Reducing Speciesism by Changing People's Need to Dominate Through Intergroup Contact

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Abstract

We, humans, treat some animals as our friends and companions, whilst others as mere tools for human needs. This is also known as speciesism, the differential treatment of animals solely based on their membership in a certain species. As this differential treatment causes a myriad of welfare problems for animals and humans, a change is needed in the way we regard animals. This study investigated whether imagining intergroup contact (IIC), an indirect form of intergroup contact theory, could reduce speciesism through the potential mediator social dominance orientation (SDO). SDO is the desire to achieve and maintain group-based dominance, it is an ideological social attitude. In addition, the possible mediating role of empathy in the relationship between IIC and SDO was explored. This study had an experimental between-participants design. The participants were divided into a contact condition ($N = 39$) who imagined contact with a cow and a control condition ($N = 44$) who had a neutral task of imagining a frequently visited building. Participants' SDO was measured pre- and post-contact, and speciesist attitudes, behavioural intentions, and empathy were measured post-contact. The study showed that there was no effect of IIC on speciesism, therefore, SDO could not mediate the relationship and an indirect-only mediation was also not found. Counterintuitively, participants in the contact condition had a higher SDO score after contact compared to before. Further, empathy did not mediate the relationship between IIC and SDO. Possible reasons for the contradictory results compared with previous research are elaborated and discussed.

Introduction

"To discriminate against beings solely on account of their species is a form of prejudice" (Singer, 1975, as cited by Hyers, 2006). Countless animals live happy and healthy lives as pets in the homes of humans, whereas numerous other animals endure conditions such as small living spaces and bad health due to factory farming for human consumption or being used as experimental subjects to create medicine for humans (Anomaly, 2014; Cruelty Free International, 2023; Hilton, 2024). This differential treatment of animals, where some animals are seen as our friends and companions and others as mere tools for human needs, stems from this preconception mentioned by philosopher Peter Singer (Chappell & Meissner, 2025). The treatment of some animals as mere tools for human needs causes a myriad of problems for animals, humans and global well-being (Santo et al., 2020; Springmann et al., 2016; Stel et al., 2022). For example, one of the main threats to public health is infectious illnesses transferred from animals to humans, with the single most important source being animal-product manufacturing and animal consumption by humans (e.g. Covid-19; Stel et al., 2022). Therefore, to increase general welfare and to foster a more compassionate relationship between humans and other species, a change is needed in the way we regard animals. It is, hence, imperative to understand and influence the underlying mechanisms that influence the discrimination against animals, such as social dominance orientation. Therefore, the present study focuses on whether an intergroup contact intervention aimed at influencing social dominance orientation would reduce prejudiced attitudes and behaviours towards animals.

Speciesism

Humans' prejudiced attitudes and behaviours towards animals are also known as speciesism. Speciesism can be defined as the differential treatment or assignment of inherently different moral statuses to animals based entirely on their membership to a certain species (Caviola et al., 2019; Dhont et al., 2020). Speciesism manifests itself as the belief that

it is morally justifiable to believe that humans are worth more than other species and that species with similar mental and emotional capabilities deserve differential treatment (Caviola et al., 2019; Dhont et al., 2020). For example, even though the mental and emotional capacities of dogs and pigs are comparable (Gosling et al., 2003; Mendl et al., 2010), dogs are acknowledged as having unique personalities and praised for it by receiving names, whilst pigs' mental and emotional capacities are ignored and devalued, and are sent to be slaughtered (Caviola et al., 2019; Dhont et al., 2020; Leite et al., 2018). The speciesist attitudes and behaviours of an individual can fluctuate based on the situation and other conditional factors, but, over time, it is a persistent view and not a short-term belief or emotional reaction (Caviola et al., 2019). In addition, speciesist attitudes may be socially acquired over time, as Wilks et al. (2020) found that children tend to prioritise animals over humans, whereas adults prioritise the opposite.

Research suggests that speciesism is related to other forms of psychological prejudice, such as racism and sexism. Allport's (1954) theory on generalised prejudice posits that if someone is highly prejudiced against Group A, they are likely to also be highly prejudiced against Groups B and C. Numerous studies found endorsement for this theory regarding racism, sexism and homophobia (Dhont et al., 2014; Sidanius et al., 1996), and in recent studies also speciesism (Dhont et al., 2016, 2020; Hyers, 2006; Plous, 2003). This means those who hold racist, sexist or homophobic prejudiced opinions also hold speciesist beliefs and attitudes (Caviola et al., 2019). In addition, Dhont et al. (2016) introduced the Social Dominance Human-Animal Relations Model (SD-HARM). This model explains that the association of speciesism with human-human forms of prejudice (e.g. homophobia, racism and sexism) comes from the mutual underlying socio-ideological belief of social dominance orientation.

