs

Predictor	β (*SE*)	
	Model 1	**Model 2**
Prejudice (racial)	0.244 (0.022)***	0.202 (0.029)***
Male		0.074 (0.020)***
Age		0.068 (0.011)***
Education		-0.118 (0.012)***
Income (log)		-0.070 (0.014)***
Religious		0.188 (0.024)***
Political right		0.060 (0.010)***
Countries	46	45
Participants	56,759	44,833
	Model 3	**Model 4**
Prejudice (marginalized)	0.133 (0.009)***	0.113 (0.012)***
Male		0.076 (0.020)***
Age		0.070 (0.011)***
Education		-0.116 (0.012)***
Income (log)		-0.073 (0.015)***
Religious		0.184 (0.024)***
Political right		0.054 (0.011)***
Countries	46	45
Participants	53,707	42,602
	Model 5	**Model 6**
Prejudice (all groups)	0.107 (0.010)***	0.078 (0.013)***
Male		0.078 (0.023)***
Age		0.057 (0.012)***
Education		-0.139 (0.013)***
Income (log)		-0.058 (0.016)***
Religious		0.143 (0.028)***
Political right		0.045 (0.012)***
Countries	39	45
Participants	43,882	46,253

$^{†}p < .10.\ ^{*}p < .05.\ ^{**}p < .01.\ ^{***}p < .001.$

more strongly believed that humans are meant to rule over nature, a belief that devalues animals' agency and interests and has been linked to various exploitative attitudes and

behaviors towards animals (Dhont & Hodson, 2014; Leite et al., 2019). This association was observed when analyzing prejudice towards people from another race, prejudice towards various social groups that are typically marginalized, and prejudice against an even broader set of groups, including groups that are typically not marginalized. Associations with racial prejudice were generally larger than associations with generalized prejudice against groups.

Study 2

Study 2 (n = 1,566) shifted the focus to different operationalizations of animal-directed prejudice by examining associations between human-directed prejudice and a diverse set of attitudes, beliefs, emotional responses, and behaviors related to meat consumption. The use of animals for food can arguably be seen as the most common way in which animals' welfare and interests are devalued and measures of speciesism and animal rights often contain items on the use of animals for food (e.g., Dhont et al., 2014; Wuensch et al., 2002).

Methods

Participants

Study 2 used data from the LISS (Longitudinal Internet Studies of the Social Sciences) panel. The panel consists of participants from a probability sample of Dutch households that were drawn from the population register. Participants are representative of the Dutch population on indicators like gender, age, education, and income (for more information, see LISS Panel, 2024). I combined data from surveys that were administered at different times. Data on attitudes towards animals and meat consumption were taken from a single-wave survey on consumer behavior that was administered in October 2012. Questions related to prejudice and socio-demographic variables are part of surveys that are administered in recurring waves. I extracted data from wave five because it was collected closest to the data collection period of the consumer behavior survey. Specifically, data on prejudice and political orientation were assessed in February 2012, data on religiosity were assessed in April 2012, and data on gender, age, education, income, and urban vs. rural character of living environment were assessed in October 2012. Only participants with available data for at least one measure of animal-directed prejudice and complete data for all other variables (i.e., human directed prejudice and socio-demographic variables) were retained, which resulted in a sample of 1,566 participants (M_{age} = 58.93, SD_{age} = 14.04; 60.91% female, 39.08% male). For more detailed descriptive statistics, see Table S1 in the Supplemental Materials in Jaeger (2024).

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Measures

The data set includes various variables that capture participants' views of animals. Three variables were used to assess attitudes and beliefs related to the devaluation of animals. A variable capturing participants' *general attitude towards meat consumption* was created by averaging responses to five questions (ω = .97). Participants indicated how they think about the consumption of meat produced in conventional chicken and pig farms using five seven-point scales than ranged from -3 ("bad", "negative", "inappropriate", "undesirable", "unpleasant") to 3 ("good, "positive", "appropriate", "desirable", "pleasant"). Two beliefs about meat consumption were measured with binary variables. Participants were asked if they think the labels *animal-unfriendly* (reverse-scored) and *morally acceptable* apply to the consumption of meat produced in conventional chicken and pig farms.

