Prejudice across species lines

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Generalized Prejudice Predicts Attitudes, Emotions, and Behaviors Towards Animal Exploitation

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Abstract

People who are prejudiced against one social group also tend to be prejudiced against other social groups—they show *generalized prejudice*. Many scholars have noted parallels between the exploitation and marginalization of certain social groups (e.g., racism) and the treatment of non-human animals (i.e., speciesism), suggesting that generalized prejudice may even extend across species lines. Two studies tested this hypothesis using large and diverse participant samples and different operationalizations of prejudice. Study 1 (56759 participants from 46 European countries) showed a positive association between prejudice and human supremacy beliefs, a key feature of speciesist ideology. Study 2 (1566 Dutch participants) revealed positive associations between prejudice and a host of attitudes, emotional responses, and behaviors related to the exploitation of animals. These findings support recent theorizing on the common psychological roots (e.g., social dominance orientation) of both human-directed and animal-directed prejudice and attest to the generality of generalized prejudice.

Keywords: generalized prejudice; speciesism; social dominance; human-animal relations

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Generalized Prejudice Predicts Attitudes, Emotions, and Behaviors Towards Animal

Exploitation

Picture an old man sitting on a porch with his little granddaughter, telling her a cautionary tale about how we used to systematically mistreat and exploit certain individuals in the past just because they were different: Back then it was normal to think that some individuals are inferior, that their interests do not matter, and that their lives are worth less. This ideology was used to justify the terrible thing that we would do to them, such as exploiting their free labor on plantations. In many places, they would live crammed together in dirty conditions without sufficient food and water, often falling victim to disease. Some people would experiment on them or, in some cases, torture and kill them.

This could be a tale told in 1890 about slavery or in 1990 about the holocaust, but it also describes the conditions many non-human animals find themselves in today. Indeed, philosophers and scientists have noted the many similarities between the systemic exploitation of animals and (past and ongoing) systemic discrimination against certain human groups, such as racism and sexism (Allen et al., 2000; Dhont, Hodson, Leite, et al., 2019; Horta, 2010; Plous, 2003; Serpell, 2004; Singer, 1975). Building on these observations, an emerging field of study is exploring the psychology underlying the differential treatment of beings based on their species membership (Caviola et al., 2019; Dhont, Hodson, Leite, et al., 2019). These attitudes and behaviors are often subsumed under the label of "speciesism", a term that is meant to highlight parallels with racism and sexism (Horta, 2010; Singer, 1975). But parallels may not only exist at the surface. Some have proposed that both prejudice against humans and prejudice against animals are the product of the same underlying psychology (Dhont et al., 2016; Dhont & Hodson, 2014). Thus, generalized prejudice— the observation that people who are prejudiced against one social group also tend to be prejudiced against other social groups—may not only generalize across different social groups (Akrami et al., 2011; Bergh & Brandt, 2023), but also across species lines. The present studies test this hypothesis, examining whether people who show prejudice against different social groups also show prejudice against animals. The studies are based on large, demographically diverse samples of participants (Study 1: 56759 participants from 46 countries, Study 2: 1566 participants from the Netherlands) and examine a host of attitudes, beliefs, emotional responses, and behaviors related to the exploitation of animals.

Prejudice against humans and animals

Decades of research have shown that people who derogate and devalue some groups also tend to devalue and derogate others, an individual difference that is referred to as *generalized prejudice* (Akrami et al., 2011, 2011; Allport, 1954; Dhont et al., 2016; Meeusen & Dhont, 2015). One explanation for why different forms of prejudice often 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 propose that generalized prejudice and the devaluation and derogation of animals—manifested, for example, in the common practices of meat consumption, animal experimentation, and recreational hunting—share the same underlying psychological mechanisms (Costello & Hodson, 2010, 2014a; 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), prejudice towards animals can be explained by beliefs about the superiority and dominance of humans over animals, which legitimizes their exploitation (Dhont et al., 2014, 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 derogation of human outgroups by likening them to lower-status animals (Costello & Hodson, 2010, 2014a, 2014b).