Social Dominance Orientation

Social dominance orientation (SDO) is a social-attitudinal orientation focused on hierarchical group relations (Pratto et al., 1994). The definition of SDO is "the fundamental desire to achieve and maintain group-based dominance and inequality among social groups" (Dhont et al., 2014). SDO is an attitude that people hold, as it is about a person's appraisal of someone or a group on a continuum of favourable to unfavourable (Duckitt & Sibley, 2009; Pratto et al., 2011). SDO is the underlying factor that associates the different forms of prejudice (Kteily et al., 2012; Pratto et al., 1994). That is, the previously mentioned generalised prejudices are correlated with each other *due to* people's desire to achieve and preserve group-based dominance (Sidanius et al., 1996; Dhont et al., 2014, 2016).

These social dominance desires manifest themselves in people high in SDO as discriminatory acts towards marginalised groups with low socioeconomic status and endorsing and partaking in intergroup and institutional processes that enhance and legitimise the dominant position of groups with a high socioeconomic status (Dhont et al., 2020; Duckitt, 2006). To justify these actions, people high in SDO support a wide variety of hierarchy-enhancing legitimising myths (HELMs; Duckitt, 2006; Duckitt & Sibley, 2009; Pratto et al., 2006). Legitimising myths are values, attitudes, beliefs and cultural ideologies that are commonly held, where HELMs are meant to elevate, justify or uphold group inequality and dominance (Pratto et al., 1994, 2006). HELMs about speciesism are either nature or nurture-based (Hyers, 2006). Nature-based HELMs justify the use of animals as it is a part of the natural system, the food chain, where humans are at the top (Hyers, 2006). In nurture-based HELMs, animal use is legitimised by the belief that using animals is a part of culture (Hyers, 2006).

Different sets of values, motivational goals and psychological bases underpin SDO. The basic human value to which SDO is correlated is the value of Self-Enhancement (Duckitt

& Sibley, 2009; Sibley & Duckitt, 2013), which is defined as "the importance of enhancing one's own interests, even at the expense of others" (Lechner et al., 2024; Schwartz, 1992). Furthermore, SDO emanates from the worldview of seeing the world as a ruthless competitive jungle where the strong win and might is right (Duckitt & Sibley, 2009; Sibley & Duckitt, 2013). This worldview is derived directly from the personality trait of low Agreeableness (Duckitt & Sibley, 2009; Sibley & Duckitt, 2013). A lack of empathy and the motivational goals of power, dominance and superiority in people who have low Agreeableness causes them to see the world as a competitive jungle (Duckitt & Sibley, 2009). Thus, knowing the underlying psychological bases of SDO begs the question, how can we lower people's SDO levels? This is where the theory of intergroup contact comes into play.

Intergroup Contact Theory

Intergroup contact theory (ICT) argues that positive contact between different groups reduces previously held prejudiced attitudes and behaviours towards one another (Allport, 1954; Auger & Amiot, 2019; Pettigrew, 1998). Four mechanisms mediate the attitude change within ICT, namely acquiring information about the outgroup, behaviour change, creating affective ties and reappraisal of the ingroup and outgroup (Pettigrew, 1998; Shook et al., 2015). When there is contact between two groups, there are four conditions that *improve* the effects of intergroup contact. Namely, within the situation, both groups have an equal status, the groups have a common goal, cooperation between the groups, and authority supports the contact between the groups (Pettigrew, 1998). Furthermore, not only does intergroup contact reduce prejudice towards the outgroup in that specific interaction, but it also generalises towards other outgroups not involved in that situation, known as the secondary transfer effect (Pettigrew, 2009; Shook et al., 2015). This effect is limited, however, to outgroups that are analogous to the main outgroup in either perceived status, stereotypes, stigma or cultural similarity (Pettigrew, 2009; Shook et al., 2015).

The effect of intergroup contact extends further than changing attitudes towards the outgroup in the contact situation and related outgroups, namely, it also affects SDO as a whole. Dhont et al. (2013) performed a longitudinal study in which they researched whether intergroup contact reduces levels of SDO. They found that intergroup contact decreases SDO immediately after the intervention and over time. These findings even held up for people high in SDO (Dhont et al., 2013), who had previously been subject to discussion about whether they would engage with and benefit from intergroup contact (Duckitt, 2006; Hodson, 2011). Thus, Dhont et al. (2013) showed that intergroup contact decreases levels of SDO in human-human relationships, however, as speciesism involves animals, the question is whether intergroup contact has a similar effect on human-non-human relations.

