Title:

Animalizing women and feminizing men: The psychological intersections of human supremacism, sexism, and anti-veganism

Abstract:

Ecofeminist scholars have proposed that oppressive attitudes towards women and animals are interrelated. This thesis uses quantitative methods to test predictions derived from ecofeminist theory that have thus far received little empirical attention in psychology. The first empirical chapter of this thesis, Chapter 2, investigates the associations between human supremacy beliefs over animals and nature, dehumanization of women, and ambivalent sexism. Across five studies (total N = 2,409), human supremacy beliefs were associated with hostile and benevolent sexism. Dehumanization of women was primarily associated with hostile sexism, whereas views of women as connected to nature were primarily associated with benevolent sexism. The results further demonstrated that Social Dominance Orientation as an underlying ideological factor partly explained the association between human supremacy beliefs and sexism and between dehumanization and hostile sexism, whereas benevolent beliefs about nature partly explained the association between women's connection to nature and benevolent sexism. The second empirical chapter, Chapter 3, focuses on the role of masculinity perceptions and gender role beliefs in the evaluation of plant-based meat alternatives. Across two experiments (total N = 484), images of identical meat dishes were evaluated more negatively when labelled as plant-based meat as opposed to regular meat, and this was partly explained by the lower perceived masculinity of plant-based meat dishes. The association between perceived masculinity and evaluations was stronger for participants higher (vs. lower) in traditional gender role beliefs. The third empirical chapter, Chapter 4, turns the focus onto the role of masculinity perceptions and gender role beliefs in bias towards vegetarian and vegan men. One correlational study and two experiments (total N = 1258) confirmed that bias towards vegetarian and vegan men is partly explained by their lower perceived masculinity, and that this link is stronger for those higher (vs. lower) in traditional gender role beliefs. Taken together, the findings of this thesis demonstrate that 1) beliefs about nature and animals, and about women in relation to nature and animals, are associated with gender-based prejudice and 2) beliefs about gender roles and perceptions of masculinity are associated with anti-vegan biases towards both plant-based meat alternatives and vegan men. Thus, this thesis adds to the growing body of literature showing that human intergroup and human-animal relations are meaningfully interconnected and can inform and expand each other.

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Animalizing women and feminizing men: The psychological intersections of human supremacism, sexism, and anti-veganism

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This thesis is submitted in accordance with the requirements of the University of Kent for the degree of Doctor in Philosophy in Social Psychology.

Declaration

The research reported in this thesis is my own work, except where indicated otherwise.

Chapter 1

Parts of Chapter 1 have been published as an article co-authored with Kristof Dhont in *The Psychologist*.

Salmen, A., & Dhont, K. (2021, January). On 'meatheads' and 'soy boys'. *The Psychologist, 34*. https://thepsychologist.bps.org.uk/volume-34/january-2021/meatheads-and-soy-boys

Chapter 2

Two of the studies included in this chapter were part of the author's MSc Dissertation. This chapter has been published in *Group Processes and Intergroup Relations* with co-author Kristof Dhont. Some minor changes were made to the manuscript before inclusion in this thesis.

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Chapter 3

The work presented in this chapter was carried out in collaboration with Kristof Dhont, Nadira Faber, and Victoria Candace Krings and is currently being prepared as a manuscript for publication.

Chapter 4

The work presented in this chapter was carried out in collaboration with Kristof Dhont and Nadira Faber and is currently being prepared as a manuscript for publication.

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Table of Contents

Abstract

Ecofeminist scholars have proposed that oppressive attitudes towards women and animals are interrelated. This thesis uses quantitative methods to test predictions derived from ecofeminist theory that have thus far received little empirical attention in psychology. The first empirical chapter of this thesis, Chapter 2, investigates the associations between human supremacy beliefs over animals and nature, dehumanization of women, and ambivalent sexism. Across five studies (total N = 2,409), human supremacy beliefs were associated with hostile and benevolent sexism. Dehumanization of women was primarily associated with hostile sexism, whereas views of women as connected to nature were primarily associated with benevolent sexism. The results further demonstrated that Social Dominance Orientation as an underlying ideological factor partly explained the association between human supremacy beliefs and sexism and between dehumanization and hostile sexism, whereas benevolent beliefs about nature partly explained the association between women's connection to nature and benevolent sexism. The second empirical chapter, Chapter 3, focuses on the role of masculinity perceptions and gender role beliefs in the evaluation of plant-based meat alternatives. Across two experiments (total N = 484), images of identical meat dishes were evaluated more negatively when labelled as plant-based meat as opposed to regular meat, and this was partly explained by the lower perceived masculinity of plant-based meat dishes. The association between perceived masculinity and evaluations was stronger for participants higher (vs. lower) in traditional gender role beliefs. The third empirical chapter, Chapter 4, turns the focus onto the role of masculinity perceptions and gender role beliefs in bias towards vegetarian and vegan men. One correlational study and two experiments (total N = 1258) confirmed that bias towards vegetarian and vegan men is partly explained by their lower perceived masculinity, and that this link is stronger for those higher (vs. lower) in traditional gender role beliefs. Taken together, the findings of this thesis demonstrate that 1) beliefs about nature and animals, and

about women in relation to nature and animals, are associated with gender-based prejudice and 2) beliefs about gender roles and perceptions of masculinity are associated with anti-vegan biases towards both plant-based meat alternatives and vegan men. Thus, this thesis adds to the growing body of literature showing that human intergroup and human-animal relations are meaningfully interconnected and can inform and expand each other.

Chapter 1: The Psychological Intersections of Human Supremacism, Sexism, and Anti-Veganism[1]

> "[…] The way gender politics is structured into our world is related to how we view animals, especially animals who are consumed. Patriarchy is a gender system that is implicit in human/animal relationships. Moreover, gender construction includes instruction about appropriate foods. Being a man in our culture is tied to identities that either claim or disown – what "real" men do and don't do. "Real" men don't eat quiche. It's not only an issue of privilege, it's an issue of symbolism. Manhood is constructed in our culture, in part, by access to meat and control of other bodies." (Adams, 2015, pp. xxvi-xxvii)

1.1 Introduction

Sweaty, muscly men punching bags and lifting weights to the sound of heavy grunts and loud hip-hop music - The opening sequence of James Cameron's new documentary *The Game Changers* leaves no doubt that this is not your run-of-the-mill pro-vegan documentary. Rather than shedding light on animal cruelty or making a case for the disastrous environmental impact of meat consumption, The Ultimate Fighter winner James Wilks travels around the globe to meet plant-based professional athletes, aiming to clear up the myth that animal protein is necessary for physical strength and performance. Indeed, historically and culturally, we have come to believe that meat is essential for strength, and traditional gender roles demand strength and toughness from men in particular. Therefore, real men eat meat.

The idea that meat is manly is engrained in society and permeates pop-culture and advertising. For instance, meat advertisements often target men by praising the masculinity of

[1] Parts of Chapter 1 have been published as an article co-authored with Kristof Dhont in *The Psychologist*, available at https://thepsychologist.bps.org.uk/volume-34/january-2021/meatheads-and-soy-boys.

eating meat or by portraying sexualized women alongside meat (Adams, 2020), implying that both women and animals are consumption products for men. Several scholars picked up on this issue, including ecofeminist Carol Adams. As illustrated in the opening quote, Adams (2015) and other ecofeminists argue that patriarchal systems oppress and degrade women, animals, and nature, and that meat acts as a symbol of these power dynamics (e.g., C. A. MacKinnon, 1989, 2004; Wyckoff, 2014). Such ideas have long been confined to philosophical and sociological spaces. But in recent years, and with the growing popularity of plant-based diets, psychological scientists have also started to develop an interest in the intertwined nature of gender politics, attitudes towards animals, meat, and masculinity, and the implications for individuals and society (Dhont et al., 2019). This thesis aims to add to this growing body of research by using social psychological methods to address gaps in the literature that tests key claims of ecofeminist theory:

1) Oppressive attitudes towards women and towards animals are interconnected, and women are animalized to justify their lower status (relative to men) in society.
2) Meat eating and notions of masculinity and virility are interconnected.

Focusing on the first key claim, the five studies in Chapter 2 investigate the associations of sexist attitudes towards women with beliefs in human supremacy over animals and nature and perceptions of women as more animal-like and more closely connected to nature than men. A particular focus is on the thus far neglected idea that the dehumanization of women and the view of women as connected to nature differentially predict hostile and benevolent sexism, respectively. Focusing on the second key claim, Chapters 3 and 4 investigate how gender role beliefs and perceptions of masculinity are implicated in evaluations of plant-based meat alternatives (Chapter 3) and men who abstain from meat consumption (Chapter 4). Thus, these research lines integrate ecofeminist theory with social psychological theories of ambivalent sexism, dehumanization, and gender roles. This thesis

thereby uniquely builds on and significantly expands the growing body of literature showing that human intergroup and human-animal relations are meaningfully connected and have the potential to enrich and inform each other.

1.2 Ecofeminism

In one of the seminal works of ecofeminist theory, "The Sexual Politics of Meat", Carol Adams (2015) argues that the subordination of women and the subordination of animals in society are meaningfully linked. One key argument of ecofeminist theory is that women's relatively lower status in society is justified through viewing them as less mature and rational than men and reducing them to their reproductive functions, thereby effectively dehumanizing them (Adams, 2015). This enables women to be placed outside of the boundaries of moral consideration and to be viewed as objects for consumption, in the same way that animals are objectified by being reduced to their function as meat for human consumption (Adams, 2010, 2015; Opotow, 1993).