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), and broader antisocial personality traits such as low empathy, entitlement, and callousness (Hopwood & Bleidorn, 2020). 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., homosexuals, Muslims, and disabled people). The killing and consumption of animals is perhaps the most typical symptom of the

devaluation of animal lives. Evidence suggests that meat eaters are also more likely to be prejudiced against human groups (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). Finally, there is evidence showing that interventions that tend to reduce prejudice towards humans groups, imagined contact with a member of the group, may also succeed in reducing prejudice towards animals (Auger & Amiot, 2019).

There is also evidence suggesting that social dominance orientation can explain prejudice against both humans and animals. Decades of research have shown that SDO predicts prejudice against various social groups (Bergh & Brandt, 2023; Ho et al., 2015; Sibley & Duckitt, 2008). Recent work has found similar associations between SDO and prejudice against animals. People who score higher on SDO also score higher on speciesist attitudes (Braunsberger et al., 2021; Caviola et al., 2019; Graça et al., 2018; Hopwood & Bleidorn, 2020). They are more likely to think that hunting and fishing are justified (Hopwood & Bleidorn, 2020), more strongly endorse the use of animals by humans (Hyers, 2006), and 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 (Allen et al., 2000; Dhont & Hodson, 2014; Krings et al., 2021; Stone, 2023; Veser et al., 2015) and high-SDO individuals are less motivated to reduce their meat consumption because of animal welfare concerns (Hopwood & Bleidorn, 2020).

Research by Dhont and colleagues (2014, 2016) directly tested whether SDO can account for the links between prejudice towards human 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 (but not RWA) was positively related to both 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). 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

Prior studies mostly supported the notion that human- and animal-directed prejudice are linked, but they also share a number of critical limitations. First, the overwhelming majority or previous studies relied on self-report measures of attitudes and beliefs towards both human groups and animals (e.g., Caviola et al., 2019; Dhont et al., 2016). This may lead to inflated correlations between the measures due to common method bias or social desirability bias (e.g., participants who are more motivated to appear moral may self-report lower levels of speciesism *and* prejudice against humans). The present studies examined not only general attitudes and beliefs towards animal exploitation (e.g., human supremacy beliefs in Study 1), but also a host of more specific beliefs, emotional responses, and behaviors (e.g., actual meat consumption, willingness to buy meat replacement products, beliefs about the animal friendliness of animal agriculture, feelings of shame when thinking about meat consumption in Study 2).

Second, previous findings were overwhelmingly based on students or workers from online platforms (i.e., Amazon MTurk or Prolific) from English-speaking countries (Auger & Amiot, 2019; Caviola et al., 2019; Dhont et al., 2016; Everett et al., 2019; Hopwood & Bleidorn, 2020; Hyers, 2006; Jackson, 2019). The present studies relied on more demographically diverse samples of participants who live outside of the Anglosphere (Study 1: 56759 participants from 46 European countries, Study 2: 1566 participants from the Netherlands).

Finally, it is unclear how robust the positive association between human-directed and animal-directed prejudice is when controlling for various socio-demographic factors. 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; Waytz et al., 2019) and it seems like these association are not only due to differences in SDO (Dhont & Hodson, 2014; Graça et al., 2018). The present studies explored (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 animal exploitation and (b) whether the link between human- and animal-directed prejudice still emerges when controlling for these variables.

In sum, the present studies leverage large, demographically diverse panel data sets with different operationalizations of human- and animal-directed prejudice to provide a strong test of

the hypothesis that generalized prejudice also extends to animals. All data and analysis scripts are available at the Open Science Framework (https://osf.io/dxrq5/).

Study 1

Study 1 was a first test of the hypothesis that people who are more prejudiced towards human social groups are also prejudiced against non-humans. This hypothesis was tested with a large, demographically diverse, cross-national data set with 56759 participants from 46 European countries. Specifically, associations between human-directed prejudice and beliefs that humans are meant to rule over nature were examined. Beliefs about human supremacy are key in legitimizing the domination exploitation of animals and individual differences in these beliefs are associated with increased meat consumption, support for the use of animals in testing, and related outcomes (Becker et al., 2019; Dhont & Hodson, 2014; Krings et al., 2021; Leite et al., 2019).

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 (i.e., "misanthropy") component across a large and diverse set of target groups, results also suggest that there may be three somewhat distinct prejudice types, representing (in the context of the United States) 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 could test 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).