Three binary variables measured emotional responses towards the use of animals in food production. Participants were asked whether they feel *discomfort*, *shame*, or *guilt* when thinking about the consumption of meat produced in conventional chicken and pig farms.

Finally, five variables measured behaviors (or behavioral intentions) related to the devaluation of animals. Based on participants' self-described diet (meat eater, meat reducer, pollotarian, pescetarian, ovo-lacto-vegetarian, or vegan), a binary variable indicating whether participants described themselves as a *meat eater* (the first diet) or not (combining the remaining four diets) was created. The initial plan was to contrast participants who eat meat (combining the first four diets) with those who do not eat meat (combining the last two diets). However, the number of vegetarians and vegans in the sample was very low (*n* = 26, 1.60% of all participants) and I therefore decided to compare meat eaters (*n* = 926, 59.13%) with meat reducers, vegetarians, and vegans (*n* = 638, 40.74%; two additional participants chose not to report their diet).

Two variables measured participants' *frequency* and *quantity of meat consumption*. For each of three types of meat (chicken, pork, and beef), participants indicated on how many days in a span of four weeks they typically eat the meat and how many grams of the meat they typically eat on a day they consume it. Participants' responses across the three types of meat were summed to create two variables indicating the frequency and quantity of meat consumption.

One item measured whether participants purchase more *"ethically produced" meat*. Participants indicated whether they buy chicken or pig meat with a "Beter Leven" label (the most well-known certification system of the animal-friendliness of various animal products in the Netherlands) of three out of three stars on a five-point scale ranging from 1 (never) to 5 (always).

Participants' willingness to eat a *meat substitute* instead of meat at least once a week was measured on a five-point scale ranging from 1 (definitely not) to 5 (definitely/ I already do so).

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Individual differences in prejudice were measured with five questions capturing views on immigrants and people of foreign descent ("There are too many people of foreign origin or descent in the Netherlands", "It does not help a neighborhood if many people of foreign origin or descent move in", "It is good if society consists of people from different cultures", "Legally residing foreigners should be entitled to the same social security as Dutch citizens", "It should be made easier to obtain asylum in the Netherlands"). The last three items were reverse-coded before creating an average score of all five items (ω = .81).

Next to the socio-demographic variables that were also recorded in Study 1 (participants' gender, age, level of education, income, religiosity, and political orientation), an additional variable indicating whether participants lived in a rural or urban area was recorded. Educational attainment was measured by recoding participants' highest completed education on a six-point scale reflecting the Dutch education system (primary school, preparatory secondary vocational education, senior general secondary education, secondary vocational education, university of applied sciences, academic university). Income was measured by recording participants' net monthly household income in Euros. Due to its right-skewed distribution, the income variable was $\log_{10}$-transformed. Religiosity was measured on a binary scale by asking participants if they consider themselves a member of a certain religion or church community. Political orientation was measured by asking participants how they would place their political views on a ten-point scale ranging from 1 (left) to 10 (right). Urban character of participants' place of residence was measured on a five-point scale ranging from 1 (extremely urban) to 5 (not urban). The item was reverse-coded so that higher scores reflect a more urban environment. All continuous predictors were z-standardized prior to analysis.

Results

The hypothesized relation between human- and animal-directed prejudice was tested by examining zero-order correlations between the variables of interest (see the Supplemental Materials in Jaeger, 2024 for a full correlation matrix) and with a series of regression models. In separate models, measures of the devaluation of animals were regressed on anti-immigrant prejudice, while controlling for demographic variables: gender, age, education, residential environment (rural vs. urban), income, religiosity, and political orientation (left vs. right).