According to ecofeminist theory, meat is a symbol of patriarchy, power, dominance, and masculinity (Adams, 2015). In support of this, men's magazines (Stibbe, 2004) and fast-food advertisements often portray meat as essential to masculinity and, for example, present it as the solution to a masculinity crisis elicited by the presence of tofu (Rogers, 2008). In analysing the gendered nature of meat advertising, Adams (2010, p. 303) remarks that "meat eating bestows an idea of masculinity on the individual consumer with ideas that men should eat meat and women should serve meat." Theoretically, the meat-masculinity link is thought to stem from gendered divisions of labour in humanity's hunter-gatherer origin. Meat was often difficult to find and enjoyed only on rare occasions but valued for providing the strength to survive harsh conditions (Bunn, 1981; Milton, 1999; Smil, 2002). Thus, those who were able to provide meat were granted more power and higher status than those who were not (Chan & Zlatevska, 2019). Given that hunting was by and large a male activity, this

applied mainly to men (Allen & Baines, 2002). Meat was not only selectively provided by men, but also to them: In human history, when meat was rare, it was given to men rather than women (Adams, 2015; Ruby & Heine, 2011). These factors are thought have contributed to the symbolic value of meat representing masculinity, strength, and domination over nature (Allen & Baines, 2002; see also Adams, 2015).

1.3 Linked Oppression: Intersections of Attitudes Towards Animals and Women

Ecofeminist theory proposes that patriarchal gender structures and oppressive attitudes towards animals are interconnected (Adams & Gruen, 2014; Bloodhart & Swim, 2010) because animals are devalued and, through dehumanization, women are placed on this lower animal status (e.g., Adams, 2015). This is thought to be the basis for much of the disproportionate level of discrimination and victimization women experience as a group (Adams, 2015; Opotow, 1993), in line with evidence that dehumanization serves to justify and minimize intergroup aggression (e.g., Castano & Giner-Sorolla, 2006).

1.3.1 Defining Dehumanization

Dehumanization, the denial of full humanness to other people or groups, is most commonly studied in the context of ethnicity and race (Haslam, 2006). However, the dehumanization of women has also been a topic of interest for feminist scholars and psychologists alike. It is not straightforward to precisely determine what dehumanization is, and different scholars conceptualize it differently. While groups and individuals can be explicitly likened to animals, objects, or less evolved humans (see e.g., Kteily et al., 2015), contemporary research on dehumanization focuses largely on attributing humanness to groups in more subtle and relative ways, often through the denial of certain characteristics viewed as distinctly human (Vaes et al., 2021).

Multiple lines of research have investigated the exact characteristics that are denied groups which are dehumanized. The theory of infra-humanization proposes that humans tend

to attribute more humanness to their ingroup than to outgroups (Leyens et al., 2000). Indeed, people attribute more secondary emotions, which they believe to be uniquely human (e.g., hope, disappointment), to their ingroup relative to outgroups, but not more primary emotions, which people believe to be shared with other animals (e.g., surprise, fear; Leyens et al., 2001; see also Cortes et al., 2005). Inspired by the work on infra-humanization, Haslam (2006) proposed an integrative framework, distinguishing between animalistic and mechanistic dehumanization. According to this model, groups or individuals that are mechanistically dehumanized are denied traits that are seen as essential to human nature (e.g., emotionality and curiosity), whereas groups and individuals that are animalistically dehumanized are denied traits that are seen as uniquely human, i.e., traits that distinguish humans from animals (e.g., rationality, logic, moral sensibility, and refined emotion). Two key social-psychological theories address how and why women might be denied full humanness: Objectification Theory (Fredrickson & Roberts, 1997) and Ambivalent Sexism Theory (Glick & Fiske, 1996).

1.3.2 Objectification Theory

Objectification Theory (Fredrickson & Roberts, 1997) examines the effects of being a woman in a culture that objectifies the female body, e.g., through media images or social interactions. Within the scope of this theory, objectification is defined as "the experience of being treated as a body (or collection of body parts) valued predominantly for its use to (or consumption by) others" (Fredrickson & Roberts, p. 174). Other scholars argued that objectification, at its core, constitutes perceiving another person as less than fully human (e.g., Dworkin, 1997; Nussbaum, 1995). While both definitions evoke associations of animalistic dehumanization, objectification research commonly assumes that the objectification of women is dehumanizing because it associates women with inanimate

objects (e.g., Bernard et al., 2012). However, other research found that objectified women are instead associated with animals (e.g., Vaes et al., 2011).

Attempting to resolve this inconsistency, Morris and Goldenberg (2015) proposed that the type of dehumanization women are subjected to depends on the manner in which they are objectified. On the one hand, objectifying women through a focus on their appearance (beauty-based objectification) should reduce the attribution of human nature traits to them (e.g., warmth and emotionality). On the other hand, because sexuality is associated with our animal nature (Goldenberg et al., 2002), objectifying women through a sexualized focus on their body parts (sex-based objectification) should reduce the attribution of uniquely human traits to them (e.g., refined emotions and higher order cognition). Across three studies, Morris et al. (2018) found support for this claim. Participants rated a woman lower on uniquely human traits when she was portrayed in a sexualized way than when the focus was on her appearance without a sexualized angle or when she was depicted in a neutral way. Conversely, the woman was rated lower on human nature traits in the appearance-focus condition relative to the sexualized and control condition.

Other work provided further support for Morris and Goldenberg's (2015) theorizing. People attributed less mind but more experience to targets depicted in revealing vs. non-revealing images, consistent with animalistic dehumanization (Gray et al., 2011). Similarly, in two studies, women in ad campaigns depicted in lingerie were attributed fewer uniquely human characteristics than fully clothed women (Bongiorno et al., 2013). A female acquaintance rape victim was also attributed less mind when pictured in a sexualized vs. non-sexualized way (Loughnan et al., 2013). Almost all items on the mind scale used by Loughnan et al. (2013) referred to higher-order cognition (i.e., planning, reasoning, logic, feeling, and abstract thinking), and therefore to traits commonly seen as uniquely human, in line with animalistic dehumanization. However, the sexualized target was also expected to

suffer less than the non-sexualized target after being victimized (when measured indirectly; Loughnan et al., 2013). The attribution of lower capacity to suffer, and therefore of lower experience, signifies mechanistic (rather than animalistic) dehumanization (Haslam, 2006). Similarly, when a female victim of intimate partner violence was portrayed in a sexualized way, she was seen as less deserving of moral concern, but not as less morally virtuous, than the same woman in neutral, casual clothing (Pacilli et al., 2016). Participants also expressed lower intentions to help her. The denial of moral patiency and reduced perceptions of a capacity to suffer align with mechanistic (rather than animalistic) notions of dehumanization (Haslam, 2006).

However, when sex-based and beauty-based objectification are studied separately, it is difficult to determine which type of objectification is in fact triggered by a given manipulation (Morris & Goldenberg, 2015). Portraying women in a sexualized way also involves a focus on their appearance, and without comparing this to a non-appearance focused sexualized condition, we cannot ascertain the effects of a focus on appearance vs. a focus on sexual functions. Hence, portraying women in sexualized ways might trigger both beauty-based and sex-based objectification, and therefore both mechanistic and animalistic dehumanization. Overall, evidence indicates that the ubiquitous sexualized portrayal of women in media images could contribute to views of women as more animal-like.

1.3.3 Ambivalent Sexism Theory

Ambivalent Sexism Theory (Glick & Fiske, 1996, 2001) posits that sexism is different from other types of prejudice because gender relations constitute a unique intergroup context: No other two groups are as intimately connected as men and women (Fiske & Stevens, 1993). Sexism, from this perspective, is not a unidimensional construct, but instead reflects both antipathy and contempt towards women (termed hostile sexism), but also subjectively positive views of women which yet portray them as weak, in need of male protection, and

essential to fulfilling men's desires (termed benevolent sexism). Both are thought to work together to maintain the patriarchal status quo where men disproportionately inhabit positions of higher power whereas women disproportionately inhabit positions of lower power (e.g., wives, mothers, and homemakers; Glick & Fiske, 2001). Glick and Fiske (1996) argued that ambivalent sexism is partly rooted in the role women play in natural reproduction. Men depend on women to satisfy their sexual needs and bear their children, which grants women a certain power over men (Guttentag & Secord, 1983). This dependency is theorized to foster hostile sexist views amongst men, who resent women for their ostensible power to use their sexual attractiveness to manipulate and control men (Glick & Fiske, 2001), mirroring ideas that a focus on women's sexuality triggers their animalistic dehumanization (Morris & Goldenberg, 2015; Morris et al., 2018).

Indeed, animalistic media images of women often depict them as feral and in need to be tamed, sometimes even shackled or caged (Plous & Neptune, 1997). Animalistic metaphors of women as sexually aggressive also portray them as predators (e.g., cougar, vixen), and exposure to these animal metaphors increases hostile sexism (Tipler & Ruscher, 2019), in line with the idea that animalistic dehumanization is associated with feelings of disgust and contempt (Haslam, 2006). These findings indicate that animalistically dehumanizing women should be associated with hostile, rather than benevolent, sexist attitudes towards women, consistent with robust evidence that outgroup dehumanization is associated with hostile outgroup attitudes (Haslam & Loughnan, 2014; Hodson & Costello, 2007; Kteily et al., 2015; Leyens et al., 2000). This is the first key research question addressed in Chapter 2.

Specifically, in Chapter 2, we tested the hypothesis that animalistically dehumanizing women (both through denying them uniquely human traits and through explicitly viewing them as not fully evolved) is associated primarily with hostile sexist, rather than benevolently

sexist, views of women. We further tested whether the animalistic dehumanization of women also predicts greater acceptance of rape myths through hostile sexism, in line with ecofeminist theorizing that a function of dehumanizing women is to justify the disproportionate amount of sexual violence they face in society.