Methods

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 one 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 66280 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 56759 participants was retained for analysis ($M_{age} = 46.21$, $SD_{age} = 17.83$; 54.81% female, 45.19% male; see Table 1 for descriptive statistics). Sample sizes per country ranged from 355 (Great Britain) to 1961 (Switzerland) with a median sample size of 1276 ($M = 1234$, $SD = 297$).

Measures. Attitudes towards animal exploitation 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. Racial prejudice may be psychologically closest to speciesist 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 measure of prejudice against marginalized groups was created (McDonald's $\omega = .84$), 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 measure of prejudice against all groups that were assessed was created (McDonald's $\omega = .84$), 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.

Table 1

Descriptive statistics for Studies 1 and 2

	Study 1		Study 2	
	M	*SD*	*M*	*SD*
Male (%)	45.19	-	32.06	
Age	46.21	17.83	58.93	14.04
Education[a]	5.01	1.93	3.77	1.442
Urban[b]	-	-	3.02	1.28
Income[c]	1264.19	1305.90	2950.06	1470.78
Religious (%)	70.13	-	39.08	
Political right[d]	5.44	2.20	5.11	2.21
$N_{countries}$	46		1	
$N_{participants}$	56759		1566	

[a]Education level was measured on an eight-point scale in Study 1 and on a six-point scale in Study 2 (see Methods section for details).
[b]In Study 2, urban character of place of residence was measured on a five-point scale ranging from not urban to extremely urban (see Methods section for details).
[c]Income represents the net monthly household income in Euros for Study 1 and the net monthly household income, converted to Euros and corrected for purchasing power parity for Study 2 (see Methods section for details).
[d]In Studies 1 and 2, political orientation was measured on a ten-point scale (see Methods section for details).

Results

Descriptive statistics are displayed in Table 1. To test the main hypothesis, the relationship between prejudice and human supremacy beliefs was examined by estimating a series of multilevel regression models with random intercepts per country using the *lme4* (Bates et al., 2015) and *lmerTest* (Kuznetsova et al., 2016) packages in R (R Core Team, 2021). Three different operationalizations of prejudice were: 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, $\beta = 0.113$, *SE* = 0.010, 95% CI [0.089, 0.134], $p < .001$ (see Table 2, Model 1). In line with the hypothesis, more prejudiced individuals expressed stronger human supremacy beliefs. Next, it was tested whether this relationship still emerges when controlling for a host of

demographic factors (i.e., sex, age, education, income, and religiosity, see Table 2, Model 2). Results showed that human supremacy beliefs were more strongly endorsed by men, by older participants, by less educated and lower-income participants, and by religious participants. There was still a positive association between racial prejudice and human supremacy beliefs when comparing for these variables, $\beta = 0.099$, $SE = 0.012$, 95% CI [0.078, 0.121], $p < .001$ (see Table 2, Model 2). Previous work suggests that political conservatism is a strong predictor of exploitation of animals (Dhont & Hodson, 2014; see also Waytz et al., 2019). In Model 3 (Table 2), political orientation was also included as a predictor. Identification with the political right was positively related to human supremacy beliefs, but there was still a positive association between racial prejudice and human supremacy beliefs, $\beta = 0.091$, $SE = 0.013$, 95% CI [0.066, 0.118], $p < .001$.

Next, we tested the robustness of these results by examining the association between human supremacy beliefs and prejudice against groups that are typically marginalized. There was again a positive association between prejudice against marginalized groups and human supremacy beliefs, $\beta = 0.061$, $SE = 0.004$, 95% CI [0.053, 0.069], $p < .001$ (see Table 3, Model 1). This association remained significant when controlling for sex, age, education, income, and religiosity, $\beta = 0.053$, $SE = 0.005$, 95% CI [0.045, 0.064], $p < .001$ (see Table 3, Model 2), and when also controlling for political orientation, $\beta = 0.050$, $SE = 0.005$, 95% CI [0.040, 0.063], $p < .001$ (see Table 3, Model 3).