Attitudes and Beliefs

First, participants' attitudes and beliefs towards meat production were examined. In line with the hypothesis, there were positive correlations between human-directed prejudice and (a) positive attitudes towards meat production, $r(1562)$ = .218, p < .001, beliefs that meat production facilities are animal-friendly, $r(1563)$ = .159, p < .001, and morally acceptable, $r(1563)$ = .093, p < .001. When controlling for gender, age, education, rural vs.

urban living environment, income, religiosity, and identification with the political right, prejudice was still positively related to positive attitudes towards meat production, β = 0.145, SE = 0.039, 95% CI [0.069, 0.222], p < .001 (see Table 2, Model 1). Associations for the beliefs that meat production is animal-friendly, β = 0.025, SE = 0.014, 95% CI [-0.004, 0.053], p = .094 (see Table 2, Model 2), and morally acceptable, β = 0.017, SE = 0.013, 95% CI [-0.009, 0.042], p = .203 (see Table 2, Model 3), were no longer significant.

Table 2

Associations Between Human-Directed Prejudice and Positive Attitudes Towards Meat Production (Model 1), Beliefs That Meat Production Is Morally Acceptable (Model 2) and Animal-Friendly (Model 3), and Feelings of Discomfort (Model 4), Shame (Model 5), and Guilt (Model 6) When Thinking About Meat Production

Predictor	β (*SE*)		
	Model 1: General attitude	**Model 2: Animal-friendly**	**Model 3: Morally acceptable**
Prejudice	0.145 (0.039)***	0.025 (0.015)[†]	0.017 (0.013)
Male	0.466 (0.071)***	0.052 (0.027)[†]	0.084 (0.024)***
Age	-0.113 (0.048)*	-0.029 (0.018)	0.021 (0.016)
Education	-0.130 (0.040)**	-0.073 (0.015)***	-0.034 (0.013)*
Urban	-0.080 (0.034)*	0.029 (0.013)*	-0.010 (0.011)
Income (log)	0.028 (0.040)	-0.012 (0.015)	0.012 (0.013)
Religious	0.422 (0.070)***	0.083 (0.026)**	0.048 (0.023)*
Political right	0.242 (0.038)***	0.070 (0.014)***	0.030 (0.013)*
Intercept	-0.743 (0.053)***	0.432 (0.020)***	0.202 (0.018)***
Participants	1,564	1,565	1,565
	Model 4: Discomfort	**Model 5: Shame**	**Model 6: Guilt)**
Prejudice	-0.054 (0.014)***	-0.027 (0.010)**	-0.010 (0.012)
Male	-0.126 (0.025)***	-0.051 (0.019)**	-0.078 (0.021)***
Age	0.024 (0.017)	0.002 (0.013)	-0.051 (0.015)***
Education	0.027 (0.013)[†]	0.030 (0.011)**	0.013 (0.012)
Urban	0.036 (0.012)**	0.012 (0.009)	0.021 (0.010)*
Income (log)	0.018 (0.014)	-0.007 (0.011)	-0.016 (0.012)
Religious	-0.030 (0.025)	-0.006 (0.019)	0.0002 (0.021)
Political right	-0.037 (0.014)**	-0.052 (0.010)***	-0.035 (0.011)**
Intercept	0.363 (0.019)***	0.154 (0.014)***	0.243 (0.016)***
Participants	1,565	1,565	1,565

[†]p < .10. *p < .05. **p < .01. ***p < .001.

Emotions

Next, emotional reactions towards meat production were examined. In line with the hypothesis, there were negative correlations between human-directed prejudice and feelings of discomfort, r(1563) = -.171, p < .001, shame, r(1563) = -.168, p < .001, and

guilt, $r(1563)$ = -.080, p = .001, when thinking about meat production. When controlling for socio-demographic factors, human-directed prejudice was still negatively related to feelings of discomfort, β = -0.054, *SE* = 0.014, 95% CI [-0.081, -0.027], p < .001 (see Table 2, Model 4), and shame, β = -0.027, *SE* = 0.010, 95% CI [-0.048, -0.007], p = .010 (see Table 2, Model 5), but not guilt, β = -0.010, *SE* = 0.012, 95% CI [-0.033, 0.013], p = .403 (see Table 2, Model 6).