On the other hand, viewing women as more closely connected to nature might be associated primarily with benevolent, rather than hostile, sexism. Ambivalent Sexism Theory posits that women, as the future or present bearers of men's children, require protection. Hence, women's role in reproduction, and by extension their connection with nature, is thought to also foster benevolently sexist views (Glick & Fiske, 2001; Glick et al., 2000; Guttentag & Secord, 1983; Smuts, 1992). Feminist scholars have argued that because of their unique role in reproduction, women, relative to men, are seen as part of nature rather than culture (C. A. MacKinnon, 2004; Ortner, 1972). From this perspective, women are not necessarily denied full humanness, but are viewed as more connected to and in tune with nature than men.

In support of the women-nature association, women express stronger pro-environmental beliefs and behaviors than men (Chen et al., 2011; Hunter et al., 2004; McCright, 2010; Zelezny et al., 2000). Further, when people anthropomorphize nature, they are more likely to do so using female rather than male gender (Reynolds & Haslam, 2011; Tam, 2014). Both laypeople and media representations associate women, more so than men, with nature (Reynolds & Haslam, 2011), and this association has also been demonstrated using implicit measures (Liu et al., 2019). Women who associate themselves with nature are evaluated more positively than men who associate themselves with nature and women who do not (Reynolds & Haslam, 2011).

Despite these positive connotations, ecofeminist theory posits that women's perceived connection with nature might constitute a source of their subordination in society (de

Beauvoir, 1974; Ortner, 1972): Men dominate over nature; hence women and animals are perceived as fundamentally inferior to men (Bloodhart & Swim, 2010; C. A. MacKinnon, 1989). Perceptions of women as weak and in need of protection form a key basis of their subordination through benevolent sexism (Glick & Fiske, 1996). Further, feminine metaphors of nature mirror some of the stereotypes of women inherent to the ideology of benevolent sexism. A prominent example is the metaphor of "Mother Nature", characterizing nature as nurturing and life-giving (Dunayer, 1995; Jelinski, 2011; Roach, 2003; Sacchi et al., 2013). Overall, viewing women, more so than men, as part of nature, and therefore as delicate, nurturing, and in need of protection, seems to constitute a legitimizing belief justifying women's relatively lower status in society (Glick & Fiske, 1996, 2001; Hopkins-Doyle et al., 2019). This theoretical idea is the second key focus of Chapter 2. Specifically, we tested whether associating women (more so than men) with nature would be primarily associated with benevolently sexist beliefs rather than hostile sexist beliefs. We further investigated whether the women-nature association would be indirectly associated with an endorsement of policies that restrict pregnant women's freedom through benevolent sexism, thus exploring whether sexist attitudes towards women are associated with desires to control and protect their reproductive functions.

1.3.4 Sexism and Human Supremacy Beliefs

If women are viewed as animal-like and connected to nature, we should expect gender-relevant beliefs to be associated with beliefs about animals, meat, and those who abstain from meat consumption (i.e., vegetarians and vegans, henceforth termed veg*ns). Research suggests that this is indeed the case. Those with more gender-egalitarian attitudes express stronger pro-animal attitudes (Allcorn & Ogletree, 2018). Conversely, those higher in sexist attitudes express stronger support for carnism, the ideology that supports the killing and eating of animals (Monteiro et al., 2017), and stronger pro-meat-eating attitudes and

meat-eating justifications (Allcorn & Ogletree, 2018). They also report stronger speciesist attitudes, i.e., more prejudicial attitudes towards animals (Caviola et al., 2019). While there is evidence of associations between sexism and specific attitudes in support of animal exploitation, research has thus far not systematically tested the idea that general beliefs in human superiority over animals and nature are associated with sexist attitudes towards women. From an ecofeminist perspective, it can be expected that those who see women as inferior to men also tend to see animals as inferior to humans. This is the third key focus of Chapter 2, where we tested whether stronger beliefs in human superiority over animals and nature would be related to more hostile and benevolent sexist beliefs.

Ecofeminist theorizing further proposes that patriarchal values of domination underly attitudes and behavior towards both women and animals (e.g., Bloodhart & Swim, 2010). This mirrors assumptions of the Social-Dominance Human-Animal Relations Model (SD-Harm; Dhont et al., 2016), which posits that Social Dominance Orientation (SDO), a desire for intergroup dominance and hierarchy (Pratto et al., 1994), is a key underlying ideological factor explaining why prejudicial human intergroup and human-animal attitudes are connected. In support of this model, after accounting for SDO, positive associations between ethnic prejudice and speciesist attitudes become weaker or non-significant (Dhont et al., 2014, 2016). Similar dynamics can be expected in the context of gender relations, but this has been tested to a much lesser extent, with only one study showing that SDO partly explains the relationships between sexism and speciesism (Caviola et al., 2019). Hence, in Chapter 2 we additionally tested the novel hypothesis that SDO would underly the association between a general belief in superiority over animals and nature and sexist beliefs.

1.4 Meat is Manly

According to ecofeminist theory, one implication of the interconnected nature of patriarchal gender structures and systems of animal exploitation is the perception that meat

consumption symbolizes strength, masculinity, and power (e.g., Adams, 2015). While past psychological research has provided some evidence for the ideas derived from this theory, several key questions remain to be addressed.

1.4.1 Masculinity Perceptions of Meat Products

Meat dishes are robustly associated with masculinity. In an Implicit Association Test (Greenwald et al., 1998), people are quicker to pair meat-related words with male names than with female names and quicker to pair vegetable-related words with female names than with male names (Rozin et al., 2012). The meat-masculinity link seems to also be reflected in the construction of language: In 20 languages that gender nouns, meat-related words are assigned male gender in 66% of cases. People also rate meat dishes as more male than female, and this difference is greatest for mammal muscle meat (as opposed to, e.g., chicken; Rozin et al., 2012). Overall, while men perceive meat to be more masculine than women (Lax & Mertig, 2020), both men and women associate meat, particularly red meat, more with masculinity than with femininity on explicit as well as implicit levels. Meat dishes are also viewed as more masculine than vegetarian dishes (Cavazza et al., 2015a, 2015b). However, in these studies, meat dishes are often compared to vegetable-based dishes, so it remains unclear whether the masculinity difference is driven by meat-masculinity association or by the vegetable-femininity association (see Rozin et al., 2012). Further, little is known about the perceived masculinity of "fake meats", or plant-based meat alternatives. This is the focus of Chapter 3.

Plant-based meat alternatives imitate the texture, flavour, and appearance of meat using textured vegetable proteins. They tend to be more sustainable to produce than regular meat (Hashempour-Baltork et al., 2020; Kumar et al., 2017), and could aid efforts to reduce global meat consumption (e.g., Dagevos & Voordouw, 2013; de Bakker & Dagevos, 2011). In line with Adams' (2015) proposition that meat eating is motivated by a desire to oppress,

meat is expected to obtain some of its masculine value from dominance over, and killing of, animals. Plant-based meat alternatives, albeit highly similar to regular meat, do not require the killing of an animal and should therefore not retain the symbolic masculine value of meat. In Chapter 3, we experimentally tested the hypotheses that identical meat dishes would be perceived as less masculine when labelled as plant-based meat alternatives rather than regular meat, and that this would be further associated with more negative evaluations of the dish.

1.4.2 Gender Differences in Meat Consumption and Attitudes

Given the robust support for the meat-masculinity link, one would expect men and women to differ in meat consumption and attitudes towards meat, animals, and veg*nism. Indeed, women report eating more meat than men across time and cultures (Beardsworth & Bryman, 1999; Beardsworth et al., 2002; Pfeiler & Egloff, 2018; Prättälä et al., 2006; Schösler et al., 2013). While it is important to note that women might be underreporting their meat consumption (Rothgerber, 2019), women are also twice as likely as men to class themselves as vegan or vegetarian (Ruby, 2012; Trocchia & Janda, 2003) and report stronger disgust and more negative attitudes towards meat than men (Kubberød et al., 2002a, 2002b).

Men also report stronger meat attachment (Graça et al., 2015) and resistance to giving up or reducing meat consumption in the future (Nakagawa & Hart, 2019). Among men and women who do consume meat, men use more direct, unapologetic justifications (such as that humans are meant to eat meat) whereas women use more avoidant strategies (such as dissociating meat from animals), which is associated with lower meat consumption (Rothgerber, 2013). Thus, even women who do eat meat seem to be more uncomfortable with their meat consumption than men. Taken together, the meat-masculinity link is evident in gender differences in meat consumption and attitudes: Men consume more meat than women, are more attached to and less apologetic about their meat consumption, and evaluate meat more positively.

*1.4.3 Perceptions of Veg*n Men*

Given that people infer masculinity and femininity from other's dietary choices (e.g., Bock & Kanarek, 1995; Chaiken & Pliner, 1987; Turner et al., 2013), it is plausible that whether someone consumes meat or not affects how masculine they are perceived to be. Indeed, an identical male target person described in a vignette was perceived to be more masculine when his favorite foods included meat vs. when they did not and when he was described as a vegetarian vs. an omnivore (Ruby & Heine, 2011). In a conceptual replication, vegetarian men were not perceived as less masculine than omnivorous men, but vegan men were (Thomas, 2016). Further, when the target was vegan out of necessity (for health reasons), he was perceived as more masculine than when he was vegan by choice, suggesting that it is the choice to eschew a traditionally masculine behavior that seems to strip vegan men of their masculinity.