Finally, the association between human supremacy beliefs and prejudice against an even broader set of social groups (including groups that are typically not marginalized) was examined. Again, prejudice was positively associated with human supremacy beliefs, $\beta = 0.048$, $SE = 0.005$, 95% CI [0.040, 0.058], $p < .001$ (see Table 4, Model 1). This association remained significant when controlling for sex, age, education, income, and religiosity, $\beta = 0.053$, $SE = 0.005$, 95% CI [0.045, 0.062], $p < .001$ (see Table 4, Model 2), and when also controlling for political orientation, $\beta = 0.050$, $SE = 0.005$, 95% CI [0.041, 0.061], $p < .001$ (see Table 4, Model 3).

Table 2

The association between racial prejudice and human supremacy beliefs

	Model 1: Human supremacy β (SE)	Model 2: Human supremacy β (SE)	Model 3: Human supremacy β (SE)
Intercept	2.201 (0.040)***	2.131 (0.037)***	2.130 (0.039)***
Prejudice (racial)	0.113 (0.010)***	0.099 (0.012)***	0.091 (0.013)***
Male		0.034 (0.008)***	0.035 (0.009)***
Age		0.030 (0.004)***	0.031 (0.005)***
Education		-0.055 (0.005)***	-0.055 (0.005)***
Income (log)		-0.026 (0.006)***	-0.030 (0.006)***
Religious		0.074 (0.010)***	0.085 (0.011)***
Political right			0.026 (0.005)***
Countries	46	45	45
Participants	56759	44833	35421

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

Table 3

The association between prejudice against marginalized social groups and human supremacy beliefs

	Model 1: Human supremacy β (SE)	Model 2: Human supremacy β (SE)	Model 3: Human supremacy β (SE)
Intercept	2.224 (0.040)***	2.153 (0.037)***	2.149 (0.039)***
Prejudice (marginalized groups)	0.061 (0.004)***	0.053 (0.005)***	0.050 (0.005)***
Male		0.036 (0.008)***	0.036 (0.009)***
Age		0.030 (0.005)***	0.031 (0.005)***
Education		-0.056 (0.005)***	-0.054 (0.005)***
Income (log)		-0.027 (0.006)***	-0.032 (0.007)***
Religious		0.071 (0.010)***	0.083 (0.011)***
Political right			0.023 (0.005)***
Countries	46	45	45
Participants	53707	42602	33975

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

Table 4

The association between prejudice against all social groups and human supremacy beliefs

	Model 1: Human supremacy β (SE)	Model 2: Human supremacy β (SE)	Model 3: Human supremacy β (SE)
Intercept	2.250 (0.044)***	2.153 (0.037)***	2.149 (0.038)***
Prejudice (all groups)	0.048 (0.005)***	0.053 (0.005)***	0.050 (0.005)***
Male		0.036 (0.008)***	0.036 (0.009)***
Age		0.030 (0.005)***	0.031 (0.005)***
Education		-0.054 (0.005)***	-0.054 (0.005)***
Income (log)		-0.027 (0.006)***	-0.032 (0.007)***
Religious		0.071 (0.010)***	0.083 (0.011)***
Political right			0.023 (0.005)***
Countries	39	45	45
Participants	43882	46253	33975

$^\dagger p < .10$, $* p < .05$, $** p < .01$, $*** p < .001$

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 35286 to 58961 participants, depending on the exact analysis), more prejudiced individuals more strongly believe that humans are meant to rule over nature, a belief that 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, which may be psychologically closest to prejudice against animals (Caviola et al., 2019; Singer, 1975), generalized prejudice towards various social groups that are typically marginalized (e.g., immigrants, homosexuals, drug addicts), and generalized prejudice against all groups, including groups that are typically not marginalized (e.g., Christians, large families, left-wing extremists). Associations with racial prejudice were generally larger than associations with generalized prejudice against groups. This may indicate that, even though generally negative attitudes towards all other humans (i.e., misanthropy) can explain some variation in animal-directed prejudice, prejudice against racial outgroups in particular have more explanatory power.