Numerous studies theorised that contact-based interventions aimed at lowering participants' levels of SDO might show promising results in human-non-human relations (Dhont et al., 2016, 2020; Duckitt, 2006; Shook et al., 2015). A study that strongly indicates that ICT might influence SDO and its consequences, namely speciesism, is the study from Auger and Amiot (2019). They examined how contact with a single specific animal (a dog or cow) influenced positive attitudes towards their animal subgroup and animals in general. They studied this via imagined intergroup contact (IIC), which builds on the proven assumption that imagined social interaction produces similar cognitive activations as experiencing the interaction in real life (Crisp & Turner, 2009, 2012; Miles & Crisp, 2013; Turner et al., 2007). IIC is an indirect form of ICT, but IIC has as benefit that the contact between two groups, which in reality might be difficult to set up, can be studied (Auger & Amiot, 2009; Crisp & Turner, 2009). Auger and Amiot (2019) found that IIC reduced prejudiced attitudes and behaviours towards animals in general. They included SDO as a *moderator*, thus investigating whether it affects the strength or direction of the relationship between IIC and speciesism. Auger and Amiot (2019) found that after IIC participants high in

SDO more strongly reduced their hurtful assessment of and behaviour towards animals. Using the IIC method from Auger and Amiot (2019), this study will investigate whether SDO acts as a *mediator* between IIC and speciesism, thus investigating if IIC lowers SDO and hence explains the relationship between IIC and speciesism.

Present Study

Several researchers of these studies about speciesism, SDO and ICT suggest that having intergroup contact could potentially decrease an individual's level of SDO, which in turn may lead to diminished speciesist beliefs and attitudes. Hence, the present study investigates, via an experimental study, whether this implication of an influential relationship between ICT, SDO and speciesism is valid. Specifically, we investigate whether IIC with a cow (contact condition) leads to a decrease in SDO, which in turn lowers speciesism, compared to a neutral task of imagining a frequently visited building (control condition; Auger & Amiot, 2019). It is hence predicted that: (a) IIC reduces SDO compared with no contact (Hypothesis 1), (b) IIC reduces speciesist attitudes and intentions compared with no contact (Hypothesis 2), (c) SDO mediates the relationship between IIC and speciesism (Hypothesis 3). This is expected because SDO is one of the underlying factors of speciesism (Caviola et al., 2019; Dhont et al, 2016; Pratto et al., 1994), and previous research showed that IIC decreases SDO (Dhont et al., 2013). Additionally, the role of empathy is explored as it might explain why intergroup contact affects SDO.

Empathy can be defined as an other-oriented emotional response consistent with another's perceived well-being, often as a result of taking the perspective of others (Batson et al., 1997). Empathic feelings include, among others, sympathy, compassion and tenderness (Batson et al., 1997). A probable reason why intergroup contact also affects SDO and not just prejudice might be because of one of the mechanisms of intergroup contact, namely, empathy. Pettigrew and Tropp (2008) found that empathy is one of the main mediators

between intergroup contact and prejudice, and as posited previously, a lack of empathy is one of the underlying psychological bases that causes SDO (Duckitt & Sibley, 2009). Moreover, Sidanius et al. (2013) found that the lower one's empathic feelings are, the higher SDO becomes. In other words, intergroup contact may facilitate one to take the perspective of an outgroup member and empathise with their concerns, thus increasing their empathy, which could contribute to improved intergroup attitudes and lowered SDO. Thus, it is presumable to theorise that empathy mediates the relationship between intergroup contact and SDO. Hence, this study will additionally explore whether empathy mediates the relationship between IIC and SDO.

Method

Design

This study consisted of an experimental between-subjects design. The independent variable was IIC, with a contact condition involving contact with a cow and a control condition involving the imagination of a frequently visited building. The dependent variable was speciesism, which included speciesist attitudes and behaviours. The mediating variable was SDO. Empathy was measured as an explorative mediating variable between IIC and SDO.

Participants

To be eligible to participate in this study, participants had to be older than 18 years. Participants were recruited via non-probability sampling. Namely, convenience and snowball sampling among friends of the researcher and voluntary response sampling among students of Behavioural, Management and Social Sciences at the University of Twente in exchange for Sona credits if they filled out the survey. As an extra incentive for all participants, everyone had the chance to win a 50 euro voucher, which was given to a participant at random.

In total, one hundred and thirty-six participants filled in the questionnaire. After excluding participants who did not complete the survey adequately, e.g. quitting prematurely ($N = 42$), under 18 years old ($N = 1$) or did not provide consent ($N = 10$), the final sample consisted of 83 participants. See Table 1 for the description of the participants.