This is in line with theorizing and evidence that manhood, but not womanhood, needs to be earned and constantly proven (Vandello & Bosson, 2013). As downstream implications of the precarious nature of manhood (Vandello et al., 2008), men experience stress and anxiety about conforming to masculine standards (Reidy et al., 2014, 2015), engage in risky and aggressive behaviors in order to maintain their masculinity (e.g., Blazina & Watkins, 1996; Mahalik et al., 2006), and engage in compensatory stereotypically masculine behaviors when their masculinity is threatened (e.g., Bosson et al., 2009; Weaver et al., 2013; Willer et al., 2013).

Given this evidence that men are incentivized to adhere to masculine social roles, and that, in social situations, food is used for impression management (Herman et al., 2003; Vartanian, 2015), men likely consume meat strategically to augment their masculinity. Indeed, in an imagined dining scenario, men chose more meat-based dishes for themselves than for their fictitious female partner, and this effect was stronger for men who more

strongly associated vegetarianism with femininity (Timeo & Suitner, 2018). While these findings require replication, they indicate that men use gender-conforming meat consumption behavior in interpersonal contexts for impression-management.

Meat consumption also functions as a compensatory behavior when masculinity is threatened. Men under masculinity threat are significantly more likely to agree that they need meat to feel full and less likely to say they would consider adopting a vegetarian diet (Nakagawa & Hart, 2019). Masculinity stress, a chronic form of feeling threatened in one's masculinity (Eisler & Skidmore, 1987), also predicts intentions to purchase meat, and this is mediated by the belief that consuming meat enhances masculinity. This indirect effect is stronger among men with more (vs. less) traditional gender role beliefs (Mesler et al., 2021). The effect of masculinity stress on meat preference was reversed when participants were given information that red meat consumption was surging among women (vs. men), suggesting that the masculine value of meat consumption is reduced when it is presented as a behavior women engage in frequently. The effect was also not present when masculinity was affirmed before the threat manipulation. Hence, meat consumption as a compensatory behavior might not be necessary if masculinity is restored in another way. This is in line with the concept of "masculine capital", wherein masculine behavior in one domain can compensate for non-masculine behavior in another (de Visser et al., 2009). Threatening women's femininity, on the other hand, showed inconsistent outcomes, with either no effect or weak effects (Nakagawa & Hart, 2019), supporting the assumption that manhood, more so than womanhood, is precarious (Vandello et al., 2008).

Accordingly, men, more so than women, are penalized for violating gender role expectations (David et al., 2004; Prentice & Carranza, 2002), and indeed veg*n men are evaluated more negatively than veg*n women (MacInnis & Hodson, 2017). In line with Social Role Theory (Eagly & Wood, 1999) and evidence that people value characteristics in

potential sexual partners that are in line with gender role expectations (Buss et al., 1990; see also Urbaniak & Kilmann, 2006), vegetarian men are also perceived as less attractive dating partners than their omnivorous counterparts (Timeo & Suitner, 2018), and this is partly explained by their lower perceived masculinity. This research suggests, in the specific context of evaluations of dating partners, that veg*n men are evaluated more negatively than omnivorous men because they violate traditional gender role expectations. However, this has not yet been explicitly and systematically tested in the broader context of general evaluations of veg*n men. In Chapter 4, we tested the novel hypothesis that the lower perceived masculinity of veg*n men (relative to omnivorous men) would explain bias towards and social avoidance of veg*n men.

1.4.4 The Role of Individual Differences in Gender Role Beliefs

While mean-level differences between men and women in attitudes towards animals and meat tend to be robust, most research has overlooked the potential critical role of *individual differences* in gender role beliefs. Individuals who subscribe to traditional gender role beliefs favor traditional divisions of labour, supporting women's main role as the caretaker at home and men's main role as the financial provider (e.g., Eagly, 1987; Williams & Best, 1990). Schösler et al. (2015) found that cultural background affects the strength of the meat-masculinity link: Gender differences in preferred meat portion size and willingness to reduce meat consumption were largest amongst Turkish-Dutch (vs. Chinese-Dutch and Dutch) participants, who also hold the most traditional gender role beliefs. On an individual level, men identifying more strongly with "new masculinity", which allows for expressions traditionally regarded as feminine, were less attached to meat, more willing to reduce meat consumption, and felt more positive towards vegetarians (de Backer et al., 2020). Conforming with traditional gender role beliefs further predicted higher frequency of beef and chicken (but not pork or fish) consumption and lower willingness to become vegetarian

among men, but not among women (Rosenfeld & Tomiyama, 2021). Overall, while men generally express more favorable attitudes towards meat than women, there are also significant individual differences (i.e., within gender groups) in these attitudes and behaviors, depending on the extent to which an individual values traditional gender roles.

The role of traditional gender role beliefs in the evaluation of plant-based meat alternatives and veg*n men has as of yet been neglected. In Chapter 3, we tested whether the association between lower perceived masculinity of plant-based meat alternatives (relative to regular meat dishes) and more negative evaluations of the dishes would be stronger for participants higher (vs. lower) in traditional gender role beliefs. Using a parallel approach, in Chapter 4, we tested whether the association between lower perceived masculinity of veg*n men (relative to omnivorous men) and bias towards and social avoidance of veg*n men would be stronger for participants higher in traditional gender role beliefs.

1.5 Summary of Research Aims

The general aim of this thesis is to provide the first systematic, social psychological investigation of several key claims derived from ecofeminist theory on the interconnected nature of sexist biases in gender relations and speciesist biases in human-animal relations. Indeed, much of the previous research on the intertwined nature of human-animal and human intergroup relations has been conducted in the context of ethnic outgroups. In testing thus far neglected predictions derived from ecofeminist theory with quantitative (experimental and correlational) methods, this thesis substantially expands the scope of the literature to include gender relations. As such, this thesis offers an integration and extension of the literature on meat and masculinity, dehumanization, social dominance, and ambivalent sexism.

The first empirical chapter, Chapter 2, presents five survey studies which examined the associations between views of women as animal-like and connected to nature, human supremacy beliefs over animals and nature, and hostile and benevolent sexism. We expected

that the dehumanization of women would be primarily related to hostile rather than benevolent sexism whereas views of women as connected to nature would be primarily related to benevolent rather than hostile sexism. We further hypothesized that those with stronger human supremacy beliefs over animals and nature would express higher hostile and benevolent sexism.

In Chapter 3, the focus turns to evaluations of plant-based meat alternatives. In two experiments, we hypothesized that participants would evaluate an image of an identical meat dish as less masculine and evaluate it more negatively when labelled as plant-based rather than regular meat. We further expected that lower perceived masculinity would partly explain the more negative evaluations of plant-based dishes, and that the link between lower perceived masculinity and more negative evaluations would be stronger for participants higher (vs. lower) in traditional gender role beliefs.

Chapter 4, the final empirical chapter, focuses on evaluations of men who abstain from the consumption of meat and other animal products, i.e., veg*n men. In the first study, we tested the hypothesis that lower perceived masculinity of veg*n men would be associated with more negative attitudes towards them, especially among participants higher in traditional gender role beliefs. In studies 2 and 3, we experimentally tested the hypothesis that a male vegan target would be evaluated more negatively than an otherwise identical omnivorous target, and that this bias would be partly explained by lower perceived masculinity of the vegan target. We further predicted that the association between lower perceived masculinity and more negative evaluations would be stronger for participants higher, vs. lower, in traditional gender role beliefs.

The final chapter of the thesis, Chapter 5, constitutes an integrative discussion of all three empirical chapters, including their limitations and implications for theory and practice.

Chapter 2: Hostile and Benevolent Sexism - The Differential Roles of Human Supremacy Beliefs, Women's Connection to Nature, and the Dehumanization of Women[2]

2.1 Introduction

> Both women and animals are identified with nature rather than culture by virtue of biology. Both are imagined in male ideology to be thereby fundamentally inferior to men and humans. (C. A. MacKinnon, 1989, p. 264)

Social psychologists have become increasingly aware that our thinking about animals[3] and nature also informs our understanding of human intergroup relations (Dhont & Hodson, 2014; Hodson et al., 2020; Milfont & Sibley, 2014; Plous, 2003). For instance, people expressing stronger support for animal exploitation tend to hold more prejudiced attitudes towards ethnic outgroups (Caviola et al., 2019; Dhont et al., 2016, 2020).

Yet, as illustrated by the opening quote, feminist scholars have also long proposed that beliefs in human supremacy over animals and nature are associated with subordinating views of women (Adams, 2015; Adams & Gruen, 2014; C. A. MacKinnon, 1989, 2004; Wyckoff, 2014). Systematic research addressing whether and how people's views about animals and nature may be implicated in gender-based prejudice (i.e., sexism) is currently lacking and is the focus of the present research.

[2] Two of the studies included in this chapter were part of the author's MSc Dissertation. This chapter has been published in *Group Processes and Intergroup Relations* with co-author Kristof Dhont. Some minor changes were made to the manuscript before inclusion in this thesis. The full article is available at https://doi.org/10.1177/1368430220920713.

[3] For the sake of brevity, we use the term 'animals' to refer to non-human animals.

2.1.1 Sexism and Beliefs in Human Supremacy over Animals and Nature

The idea that the exploitation of women and animals are two connected forms of oppression driven by group-based dominance motives has received ample attention outside of psychological science. In her seminal work "The Sexual Politics of Meat", Adams (2015) argued that women are animalized in order to justify their lower status and, in extreme cases, their victimization through sexual violence. Indeed, women are often portrayed as closer to nature and animals because of their role in natural reproduction and their 'maternal instincts'. By endorsing beliefs in human superiority over nature and animals and putting women on this lower 'animal status', women are considered inferior to men, and become targets of sexism (C. A. MacKinnon, 2004; Ortner, 1972). Theoretically, human supremacy beliefs are thus assumed to be connected to biases towards women, both entrenched in group dominance motives.