Study 1 provided a first test of the hypothesis that human-directed and animal-directed prejudice are linked in a cross-cultural context with a large sample and various

operationalizations of human-directed prejudice. Another objective of the current investigation was to examine not only self-reported attitudes and beliefs towards animals, which may be more influenced by social desirability concerns or common method bias, but a range of outcomes that are indicative of exploitative views and behaviors towards animals. Study 2 therefore examined associations between generalized prejudice and a more comprehensive set of attitudes, beliefs, emotional responses, and behaviors related to animal exploitation.

Study 2

Study 2 represents a more comprehensive test of the association between generalized prejudice towards human groups and prejudice towards animals. If (a) prejudice captures the devaluation of a certain group and (b) generalized prejudice also extends to nun-human groups, then people high on generalized prejudice should display various attitudes and behaviors that indicate a decreased valuation of animal welfare. A key domain in which attitudes towards animal welfare manifest in everyday life is meat consumption (Amiot & Bastian, 2015; Dhont, Hodson, Loughnan, et al., 2019). The present study therefore examined associations between generalized prejudice against humans and various attitudes (e.g., towards conventional animal agriculture), emotional responses (e.g., feeling guilt or shame when thinking about meat production), and behaviors (e.g., frequency and quantity of meat consumption) related to meat consumption.

Methods

Participants. Study 2 used data from the LISS (Longitudinal Internet Studies of the Social Sciences) panel (Scherpenzeel & Das, 2010). 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 lissdata.nl). We combined data from two surveys that were administered at different times. Data on attitudes towards animals and meat consumption were taken from a survey that was administered in October 2012 (De Jonge & Van Trijp, 2014). Questions related to prejudice and socio-demographic variables are part of the yearly waves of the panel. We extracted data from wave five because it was collected closest to the data collection period of the other study. We only retained participants with available data on at least one outcome variable and all predictor variables, which resulted in a sample of 1566 participants

(M_{age} = 58.93, SD_{age} = 14.04; 60.91% female, 39.08% male; see Table 1 for descriptive statistics).

Measures. The data set included a range of variables that capture participants' views towards animal exploitation. Attitudes and beliefs towards animal exploitation were measured with three variables. 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 additional attitudes towards meat consumption were measured with binary variables. Participants were asked if they think the labels "animal unfriendly" and "morally acceptable" apply to the consumption of meat produced in conventional chicken and pig farms (answers to the first question were reverse-scored).

Emotional responses towards animal exploitation were measured with three binary variables. 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, behaviors related to animal exploitation were measured with five variables. Based on participants' self-described diet (meat eater, meat reducer, pollotarian, pescotarian, 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. Note that 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 it was therefore decided to compare meat eaters (59.21%) with meat reducers, vegetarians, and vegans (60.79%).

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 replacement product 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).

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 ($\omega = .81$).

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 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 relationship between prejudice and various attitudes, beliefs, emotions, and behaviors related to animal exploitation was tested in two ways. First, zero-order correlations between the variables of interest were examined (see the Supplemental Materials for a full correlation matrix). Second, a series of regression models was estimated in R (R Core Team, 2021). In separate models, measures of animal exploitation were predicted with anti-immigrant prejudice, while controlling for a host of 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 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, $\beta = 0.145$, $SE = 0.039$, 95% CI [0.069, 0.222], $p < .001$ (see Table 3, Model 1). Associations between prejudice and the belief that meat production is animal-friendly, $\beta = 0.025$, $SE = 0.014$, 95% CI [-0.004, 0.053], $p = .094$ (see Table 3, Model 2), and the belief that meat production is morally acceptable, $\beta = 0.017$, $SE = 0.013$, 95% CI [-0.009, 0.042], $p = .203$ (see Table 3, Model 3), were no longer significant.

   Emotions. Next, emotional reactions towards meat production were examined. In line with the hypothesis, there were negative correlations between 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, prejudice was still negatively related to feelings of discomfort, $\beta = -0.054$, $SE = 0.014$, 95% CI [-0.081, -0.027], $p < .001$ (see Table 4, Model 4), and shame, $\beta = -0.027$, $SE = 0.010$, 95% CI [-0.048, -0.007], $p = .010$ (see Table 4, Model 5). However, the association with feelings of guilt was no longer significant, $\beta = -0.010$, $SE = 0.012$, 95% CI [-0.033, 0.013], $p = .403$ (see Table 4, Model 6).