Behaviors

Finally, behaviors related to the devaluation of animals were examined. In line with the hypothesis, there were positive relations between human-directed prejudice and self-identifying as a meat-eater, $r(1562)$ = .160, p < .001, the frequency of meat consumption in the last month, $r(1564)$ = .116, p < .001, and the quantity of meat consumption in the last month, $r(1564)$ = .108, p < .001. There were also negative associations between human-directed prejudice and the frequency of purchasing more "ethically produced" meat, $r(1327)$ = -.165, p < .001, and the willingness to eat meat substitutes at least once a week, $r(1562)$ = -.218, p < .001. When controlling for socio-demographic factors, prejudice was still positively related to self-identifying as a meat-eater, β = 0.253, *SE* = 0.066, *OR* = 1.29, 95% CI [1.28, 1.81], p < .001 (see Table 3, Model 7). That is, individuals who scored one standard deviation higher on human-directed prejudice were almost 30% more likely to self-identify as a meat-eater. Associations of human-directed prejudice with the frequency, β = 0.933, *SE* = 0.264, 95% CI [0.415, 1.451], p < .001 (see Table 3, Model 8), and quantity, β = 12.18, *SE* = 5.954, 95% CI [0.498, 23.856], p = .041 (see Table 3, Model 9), of meat consumption also remained significant when controlling for socio-demographic factors. Finally, the negative associations of human-directed prejudice with the frequency of buying more "ethically produced" meat, β = -0.167, *SE* = 0.038, 95% CI [-0.241, -0.093], p < .001 (see Table 3, Model 10), and the willingness to eat meat substitutes at least once a week, β = -0.202, *SE* = 0.040, 95% CI [-0.281, -0.123], p < .001 (see Table 3, Model 11), were also still significant when controlling for socio-demographic variables.

Table 3

Associations Between Human-Directed Prejudice and Self-Describing as a Meat-Eater (Model 7), Monthly Frequency (Model 8) and Quantity (Model 9) of Meat Consumption, Frequency of Purchasing More "Ethically Produced" Meat (Model 10), and Willingness to Eat Meat Substitutes at Least Once a Week (Model 11)

Predictor	β (SE)				
	Model 7: Meat-eater	Model 8: Meat frequency	Model 9: Meat quantity	Model 10: "Ethical" meat	Model 11: Meat substitutes
Prejudice	0.253 (0.066)***	0.933 (0.264)***	12.12 (5.954)*	-0.167 (0.038)***	-0.202 (0.040)***
Male	0.819 (0.122)***	1.286 (0.480)**	81.90 (10.82)***	-0.290 (0.069)***	-0.436 (0.073)***
Age	-0.521 (0.082)***	-0.020 (0.326)	-18.99 (7.342)**	0.177 (0.047)***	0.065 (0.050)
Education	-0.290 (0.066)***	-0.427 (0.268)	-18.60 (6.031)	0.112 (0.038)**	0.165 (0.041)***
Urban	-0.146 (0.056)**	-0.541(0.229)*	8.641 (5.153)†	0.118 (0.032)***	0.060 (0.035)†
Income (log)	0.117 (0.066)†	0.867(0.270)**	-7.007 (6.093)	-0.207 (0.067)**	-0.051 (0.041)
Religious	0.80 (0.115)*	0.340 (0.470)	-5.324 (10.60)	0.028 (0.039)	-0.137 (0.072)†
Political right	0.067 (0.063)	-0.051 (0.256)	13.85 (5.779)*	0.012 (0.037)	-0.126 (0.039)**
Intercept	0.417 (0.089)***	17.16 (0.361)***	358.7 (8.145)***	2.131 (0.052)***	2.957 (0.055)***
Participants	1,564	1,566	1,566	1,329	1,564

†$p < .10$. *$p < .05$. **$p < .01$. ***$p < .001$.