Along similar lines, studies found that beliefs in a greater human-animal divide and human supremacy are related to heightened ethnic prejudice (Costello & Hodson, 2010, 2014), indicating that hierarchically dividing animals and humans organizes our social perception and evaluation of both animals and human groups. Furthermore, recent studies demonstrated the interconnected nature of dominance motives in human intergroup relations and human-animal relations (see Dhont et al., 2020). The Social Dominance Human-Animal Relations model (SD-HARM; Dhont et al., 2016) proposes that preferences for hierarchy and group-based dominance, indicated by Social Dominance Orientation (SDO; Pratto et al., 1994; Sidanius & Pratto, 1999), represent the common ideological motive underpinning biases in both human intergroup relations and human-animal relations and explain why these biases are connected (see also Caviola et al., 2019; Dhont et al., 2014). Dhont et al. (2016) showed that greater ethnic prejudice was related to greater acceptance of animal exploitation. Yet as predicted by SD-HARM, these associations became weaker or non-significant after

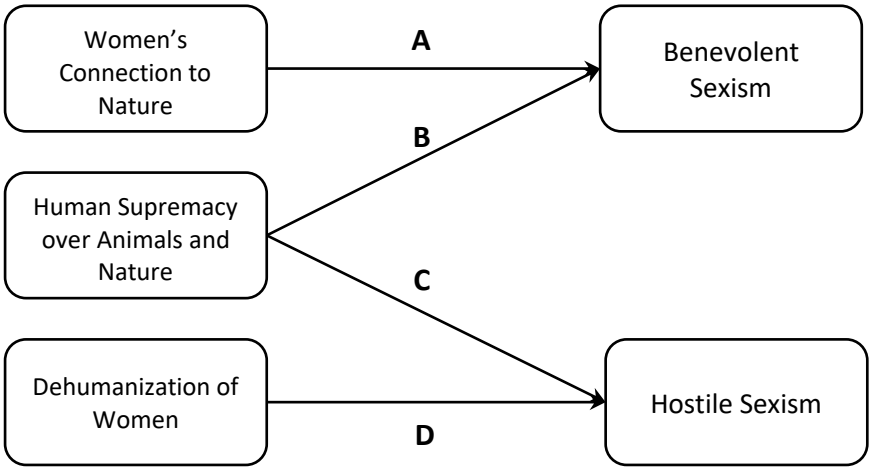
accounting for SDO, modelled as the common factor linking prejudicial tendencies in human-human and human-animal relations.

To date, research in this area has largely focused on ethnic prejudice, but no published study has tested whether human supremacy beliefs are related to gender-based prejudice (i.e., sexism). Integrating theorizing on gender relations and human-animal relations, our first hypothesis states that those holding stronger human supremacy beliefs also show higher levels of sexism (paths B and C in Figure 2.1). Furthermore, given that SDO is a robust predictor of both human supremacy beliefs (Dhont & Hodson, 2014; Graça et al., 2018; Milfont et al., 2013) and sexism (e.g., Kteily et al., 2015; Meeusen & Dhont, 2015; Sibley et al., 2007), SDO likely represents a key ideological motive underpinning both human supremacy beliefs and sexism.

Further extending this framework, we also hypothesized that sexism would be related to views of women as more closely connected to nature (i.e., women's connection to nature) and more animal-like (i.e., dehumanization) than men. Critically, however, these constructs likely show differential relations with different dimensions of sexism, making it important to differentiate between hostile and benevolent sexism.

Figure 2.1

The Key Hypothesized Common and Distinct Correlates of Benevolent and Hostile Sexism.



2.1.2 Ambivalent Sexism

Ambivalent Sexism Theory (Glick & Fiske, 1996, 2011) proposes that sexism is a multidimensional construct reflecting on the one hand antipathy towards women, termed hostile sexism. On the other hand, it reflects evaluations of women that are subjectively positive, yet encompassing beliefs that women are weak, in need of protection, and crucial to making men complete and fulfilling their desires (Glick & Fiske, 1996, 2001). This latter dimension has been labelled benevolent sexism. Hostile sexism is, thus, an antagonistic type of prejudice closely fitting classic conceptualizations of prejudice (Allport, 1954), and its expressions are, arguably, easy to identify. Benevolent sexism is, however, often expressed in language and behaviors that can be subjectively perceived as positive, yet are patronizing, rooted in traditional female stereotypes, and legitimize the restriction of women's autonomy (e.g., Hopkins-Doyle et al., 2019; Sutton et al., 2011).

Glick and Fiske (1996) argued that ambivalent sexism is partly rooted in women's role in natural reproduction. This role renders women a certain power over men, who depend on them to satisfy their sexual needs and bear their children (Guttentag & Secord, 1983). This dependency paves the way for hostile sexist views, as men resent women for ostensibly being able to gain power over them using their sexual attractiveness (Glick & Fiske, 2001). At the same time, men's dependency on women for reproduction also fosters paternalistic, benevolently sexist attitudes towards women, who, as the current or future bearers of men's children, need to be protected (Glick & Fiske, 2001; Glick et al., 2000; Guttentag & Secord, 1983; Smuts, 1992). Critically, this dynamic suggests that women's role in natural reproduction is associated with both hostile and benevolent sexism.

Benevolent Sexism and Women's Connection to Nature. While men are often stereotypically perceived as separate from nature, women are stereotyped as part of nature (C. A. MacKinnon, 2004; Ortner, 1972). From this perspective, women are portrayed as being

more ‘in tune’ with nature and assumed to show a stronger connection with nature than men. Given the positive valence associated with nature (e.g., Berman et al., 2008; van den Berg et al., 2003), viewing women as closely connected to nature likely colors the evaluation of women in a subjectively positive way. Consistent with this idea, Reynolds and Haslam (2011) demonstrated that women who associated themselves with nature were evaluated as more likeable than women who did not, and also as more likeable than men who associated themselves with nature.

However, views of women’s connection to nature might come with aversive consequences. Indeed, nature itself is viewed as delicate and in need of conservation (Plumwood, 1993), while benevolent metaphors of *Mother Nature* also portray nature as nurturing and crucial to human thriving (Roach, 2003). Given these benevolent beliefs about nature, the perceived ties between women and nature may also shape perceptions of women as fragile and in need of protection. Such views fit with the ideology that shapes benevolent sexism and constitute legitimizing beliefs for the dominant role of men in social relationships (Glick & Fiske, 1996, 2001; Hopkins-Doyle et al., 2019).

To date, no published studies have directly tested the association between the perceived connection of women with nature and sexist attitudes. We hypothesized that the extent to which people perceive women to be more connected to nature than men is primarily and positively associated with benevolent sexism (path A in Figure 2.1). Moreover, we expected that this association would be underpinned by benevolent beliefs about nature being fragile and integral to human happiness.

Furthermore, in line with Ambivalent Sexism Theory, women might also be resented for their role in natural reproduction and the perceived power it gives them over men (Glick & Fiske, 2001). Hence, while we expected a pronounced positive association between women’s connection to nature and benevolent sexism, also a positive, albeit weaker,

association could be expected with hostile sexism. However, women's link with nature might be particularly associated with hostile attitudes if they are likened to animals and denied full humanness.

Hostile Sexism and the Dehumanization of Women. Evidence for how women's role in reproduction can shape negative attitudes towards them comes from research showing that women are often dehumanized when their reproductive and sexual functions are emphasized (Gray et al., 2011; Morris & Goldenberg, 2015; Morris et al., 2018). The view of women as sexually aggressive is also reflected in animalistic metaphors portraying women as predator-like (e.g., cougar, vixen), which are linked to hostile sexist views (Tipler & Ruscher, 2019). Along similar lines, media images of women as animals, sometimes shackled or caged, portray them as feral and in need to be tamed (Plous & Neptune, 1997).

Yet everyday instances of dehumanization most frequently occur in subtle rather than blatant ways, for example, by attributing groups fewer uniquely human characteristics (Haslam, 2006; Haslam & Loughnan, 2014; Hodson & Costello, 2007; Leyens et al., 2000). The dehumanization of social groups seems to put them closer to animals on the perceived animal-human continuum and outside moral boundaries similar to how animals are excluded from moral consideration to justify their exploitation (see Loughnan et al., 2010; Opotow, 1993). Indeed, when applied to women, research showed that men who implicitly animalize women report a greater willingness to engage in sexual harassment and rape and hold more negative attitudes towards female rape victims (Rudman & Mescher, 2012).

Given that outgroup dehumanization is associated with outgroup hostility (Haslam & Loughnan, 2014; Hodson & Costello, 2007; Kteily et al., 2015; Leyens et al., 2000), we expected that the dehumanization of women would be positively associated with hostile rather than benevolent sexism (path D in Figure 2.1; see also Tipler & Ruscher, 2019; Viki & Abrams, 2003). Moreover, the dehumanization of outgroups is rooted in dominance motives

aiming to increase the relative status of the ingroup, with SDO as a reliable predictor of dehumanization (e.g., Esses et al., 2008). Therefore, we expected SDO to be a key ideological factor underlying the association between the dehumanization of women and hostile sexism.

2.1.3 The Present Research

The aim of this research was to rigorously test the following set of hypotheses, depicted in Figure 2.1:

1) Stronger beliefs in human supremacy over nature and animals are associated with both hostile and benevolent sexism (paths B and C).
2) Stronger beliefs in women's connection to nature are more strongly associated with heightened benevolent than with hostile sexism (path A).
3) Dehumanization of women is more strongly associated with heightened hostile sexism than with benevolent sexism (path D).