Table 1

Description of the Participants' Characteristics of all Participants (N = 83), the Control Condition (N = 44) and the Contact Condition (N = 39)

Variables	All Participants	Control Condition	Contact Condition
Age, *M* (*SD*)	35.92 (16.28)	35.52 (16.07)	36.36 (16.72)
Gender			
Female	58	30	28
Male	18	11	7
Non-Binary	5	2	3
Other	2	1	1
Nationality			
Dutch	73	38	35
German	3	1	2
Other	7	5	2
Education			
SVE	3	1	2
HVE	22	10	12
AE	49	30	19
Other	9	3	6
Employment			
Employed	60	32	28
Unemployed	23	12	11
Consumption			
Omnivore	57	31	26
Pescetarian	9	4	5
Vegetarian	7	4	3
Vegan	8	5	3
Don't know	2	-	2

Note. Age is measured in years. SVE = Secondary Vocational Education, HVE = Higher Vocational Education, AE = Academic Education.

Procedure

The Faculty of Behaviour Sciences Ethics Committee of the University of Twente provided ethical approval for this study, 250916. Through the Qualtrics website, participants gained access to the survey. Participants could withdraw at any time throughout the study, and the data were anonymised by the researchers.

After reading information about the aim of the study, the risks and how the data would be handled, participants had to agree or not to an informed consent form. Depending on whether the participant agreed, the questionnaire continued with questions about their demographics. Next, participants were asked to answer questions about SDO (see Materials). To hide the true purpose of the questionnaire and increase the time between the pre-contact and post-contact SDO questions, making it more difficult for participants to recall their earlier responses, filler questions about creativity were included (Runco Ideational Behaviour Scale; Runco et al., 2001).

After the creativity filler questions, participants were randomly divided into either the control condition or the contact condition for IIC. Similar to the study of Auger and Amiot (2019), intergroup contact was manipulated and measured by imagining a positively toned intergroup contact situation. The subject of the IIC in the contact condition was a cow, as they are considered prototypical farm animals (Auger & Amiot, 2019). The instructions were as follows: “Take a minute to close your eyes and imagine that you are having friendly contact with a cow that you have never met before. Imagine the context in which this interaction is taking place (when, where). Imagine what this cow looks like and how it interacts with you” (Auger & Amiot, 2019). For the control condition, the participants were given a neutral task, they had to imagine a building they regularly visit (Auger & Amiot, 2019). The instructions were: “Take a minute to close your eyes and think about the building that you visit most often on campus. Imagine in what context you use this building (when,

why). Imagine, in detail, what this building looks like, and what you do in this building" (Auger & Amiot, 2019). After the mental simulation task, both the participants in the contact and control conditions were asked to answer five questions with at least 2 sentences, to promote the elaboration of the mental script. An example of a question is "Describe the positive interactions you have had with the cow and why it was positive (contacts, activities, behaviours)".

Then, the participants from both conditions had to answer post-contact SDO questions for pre- and post-intervention comparison (see Materials). Following this were the questions for speciesist attitudes and speciesist behavioural intentions (see Materials). Then, the participants were asked to answer questions regarding empathy and social desirability (see Materials). The questionnaire ended with a thank you for participating, a debriefing of the true purpose of the questionnaire and hence an additional informed consent, and contact information in case a participant had questions or concerns about the study. After filling in the survey, participants could choose to get redirected to a different questionnaire where they could provide their e-mail address to participate in the raffle. The answers of the participants and their e-mail addresses could not be linked to each other. In total, filling in the questionnaire took approximately 30 minutes.

Materials

Questionnaires

SDO. The levels of SDO were measured using the SDO scale from Dhont et al. (2014), because the items in this SDO scale are about groups, which in the context of this study can be interpreted as including animals. The six items were asked pre- and post-contact, with the instruction stating that they should answer how they felt at that moment. An example of one of the 6 items is: "Superior groups should dominate inferior groups". The items were measured using a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*). High

levels of SDO are indicated by a higher score. For these 12 items from pre and post-combined, Cronbach's alpha was considered acceptable (α = .76). A bootstrapped 95% confidence interval based on 1.000 samples ranged from .69 to .82 (*N* = 83).

Speciesist Attitudes. To measure participants' speciesist attitudes, the Speciesism Scale from Dhont et al. (2016) was used. This questionnaire was adapted from Herzog et al. (1991) by Dhont et al. (2016) to include examples of current animal exploitations, which makes the questionnaire more varied and elaborate. An example of one of the 12 items is: "I think it is perfectly acceptable for cattle, chickens, and pigs to be raised for human consumption." The items were rated on a 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*), with a higher overall score meaning higher levels of speciesism. The Cronbach's alpha was calculated for all 12 items together and was considered acceptable (α = .76). A bootstrapped 95% confidence interval based on 1.000 samples ranged from .57 to .79 (*N* = 83).