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Discussion

Results of Study 2 provided additional support for a link between prejudice towards humans and animals. In a large and demographically diverse sample of participants from the Netherlands, individuals who were more prejudiced against immigrants were also more likely to devalue the welfare and interests of animals, as operationalized by various attitudes, beliefs, emotional responses, and behaviors related to the use of animals for food. Out of the eleven variables examined here, eight (general attitudes towards meat production, feelings of discomfort and shame when thinking about meat production, identification as a meat-eater, monthly frequency and quantity of meat consumption, frequency of purchasing more "ethically produced" meat, and willingness to eat meat substitutes at least once a week) still showed a significant association with human-directed prejudice when controlling for a host of socio-demographic variables, suggesting that the relation cannot be (entirely) explained by characteristics such as gender, age, education, or political orientation. The three variables for which associations became non-significant were feelings of guilt when thinking about meat production and beliefs that meat production is morally acceptable and animal-friendly.

General Discussion

Several theories have proposed that generalized prejudice may even extend across species lines (Costello & Hodson, 2010; Dhont et al., 2016). That is, the same basic values and beliefs (e.g., social dominance orientation) that justify and motivate the devaluation of certain human groups may also justify and motivate the devaluation of non-human animals (i.e., speciesism). The present studies tested this hypothesis, examining whether people who show stronger prejudice towards human groups also report more speciesist attitudes, beliefs, and behaviors.

In Study 1, I examined human supremacy beliefs (i.e., the belief that humans are meant to rule over nature), which are key in justifying the exploitation of animals (Becker et al., 2019; Dhont & Hodson, 2014; Krings et al., 2021; Leite et al., 2019). In a large and demographically diverse sample of participants from 46 European countries ($N = 56,759$), individuals who showed stronger human-directed prejudice were also more likely to endorse human supremacy beliefs. This link still emerged when controlling for various socio-demographic characteristics, such as gender, educational attainment, and political orientation.

A link between prejudice towards humans and animals was also found when testing various operationalizations of human-directed prejudice: prejudice against people from another race, generalized prejudice against marginalized groups (e.g., immigrants, homosexuals), and generalized prejudice against a large set of social groups, including groups that are typically not marginalized (e.g., large families, Christians). The largest

association was observed for racial prejudice, which supports perspectives that liken the disparaging treatment of animals to the disparaging treatment of people from racial minorities (Caviola et al., 2019; Dhont et al., 2016; Singer, 1975). Even though a generalized prejudice measure that also included groups that are typically not marginalized was also associated with human supremacy beliefs, additional analyses (reported in the Supplemental Materials in Jaeger, 2024) suggest that this was primarily driven by responses towards marginalized groups. Regressing human supremacy beliefs on prejudice against groups that are typically not marginalized did not show a significant association, β = 0.011, SE = 0.007, p = .132.

Results of Study 2 lend further support to these conclusions. In a large and demographically diverse sample of Dutch participants (N = 1,566), prejudice against immigrants and people of foreign descent (groups that are typically marginalized) was positively related to a host of variables related to the devaluation of animals' welfare and interests. Individuals who showed more human-directed prejudice also reported more positive attitudes towards meat production, stronger beliefs that meat production facilities are animal-friendly and morally acceptable, and weaker feelings of discomfort, shame, and guilt when thinking about meat production. More prejudiced individuals were more likely to identify as a meat-eater, reported eating meat more often and in greater quantities, were less likely to purchase "ethically produced" meat, and less willing to buy meat replacement products. Eight of these eleven associations were still significant when controlling for various socio-demographic characteristics.

In sum, the present studies lend support to theories that posit a common psychological foundation underlying human-directed and animal-directed prejudice, such as the SD-HARM model (Dhont et al., 2014, 2016; Dhont & Hodson, 2014) and the interspecies model of prejudice (Costello & Hodson, 2010, 2014). Crucially, the present studies addressed limitations of previous work on this topic, which overwhelmingly studied individuals from a few English-speaking countries who were recruited via university participant pools or online platforms (i.e., Prolific or Amazon MTurk; Caviola et al., 2019; Dhont et al., 2016; Everett et al., 2019; Hyers, 2006). The present studies relied on larger and more diverse samples of participants including nationally representative samples from 46 European countries (Study 1).