We conducted five studies with large samples of adults based in the US and the UK to test the hypotheses. Noteworthy, in all studies we used a subtle measure of dehumanization, but Study 2-4 also included a blatant dehumanization measure. This allowed us to test, for the first time, the associations between blatant dehumanization of women and sexism. Additionally, because men typically show stronger support for animal exploitation and score higher on human supremacy beliefs (e.g., Graça et al., 2018; Herzog et al., 1991), we tested all associations while controlling for participant gender. We also explored whether the hypothesized associations were moderated by gender, yet these analyses (reported in Appendix A) did not reveal any consistent moderation effects.

In Studies 3 and 4, we also investigated the belief systems expected to underpin the associations. Specifically, Study 3 tested the role of SDO underpinning the associations of human supremacy beliefs and dehumanization with sexist attitudes. Study 4 focused on the

role of benevolent nature beliefs in explaining the associations between women's connection to nature and benevolent sexism. Finally, Study 5 extended the model by investigating how our core constructs are associated with societally relevant variables such as rape myth acceptance and support for policies restricting women's autonomy.[4]

2.2 Study 1

2.2.1 Method

Participants. Respondents were 506 adults based in the US and recruited via MTurk[5], and were paid $0.50. Participant age ranged from 19 to 88 years (*M*=38.94 years, *SD*=13.08), with 57.3% women, 41.9% men, 0.6% indicated "another gender", and 0.2% indicated no gender or "prefer not to say".

Measures. All measures were presented in randomized order. *Benevolent and Hostile Sexism* were measured using the Ambivalent Sexism Inventory (Glick & Fiske, 1996), with 11 items assessing benevolent sexism (α = .90; *M* = 3.71; *SD* = 1.34), e.g., 'Many women have a quality of purity that few men possess', and 11 items assessing hostile sexism (α = .94; *M* = 3.16; *SD* = 1.52), e.g., 'Many women are actually seeking special favors, such as hiring policies that favor them over men, under the guise of asking for "equality". Participants indicated their responses on 7-point scales anchored by *strongly disagree* and *strongly agree*.

[4] Our studies included three attention checks to verify whether respondents paid sufficient attention (Berinsky et al., 2014; Vannette, 2017). We did not exclude participants based on this, following recommendations against the elimination of respondents based on failed attention checks because this may introduce demographic bias without improving data quality (Vannette, 2016, 2017). Instead, after running the main analyses with all participants, we tested whether the findings would change after excluding respondents who failed more than one attention check item, confirming that the results remained consistent. All studies received ethics approval from the ethics committee at the researchers' University.

[5] MTurk samples have been found to be more diverse than samples collected through traditional methods in psychological research (e.g., Buhrmester et al., 2011), and have been shown to be suitable for research on ideological attitudes, values, and personality (Clifford et al., 2015).

Where needed, item scores were recoded before averaging, so that higher scores reflect greater endorsement of sexist attitudes.

Belief in human supremacy over animals and nature (α = .94; *M* = 3.61; *SD* = 1.55) was measured with twelve items on 7-point scales (1, *strongly disagree*; 7, *strongly agree*), using six items from the 'dominance over nature' subscale of Milfont and Duckitt (2010) and the six items of Dhont and Hodson's (2014) human supremacy scale (see also Jylhä & Akrami, 2015). Example items are 'Humans were meant to rule over the rest of nature' and 'The life of an animal is just not of equal value as the life of a human being'. Higher scores reflect stronger human supremacy beliefs.

We developed a new scale comprising four items to measure *beliefs in women's connection to nature.* Participants indicated the extent to which they think each of the items apply to women more or less than to men using 7-point scales ranging from 1 (*a lot less than men*) to 7 (*a lot more than men*). The four items are: 'Women are connected with nature', 'Women are closely tied to natural reproduction', 'Women are a part of nature', and 'Women are in tune with nature'. Confirmatory factor analysis supported the unidimensionality of the scale, $\chi^2(2) = 0.80$, $p = .67$, CFI = 1.000, SRMR = 0.007, RMSEA = 0.000 [90% CI: 0.000, 0.067], with factor loadings ranging from .40 to .91. The internal consistency for the scores on this new scale was .78 and thus satisfactory. Item scores were averaged, with higher scores representing a stronger belief that women, relative to men, are more closely connected to nature (*M* = 4.58; S*D* = 0.87).

We measured the *subtle dehumanization of women*[6] (*M* = 0.31; *SD* = 1.30) closely following the procedures of Hodson and Costello (2007; based on Haslam et al., 2005; see

[6] We labeled this measure 'subtle dehumanization' to differentiate it from the blatant measure used in Study 2, which is consistent with the recent conceptualization of subtle and blatant dehumanization proposed by Kteily et al. (2015).

also Costello & Hodson, 2010; Haslam, 2006) through tapping into participants' attribution of uniquely human personality traits to groups. Following this conceptualization, outgroups are dehumanized if their members are attributed fewer uniquely human traits, relative to traits perceived to be shared with other animals, than the ingroup. Participants were presented with the 10-item Big 5 Personality Inventory (Gosling et al., 2003) and indicated the extent to which they thought each trait applied to women and men as a group respectively on a 7-point scale (*trait does not apply to women / men as a group; trait strongly applies to women / men as a group*). Hodson and Costello (2007) identified openness and conscientiousness as the traits perceived to be the most uniquely human and agreeableness and neuroticism as those perceived to be the least uniquely human, in line with prior research (Gosling & John, 1999; Haslam et al., 2005). We computed the difference score between uniquely human and not uniquely human traits for each group (men and women). The relative dehumanization of women as compared to men was then computed by subtracting the human-nonhuman score for women from the human-nonhuman score for men (Hodson & Costello, 2007). Higher scores represent a greater perception that women possess fewer human relative to non-human traits than men.

2.2.2 Results and Discussion

Zero-order Correlations. As expected, human supremacy beliefs were significantly positively related to both benevolent and hostile sexism (Table 2.1). Also as expected, women's connection to nature was significantly positively related to benevolent sexism but not to hostile sexism, whereas subtle dehumanization was significantly related to hostile but not benevolent sexism.

Table 2.1

Zero-order Correlations between Variables in Study 1

	1	2	3	4	5
1. Human supremacy beliefs	/	-.18***	.28***	.35***	.41***
2. Women's connection to nature		/	-.13**	.26***	.02
3. Subtle dehumanization of women			/	.02	.30***
4. Benevolent sexism				/	.43***
5. Hostile sexism					/

Note: *$p < .05$; ** $p < .01$; *** $p < .001$.

Hypotheses Test. To test our hypotheses, we conducted path analyses in Mplus (Version 8, Muthén & Muthén, 1998-2019), using the robust maximum likelihood estimator. We modelled women's connection to nature, human supremacy beliefs, and subtle dehumanization as predictors of benevolent and hostile sexism. Gender was included as a control variable next to the predictors.[7]

[7] In all studies, given that gender was included as control variable (as a dichotomous variable), only the data of those participants who indicated to belong to the gender category of men or women were included in the path analyses. We included the associations between all variables to test the hypothesized model and to allow for comparing the strengths of different paths. Hence, these models were fully saturated (df = 0).

Table 2.2

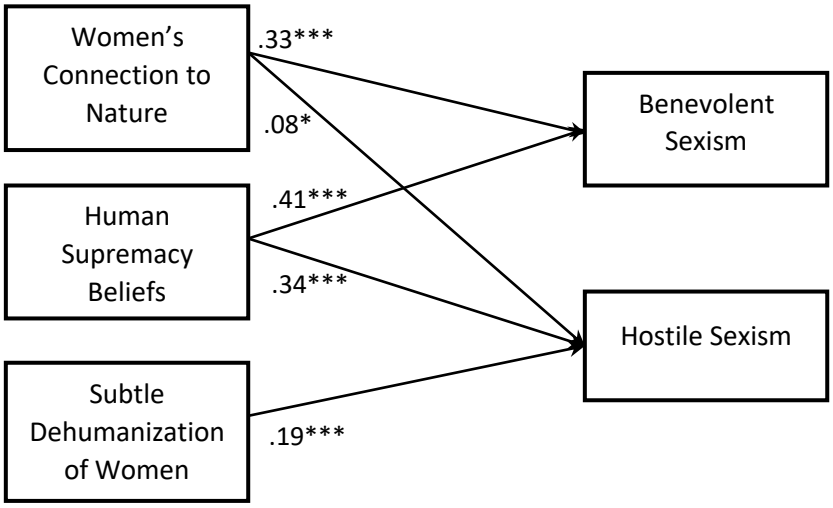
Results (standardized estimates) of Path Models in Study 1(S1), Study 2 (S2), and Study 3 (S3) Testing the Associations of Human Supremacy Beliefs, Women's Connection to Nature, and Dehumanization of Women with Benevolent and Hostile sexism, Controlling for Gender (coded 0 = male, 1 = female)

		Benevolent sexism		Hostile sexism	
		β [95% CIs]	*p*	*β* [95% CIs]	*p*
Human supremacy beliefs	S1	.405 [.328, .482]	< .001	.341 [.260, .423]	< .001
	S2	.193 [.106, .279]	< .001	.237 [.159, .314]	< .001
	S3	.328 [.236, .420]	< .001	.310 [.221, .398]	< .001
Women's connection to nature	S1	.328 [.252, .404]	< .001	.080 [.008, .152]	.028
	S2	.240 [.154, .326]	< .001	.114 [.037, .191]	.006
	S3	.309 [.225, .394]	< .001	.121 [.044, .197]	.002
Subtle dehumanization of women	S1	-.062 [-.155, .031]	.192	.187 [.095, .279]	< .001
	S2	-.010 [-.107, .087]	.842	.252 [.172, .331]	< .001
	S3	-.048 [-.133, .038]	.274	.201 [.117, .285]	< .001
Blatant dehumanization of women	S1	/	/	/	/
	S2	.155 [.057, .254]	.002	.178 [.108, .249]	< .001
	S3	.056 [-.018, .130]	.139	.155 [.091, .219]	< .001
Gender	S1	-.096 [-.173, -.018]	.015	-.234 [-.309, -.159]	< .001
	S2	-.196 [-.279, -.112]	< .001	-.230 [-.307, -.152]	< .001
	S3	-.072 [-.152, -.007]	.073	-.117 [-.195, -.039]	.003

