Common Ideological Roots of Speciesism and Generalized Ethnic Prejudice: The Social Dominance Human-Animal Relations Model (SD-HARM)

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Abstract

Recent research and theorizing suggest that desires for group-based dominance underpin biases towards both human outgroups and (non-human) animals. A systematic study of the common ideological roots of human-human and human-animal biases is, however, lacking. Three studies (in Belgium, UK, and USA) tested the Social Dominance Human-Animal Relations Model (SD-HARM) proposing that Social Dominance Orientation (SDO) is a key factor responsible for the significant positive association between ethnic outgroup attitudes and speciesist attitudes towards animals, even after accounting for other ideological variables (that possibly confound previous findings). Confirming our hypotheses, the results consistently demonstrated that SDO, more than right-wing authoritarianism (RWA), is a key factor connecting ethnic prejudice and speciesist attitudes. Furthermore, Studies 2 and 3 showed that both SDO and RWA are significantly related to perceived threat posed by vegetarianism (i.e., ideologies and diets minimizing harm to animals), but with SDO playing a focal role in explaining the positive association between threat perceptions and ethnic prejudice. Study 3 replicated this pattern, additionally including political conservatism in the model, itself a significant correlate of speciesism. Finally, a meta-analytic integration across studies provided robust support for SD-HARM and offers important insights into the psychological parallels between human intergroup and human-animal relations.

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Human beings are a part of the animal kingdom, not apart from it. The separation of "us" and "them" creates a false picture and is responsible for much suffering. It is part of the in-group/out-group mentality that leads to human oppression of the weak by the strong as in ethnic, religious, political, and social conflicts. (Marc Bekoff, 2007, pp. 170-171)

Influential philosophers and animal rights advocates have often compared the struggle for reducing and ending the exploitation of animals[1] with the struggle of the human rights movement to eliminate racial discrimination (e.g., Nibert, 2002; Regan, 1983; Singer, 1975; Spiegel, 1988). In their work, parallels are drawn between ideological belief systems sustaining prejudices towards human outgroups (such as racism and sexism) and the way we view and treat non-human animals (see also Jackson, 2011; Joy, 2010; Plous, 2003). Only recently, however, have psychological scientists turned empirical attention to the psychology of attitudes and behaviours towards non-human animals, after long considering this a non-issue (see Amiot & Bastian, 2015; Serpell, 2009).

Recent theorizing on the psychological similarities between human intergroup relations and human-animal relations has proposed that people who are more prejudiced towards ethnic minorities are also more likely to endorse negative attitudes towards (non-human) animals, and to support animal exploitation for human benefits (Costello & Hodson, 2014a; Dhont & Hodson, 2014; Hodson & Costello, 2012; Hodson, MacInnis, & Costello, 2014; Plous, 2003). At present, a systematic research line empirically addressing whether ethnic prejudice is positively related to speciesism is lacking. Moreover, if biases towards human outgroups are related to biases towards animals, it is plausible that common ideological motives underpin both biases. The Social Dominance Human-Animal Relations Model (SD-HARM), presented in the current paper, posits that the desire for group-based dominance and support for inequality primarily constitutes the shared ideological core of

biases towards both animals and human outgroups, explaining why speciesist attitudes (i.e., support for the wilful exploitation of animals in favour of human interests; see Singer, 1975) are related to human outgroup prejudices such as anti-ethnic bias.

A Social Dominance Approach

In the multilevel framework of Social Dominance Theory, group-based social inequality and oppression are produced and maintained by the dynamic interactions between contextual, institutional, and individual level factors (Pratto, Sidanius, Stallworth, & Malle, 1994; Sidanius & Pratto, 1999). At the individual level, the theory posits that Social Dominance Orientation (SDO), defined as a general preference for enforcing and preserving hierarchical social systems and inequality between human groups in society, is a key factor to understanding the psychology of group-based dominance. People with higher scores on the SDO-scale, which focuses on human intergroup relations, support discriminatory practices detrimental to low-status groups, in order to enhance the dominant status and relative advantages of high-status groups (Sidanius & Pratto, 1999). Such systemic discrimination against subordinate groups is rationalized by endorsing ideological belief systems that provide moral or intellectual justification for these discriminatory social policies. Indeed, numerous studies have shown that SDO is a robust predictor of prejudiced attitudes in different domains and contexts (Kteily, Ho, & Sidanius, 2012; Sibley & Liu, 2010; Sidanius & Pratto, 1999). For instance, those higher in SDO endorse more racist, sexist, and homophobic beliefs (Hodson & Costello, 2007; Meeusen & Dhont, 2015; Whitley, 1999; Zick et al., 2008), supporting the central claim of Social Dominance Theory that SDO expresses a very *general* support for group-based dominance, “regardless of the manner in which these groups are defined” (Sidanius & Pratto, 1999, p. 61; see also Hodson, MacInnis, & Busseri, 2017).

Following from this general group dominance perspective, SDO represents the unifying individual difference construct lying at the core of distinct ideological belief systems, that is, explaining why different belief systems show robust correlations between each other (Sidanius & Pratto, 1999; Sidanius, Pratto, & Bobo, 1996). Sidanius and Pratto (1999; see also Sidanius et al., 1996) have nicely demonstrated this unifying principle with regard to the positive correlation between racism and political conservatism observed in several large samples from different countries (i.e., USA, Sweden, Israel). After accounting for SDO, the correlation between racism and political conservatism largely disappears and is no longer statistically significant. Within human intergroup relations (e.g., racism), such findings support the claim that expressions of conservatism and racism are positively correlated because they are both rooted in competitive power motives and desires for group-based dominance (i.e., SDO).

But what about dominance strivings in human-animal relations? Given the basic human tendency to think categorically about groups, the same ingroup-outgroup mentality responsible for the psychological representation of socially constructed ingroups and outgroups in human intergroup relations applies to human-animal relations (Plous, 2003; see also Costello & Hodson, 2010), with animals perhaps the quintessential low-status outgroup. Considering the generalized nature of SDO applicable to ingroup-outgroup biases in its many forms (see e.g., Kteily et al. 2012; Sibley & Liu, 2010), we argue that social dominance desires may be relevant not only to human-human relations but also to relations between human and other species. Indeed, a growing body of evidence demonstrates that SDO is also expressed in the extent to which people differ from each other in their desires to dominate over animals. More specifically, those higher in SDO perceive a greater hierarchical divide between humans and animals (Costello & Hodson, 2010, 2014a) and hold greater human supremacy beliefs over animals (Dhont & Hodson, 2014). Furthermore, greater SDO also

predicts greater speciesism, and a greater personal use and consumption of animals (Bilewicz, Imhoff, & Drogosz, 2011; Dhont & Hodson, 2014; Dhont, Hodson, Costello, & MacInnis, 2014; Hyers, 2006). Overall, these recent findings indicate that the fundamental desire of high SDO individuals to enforce social hierarchy and group dominance is expressed not only in human intergroup relations but also in human-animal relations. Drawing on the theoretical underpinning of Social Dominance Theory, and the aforementioned empirical observations, we propose the Social Dominance Human-Animal Relations Model to explain the critical but largely unrecognized role of SDO in human-animal relations.

The Social Dominance Human-Animal Relations Model (SD-HARM)

The Social Dominance Human-Animal Relations Model proposes that human outgroup prejudices (such as racial and ethnic prejudice) and speciesism share common ideological motives, including the desire for group-based dominance and inequality, indicated by SDO. Put differently, this model proposes that SDO represents a key ingredient underpinning prejudicial and exploitative tendencies towards both human and animal outgroups. Empirically, prejudice towards ethnic outgroups should be positively correlated with speciesism precisely due to this common core. Critically, if this model holds, the empirical relation between ethnic prejudice and speciesism should disappear when accounting for the shared variance with SDO. That is, as Sidanius and Pratto (1999; Sidanius et al., 1996) have demonstrated that the correlation between ethnic/racial prejudice and political conservatism is ascribable to their joint association with SDO, so can the correlation between ethnic prejudice and speciesism be attributed to their joint association with SDO. These predictions of SD-HARM are consistent with the suggestion of moral philosophers (e.g., Regan, 1983; Singer, 1975) and activists that prejudicial tendencies towards human outgroups and animals are interconnected, with this model offering a psychological account of *why* they are systematically connected.

To the best of our knowledge, only one published study has simultaneously investigated the relations between SDO, ethnic prejudice, and speciesism. Using a sample of Canadian undergraduate students, Dhont, Hodson, and colleagues (2014) found that ethnic and speciesist prejudice were indeed positively correlated ($r = .34$, $p < .001$). Consistent with the proposed model, however, the relation between ethnic prejudice and speciesism was substantially reduced and statistically non-significant after controlling for SDO as the common factor underpinning each construct. These findings provided preliminary evidence for SD-HARM, yet more systematic research is needed to attest to the robustness of the model and to rule out competing alternative explanations.