Table 5

Associations between prejudice and positive attitudes towards meat production (Model 1),
beliefs that meat production is morally acceptable (Model 2), and beliefs that meat production
is animal friendly (Model 3).

	Model 1: General attitude β (SE)	Model 2: Animal-friendly β (SE)	Model 3: Morally acceptable β (SE)
Intercept	-0.743 (0.053)***	0.432 (0.020)***	0.202 (0.018)***
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)*
Participants	1564	1565	1565

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

Table 6

Associations between prejudice and feelings of discomfort (Model 4), shame (Model 5), and
guilt (Model 6) when thinking about meat production.

	Model 4: Discomfort β (SE)	Model 5: Shame β (SE)	Model 6: Guilt β (SE)
Intercept	0.363 (0.019)***	0.154 (0.014)***	0.243 (0.016)***
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)**
Participants	1565	1565	1565

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

Behaviors. Finally, more concrete behaviors related to animal exploitation were
examined. In line with the hypothesis, there were positive relations between prejudice and an
omnivorous (vs. meat-free) diet, $r(1562) = .160$, $p < .001$, 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 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 following an omnivorous (vs. meat-free) diet, $\beta = 0.253$, $SE = 0.066$, $OR = 1.29$, 95% CI [1.28, 1.81], $p < .001$ (see Table 7, Model 7). That is, individuals who scored one standard deviation higher on prejudice were almost 30% more likely to identify as an omnivore. Associations of prejudice with the frequency, $\beta = 0.933$, $SE = 0.264$, 95% CI [0.415, 1.451], $p < .001$ (see Table 7, Model 8), and quantity, $\beta = 12.18$, $SE = 5.954$, 95% CI [0.498, 23.856], $p = .041$ (see Table 7, Model 9), of meat consumption also remained significant. Finally, the negative associations of prejudice with the frequency of buying more "ethically produced" meat, $\beta = -0.167$, $SE = 0.038$, 95% CI [-0.241, -0.093], $p < .001$ (see Table 7, Model 10), and the willingness to eat meat substitutes at least once a week, $\beta = -0.202$, $SE = 0.040$, 95% CI [-0.281, -0.123], $p < .001$ (see Table 7, Model 11), were also still significant when controlling for socio-demographic variables.

Table 7

Associations between prejudice and self-describing as a meat-eater (Model 7), monthly frequency of meat consumption (Model 8), monthly quantity of meat consumption (Model 9), frequency of purchasing of more "ethically produced" meat (Model 10) and willingness to eat meat substitutes at least once a week (Model 11)

	Model 7: Meat-eater β (SE)	Model 8: Meat frequency β (SE)	Model 9: Meat quantity β (SE)	Model 10: "Ethical meat" β (SE)	Model 11: Meat substitutes β (SE)
Intercept	0.417 (0.089)***	17.16 (0.361)***	358.7 (8.145)***	2.131 (0.052)***	2.957 (0.055)***
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)**
Participants	1564	1566	1566	1329	1564

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

Discussion

Results of Study 2 provided additional support for a link between prejudice towards humans and the exploitation of animals. In a large and demographically diverse sample of participants from the Netherlands, more prejudiced individuals had more positive attitudes towards meat consumption and stronger beliefs that the production of meat on conventional farms is animal-friendly and morally acceptable. More prejudiced individuals were less likely to feel discomfort, shame, or guilt when thinking about meat production. More prejudiced individuals were also more likely to identify as meat eaters and reported eating meat more often and in larger quantities, they were less likely to buy more "ethically produced" meat and less willing to eat meat substitutes at least once a week. Most of these associations (except for feelings of guilt when thinking about meat production and beliefs that meat production is animal-friendly and morally acceptable) remained significant when controlling for a host of socio-demographic variables, many of which have been shown to be related to both prejudice and animal exploitation in the prior work (Dhont & Hodson, 2014; Graça et al., 2018). Thus, the positive relation between individual differences in prejudice and animal exploitation cannot (entirely) be explained by characteristics such as individuals' gender, age, education, or political orientation. Notably, the results extend the findings of Study 1 by showing that prejudice is not only related to self-reported attitudes and beliefs about animals, but also to behavioral outcomes such as the frequency and quantity of meat consumption.