Speciesist Behavioural Intentions. To test whether participants would change their speciesist behaviours, the behavioural intention items as measured in Banach & Stel (2024) and Stel & Unterweger (2025) were applied. This 9-item questionnaire measures whether participants intend to change their behaviour in animal product consumption, buying products including or made of animals and animal entertainment (e.g. the circus). An example of a behavioural intention item is: "I intend to consume meat…". Participants' behavioural intentions were rated on a 4-point Likert scale (1 = *more than I currently do* to 4 = *stop … all together*) or participants could answer that they never portrayed this type of behaviour and will continue to do so. Higher scores mean more behavioural changes. Cronbach's alpha was considered good (α = 80). A bootstrapped 95% confidence interval based on 1.000 samples ranged from .74 to .86 (*N* = 83).

Empathy. To explore the effect of empathy in the relation of IIC and SDO, the Animal Empathy Scale Short Form, developed by Okutan (2023), was used. The scale has eight items, four measuring the factor of empathic feelings and four measuring the factor of non-empathic emotions. The items were adapted to measure their current empathic feelings. Thus, instead of "Sometimes I am amazed how upset people get when an old pet dies", the item was stated as "I am amazed how upset people get when an old pet dies", and the explanation included the instruction to answer how they would feel at that moment. A 7-point Likert scale (1 = *strongly disagree* to 7 = *strongly agree*) was used to measure the items. From the sum of the answers to all items, a single scale score was calculated, with a high score indicating increased levels of empathy towards animals. Cronbach's alpha for the scale was considered good ($\alpha = .84$). A bootstrapped 95% confidence interval based on 1.000 samples ranged from .78 to .90 ($N = 83$).

Social Desirability. The Social Desirability Scale of Marlowe-Crowne (Reynolds, 1982) was used to measure whether participants answered honestly or gave socially favourable answers. An example of one of the 12 items is: "I sometimes try to get even rather than forgive and forget". These items were answered by stating either "true" (1) or "false" (2), with a high score indicating a tendency to answer socially desirable. The Cronbach's alpha for the scale was considered acceptable ($\alpha = .71$). A bootstrapped 95% confidence interval based on 1.000 samples ranged from .59 to .80 ($N = 83$).

Results

The means and standard deviations per group for each measurement are displayed in Table 2 and Table 3. The correlation coefficient between each measurement is displayed in Table 4.

Table 2

Mean Scores of Pre- and Post-Contact SDO (and Standard Deviations) for the Control Condition (N = 44) and Contact Condition (N = 39)

Measurements	Control Condition	Contact Condition
Pre-contact SDO	1.89 (0.79)$_a$	2.08 (1.00)$_a$
Post-contact SDO	1.81 (0.87)$_a$	4.08 (2.12)$_b$

Note. Means with different subscripts significantly differed from other means in columns and rows.

Table 3

Mean Scores of Speciesism, Behavioural Intentions and Empathy (and Standard Deviations) for the Control Condition (N = 44) and Contact Condition (N = 39)

Measurements	Control Condition	Contact Condition
Speciesist Attitudes	2.65 (0.78)$_a$	2.81 (0.68)$_a$
Speciesist Behavioural Intentions	3.16 (0.66)$_a$	3.02 (0.71)$_a$
Empathy	5.98 (0.93)$_a$	5.94 (0.93)$_a$

Note. Means with different subscripts significantly differed from the other means in the row.

Table 4

Correlations Between the Variables and Measurements

Measurements	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	—											
2. Gender	.09	—										
3. Nationality	-.03	-.07	—									
4. Education	-.10	.04	.04	—								
5. Employment	-.19	.16	.02	-.02	—							
6. Consumption	.09	.01	-.01	-.10	.12	—						
7. IIC	-.01	-.03	-.06	-.04	.01	.04	—					
8. Pre-contact SDO	.02	-.07	.07	-.04	-.08	-.15	.08	—				
9. Post-contact SDO	.03	-.01	.02	-.22*	-.01	.06	.55*	.29*	—			
10. Speciesist Attitudes	-.14	.09	.07	.04	-.00	-.43*	.09	.35*	.19	—		
11. Speciesist Behavioural Intentions	.13	-.08	.12	-.12	-.05	.50*	.00	-.04	-.04	-.53*	—	
12. Empathy	.04	-.04	.06	.08	-.14	.24*	-.03	-.25*	-.03	-.53*	.32*	—

*$p < .05$.

SDO

A linear mixed-effects model (LMM) was conducted to assess the effect of IIC on SDO scores between and within the two conditions, with the pre- and post-contact, the contact condition and control condition, and their interaction as fixed effects. A random intercept was included for each participant to account for individual differences in baseline SDO scores.