Indeed, it is critical to demonstrate the focal role of SDO after including other related ideological variables in tests of the model. Right-wing authoritarianism (RWA, Altemeyer, 1981, 1998) is the construct that is conceptually most closely related to SDO, reflecting support for conventionalism, authoritarian submission, and authoritarian aggression. RWA predicts many of the same outcome variables in the political and intergroup domain that SDO predicts (e.g., Hodson & Costello, 2007; Meeusen & Dhont, 2015) and is considered an alternative predictor of outgroup negativity and group-based inequality (Altemeyer, 1998; Duckitt, 2001; Ekehammar, Akrami, Gylje, & Zakrisson, 2004; Sibley & Duckitt, 2008). When using a regression-based approach, RWA and SDO in tandem predict prejudice and account for more variance in prejudice (together about 40-50%) than each of them alone (Altemeyer, 1998; Hodson et al., 2017; Van Hiel & Mervielde, 2005).

The conceptual difference between SDO and RWA lies in the underlying worldviews and motives that feed into or predict SDO and RWA (Duckitt, 2001; Van Hiel, Cornelis, & Roets, 2007). In particular, SDO stems from a competitive-jungle-themed worldview and emphasizes the authoritarian dominance aspect in hierarchical and unequal group relations. In contrast, RWA stems from dangerous worldviews (i.e., the world is dangerous and chaotic)

and emphasizes authoritarian submission and conventionality (Altemeyer, 1998; Duckitt, 2001). As a result of these different dynamics, low status groups and competing groups (e.g., immigrants) are especially targets of SDO-based prejudice, whereas groups perceived as threatening group values and norms (e.g., feminists, environmentalists) are the typical targets of RWA-based prejudice (Asbrock, Sibley, & Duckitt, 2010; Duckitt & Sibley, 2010). This line of theorizing is consistent with the notion that SDO concerns the acceptance of inequality (relevant to hierarchy) whereas RWA concerns resistance to change and preservation of the status quo (relevant to stability), and are, thus, related but distinct constructs (Jost, Glaser, Kruglanski, & Sulloway, 2003). Of course, such differential patterns of relations between RWA and SDO with different types of outgroup bias can go unnoticed when these relations are not tested simultaneously. Moreover, endorsement of speciesist attitudes may partly reflect traditionalism and an aversion for system change (as expressed in RWA), particularly in a society where the exploitation of animals is the norm and deeply ingrained in cultural traditions. Consistent with this idea, previous research has shown that those holding stronger traditional values or scoring higher on RWA report consuming more meat, are less likely to be vegetarian, and show stronger support for animal exploitation (e.g., Allen, Wilson, Ng, & Dunne, 2000; Dhont & Hodson, 2014; for a review, see Ruby, 2012). Therefore, to test our central claim that the *dominance* aspect of right-wing ideologies, captured by SDO's emphasis on hierarchy and dominion, is a key factor responsible for the link between ethnic prejudice and speciesism, we included RWA when testing SD-HARM, thereby testing for possible effects of RWA.

The Present Research

The aim of this research is to test the robustness of the SD-HARM model by seeking to: (a) replicate the Canadian findings of Dhont, Hodson et al. (2014), in line with the increased awareness of the importance of replicability in psychology to ensure confidence in

the findings (e.g., Asendorpf, et al., 2013; Nosek, Spies, & Motyl, 2012); (b) accounting for the possible variance explained by other ideological variables (e.g., RWA, political conservatism); and (c) test generalizability across different social contexts. Furthermore, conducting a new set of studies allows us to extend the model by including new, yet related variables (e.g., negativity towards vegetarians), enhancing our theoretical understanding of dominance strivings in human-animal relations.

More specifically, we conducted three survey studies in three new contexts: Belgium (Study 1), the UK (Study 2), and the USA (Study 3). In all three studies we first test the core assumption of SD-HARM by examining the role of SDO as the shared ideological root that links ethnic prejudice and speciesism (such that, after accounting for SDO, the relation between ethnic prejudice and speciesism becomes weaker or non-significant). The conceptual core of SD-HARM is represented by the grey boxes in Figure 1. Furthermore, we also test alternative models to rule out the possibility that ethnic prejudice accounts for the SDO-speciesism relation, or the possibility that speciesism accounts for the SDO-ethnic prejudice association (see also Dhont, Hodson et al., 2014; Sidanius et al., 1996).

In all three studies, we then included RWA as related ideological variable to determine its role, and whether the proposed model that emphasizes SDO as central still holds over and beyond possible relations of RWA with ethnic prejudice and speciesism (i.e., presented as competing explanatory constructs in Figure 1). This analytic strategy isolates the nature of the effect of SDO (i.e., group-based dominance) on the association between ethnic prejudice and speciesism, by accounting for the submissive-conventionalism aspect of authoritarianism and right-wing ideologies.

In Studies 2 and 3 we further extended the model by investigating whether, in addition to speciesism, perceived threat from anti-speciesist ideologies (vegetarianism threat, Dhont & Hodson, 2014) is related to ethnic prejudice, and by testing the potential explanatory

role of SDO underlying this relationship (see Figure 1). In addition, because RWA plays a key role in predicting resistance to groups and ideologies that threaten widely accepted conventional norms, we further tested whether RWA accounts for the relationship between ethnic prejudice and vegetarianism threat.

In Study 3 we then added political conservatism in the model, as it is correlated with both SDO and RWA and is an important predictor of ethnic/racial prejudice (see Hodson & Dhont, 2015). Finally, following contemporary recommendations to move towards a "cumulative science" approach (Cumming, 2014; Funder et al., 2014), we conducted a meta-analysis testing the main model across the three datasets from the present project plus the sample of Dhont, Hodson, et al. (2014).

Study 1

Participants

A total of 128 undergraduate psychology students at a Belgian university completed an online survey. After excluding 10 non-Belgian respondents (due to the intergroup nature of the study) the final sample was 118 Belgian students (85% females; M_{age} = 20.68 years, SD_{age} = 3.94).

Method

Respondents completed a 14-item SDO scale (α = .89; *M* = 2.98; *SD* = 0.95, e.g., "Some groups of people are simply not the equals of other groups", Pratto et al., 1994), and a shortened 11-item version of the RWA scale (α = .83; *M* = 3.19; *SD* = 0.88, e.g., "Obedience and respect for authority are the most important virtues children should learn", Altemeyer, 1981) on 7-point scales (1, *strongly disagree*; 7, *strongly agree*).

We used three indicators of prejudice towards ethnic outgroups. Where needed, we recoded the items so that higher mean scores on each indicator reflect greater ethnic prejudice. First, respondents indicated attitudes towards North Africans, Black Africans,

Turks, ethnic minorities, Muslims, Jews, and East Europeans on attitude thermometers ranging from 0-10° (extremely unfavourable) to 91-100° (extremely favourable) (M = 4.97; SD = 1.77). The second prejudice indicator consisted of eight items of the subtle prejudice scale (M = 3.89; SD = 0.98, e.g., "I admire the members from ethnic minority communities who live here under difficult circumstances"; based on Pettigrew & Meertens, 1995; see Dhont, Roets, & Van Hiel, 2011).[2] These items were rated on 7-point scales (1, *strongly disagree*; 7, *strongly agree*). The third indicator consisted of five bipolar scales (M = 3.75; SD = 0.86) asking to describe how respondents felt about ethnic minority members in general (1-7; *cold-warm, negative-positive, hostile-friendly, disgust-admiration, contempt-respect*; Wright, Aron, McLaughlin-Volpe, & Ropp, 1997; see Dhont et al., 2011). Because the three indicators were highly correlated, we standardized the scores for each indicator and averaged them into a single indicator of general ethnic prejudice (α = .94).

Thirteen items (based on Hertzog, Betchart, & Pittman, 1991; Wuensch, Jenkins, & Poteat, 2002) measured speciesist attitudes and included examples of animal exploitation across a range of current societal practices and animals (e.g., hunting, factory farming, animal testing, fur industry, whaling). An example item is "The use of animals such as rabbits for testing the safety of cosmetics and household products is unnecessary and should be stopped" (see Appendix A). Items were completed on 7-point scales (1, *strongly disagree*; 7, *strongly agree*), with higher scores reflecting greater speciesism (α = .82; M = 3.50; SD = 0.89).

Results

Zero-order correlations. First, we analysed the zero-order relations between the variables (see Table 1). As expected, both SDO and RWA were positively associated with ethnic prejudice and speciesism at the zero-order correlation level, *rs* ranging from .29 to .60, *p*s < .001. Furthermore, consistent with previous findings obtained in a Canadian sample

(Dhont, Hodson, et al., 2014), ethnic prejudice was positively correlated with speciesism (r = .32, $p < .001$).

Testing the core of SD-HARM. Next, we tested the Social Dominance Human-Animal Relations Model with path analysis, using the observed scale scores, in Mplus (version 7.2, Muthen & Muthen, 1998-2013). SDO was modelled as the common factor underpinning both ethnic prejudice and speciesism (such that, after accounting for SDO, the relation between ethnic prejudice and speciesism becomes weak or non-significant). In this path model, as well as in all following path models, all possible relations between the variables are included (i.e., $df = 0$), resulting in saturated models.