Consistent with Hypothesis 1, stronger endorsement of human supremacy beliefs was significantly related to higher levels of both benevolent and hostile sexism (see Figure 2.2 and Table 2.2). Furthermore, women's connection to nature was significantly related to benevolent sexism, while the association with hostile sexism was less pronounced and significantly weaker than the path from women's connection to nature to benevolent sexism, Δb = .36, *SE* = .07, $p <$ .001, corroborating Hypothesis 2. Supporting Hypothesis 3, higher levels of subtle dehumanization significantly predicted hostile sexism, but not benevolent sexism, resulting in a significant difference between the strength of these paths, Δb = .28, *SE* = .07, $p < .001$. In sum, Study 1 supported all three hypotheses, demonstrating that people's views on nature and animals are intertwined with their attitudes towards women.

Figure 2.2

Results of Study 1 Showing the Associations of Women's Connection to Nature, Human Supremacy Beliefs, and Subtle Dehumanization of Women with Benevolent and Hostile Sexism



Note. N = 502. Figure shows significant standardized path estimates, controlling for gender (see Table 2.2). * $p < .05$, ** $p < .01$, *** $p < .001$.

2.3 Study 2

The aim of Study 2 was to replicate the results of Study 1 in a different country (UK). Furthermore, because we relied on a measure of subtle dehumanization of women in Study 1, we also included a measure of blatant dehumanization in Study 2. While a vast body of research has now explored subtle dehumanization by focusing on the attribution of fewer uniquely human characteristics and experiences to other groups, more blatant forms of dehumanization have, until recently, largely been ignored. Kteily et al. (2015), however, argued that individuals sometimes explicitly endorse and communicate their view of outgroup members as animal-like, and that subtle measures of dehumanization fail to capture such overt expressions. Their newly developed measure of blatant dehumanization predicted intergroup outcomes over and above subtle dehumanization. As of yet, no study has investigated the blatant dehumanization of women and its association with sexism. We expected that blatant dehumanization would predict additional variance in hostile sexism over and above subtle dehumanization.

2.3.1 Method

Participants. Respondents were 499 adults based in the UK, recruited via Prolific[8], and paid £0.70 (57.5% women, 42.1% men, 0.4% indicated "another gender" or "prefer not to say"). Participant age ranged from 18 to 74 years with a mean age of 36.70 years (*SD* = 13.24).

Measures. We used the same measures of human supremacy beliefs (α = .90; *M* = 3.26; *SD* = 0.96), benevolent (α = .86; *M* = 3.27; *SD* = 1.12) and hostile (α = .92; *M* = 3.12; *SD* = 1.34) sexism, subtle dehumanization of women (*M* = 0.24; *SD* = 1.11), and women's connection to nature (α = .71; *M* = 4.53; *SD* = 0.64) as in Study 1. To measure blatant

[8] Prolific has been shown to provide high quality data, comparable to MTurk data (Peer et al., 2017).

dehumanization of women, we used an adapted version of the 'Ascent of Man' scale (Kteily et al., 2015). This visual scale uses five silhouettes depicting the physiological and cultural evolution of humans, from early human ancestors to advanced modern humans. Because the original silhouettes appear relatively masculine, we modified them slightly to appear more ambiguous in terms of sex, thereby adapting them to the measurement of blatant dehumanization of women (see Appendix B). Participants were asked to rate the 'evolvedness' of seven different social groups, including women, using continuous sliders (1-100%). The perceived 'evolvedness' of women was reverse-scored so that higher scores represent a greater dehumanization of women. On average, women were perceived as 6.86% below a fully evolved human (*SD* = 13.51). Other social groups were included as distractors and were not part of the analyses.

2.3.2 Results and Discussion

Zero-order Correlations. Replicating the findings of Study 1, human supremacy beliefs were significantly related to both benevolent and hostile sexism (Table 2.3). Furthermore, women's connection to nature was significantly correlated with benevolent but not hostile sexism, whereas subtle dehumanization of women was significantly correlated with hostile but not benevolent sexism. Blatant dehumanization was positively and significantly correlated with benevolent and hostile sexism.

Table 2.3

Zero-order Correlations between Variables in Study 2

	1	2	3	4	5	6
1. Human supremacy beliefs		-.04	.13**	-.01	.20***	.29***
2. Women's connection to nature		/	.02	-.03	.22***	.08
3. Subtle dehumanization of women			/	.06	.05	.33***
4. Blatant dehumanization of women				/	.16***	.21***
5. Benevolent sexism					/	.46***
6. Hostile sexism						/

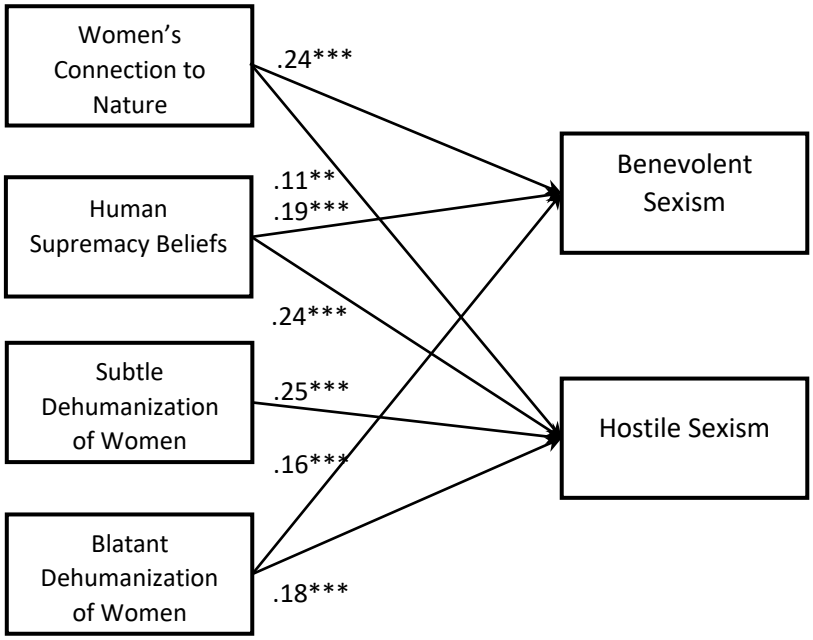
Note: *$p < .05$; ** $p < .01$; *** $p < .001$.

Hypotheses Test. Next, we tested our hypotheses following the same statistical procedures as in Study 1, but in this study, blatant dehumanization was entered as an additional predictor next to the other key predictors. Replicating the results of Study 1, human supremacy beliefs significantly predicted both hostile and benevolent sexism (Figure 2.3 and Table 2.2). Furthermore, women's connection to nature showed a significantly stronger association with benevolent sexism than with hostile sexism, $\Delta b = .18$, $SE = .09$, $p = .041$. Subtle dehumanization of women significantly predicted hostile sexism, but not benevolent sexism. The strengths of these paths were also significantly different from each other, $\Delta b = .31$, $SE = .06$, $p < .001$. Extending the findings of Study 1, blatant dehumanization was significantly related to hostile sexism, yet also to benevolent sexism. The strength of these two paths did not differ significantly, $\Delta b = .01$, $SE = .00$, $p = .278$.

Study 2 replicated the findings of Study 1 in a UK sample, demonstrating the generalizability of the findings in a different context. Furthermore, Study 2 demonstrated that higher levels of blatant dehumanization of women were associated with greater sexism and explained variance in hostile sexism over and above subtle dehumanization. Moreover, although not expected, blatant dehumanization also predicted benevolent sexism.

Figure 2.3

Results of Study 2 Showing the Associations of Women's Connection to Nature, Human Supremacy Beliefs, and Subtle and Blatant Dehumanization of Women with Benevolent and Hostile Sexism



Note. $N = 497$. Figure shows significant standardized path estimates, controlling for gender (see Table 2.2). * $p < .05$, ** $p < .01$, *** $p < .001$.

2.4 Study 3

In Study 3, we turned attention to the potential role of SDO, theoretically considered a key ideological motive underpinning human supremacy beliefs, dehumanization, and sexism.

Specifically, drawing on the SD-HARM model (Dhont et al., 2016), we expected that SDO would partly explain the association between human supremacy beliefs and sexism such that the associations between human supremacy beliefs and both benevolent and hostile sexism would become weaker after accounting for SDO. Along similar lines, we tested whether SDO can explain the association between the dehumanization of women and hostile sexism, such that the association between dehumanization and hostile sexism would become weaker after accounting for SDO.

2.4.1 Method

Participants. Respondents were 504 adults based in the US, recruited via MTurk (56.7% women, 43.1% men, 0.2% indicated "other"), and were paid $0.50. Participant age ranged from 19 to 85 years with a mean age of 38.74 years (*SD* = 12.16).