Results showed significant difference in pre-contact SDO (M = 2.08; SD = 1.00) and post-contact SDO (M = 4.08; SD = 2.12) scores for participants in the contact condition, b = 2.00, SE = 0.39, $t(37) = -5.34$, $p < .001$, Cohen's d = .56. A post hoc power analysis revealed that the test was highly powered to detect this effect, with an achieved power of 1.00 ($1 - \beta = .9998$). Thus, the participants in the contact condition scored significantly higher on SDO after IIC than before IIC. In contrast, participants in the control condition demonstrated that there was no significant difference in pre- and post-contact SDO scores, b = -0.08, SE = 0.27, $t(42) = 0.28$, $p = .777$.

The results of the LMM showed there was no significant difference in the mean scores of pre-contact SDO between the control and contact conditions, b = 0.19, SE = 0.28, $t(81) = 0.69$, $p = .492$. The difference in post-contact SDO scores between the control condition (M = 1.81; SD = 0.87) and contact condition (M = 4.08; SD = 2.12) was significant, b = 2.08, SE = 0.39, $t(81) = 5.34$, $p < .001$, Cohen's d = 1.37. Post hoc power analysis indicated excellent power to detect this effect ($1 - \beta = 1.0000$). Thus, participants in the contact condition scored significantly higher in post-contact SDO compared to the control condition. The results held up when accounted for social desirability, $t(80) = 6.29$, $p < .001$.

Speciesism

To analyse whether the control condition and the contact condition were different in terms of their mean speciesist attitudes scores, an independent t-test was performed with speciesist attitudes as the dependent variable and the two IIC conditions as the independent variable. The mean scores were not significantly different between the control condition and the contact condition, $t(81) = -1.02$, $p = .31$.

To investigate whether the control condition and the contact condition were different in terms of their mean speciesist behavioural intentions scores, an independent t-test was performed with speciesist behavioural intentions as the dependent variable and the two IIC

conditions as the independent variable. The independent t-test showed that there was no significant difference in the mean scores, $t(81) = -0.06$, $p = .95$.

Mediation Analysis

To investigate whether IIC reduces individual levels of SDO, which in turn leads to lower speciesist beliefs and behaviours, a mediation analysis should have been performed. However, as shown previously, the effect of IIC on speciesism was not significant. Therefore, no mediation analysis was performed as SDO cannot mediate the relationship between IIC and speciesism, as there was no relationship. When performing an indirect-only mediation, it showed that the effect of IIC on speciesism while controlling for SDO, was not significant, $b = 0.10$, $t(81) = 0.52$, $p = .60$. Thus, the hypothesis could not be confirmed: IIC does not positively influence an individual's level of SDO and therefore in return does not lead to a lower state of speciesism.

The non-significant main effect between IIC and speciesism could potentially be explained by multiple mediation, with SDO and empathy as mediators. However, this was not the case as the relationship between IIC and empathy was not significant, $b = -0.04$, $t(81) = -0.22$, $p = .83$. Moreover, as mentioned previously, the indirect-only mediation between IIC and speciesism through SDO was also not significant, $b = 0.10$, $t(81) = 0.52$, $p = .60$.

Nonetheless, it is still interesting to know whether SDO and speciesism were related to each other, because numerous studies, such as Dhont et al. (2016), found that SDO is one of the underlying causes of speciesism. Therefore, a regression analysis was conducted. For this analysis, only the post-contact SDO and speciesist attitudes results were used. The linear regression analysis with dependent variable speciesism and independent variable SDO illustrated that the effect of SDO on speciesism was not significant, $b = 0.04$, $t(81) = 1.01$, $p = .32$.

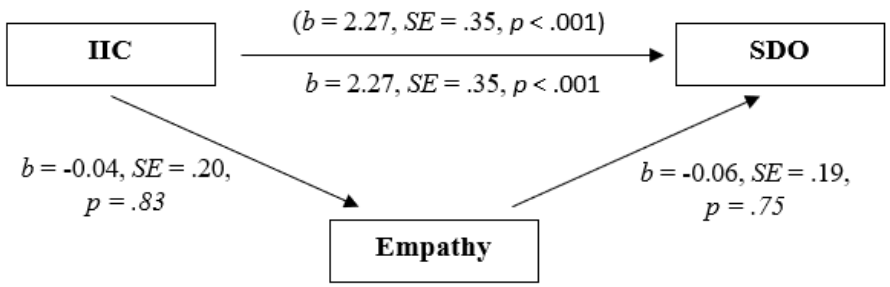
Empathy

To investigate whether the control condition and the contact condition were different in terms of their mean empathy scores, an independent t-test was performed with empathy as the dependent variable and the two IIC conditions as the independent variable. The mean score of empathy was not significantly different between the control condition and contact condition, $t(81) = 0.22$, $p = .83$.