The results of this model confirmed that SDO was significantly related to ethnic prejudice, $\beta = .56$, $p < .001$, and to speciesism, $\beta = .40$, $p < .001$. More importantly, the residual correlation between speciesism and ethnic prejudice was no longer statistically significant, $r = .13$, $p = .159$, confirming SD-HARM. Furthermore, we also tested whether the drop in the strength of the relationship between ethnic prejudice and speciesism (from $r = .32$ to $r = .13$) after inclusion of SDO was statistically significant. We conducted a third variable model test, which is statistically equivalent to mediation analysis testing for indirect effects (MacKinnon, Krull, & Lockwood, 2000), with SDO as the explanatory variable for the relationship between ethnic prejudice and speciesism (using bootstrap analysis based on 10,000 resamples); this analysis confirmed that SDO significantly explained the relationship, standardized estimate = .18 [95% bootstrapped bias-corrected confidence intervals (95% BCIs): .055, .302].

We also tested alternative models to investigate if ethnic prejudice could account for the SDO-speciesism relation, or if speciesism could account for the SDO-ethnic prejudice association (see also Dhont, Hodson, et al., 2014; Sidanius et al., 1996). In support of our social dominance account, the results demonstrated that these alternative possibilities were

not realized. For instance, ethnic prejudice did not account for the association between SDO and speciesism; the residual correlation between SDO and speciesism remained significant after partialing out ethnic prejudice, $r = .28$, $p = .001$. Likewise, speciesism did not explain the association between SDO and ethnic prejudice; the residual correlation was still significant after partialing out speciesism, $r = .49$, $p < .001$.

Including RWA in the model test. Finally, the novel test of the current study involved the inclusion of RWA in the model. Recall the significant positive zero-order correlations of RWA with all three variables of the basic model (i.e., SDO, ethnic prejudice, and speciesism, see Table 1). Hence, testing whether SD-HARM still holds after accounting for RWA provides a critical test to demonstrate the key role of SDO in explaining the association between ethnic prejudice and speciesism, that is, whether the association is about the dominative aspects of authoritarianism per se. In this full model, we then simultaneously tested the associations of SDO with ethnic prejudice and speciesism while controlling for RWA, as well as the associations of RWA with ethnic prejudice and speciesism, while controlling for SDO. Figure 2 depicts the results of this analysis. As expected, the relations between SDO and both ethnic prejudice and speciesism were still significant; in contrast, RWA was significantly related only to ethnic prejudice (not to speciesism). As in the basic model (i.e., without RWA), the residual correlation of speciesism with ethnic prejudice was no longer statistically significant, $r = .10$, $p = .299$. Moreover, with SDO included as an explanatory third variable (and keeping RWA as predictor in the model), there was a significant drop in the magnitude of the relation between ethnic prejudice and speciesism, standardized estimate = .11 [95% BCIs: .009, .219].

This study, conducted in Belgium, replicates the findings obtained in Canada by Dhont, Hodson, et al. (2014): speciesism is rooted in a generalized desire for group inequality and hierarchy (here, SDO), which in turn offers an explanation why speciesism and ethnic

prejudice are significantly interrelated. Importantly however, here we added a critical statistical control variable (RWA) to isolate and better understand the psychological nature of the effect. Indeed, whereas RWA was significantly related to ethnic prejudice, after accounting for SDO, the association of RWA with speciesism was not significant. In sum, these results confirm the specific theorized role of SDO (i.e., group-based dominance) as a key factor linking ethnic prejudice and speciesism.

Study 2

Building on a growing interest in human-animal relations in psychology, recent research also considers how people react to *vegans* and/or *vegetarians*, target groups who advocate on behalf of animals. That is, are people not only willing to exploit animals (i.e., speciesism), but are they also disparaging towards those who chose lifestyles that minimize such exploitation? Overall, meat-eaters respond to vegans and vegetarians with prejudicial attitudes and discriminatory intentions, particularly when they abstain from meat eating for reasons of animal rights (*vs*. health or environment), with greater bias expressed by those higher in SDO, RWA, or political conservatism (MacInnis & Hodson, in press). Such findings suggest that vegans and vegetarians pose a *threat*. Indeed, previous research has demonstrated that those who endorse traditional cultural values (i.e., higher in RWA) or group-based dominance (i.e., those higher in SDO), perceive the rise of vegetarianism and veganism as a threat to the dominant societal status and traditional norms of the dominant, mainstream "carnist" culture (Dhont & Hodson, 2014). Moreover, Dhont and Hodson (2014) have provided evidence that higher levels of perceived threats is one of the mediating psychological processes explaining why those higher in RWA or SDO are more likely to express speciesist attitudes. In a similar manner, those higher in SDO, RWA, or political conservatism view environmentalists (i.e., those who advocate on behalf of nature) as a threatening group, and this threat perception explains much of the left-right difference in

advocating action against climate change (Hoffarth & Hodson, 2016). Such findings demonstrate that social targets that express concern for nature or animals are themselves targets of negative bias.

For this reason, in Study 2 we examined not only the relations of ethnic prejudice with speciesism but also with perceptions of vegetarianism threat. This analytic strategy allows us to test whether SDO or RWA might represent the common underlying factor explaining any potential relations between vegetarianism threat and ethnic prejudice. Additionally, and in line with the mediation approach of Dhont and Hodson (2014), we then tested the indirect associations between SDO and RWA with speciesism via the mediating role of vegetarianism threat.

Participants

To examine the generalizability of our proposed model, we recruited participants in the UK. The base of the sample was collected among undergraduate psychology students at a UK university in a computer-class. The measures used here were part of a larger online questionnaire. To increase sample size, students were also asked to send the questionnaire to one of their parents with an invitation to participate in the study. After excluding those belonging to an ethnic minority group, the final sample consisted of 198 participants (73% students; 78% females; M_{age} = 27.25 years, SD_{age} = 13.98).

Method

Respondents completed the 16 item SDO scale (Pratto et al., 1994) on 7-point scales (1, *strongly disagree*; 7, *strongly agree*; α = .91; *M* = 2.40; *SD* = 0.98). Right-Wing Authoritarianism was measured with 12 items of the Authoritarianism-Conservatism-Traditionalism (ACT) scale of Duckitt, Bizumic, Krauss, and Heled (2010), showing satisfactory internal consistency (α = .85; *M* = 3.51; *SD* = 0.97).

Generalized ethnic prejudice was assessed with thermometers, as the ones used in Study 1, measuring attitudes towards immigrants, South Asian people, ethnic minorities, Black people, Muslims, Gypsies, which were coded so that higher scores indicate greater prejudice (M = 4.15; SD = 1.83). We also used bipolar scales as in Study 1 asking to describe how respondents feel about ethnic minority members in general (1-7; *cold-warm, negative-positive, hostile-friendly, disgust-admiration*), and coded the items so that higher scores indicate greater prejudice (M = 2.66; SD = 1.22). As in Study 1, we averaged the standardized the scores of these prejudice indicators to obtain a single index of generalized ethnic prejudice (α = .95).

Speciesism was measured similarly as in Study 1. Participants completed twelve items on 7-point scales (1, *strongly disagree*; 7, *strongly agree*; α = .76; M = 2.89; SD = 0.83). Finally, we assessed threat perceptions from vegetarianism and vegetarians with the eight items vegetarianism threat scale of Dhont and Hodson (2014); for example, “The rise of vegetarianism poses a threat to our country’s cultural customs” (α = .89; M = 2.58; SD = 1.15).

Results

Zero-order correlations. The zero-order correlations between all variables are presented in Table 1. Replicating the correlations obtained in Study 1, all variables were positively interrelated (*rs* ranging from .19 to .53, *p*s < .01), with a correlation of r = .19, p < .01, between ethnic prejudice and speciesism. As expected, vegetarianism threat was positively related to every variable, including ethnic prejudice, r = .29, p < .001. In other words, higher scores on both speciesism and vegetarianism threat are associated with more ethnic prejudice.

Testing the core of SD-HARM. We first tested the core assumption of the Social Dominance Human-Animal Relations Model using path analysis (i.e., involving SDO,

speciesism, and ethnic prejudice; see grey boxes in Figure 1). As in Study 1, all possible relations between the variables are included in this model in all following models, yielding saturated models. The model test confirmed the significant relations of SDO with ethnic prejudice and speciesism, $\beta = .53$, $p < .001$ and $\beta = .37$, $p < .001$, respectively.

Contrary to the significant positive zero-order relation between ethnic prejudice and speciesism, their residual correlation was not significant after partialing out SDO, $r = -.003$, $p = .963$. As in Study 1, accounting for SDO significantly decreased the strength of the relationship between ethnic prejudice and speciesism, standardized estimate = .20 [95% BCIs: .102, .291].

Testing for alternative models as in Study 1 showed that ethnic prejudice did not account for the association between SDO and speciesism; the residual correlations between SDO and speciesism remained significant after partialing out ethnic prejudice, $r = .32$, $p < .001$. Furthermore, speciesism did not explain the relation between SDO and ethnic prejudice; the residual correlation was still significant after partialing out speciesism, $r = .50$, $p < .001$.