Limitations and Future Directions

There are several constraints on the generalizability of the present findings. Even though participants from a much larger and more diverse set of countries were tested in Study 1 (compared to previous work), the analyses were restricted to European countries. More work is needed to test the robustness of the current findings across a more diverse set of cultures, also considering people from non-Western backgrounds.

One limitation of the analyses was that they were restricted by the variables that were available in the panel data sets, which did not include commonly used scales

to measure speciesism. However, prejudice is often defined as a "devaluing sentiment" towards a group (Bergh & Brandt, 2023) and the current analyses relied on various measures that capture the devaluation of animals' welfare and interests (beliefs in the legitimacy of ruling over them or using them for food). There is also considerable content overlap between the measures used here and a widely used speciesism scales, which includes multiple items on the use of animals for food (Dhont et al., 2014). Still, the current focus on specific expressions of speciesist beliefs and behaviors, rather than measures that capture speciesism more broadly can be seen as a limitation.

Another potential limitation of the current approach was that the relevant variables were only recorded in some waves of the panel. Results of Study 1 and Study 2 were based on data from 2008 and 2012, respectively, and it is possible that results would look different with more recent data. It is very plausible that mean levels of prejudice changed over time, but it is less obvious that correlations between different forms of prejudice would change over time or that the psychological mechanisms that used to cause both types of prejudice now diverge. In fact, scholars have observed generalized prejudice towards humans for many decades (Allport, 1954; Bergh & Brandt, 2022).

In Study 1, the association between human-directed prejudice and human supremacy beliefs was larger for racial prejudice than for prejudice against broader sets of typically marginalized and non-marginalized groups. This may indicate a more closely shared psychological basis of animal-directed prejudice and racial prejudice, but it may also result from the fact that when considering a wider set of social groups, more participants are likely to be part of (and not prejudiced toward) at least one of the social groups. It was not possible to determine participants' affiliation with each group based on the present data, but one piece of evidence speaks against the idea that weaker associations were primarily driven by how many participants in the data set belong to the group. The group with the presumably largest membership share among participants was Christians and prejudice towards Christians showed a relative strong association with human supremacy beliefs (reported in the Supplemental Materials in Jaeger, 2024).

In Study 2, zero-order correlations between human-directed prejudice and the various measures related to the devaluation of animals were rarely larger than $r = .2$. Evaluating the strength of the observed associations is not straightforward because they are influenced by many aspects of the study design (e.g., the reliability and specificity of the measures). Arguably, the observed associations were not large, which may suggest that although human-directed and animal-directed prejudice share some common causes (e.g., SDO), each prejudice type also has unique antecedents that are not shared.

It should also be noted that the present or previous results do not necessarily imply that individual differences in human-directed prejudice or SDO are among the most important predictors of speciesist attitudes, beliefs, and behaviors. A significant effect of a given variable (no matter how small) can be easily misinterpreted as evidence that the variable is an important predictor of the outcome in question. To address the

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question of which variables best predict speciesism, approaches that simultaneously consider and compare many (ideally, all) potentially relevant factors—such as empathy, personality, and childhood pet ownership—are needed. The relatively small associations observed here may indicate that human-directed prejudice would not be among the most informative predictors.

The present studies did not examine the role of SDO in explaining the link between prejudice towards humans and animals, as this measure was not available in the data sets analyzed here. In both studies, significant associations between human-directed and animal-directed prejudice still emerged when controlling for a large set of socio-demographic variables, suggesting that other factors (such as SDO) may explain the observed relation. Although the present analyses considered more variables than previous work on this topic, it is plausible that variables other than the ones included here (and other than SDO) can explain the link between the different forms of prejudice. To provide more direct evidence on the causal link between SDO and animal-directed prejudice, additional experimental work is needed.

However, this limitation is less relevant when considering the primary goal of the present studies, which was to test the descriptive claim that people who are more prejudiced against humans also tend to show increased prejudice against animals. This is a descriptive (non-causal) claim and it is not obvious that it should be tested while controlling for other factors such as gender and age. For this reason, both zero-order correlations and associations after controlling for various other factors are examined here.

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