General Discussion

People who are prejudiced against one social group also tend to be prejudiced against other social groups, a well-replicated phenomenon that is referred to as *generalized prejudice* (Akrami et al., 2011; Bergh & Brandt, 2023). Recently, 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 beliefs that justify the derogation of devaluation of certain human groups (e.g., social dominance orientation) may also justify the derogation and devaluation of non-human animals. The present studies tested this hypothesis, examining whether people who show stronger prejudice directed towards human groups also report more exploitative attitudes, beliefs, and behaviors directed towards animals.

Study 1 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 ($N = 56759$), individuals who showed stronger human-directed prejudice were also more likely to endorse human supremacy beliefs. This link between prejudice towards humans and animals still emerged when controlling for various socio-demographic characteristics, such as gender, political orientation, and educational attainment.

Notably, link between prejudice towards humans and animals emerged 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 (i.e., speciesism) to the disparaging treatment of people from another race (i.e., racism; 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 also predicted human supremacy beliefs, additional analyses (reported in the Supplemental Materials) suggest that this was driven by responses towards marginalized groups: Predicting human supremacy beliefs with prejudice against groups that are typically not marginalized did not show a significant associations ($\beta = 0.004$, $SE = 0.003$, $p = .197$). Bergh and Brandt (2022) suggest that, in data from the United States, generalized prejudice can be divided into three categories: prejudice against marginalized groups, prejudice against unconventional (as opposed to conservative) groups, and prejudice against privileged groups. Although they did not consider attitudes towards animals in their analyses, the present results suggest that it would be most closely related to prejudice against marginalized groups.

Results of Study 2 lend further support these conclusions. In a large and demographically diverse sample of Dutch participants ($N = 1566$), prejudice against immigrants and people of foreign descent was positively related to a host of variables related to the exploitation of animals. 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, guilt, and when thinking of 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. Again, most of these associations were still significant when controlling for various socio-demographic characteristics, including gender, political orientation, and educational attainment.

In sum, the present studies lend support to theories that posit a common psychological foundation underlying human-directed and animal directed prejudice (Costello & Hodson, 2010, 2014a; Dhont et al., 2016). Results were in line with the key prediction of the SD-HARM model (Dhont et al., 2014, 2016; Dhont & Hodson, 2014) that individuals who show more human-directed prejudice also show more animal-directed prejudice.

Crucially, the present studies addressed several shortcomings of previous work on this topic. Previous studies overwhelmingly studied individuals from English-speaking countries who were recruited via university participant pools or online platforms (i.e., Prolific or Amazon MTurk; Auger & Amiot, 2019; Caviola et al., 2019; Dhont et al., 2016; Everett et al., 2019; Hopwood & Bleidorn, 2020; Hyers, 2006; Jackson, 2019). The present findings attest to the generalizability of prejudice extending across species by analyzing more diverse samples of individuals from 46 European countries. Moreover, previous work has largely relied on self-report measures of attitudes towards both human groups and animals (e.g., Caviola et al., 2019; Dhont et al., 2016). This provides only a limited window into exploitative beliefs and behaviors towards animals and observed associations may be inflated due to common method bias or social desirability bias (e.g., participants who motivated to appear moral may self-report more positive attitudes towards humans and animals). Again, the present studies attest to the robustness of prejudice extending across species lines by showing associations between human-directed prejudice and a host of attitudes (e.g., towards conventional animal agriculture), emotional responses (e.g., feeling guilt or shame when thinking about meat production), and behaviors (e.g., frequency and quantity of meat consumption) related to the exploitation of animals.

A recent review highlighted two promising directions for future research on this topic: horizontal expansion (i.e., testing for a general factor across an even more diverse set of targets of prejudice) and vertical expansion (i.e., identifying subtypes of generalized prejudice). The present findings contribute to both goals. Although recent research on generalized prejudice has examined much broader sets of targets compared to early work on the topic (Bergh & Brandt, 2022; Brandt & Crawford, 2019), the focus has largely been on human groups. The present

studies show that prejudicial attitudes extend even across species lines, suggesting that generalized prejudice may be even more general than previously thought. More evidence for this view and the horizontal expansion of generalized prejudice is provided by studies showing links between human-directed prejudice and environmental exploitation (Graça, 2020; Milfont et al., 2018; Uenal et al., 2022). Regarding the vertical expansion of generalized prejudice models, recent work has focused on identifying subtypes of generalized prejudice (Bergh & Brandt, 2022). Results of Study 1 suggest that prejudice against animals is most similar to prejudice against marginalized groups.