Including RWA in the model test. Next, we tested the associations of SDO with ethnic prejudice and speciesism while controlling for RWA, and the associations of RWA with these variables while controlling for SDO. Furthermore, we simultaneously tested the associations of SDO and RWA with vegetarianism threat. Figure 3 depicts the results of this analysis. Replicating Study 1, SDO (but not RWA) was significantly related to speciesism in this model. Furthermore, SDO was also significantly related to ethnic prejudice and vegetarianism threat when controlling for RWA, whereas RWA was only significantly related to vegetarianism threat when controlling for SDO. As expected the residual correlations between ethnic prejudice and speciesism, as well as between vegetarianism threat and ethnic prejudice, were not significant, $r = -.01$, $p = .924$ and $r = .09$, $p = .202$, respectively. The explanatory role of SDO for the association of ethnic prejudice with speciesism and

vegetarianism threat was further confirmed by conducting third variable model tests (with SDO included as explanatory variable and RWA as control variable). The results showed that the strength of the association of prejudice with both speciesism and vegetarianism significantly dropped due to inclusion of SDO as explaining variable, standardized estimate = .15 [95% BCIs: .065, .231] and standardized estimate = .12 [95% BCIs: .036, .212], respectively.

Further tests of alternative models showed that ethnic prejudice did not account for the association between SDO and vegetarianism threat, nor for the association between RWA and vegetarianism threat; the residual correlations between SDO and vegetarianism threat, and between RWA and vegetarianism threat, remained significant after partialing out ethnic prejudice, $r = .31$, $p < .001$ and $r = .27$, $p < .001$, respectively. Vegetarianism threat also did not account for the association between SDO and ethnic prejudice; the residual correlation was still significant after partialing out vegetarianism threat, $r = .47$, $p < .001$.

Testing the mediating role of vegetarianism threat. In a final analysis, we included vegetarianism threat as a mediator variable in the model. The main purpose of this analysis was to test the indirect associations of SDO and RWA with speciesism via vegetarianism threat, rather than focusing on the residual correlations of ethnic prejudice with vegetarianism threat and speciesism. The results of this mediation model are consistent with the findings of Dhont and Hodson (2014), with both SDO and RWA related to vegetarianism threat ($\beta = .33$, $p < .001$ and $\beta = .18$, $p = .009$, respectively), which in turn, was significantly related to speciesism ($\beta = .26$, $p < .001$). Furthermore, both SDO and RWA were significantly, indirectly related to speciesism, standardized estimate = .09 [95% BCIs: .022, .014] and standardized estimate = 05 [95% BCIs: .001, .093], respectively. SDO was also still directly significantly related to speciesism ($\beta = .24$, $p = .001$), whereas RWA was not, $\beta = .05$, $p = .484$.[3]

Discussion

The results of Study 2 replicated the findings of Study 1 in a different country (UK) and confirm the fundamental role of SDO underlying the relation between speciesism and ethnic prejudice (i.e., explaining the connection between speciesism and ethnic prejudice). Extending the findings of Study 1, Study 2 showed that vegetarianism threat is rooted in both SDO and RWA, yet only SDO accounted for the association between vegetarianism threat and ethnic prejudice in the model (because RWA was not significantly associated with ethnic prejudice after controlling for SDO). Furthermore, Study 2 provided evidence for the role of both SDO and RWA in shaping speciesist attitudes through vegetarianism threat, despite the absence of a significant total effect of RWA on speciesism. Clearly, the inclusion of both SDO and RWA provides a more complete, and therefore more adequate picture, of the ideological roots of speciesism and ethnic prejudice.

Study 3

Thus far we have provided evidence in support of the SD-HARM framework, whereby SDO consistently explains relations between ethnic prejudice and speciesism (Studies 1-2), even after including RWA in the model. Moreover, SDO explains considerable variance in the linkage of vegetarianism threat with ethnic prejudice (Study 2). The effects of RWA were less consistent across Studies 1-2 which might be explained by contextual differences between Study 1 and 2, yet a further investigation in a bigger sample is desirable. Study 3 examined the generalizability of these effects to an American context, and drew on a larger and more heterogeneous sample (i.e., more range in age). Having already isolated the SDO-based effect from the potential confounding influence of RWA, we here sought to isolate these effects from self-identified political orientation (i.e., the degree to which people think of themselves and identify as relatively left *vs*. right leaning in orientation). Including political orientation in the model is prudent given that it tends to be correlated with both SDO

and RWA (e.g., Hoffarth & Hodson, 2016; MacInnis & Hodson, in press; Onraet, Van Hiel, Dhont, & Pattyn, 2013), and also with vegetarianism threat (MacInnis & Hodson, in press) and ethnic prejudice (Allport, 1954; Rowatt, LaBouff, Johnson, Froese, & Tsang, 2009; Sidanius et al., 1996), and might also be correlated with speciesism (Dhont & Hodson, 2014). Moreover, previous investigations have considered SDO as the factor explaining links between political conservatism and prejudice (Sidanius et al., 1996). Given that political orientation is expected to be associated with potential underlying factors (SDO, RWA) and with the tested criteria (ethnic prejudice, speciesism, vegetarianism threat), its inclusion in the model will help to illustrate not only the role of self-identified political orientation but also to isolate any of these (potential) effects from the SDO-based effects, as well as the RWA-based effects.

Participants

Study 3 was conducted online among 672 American adults recruited via MTurk. After excluding all respondents belonging to an ethnic minority group, the final sample consisted of 573 White respondents (303 females; 267 male; 3 transgender/other; M_{age} = 36.82 years, SD_{age} = 12.28).

Method

Participants completed 4 items of the SDO scale (α = .84; *M* = 2.41; *SD* = 1.41) and 4 items of the RWA scale (α = .87; *M* = 3.81; *SD* = 1.69). Generalized ethnic prejudice was assessed with thermometers (see Study 1) measuring attitudes towards immigrants, South Asians, Black people, ethnic minorities, Muslims, Latinos, with higher scores indicating greater prejudice (α = .93; *M* = 3.90; *SD* = 1.94). Identical measures of speciesism (α = .86; *M* = 3.50; *SD* = 1.11) and vegetarianism threat (α = .91; *M* = 2.63; *SD* = 1.37) were used as in Study 2.

To measure political orientation, participants completed three items asking how they would describe their political attitudes and beliefs (a) in general, (b) in terms of economic issues, and (c) in terms of social issues (Skitka, Mullen, Griffin, Hutchinson, & Chamberlin, 2002). The three items were completed on 7-point scales ranging from very liberal to very conservative ($\alpha = .93$; $M = 3.52$; $SD = 1.68$).

Results

The large sample size allowed us to analyse the relationships among the variables with structural equation modeling (SEM) with latent constructs in Mplus (version 7.1, Muthén & Muthén, 1998-2013) using a robust maximum likelihood estimation. Subsets of items were averaged into parcels to smooth measurement error and maintain an adequate ratio of cases-to-parameters. We created three parcels for each of vegetarianism threat, speciesism and ethnic prejudice, and two parcels for each of RWA and SDO. The three political ideology (liberalism-conservatism) items indicated the latent factor of political ideology.[4] The measurement model showed a good model fit $\chi^2(88) = 250.74$, $p < .001$; RMSEA = .057; SRMR = .040; CFI = .97 (Hu & Bentler, 1999).

Zero-order correlations. Replicating the pattern of correlations obtained in Belgium and the UK (Studies 1 and 2), all correlations between the latent constructs were significant and positive (see Table 1). That is, in this American sample both speciesism and vegetarianism threat were positively related to ethnic prejudice, $r = .21$, $p < .001$, and $r = .27$, $p < .001$, respectively. Extending previous findings, the correlations for political ideology with all variables were positive and significant. Higher levels of conservatism were thus associated with more speciesism, more vegetarianism threat, and more ethnic prejudice (see Table 1), indicating that it is relevant to account for political ideology when testing the associations of SDO and RWA with speciesism, vegetarianism threat, and ethnic prejudice.

Testing the core of SD-HARM. We first tested the core SD-HARM model without control variables; this analysis demonstrated that SDO was significantly related to ethnic prejudice and speciesism, $\beta = .42$, $p < .001$, and $\beta = .40$, $p < .001$, respectively. In contrast to the significant positive zero-order relation ($r = .21$, $p < .001$), the residual correlation between speciesism with ethnic prejudice was no longer significant after partialing out SDO, $r = .04$, $p = .394$, with SDO being responsible for a significant decrease in the strength of the relationship, standardized estimate = .16 [95% BCIs: .109, .216], confirming the expected model. Alternative model tests showed that ethnic prejudice did not account for the association between SDO and speciesism; the residual correlation between SDO and speciesism was still significant after partialing out ethnic prejudice, $r = .35$, $p < .001$. Speciesism also did not explain the relation between SDO and ethnic prejudice; the residual correlation was still significant after accounting for speciesism, $r = .38$, $p < .001$.