To explore whether empathy mediated the relationship between IIC and SDO, a mediation analysis was performed using Rstudio (see Figure 1). Only the post-contact SDO results were used again for this mediation analysis. Linear regression analysis showed that the total effect of IIC on SDO was significant, $b = 2.27$, $t(81) = 6.51$, $p < .001$. As stated previously, the regression of IIC on empathy was not significant, $b = -0.04$, $t(81) = -0.22$, $p = .83$. The final linear regression analysis illustrated the effect of the mediator empathy on SDO was not significant, $b = -0.06$, $t(81) = -0.32$, $p = .75$, and the effect of IIC on SDO while controlling for empathy, was significant, $b = 2.27$, $t(81) = 6.46$, $p < .001$. A Sobel test showed that the mediation effect of empathy on the relationship between IIC and SDO was not significant, $z = .17$, $SE = .01$, $p = .87$. There was no significant indirect effect, therefore, empathy did not mediate the relationship between IIC and SDO.

Figure 1

The Mediation Analysis to Explore the Effect of Empathy



Note. The coefficient above the arrow between IIC and SDO refers to the direct effect, and the coefficient below the arrow refers to the indirect effect.

Discussion

This research aimed to investigate whether imagined intergroup contact could decrease speciesism. One of the underlying psychological bases of speciesism is SDO, the desire of an individual to achieve and maintain group-based dominance (Caviola et al., 2019; Dhont et al, 2016; Pratto et al., 1994). A well-known intervention that decreases prejudice and the underlying factor SDO is IIC (Auger & Amiot, 2019; Dhont et al., 2013). Hence, this study investigated whether SDO would decrease due to imagined contact with animals, to reduce speciesist beliefs and attitudes. Therefore, it was predicted that (a) IIC reduces SDO compared with no contact (Hypothesis 1), (b) IIC reduces speciesist attitudes and intentions compared with no contact (Hypothesis 2), and (c) SDO mediates the relationship between IIC and speciesism (Hypothesis 3). In addition, this study explored the possible mediating role of empathy between IIC and SDO.

An intriguing and unexpected finding in this study is the direction and effect of IIC on SDO in participants from the contact condition. These findings were opposite to what was theorised in hypothesis 1, which was hence rejected. Namely, this study found that imagining contact with a cow significantly increased participants' levels of SDO, contrary to the findings of Dhont et al. (2013), who observed that positive intergroup contact reduced SDO. The most plausible explanation for these counterintuitive findings is a mistake that was made while developing the questionnaire. SDO was measured pre- and post-contact using the same questionnaire. However, for the contact condition, the post-contact SDO answer options were reversed compared to the pre-contact SDO answer options. In other words, instead of 1 representing "strongly disagree" and 7 representing "strongly agree", the answer scales were reversed. Moreover, the introduction to the questions read "We would like to ask you again," implying that these questions and answers were similar to the previously answered pre-contact SDO questions. This might have caused some participants to answer the questions

assuming the response options were the same as the pre-contact SDO questions, while others noticed that the answer options had switched. Consequently, it is unclear whether all participants interpreted the scale similarly and as it was intended to be, rendering it impossible to draw accurate conclusions.

Nevertheless, these findings might partially be correct, and a potential explanation for this counterintuitive effect can be participants' defensive response. According to Sidanius and Pratto (1999), even symbolic threats to group dominance may prompt individuals to reinforce their preference for group-based dominance as a defensive response. Hence, imagining contact with a cow might cause people to realise that their group is doing something wrong and should change their attitude and behaviour, threatening their status and dominance and causing them to double down on justifying their beliefs, instead of changing them.

Hypothesis 2 was rejected as IIC did not affect speciesism. A possible explanation for this result lies in the process through which IIC changes attitudes and how imagining intergroup contact functions. As previously stated, four interrelated processes mediate attitude change in intergroup contact, with learning about the outgroup being the most prominent (Pettigrew, 1998). Learning something new corrects previously held negative views of the outgroup, thereby reducing prejudice (Pettigrew, 1998). However, the concept of imagining intergroup contact involves *imagining* positive contact with an outgroup (Stathi & Crisp, 2008). In other words, one does not learn new information about the outgroup but rather uses their existing knowledge to imagine the outgroup and the situation. Therefore, negatively held views may not be corrected.

Despite this, numerous studies found that IIC can improve intergroup attitudes and reduce prejudice, because it activates cognitive processes similar to those experienced during direct interaction (Crisp & Turner, 2009, 2012; Miles & Crisp, 2013; Stathi & Crisp, 2008; Turner et al., 2007). A possible reason why IIC fails to reduce speciesism, and thus shows no

observable effect, might be the strength of people's speciesist attitudes. Caviola et al (2019) found that speciesism is a stable attitude, similar to racism and sexism. Additionally, Auger and Amiot (2019) theorised that speciesism was not affected by their imagined contact manipulation because the attitude may be crystallised and therefore less susceptible to experimental manipulations. Thus, speciesist attitudes might be too stable for imagined intergroup contact to have an effect, but IIC might still affect human-human prejudices, which were the subjects of previous studies.