Limitations and Future Directions

There are several constraints on the generalizability of the present results. Even though participants from a much larger and more diverse set of countries (compared to previous work) were tested in Study 1, 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.

The present studies leveraged data from large panel studies. This approach has several critical advantages. Analyzing demographically diverse samples of participants drawn from the general population of multiple countries allows for stronger conclusions about the robustness and generalizability of findings (compared to analyses of student samples or participants from online platforms like Prolific and Amazon MTurk). The rich data sets also allowed for a consideration of various other factors that may be related to human-directed and animal-directed prejudice. That is, the analysis could draw on various relevant variables, testing (a) different operationalizations of prejudice (Study 1), (b) a much larger set of outcomes related to the exploitation of animals (Study 2), and (c) whether there was still a link between human-directed and animal-directed prejudice when controlling for a host of socio-demographic characteristics (Studies 1 and 2).

However, one limitation of the current approach was that the relevant variables were only recorded in some waves of the panel study. Results of Study 1 were based on data from 2008. Results of Study 2 were based on data from 2012. Thus, although both studies represent valid tests of key theoretical predictions, it is possible that the pattern of results would look different with current data. This is speculative though. Although it is very plausible that mean levels of prejudice change over time (see, for example, Charlesworth & Banaji, 2022), 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; Ekehammar & Akrami, 2003). Moreover, the majority of evidence in favor of generalized prejudice across species lines was observed in the past 10 years (Caviola et al., 2019; Dhont et al., 2014; Hopwood & Bleidorn, 2020; Veser et al., 2015). These findings speak against the idea that the present findings would not replicate today.

Effect sizes always has to be evaluated in the context of specific study designs and opinions on what should be considered a small or large effect diverge. Still, the effect sizes that were observed in the current studies were not extremely large. For example, in Study 1, the expression of racial prejudice (i.e., naming a person from another race as someone one would not like to have as a neighbor) was associated with a 0.11-point increase in human supremacy beliefs (which was measured on a four-point scale). In Study 2, zero-order correlations between prejudice and the various outcomes related to the exploitation of animals were rarely larger than $r = .2$. This is not a limitation of the present studies or an indicator of weak support for the SD-HARM model, as the theory predicts that there is a positive correlation, but not necessarily a large positive correlation, between human-directed and animal-directed prejudice. This distinction is important to highlight because a significant effect of a given variable can easily be misinterpreted as showing that the variable is an important predictor of the outcome in question (for approaches that aimed to address this issue in other domains, see Douglas et al., 2023; Jaeger & Jones, 2022).

Although the present results provide support for theories such as the SD-HARM model (Dhont et al., 2014, 2016), the Interspecies Model of Prejudice (Costello & Hodson, 2010, 2014a), and the notion of speciesism (Caviola et al., 2019; Dhont, Hodson, Leite, et al., 2019; Horta, 2010), they do not necessarily show that human-directed prejudice is a particularly informative predictor of attitudes and behaviors related to the exploitation of animals. This is a separate research question that could be tested by assessing a host of variables that have been shown to relate to speciesism and other measures of animal-directed prejudice, such as empathy (Taylor & Signal, 2005), personality (Hopwood et al., 2022), political orientation (Dhont & Hodson, 2014), gender (Graça et al., 2018), and pet ownership (Rothgerber & Mican, 2014). The present results support some of these previous findings. Across the two studies, men and

individuals who identify with the political right were more likely to report attitudes and behaviors related to the exploitation of animals. However, even though many of the factors examined in the current and prior studies seem to reliably correlate with speciesism, they also correlate with each other raising questions about the unique predictive validity of each factor. Thus, to better answer the question of which individuals differences *best* predict speciesism, approaches that simultaneously consider and compare many (ideally, all) potentially relevant factors are needed.

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