Including RWA and political orientation in the model test. Next, we tested the same model as in Study 2 to investigate the role of SDO and RWA underlying speciesism, vegetarianism threat, and ethnic prejudice, but we also included political ideology. Because we included all possible relations between the variables in this model as well as in all following models, the model fit of all models are identical to the model fit of the measurement model. Figure 4 shows the results of this analysis, replicating and extending the results of Studies 1 and 2. After including both RWA and political ideology, SDO was significantly related to speciesism, ethnic prejudice, and vegetarianism threat. In contrast, RWA was only significantly related to vegetarianism threat (not to ethnic prejudice or speciesism) when controlling for SDO and political ideology. Interestingly, in this model, when partialing out RWA and SDO, political ideology was significantly related to speciesism but not to vegetarianism threat or ethnic prejudice. This pattern suggests that, to the extent that an ideological variable can account for the relations between ethnic prejudice and

speciesism or between ethnic prejudice and vegetarian threat, SDO would be the only construct statistically able to account for the linkages between these pairs of variables. However, the additional predictive value of adding RWA and political orientation to the model is evident, with RWA being significantly related to vegetarianism threat and political orientation being significantly related to speciesism, over and beyond effects of SDO.

As expected, the residual correlation between speciesism and ethnic prejudice was no longer significant in the full model, $r = .01$, $p = .874$, and the correlation between vegetarianism threat and ethnic prejudice was again reduced (from $r = .32$, $p < .001$) to a residual correlation of $r = .10$, $p = .046$, significant in this large sample. The decrease in the strength of the associations of ethnic prejudice with both speciesism and vegetarianism threat was significant and attributable to the inclusion of SDO (with RWA and political conservatism included as statistical controls), standardized estimate = .09 [95% BCIs: .049, .139] and standardized estimate = .10 [95% BCIs: .053, .147], respectively.

Further alternative model tests showed that ethnic prejudice did not account for the association between SDO and vegetarianism threat, nor for the association between RWA and vegetarianism threat; the residual correlations between SDO and vegetarianism threat and between RWA and vegetarianism threat remained sizeable and significant after partialing out ethnic prejudice, $r = .41$, $p < .001$, and $r = .51$, $p < .001$, respectively. Vegetarianism threat also did not account for the association between SDO and ethnic prejudice; the residual correlation was still significant after partialing out vegetarianism threat, $r = .33$, $p < .001$.

Testing the mediating role of vegetarianism threat. Similar to Study 2, we also considered vegetarianism threat as mediator between the ideological constructs (entered simultaneously) and speciesism. As expected, SDO and RWA were both related to vegetarianism threat ($\beta = .47$, $p < .001$ and $\beta = .34$, $p < .001$, respectively), whereas political orientation was not, $\beta = -.08$, $p = .225$. Vegetarianism threat was, in turn, significantly related

to speciesism (β = .29, p < .001). Furthermore, both SDO and RWA were significantly, indirectly related to speciesism, standardized estimate = .10 [95% BCIs: .052, .147] and standardized estimate = .14 [95% BCIs: .069, .208], respectively. The direct effects of SDO and political orientation on speciesism were positive and significant (β = .19, p = .002, and β = .32, p < .001, respectively). Also the direct effect of RWA on speciesism was significant, yet a negative effect emerged (β = -.17, p = .03).[5] In other words, even though higher levels of RWA are indirectly, positively associated with stronger endorsement of speciesism via higher levels of perceived vegetarianism threat, after accounting for the variance explained by perceived vegetarianism threat, those higher in RWA are less (not more) likely to endorse speciesist attitudes. A similar pattern of results with opposing direct and indirect effects of RWA on speciesism was also found previously in a community sample of Belgium adults (Dhont & Hodson, 2014, Study 2) and emphasizes the distinct, yet more complex, role of RWA in the prediction of speciesism.[6]

Discussion

The results of Study 3 provided converging support for the hypothesis that SDO connects prejudices towards ethnic outgroups and animals. Furthermore, the results confirmed the role of both SDO and RWA in predicting vegetarianism threat, with SDO explaining (part of) the association between vegetarianism threat and ethnic prejudice. This pattern of results held after controlling for political orientation, a strong correlate of RWA and SDO, indicated by participant's self-placement scores on liberalism-conservatism dimensions. Furthermore, the results showed that higher levels of conservatism were associated with higher levels of speciesism, a relatively unrecognized relation in the literature, even after controlling for SDO and RWA.

Meta-analytic Integration

Following cumulative science recommendations (see Asendorf et al., 2013; Cumming, 2014; Funder et al., 2014), we then meta-analysed the results, testing the main model across the three datasets from the present project in addition to that of Dhont, Hodson, et al. (2014). Each standardized effect size was analysed as a function of the sample size for that effect, with a random effects model applied (Sibley, 2008). As observed in Table 2, the zero-order relation between ethnic prejudice and speciesism was significant, mean $r = .24$, $p < .001$ [95% CI: .183, .295]. After adjusting for SDO as a common factor, however, the mean residual relation (mean $r = .05$) was non-significant, as predicted. SDO was consistently related to both ethnic prejudice and speciesism in the .43 to .46 range. As expected, SDO is consistently relevant not only to understanding human-human prejudices, but also to human-animal prejudices, and to a comparable degree.

General Discussion

The present investigation introduced the SD-HARM model, proposing that group-based dominance desires (expressed as SDO) underpin, and thus explain, the positive relation between ethnic prejudice (relevant to human intergroup relations) and speciesism (relevant to human-animal relations). Until recently, human-animal relations, particularly in an intergroup sense, lay outside of the interests of psychology. But increasingly these factors have been found to be associated (e.g., Dhont & Hodson, 2014; Dhont, Hodson, et al., 2014). Much of our present rationale was informed by Social Dominance Theory (Sidanius & Pratto, 1999), employing the basic analytic strategy that was previously used to explain the relation between conservatism and prejudice with SDO as their common source (Sidanius et al., 1996). Not only was the model supported in a Belgian sample (Study 1), but the inclusion of other related constructs revealed that the model held up against RWA (Studies 1-3) and self-identified political orientation (Study 3), and the model generalized to UK (Study 2) and

American (Study 3) samples. Moreover, Studies 2 and 3 further supported the extended model by also demonstrating that SDO explained some of the variance linking vegetarianism threat and ethnic prejudice. This series of studies clarifies the unique role of group-based dominance as a central factor linking prejudicial tendencies in human-human and human-animal relations.

Our research approach followed contemporary calls for replication, generalizability across samples, and reporting relations with and without covariates in the model. We also applied "cumulative" statistics (i.e., meta-analysis) to integrate findings and calculate the average effect sizes and confidence intervals across studies (e.g., Cumming, 2014; Funder et al., 2014). The meta-analytic results are particularly revealing, with the standardized relations of SDO with ethnic prejudice and speciesism higher than .40 (moderate-to-large effects following Cohen, 1988; large effects following Gignac & Szodorai, 2016), of comparable magnitude. Moreover, in each study (and the meta-analytic averages) the zero-order relations between ethnic prejudice and speciesism were significant and positive, but approached zero and were non-significant when SDO as common factor is modelled. Below, we discuss the theoretical and applied implications of our findings, starting with the observations most central to our theoretical framework.

Theoretical Implications of SD-HARM

The current work fits within the growing body of research considering the generalized nature of SDO predicting multiple intergroup and policy attitudes across a variety of contexts (Kteily et al., 2012; Sibley & Liu, 2010; Sidanius & Pratto, 1999). Such findings are difficult to consolidate with the "contextual critique" of SDO suggesting that the meaning of the SDO would be fully determined by context-specific attitudes, that is, by people's attitudes about a specific group in mind when completing the SDO scale (e.g., Lehmiller & Schmitt, 2007; Schmitt, Branscombe, & Kappen, 2003). Our findings demonstrate the wider consequences

of general dominance strivings by showing associations with prejudice and support for inequality in both human intergroup relations and human-animal relations, thereby addressing the contextual critique of the SDO construct in a novel domain.

Preferences for social hierarchy and inequality generalize not only to human-animal relations but also to desires to dominate over nature (Hoffarth & Hodson, 2016; Milfont, Richter, Sibley, Wilson, & Fischer, 2013; Milfont & Sibley, 2014). Research has shown that those higher in SDO are more likely to support exploitative practices depleting natural resources and to deny climate change (Häkkinen & Akrami, 2014; Hoffarth & Hodson, 2016; Jylhä, & Akrami, 2015; Milfont et al., 2013). Such theoretical advancements in our understanding of core ideological motives underlying the exploitation of animals and our planet is needed if we are to address animal neglect/cruelty and environmental problems.

The unifying principle of SDO provides a parsimonious and, therefore, appealing explanation for why speciesism and ethnic prejudice are related. However, the question of whether those higher in SDO express a fundamental desire for human dominance over animals per se, or merely endorse greater speciesism in light of their preferences for inequality in human intergroup relations, warrants further investigation. Indeed, both processes might be operating simultaneously (see Jylhä & Akrami, 2015). The latter explanation would mean that social dominators object granting a higher status to animals because this would almost unavoidably imply the recognition of higher status for human low-status groups, especially typical targets of animalistic dehumanization. In other words, the endorsement of speciesist attitudes by those higher in SDO could be considered a mere side-effect of preferences for group-based dominance in *human* groups or a strategic way to maintain social hierarchy among human groups, rather than reflecting a general preference for dominance over human and non-human outgroups. Along similar lines, Milfont and Sibley (2014) have shown that SDO predicts stronger support for environmental exploitation

(i.e., a new mining operation) *only* when high-status groups benefit from it, thus sustaining hierarchical intergroup relations. SDO did not predict support for environmental exploitation when members of both high- and low-status groups would benefit from it. Applying this approach to the study of speciesism would involve comparing participants' reactions towards elevating the status of animals in conditions with and without consequences for human intergroup relations (e.g., Milfont & Sibley, 2014), a valuable research question for future research.