Lastly, hypothesis 3, proposing that SDO mediates the relationship between IIC and speciesism, was also rejected. This may be due to the absence of a direct effect of IIC on speciesism, as SDO cannot mediate this non-existent relationship. In addition, analysis of a potential indirect-only mediation effect yielded similar results, no mediation effect. A theory of multiple mediation was explored, with the idea that both empathy and SDO are mediators between IIC and speciesism. Where empathy has a possible negative effect on speciesism and SDO has a positive effect, therefore presumably cancelling each other out, resulting in the absence of a direct effect. However, the findings did not support this assumption.

The additional objective of this study was to explore whether empathy mediates the relationship between IIC and SDO. This theory was based on the idea that IIC enhances empathy toward the outgroup, thereby improving intergroup attitudes and potentially reducing SDO (Pettigrew & Tropp, 2008). The results showed that empathy does not mediate the relationship between IIC and SDO, because IIC did not influence empathy. A plausible explanation might be the small sample size. Prior to data collection, a G-power analysis determined that 222 participants were needed to detect a medium effect size. The study in the end had 83 participants, thus, the minimum number of participants needed to test the hypotheses was not met.

Additionally, even though Sidanius et al. (2013) found that the lower one's empathic feelings are, the higher SDO becomes, the results of this study indicated that empathy does not relate to SDO. These findings could, however, be in line with another result from Sidanius et al. (2013), which showed that the effect that SDO has on empathy is stronger than empathy's effect on SDO. An explanation for this effect, posed by Sidanius et al. (2013), is that SDO influences empathy through a self-perception process. People high in SDO support actions and policies that lead to the suffering of others. They then see themselves supporting those actions and the negative effect those actions have on others, which might convince them that they are less an empathic person. Over time, this effect will reduce their empathic concern. However, this is all speculative as little research has been done in this area, as this contrasts with the widespread belief of the dual process model (Duckitt & Sibley, 2009).

Future research

Future research could address the limitations of this study by correcting the questionnaire error and repeating the study with a larger sample size. Further, the complex relationship between empathy and SDO could be investigated. In addition, this study focused on IIC, an indirect form of ICT (Crisp & Turner, 2012). The results showed that this indirect form of intergroup contact did not affect speciesism. Since Dhont et al. (2013) demonstrated that direct intergroup contact does lower human-human prejudice, such as racism and sexism, and numerous studies indicated that speciesism is another type of prejudice, related to human-human prejudice (Caviola et al., 2019; Dhont et al., 2016; Hyers, 2006; Plous, 2003), it could be valuable for future research to investigate whether direct intergroup contact with animals would affect speciesism.

Additionally, for future research, it could be relevant to examine the role of cognitive dissonance in IIC, SDO and speciesism and the relationship between them. The cognitive dissonance theory suggests that emotional discomfort or dissonance is felt when people

realise that they behave in a way that is inconsistent with their regular attitudes, and to restore this consistency, people will change one of their cognitions (Dhont et al., 2019; Festinger, 1957). Two solutions that people use to reduce the dissonance that they feel when they become aware of the conflict between their belief in not harming animals and their desire to eat meat, are dissociating the meat from the animals by making it in small unrecognisable pieces and devaluing animal abilities by denying their intellectual and emotional capabilities (Bastian & Loughnan, 2017). This behaviour could potentially influence the effect of IIC, as this emotional discomfort could be felt as a threat to their group, thus possibly reinforcing their preference for group-based dominance. Therefore, future research could explore this underlying factor of cognitive dissonance and its potential influence on IIC, speciesism and SDO.

This study contributes to the existing literature on the relationship between IIC and speciesism by providing valuable insights into the nature of the relationship. To our knowledge, this is the first study to investigate the direct relationship between IIC and speciesism and explore the influence of empathy on the relationship between IIC and SDO. Contrary to previous research and theories, this study showed that imagined contact with animals, aimed at decreasing social dominance tendencies, did not affect speciesist beliefs and attitudes. However, the results of IIC on SDO were inconclusive. Thus, to facilitate a better understanding of these relationships, further research is needed to explore the conditions and mechanisms underlying the associations between speciesism, SDO, IIC and empathy.

Disclosure Statement

During the preparation of this work, the author used; Grammarly to perform spelling checks and minor revisions and Chatgpt to assist in programming in Rstudio by explaining errors and bugs. After using these tools/services, the author reviewed and edited the content as needed and will take full responsibility for the content of the work.

The authors state there is no potential conflict of interest.

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