Notwithstanding the unifying theoretical framework connecting the power dynamics in human intergroup and human-animal relations, it is important to keep the differences in mind. Members of low-status human outgroups can actively contribute to the maintenance and reproduction of group-based inequality and oppression by endorsing system justifying beliefs and the legitimation of existing social order (Jost & Banaji, 1994; Jost, Banaji, & Nosek, 2004) or by engaging in ingroup-damaging behaviors (Sidanius & Pratto, 1999). Alternatively, they can also collectively organize to challenge the status-quo and promote social change (see Becker & Tausch, 2015; van Zomeren, Postmes, & Spears, 2008), which likely increases high-status group members' perceptions of threat posed by low-status groups to existing social hierarchies, particularly among those higher in SDO. In contrast to these reciprocal dynamics in human intergroup hierarchies, animals play a rather passive role in the dominant-subordinate interaction between humans and animals. Arguably, they cannot engage in collective actions on behalf of their group, nor will they themselves be perceived as politically and economically threatening. Yet interestingly, such threat perceptions shifts from the focal disadvantaged group (the animals) to humans who support them (e.g., vegans), themselves minorities in typical societies embracing carnist ideologies (Dhont & Hodson, 2014; MacInnis & Hodson, in press). As such, merely expressing concern or engaging in

vegan advocacy comes at the cost of becoming a target of negative biases (MacInnis & Hodson, in press).

The main focus of the current analyses concerned the role of SDO in underlying the associations of generalized ethnic prejudice with speciesism and vegetarianism threat. Despite the consistent and robust effects of SDO across studies, a model considering only SDO is not sufficient in explaining speciesism. For one, the meta-analytic relation between SDO and speciesism is .43 (R^2 = .18), meaning that SDO accounts for only a fifth of the variances in speciesism (see Table 2). Moreover, the current results also emphasize the importance of other ideological constructs in shaping speciesist attitudes (see conservatism in Study 3). Two additional findings are particularly noteworthy. First, the residual correlation between vegetarianism threat and speciesism remained significant after partialing out SDO and RWA (as well as political conservatism), with SDO significantly predicting both variables and RWA significantly predicting vegetarianism threat. This finding is consistent with previous work suggesting that the more people construe vegetarian and anti-speciesist ideologies as a threat to the dominant status of carnist and speciesist ideologies, the more likely they may actively push-back against them and express even more support for animal exploitative practices (Dhont & Hodson, 2014). More specifically, Dhont and Hodson found in two studies that higher threat perceptions from animal-right ideologies accounted in part for the associations between SDO (and to a lesser extent RWA) and speciesism, along with greater views that animals are fundamentally inferior to humans. The mediation models tested in Studies 2 and 3 of the current research confirmed this pattern of results by showing that both SDO and RWA exerted significant indirect effects on speciesism via perceived vegetarianism threat. This finding indicates that, in addition to dominance strivings, ideological motives related to resistance to change also play a role in shaping speciesism. Like with other types of oppressive ideologies, system legitimizing mechanisms to maintain

and strengthen the dominant status position of speciesism as well as traditional practices include the construction of a narrative of threat from alternative ideologies in ways that try to illegitimate and ridicule them (Dhont & Hodson, 2014; MacInnis & Hodson, in press).

Secondly, Study 3 revealed that also political conservatism was significantly related to speciesism even after accounting for SDO and RWA. This finding suggests that the way people position themselves on a liberalism-conservatism dimension predicts speciesism over and beyond the variance explained by the core elements of conservatism captured by RWA and SDO, that is, resistance to change and acceptance of inequality, respectively. One plausible explanation for this observation is that animal rights (and by extension environmentalism, see Hoffarth & Hodson, 2016) are currently inherently associated with left-wing movements and parties. Merely identifying or labeling political and social topics as left-wing (or liberal in the US) might be enough for those identifying themselves as political conservative to react against these topics or for those identifying themselves as political liberals to express their support. Clearly, more research is needed to further disentangle the dynamic connections between different indicators of political ideology and attitudes towards human and non-human outgroups.

Future studies could also consider other relevant political variables such as political interest, knowledge, and awareness, all of which have been shown to play a role in the strength of the associations between ideological variables such as RWA and SDO (e.g., Leone, Desimoni, & Chirombolo, 2014; Roccato & Ricolfi, 2005), with implications for the predictive value of RWA and SDO. Systematic differences in (unmeasured) political variables between our samples might account for some of the differences in the results between the studies. In particular, after accounting for SDO, RWA was significantly related to generalized ethnic prejudice in the (smaller) Belgian sample (Study 1), yet non-significantly related to generalized ethnic prejudice in the UK and US samples (Studies 2 and

3). Also the strength of other associations in the models seems to vary across our studies (e.g., the association between RWA and vegetarianism threat). Such findings suggest that contextual factors or other psychological factors may moderate the associations.

Overall, our findings illustrate that well-established models developed to explain human intergroup dynamics can be applied to the study of human interactions with animals. Yet, they also require theoretical expansion when aiming for a more complete understanding of the dynamics in human-animal-nature interactions.

Applied Implications of SD-HARM

Our findings provide new insights into the psychology of human-animal relations and have several implications for the field. Clearly, how we think about animals and our willingness to exploit them is systematically related to our biases against stigmatized human outgroups. Efforts to combat one type of bias, therefore, are likely to have implications for reducing the other type of bias - an idea that can be tested in future research. Of particular promise is an emphasis on lowering the levels of SDO because our findings suggest that such action would lower both ethnic prejudice and speciesism. Although SDO is relatively stable (Dhont, Van Hiel, & Hewstone, 2014; Pratto et al., 1994), increased outgroup contact is effective at lowering SDO levels over time (Dhont, Van Hiel, et al., 2014; Shook, Hopkins, & Koech, 2015). For this reason, contact-based interventions offer particular promise (see Hodson & Hewstone, 2013). One intriguing implication of our model is that positive contact with either human outgroups or with non-human animals may effectively lower SDO levels in ways that can reduce bias towards the other outgroup. Such findings can generate and guide future research and prejudice intervention strategies.

Of interest, multiple studies have recently demonstrated that human-animal relations covary meaningfully with human-human relations (e.g., Costello & Hodson, 2010, 2014a, 2014b; Dhont & Hodson, 2014; Dhont, Hodson, et al., 2014). Yet this relation is not intuitive.

In fact, even in a sample of educated undergraduates, participants not only failed to recognize this potential but actively resisted the notion that human-animal relations can inform human-human relations (Costello & Hodson, 2014b). Rather than viewing such findings with pessimism, we find cause for optimism. With participants failing to acknowledge the relation between these forms of bias, changes to one type bias can impact the other type, even among highly prejudiced individuals who tend to be resistant to interventions (Hodson, 2011; Hodson & Dhont, 2015). For instance, manipulations that stress how animals are similar to humans (i.e., "elevate" animals up to the level of humans) reduce prejudice towards immigrants and expand moral concern for marginalized outgroups through robbing outgroup dehumanization of any social power (Costello & Hodson, 2010) and by increasing moral inclusiveness towards animals (Bastian, Costello, Loughnan, & Hodson, 2012). Encouragingly, the benefit of lowering anti-immigrant prejudice by closing the perceived divide between animals and humans was effective among both those low and high in SDO (Costello & Hodson, 2010). Therefore, the present line of research has the potential to translate into real social impact.

Limitations and Future Directions

Consistent with the research goal to test whether SDO underpins speciesism, and thus support for animal exploitation in *general*, our speciesism measure included examples of animal exploitation across a range of current societal practices (e.g., hunting, factory farming, animal testing, fur industry, whaling) involving a range of different animals. However, we acknowledge that differences exist in the treatment of different animals and between cultures. Although SD-HARM was found to be generalizable across different countries, our samples were collected from Western countries. Future research can test for similarities and differences in the ideological underpinnings of human-animal relations between cultures in a cross-cultural design. Based on our findings, we expect that SDO would be a consistent and

robust predictor across cultures and general exploitative practices of animals. However, RWA presumably plays a more prominent role when focusing on exploitative practices of specific animals tied to cultural traditions and social norms within a country or region. Examples of such culturally specific practices include bull fights in Spain, consuming dogs in regions of China and South Korea, the dolphin drive hunt in Taji (Japan), and Norwegian and Icelandic whaling practices (e.g., Bowett & Hay, 2009; Wilson & Peden, 2015). Within each of those cultures, higher RWA is likely associated with more support for such culturally specific practices as an expression of endorsement of social conformity and traditions, a direction for future research. In a similar vein, future research could investigate the role of people's likeability of different animal species, in addition to focusing on exploitative practices.

Conclusion

When Martin Luther King Jr. decreed that *Injustice anywhere is a threat to justice everywhere*, he was not necessarily thinking about animal rights. But he was clearly recognizing that anti-outgroup biases are systematically linked, leading to the rather inevitable conclusion that proposed solutions may benefit from recognizing such linkages. Our empirical findings contribute to the growing literature on the psychology of human-animal interactions (Amiot & Bastian, 2015) and, specifically, how it relates to our understanding of the ideological underpinnings relevant to human intergroup relations. The present research addressed the question whether and why speciesism covaries with ethnic prejudice, thereby testing the suggestion that fundamental individual differences in people's desire for group-based dominance and social inequality constitute the common core of both biases. Our studies confirmed this by highlighting SDO as a key individual difference variable explaining the connection between ethnic prejudice and speciesism. The psychology of group-based dominance is useful not only in explaining individuals' negative attitudes

towards human outgroups but also offers insight as to why some people wilfully oppose better treatment of animals and hold negative attitudes towards vegetarians and vegans, whereas others aim to refrain from any form of animal exploitation.

Footnotes

[1] We use “animals” to refer to non-human animals, nonetheless recognizing that humans are animals.

[2] For the subtle prejudice scale, we only used items tapping the components of denial of positive emotions and defense of traditional values (see Coenders, Scheepers, Sniderman, & Verberk, 2001).

[3] The indirect effects of SDO and RWA on ethnic prejudice through vegetarianism threat were not significant (and also not hypothesized to be significant), standardized estimate = .03, [95% BCIs: -.018, .084] and standardized estimate = 02 [95% BCIs: -.009, .053], respectively].

[4] The errors of two political conservatism items were allowed to correlate.

[5] The indirect effects of RWA on ethnic prejudice via vegetarianism threat were not significant (and also not hypothesized to be significant), standardized estimate = .06 [95% BCIs: -.003, .112] and standardized estimate = -.01 [95% BCIs: -.028, .009], respectively. A weak indirect effect of SDO on ethnic prejudice emerged, standardized estimate = .04 [95% BCIs: .00, .078].

[6] Following a suggestion of a reviewer, we also tested a mediation model in which both vegetarianism threat and political orientation were considered mediators in the relationship of SDO and RWA with speciesism. In such model, SDO and RWA are thus considered social-ideological antecedents of political orientation (i.e., ideological self-placement), which in turn, is related to speciesism. In this model, SDO and RWA were significantly indirectly related to speciesism through vegetarianism threat, standardized estimate = .10 [95% BCIs: .05, .14] and standardized estimate = .12 [95% BCIs: .066, .181], respectively, as well as through political orientation, standardized estimate = .05 [95% BCIs: .015, .090] and

standardized estimate = .20 [95% BCIs: .112, .304], respectively. As in the mediation model with vegetarianism threat as the only mediator, the direct effect of SDO remains significant, β = .19, p = .002, whereas the direct effect of RWA is significant, yet negative, β = -.17, p = .030.

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Table 1. Correlations between variables in Studies 1-3 (S1-S3)

		1	2	3	4	5	6
1. SDO	S1		.53***	.56***	.40***	/	/
	S2		.43***	.53***	.37***	.41***	/
	S3		.38***	.43***	.40***	.48***	.42***
2. RWA	S1			.60***	.29***	/	/
	S2			.26***	.24***	.32***	/
	S3			.26***	.29***	.55***	.72***
3. Ethnic Prejudice	S1				.32***	/	/
	S2				.19**	.29***	/
	S3				.21***	.32***	.29***
4. Speciesism	S1					/	/
	S2					.37***	/
	S3					.42***	.39***
5. Vegetarianism Threat	S1						/
	S2						/
	S3						.40***
6. Liberalism-Conservatism	S1						
	S2						
	S3						

Note. Variables are manifest (Studies 1-2) or latent (Study 3). *p = .05; ** p < .01; *** p < .001

Table 2. Meta-analytic synthesis of Social Dominance Human-Animal Relations Model.

	SDO associations		Prejudice-Speciesism association		Sample characteristics	
	with ethnic prejudice	with speciesism	zero-order association	residual association	n	location
Dhont, Hodson et al. (2014)	.45***	.56***	.34***	.12	191	Canada
Present Paper						
Study 1	.56***	.40***	.32***	.13	118	Belgium
Study 2	.53***	.37***	.19**	-.003	198	UK
Study 3	.42***	.40***	.21***	.04	573	US
Total *N*					1080	
Mean *r*	.46***	.43***	.24***	.06		
95% CI	[.414, .513]	[.358, .501]	[.185, .298]	[-.004, .116]		

Note. Standardized path values in all columns represent paths from model (except for zero-order relation between ethnic prejudice and speciesism). ** $p < .01$; *** $p < .001$

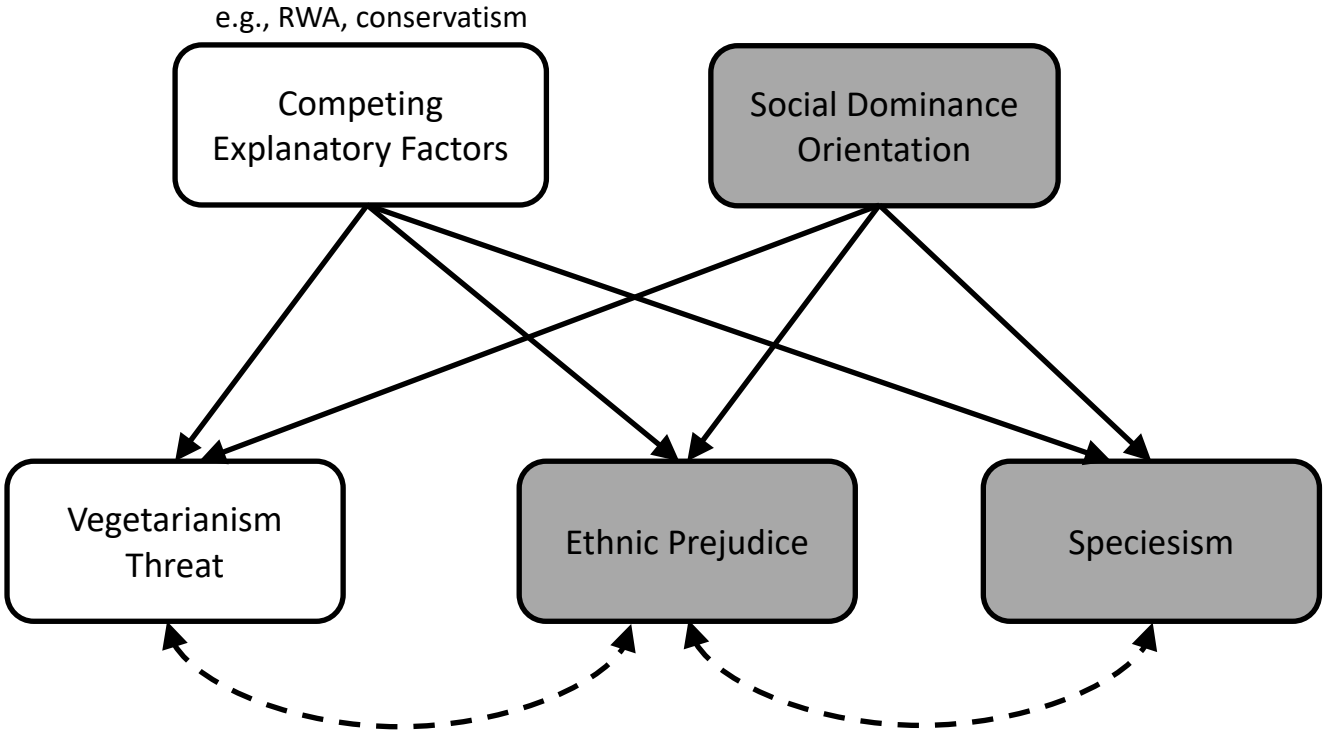

Figure 1. Conceptual representation of the Social Dominance Human-Animal Relations Model (SD-HARM). Core model in grey-scale; competing and alternative constructs in white. Dotted lines represent relations anticipated to be significant at zero-order level but weak or non-significant with SDO included.

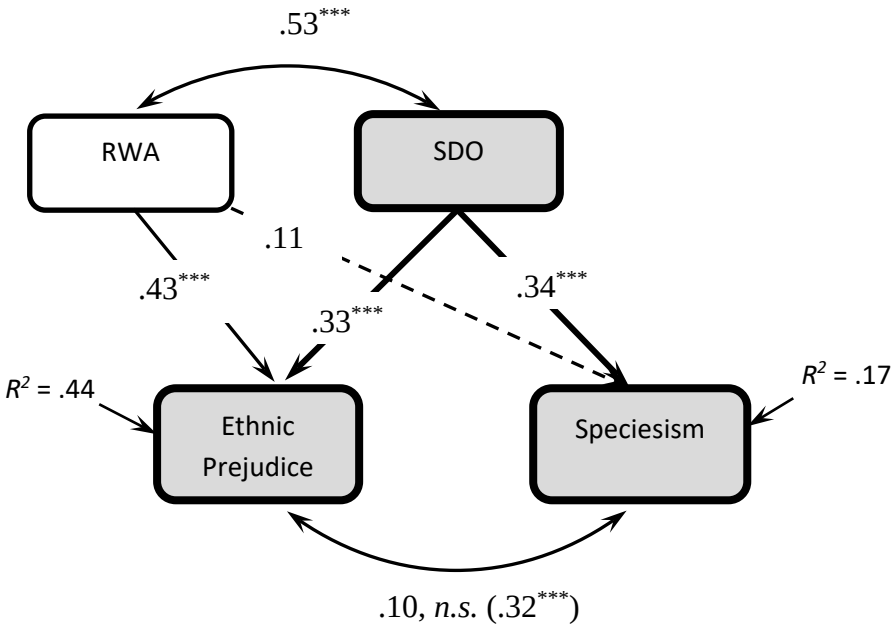

Figure 2. Test of the Social Dominance Human-Animal Relations Model after controlling for RWA (Study 1). Standardized paths are shown, with parenthetical value reflecting a zero-order relation. Core SD-HARM variables in grey. *** $p < .001$

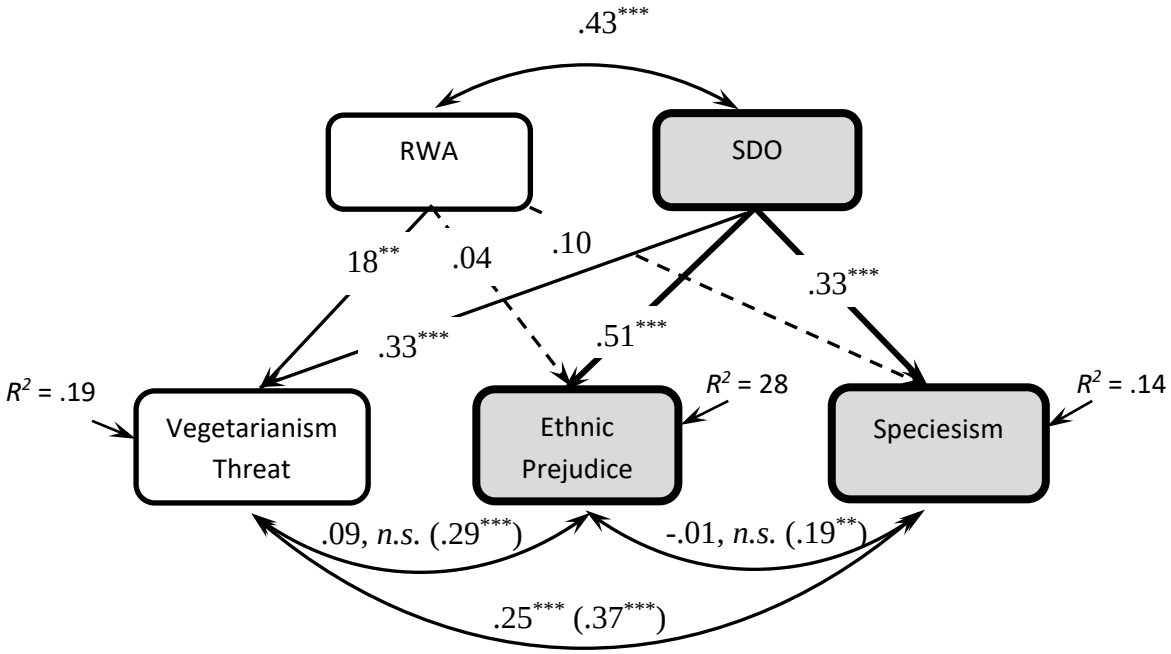

Figure 3. Social Dominance Human-Animal Relations Model after controlling for RWA and extended with vegetarianism threat (Study 2). Standardized paths shown, with parenthetical value reflecting a zero-order relation. Core SD-HARM variables in grey. ** $p < .01$; *** $p < .001$

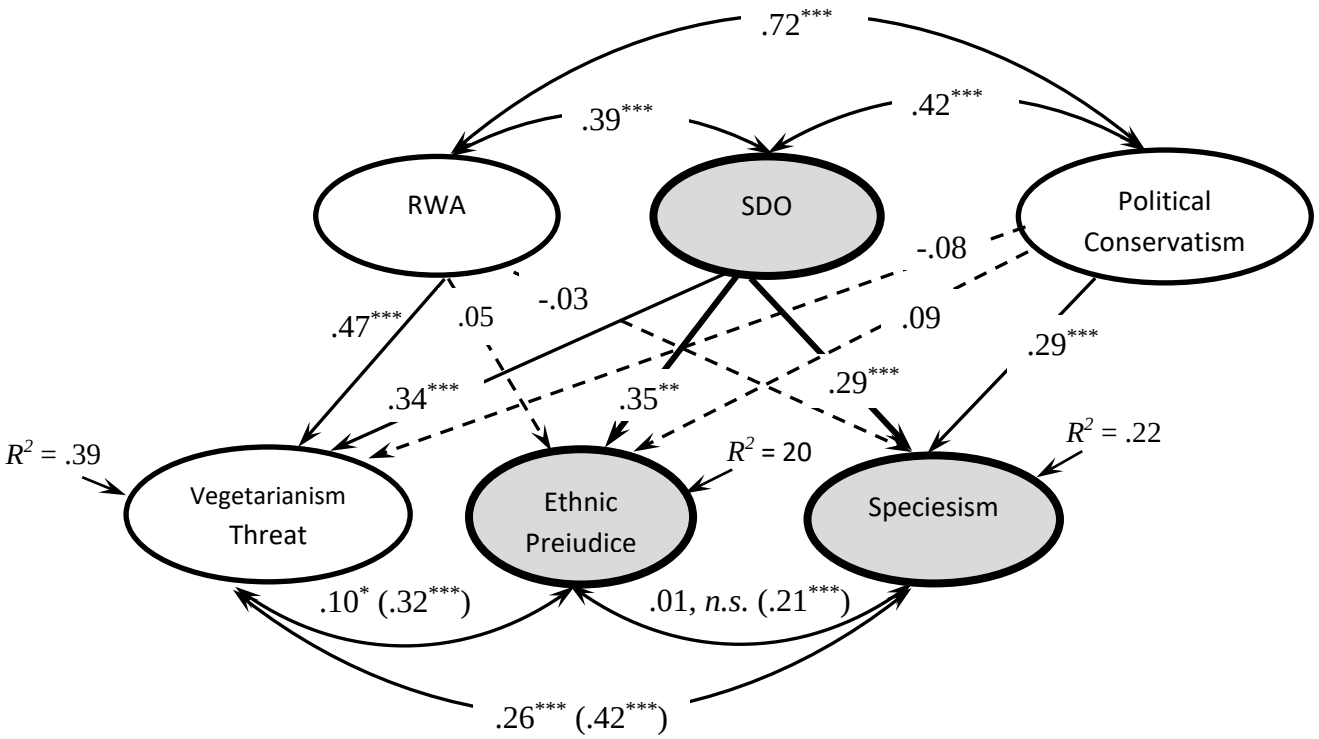

Figure 4. Social Dominance Human-Animal Relations Model after controlling for RWA and political ideology and extended with vegetarianism threat (Study 3). Standardized paths shown, with parenthetical values reflecting zero-order relations. Core SD-HARM variables in grey. $N = 573$; $\chi^2(88) = 250.74$, $p < .001$; RMSEA = .057; SRMR = .040; CFI = .97. ** $p < .01$; *** $p < .001$;

Appendix

Speciesism scale based on Hertzog, Betchart, and Pittman (1991)*

(1 = strongly disagree to 7 = strongly agree)

1. Much of scientific research done with animals is unnecessary and cruel.**
2. The production of inexpensive meat, eggs, and dairy products justifies maintaining animals under crowded conditions.
3. Continued research with animals will be necessary if we are to ever conquer diseases such as cancer, heart disease and AIDS.
4. The use of animals in rodeos and circuses is cruel.**
5. I think it is perfectly acceptable for cattle, chickens and pigs to be raised for human consumption.
6. I think that human economic gain is more important than setting aside land for wildlife.
7. There is nothing wrong with killing animals for their fur to make clothes (fur coats).**
8. The slaughter of whales and dolphins should be immediately stopped even if it means some people will be out of work
9. Breeding animals for their skins is a legitimate use of animals.**
10. It is morally wrong to hunt wild animals just for sport.**
11. The use of animals such as rabbits for testing the safety of cosmetics and household products is unnecessary and should be stopped.**
12. There is nothing morally wrong with hunting wild animals for food.

* Scale used in Study 2 and Study 3, the Dutch speciesism items used in Study 1 are available from the first author upon request.

** Reverse-coded item

Vegetarianism threat scale developed by Dhont and Hodson (2014) used in Study 2 and 3

(1 = strongly disagree to 7 = strongly agree)

1. The rise of vegetarianism poses a threat to our country's cultural customs.
2. Important culinary traditions which are typical to our country starting to die out due to the rise of vegetarianism.
3. Eating meat is part of our cultural habits and identity and some people should be more respectful of that.
4. Vegetarians should have more respect for our traditional eating customs, which meat consumption is simply part of.
5. Important family traditions and celebrations are increasingly being ruined and disappearing because of the presence of vegetarians in certain families.
6. Vegetarianism has a negative influence on the [Country] economy.
7. The vegetarian movement is too involved in local and national politics.
8. Nowadays, when it comes to nutrition and meals, people listen too much to what a minority of vegetarians wants.