Measures. Study 3 included the same measures as Study 2 of human supremacy beliefs (α = .93; *M* = 3.74; *SD* = 1.44), benevolent (α = .91; *M* = 3.75; *SD* = 1.35) and hostile sexism (α = .93; *M* = 3.19; *SD* = 1.41), women's connection to nature (α = .75; *M* = 4.58; *SD* = 0.80), subtle dehumanization (*M* = 0.37; *SD* = 1.24), and blatant dehumanization (*M* = 8.97; *SD* = 16.95).

Social dominance orientation (*M* = 2.67; *SD* = 1.35; α = .91) was assessed using the short eight-item version of the SDO7-scale (Ho et al., 2015). An example item is 'An ideal society requires some groups to be on top and others to be on the bottom'. Responses were given on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale. Reverse-coded items were recoded before calculating the SDO score, with higher scores reflecting greater SDO.

2.4.2 Results and Discussion

Zero-order Correlations. Consistent with the results of Studies 1 and 2, human supremacy beliefs were significantly correlated with both benevolent and hostile sexism (Table 2.4). Furthermore, women's connection to nature was significantly correlated with

benevolent but not with hostile sexism. Conversely, both subtle and blatant dehumanization of women were significantly correlated with hostile sexism but not with benevolent sexism. SDO showed significant positive correlations with all variables, except with women's connection to nature.

Table 2.4

Zero-Order Correlations Between Variables in Study 3

		1	2	3	4	5	6	7
1.	Human supremacy beliefs	/	-.10*	.18***	.00	.30***	.36***	.36***
2.	Women's connection to nature		/	-.11*	.01	.28***	.06	.07
3.	Subtle dehumanization of women			/	-.03	-.02	.25***	.15***
4.	Blatant dehumanization of women				/	.06	.15**	.22***
5.	Benevolent sexism					/	.39***	.34***
6.	Hostile sexism						/	.56***
7.	Social Dominance Orientation							/

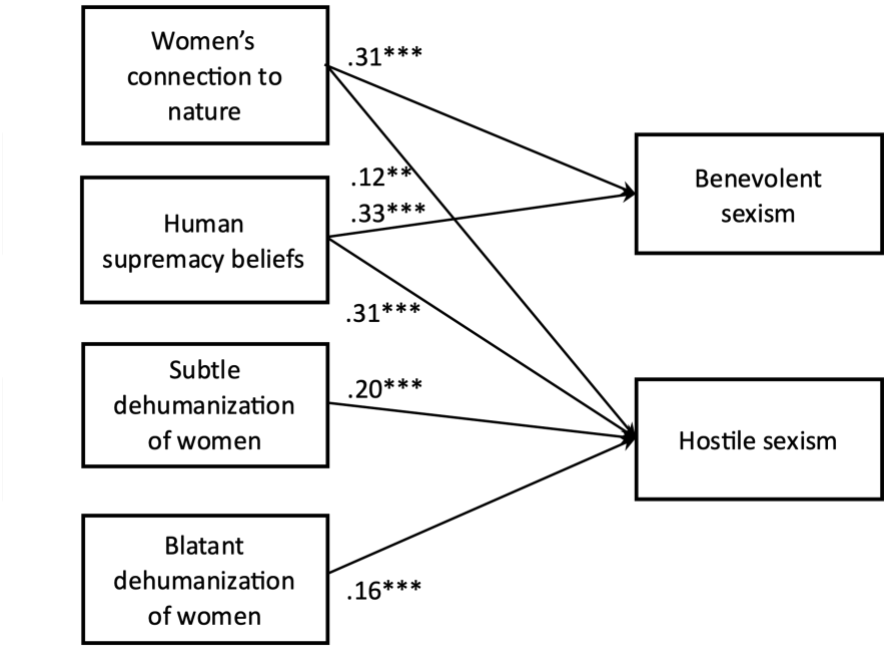
Note: *$p < .05$; ** $p < .01$; *** $p < .001$.

Hypotheses Test. We tested the main hypotheses following the same analytic procedures as applied in Study 2. Confirming Hypothesis 1 (Figure 2.4 and Table 2.2), human supremacy beliefs was significantly associated with both types of sexism. Furthermore, although beliefs in women's connection to nature was associated with both benevolent and hostile sexism, the association with benevolent sexism was significantly stronger than with hostile sexism ($\Delta b = .31$, $SE = .08$, $p < .001$), corroborating Hypothesis 2. Blatant and subtle dehumanization predicted hostile, but not benevolent sexism, and,

confirming Hypothesis 3, the associations with hostile sexism were significantly stronger than with benevolent sexism (Δb = .01, *SE* = .00, p = .007 and Δb = .28, *SE* = .06, p < .001, respectively).

Figure 2.4

Results of Study 3 Showing the Associations of Women's Connection to Nature, Human Supremacy Beliefs, and Subtle and Blatant Dehumanization of Women with Benevolent and Hostile Sexism.



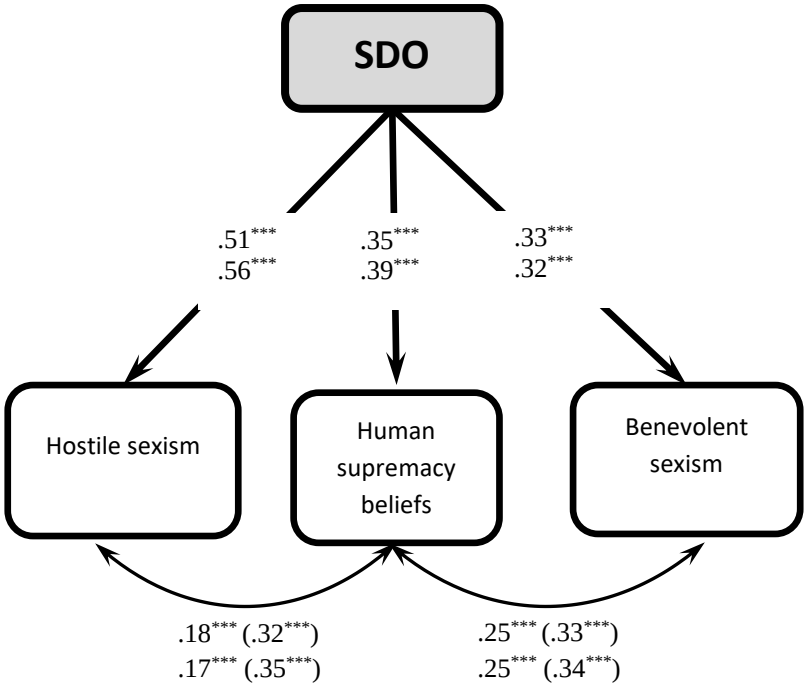
Note. Figure shows significant standardized path estimates, controlling for gender (see Table 2.2). * p < .05, ** p < .01, *** p < .001.

Testing the Role of SDO. In a next set of analyses, we tested the idea that SDO represents the common ideological factor that connects human supremacy beliefs with both types of sexism (such that, when accounting for SDO, these associations become weaker; see Dhont et al., 2016). We modelled SDO as the common factor underpinning human supremacy beliefs and both types of sexism. We also controlled for the other predictors

included in the study. The results (Figure 2.5) confirmed the pronounced associations of SDO with benevolent sexism, hostile sexism, and human supremacy beliefs. Critically, when accounting for SDO, the residual association of human supremacy beliefs with benevolent and hostile sexism was weaker than without accounting for SDO, confirming SD-HARM.

Figure 2.5

Test of the Social Dominance Human-Animal Relations Model, After Controlling for the Other Predictors and Gender (Study 3 and 5)



Note. Standardized paths are shown, with parenthetical value reflecting the relation between the variables without accounting for SDO. Upper values refer to Study 3 results, lower values to Study 5 results. *** $p < .001$.

We also tested whether the drop in the strength of the relationship between human supremacy beliefs and the sexism variables after inclusion of SDO was statistically significant. Specifically, a third variable model was tested, statistically equivalent to testing for indirect effects using mediation analysis (D. P. MacKinnon et al., 2000; see Dhont et al.,

2016). Bootstrap analysis based on 10000 resamples showed that SDO significantly explained part of the relationship between human supremacy beliefs and benevolent (standardized estimate = .08, 95% bootstrapped bias-corrected confidence interval (95% BCI) = [.044, .115]) as well as hostile sexism (standardized estimate = .15, 95% BCI = [.103; .198]).

Similarly, we tested whether SDO accounted for the association of blatant and subtle dehumanization with hostile sexism (while controlling for the other variables). Modelling SDO as the common factor underpinning these associations confirmed the expected associations of SDO with hostile sexism (β = .48, p < .001) and with blatant and subtle dehumanization (β = .26, p < .001 and β = .10, p = .049, respectively). Furthermore, when accounting for SDO, the association between the dehumanization measures and hostile sexism became non-significant for blatant dehumanization (r = .07, p = .065) and became (slightly) weaker for subtle dehumanization (r = .18, p < .001) compared to these same associations without accounting for SDO (r = .17, p < .001 and r = .22, p < .001, respectively). Critically, SDO significantly explained the relationship between blatant dehumanization and hostile sexism (standardized estimate = .10, 95% BCI = [.061, .141]) and part of the relationship between subtle dehumanization and hostile sexism (standardized estimate = .04, 95% BCI = [.002, .086]).

Taken together, Study 3 provided converging support for all three hypotheses and confirmed the key role of SDO underlying the associations of both human supremacy beliefs and the dehumanization of women with sexist beliefs. Hence, our findings extend the SD-HARM framework (Dhont et al., 2016) showing the psychological connections between gender-based beliefs and beliefs related to human-animal relations, with SDO explaining considerable variance in these connections.

2.5 Study 4

The aim of Study 4 was to focus specifically on the association between women's connection to nature and benevolent sexism. Hence, we explicitly tested the idea that associating women with nature predicts benevolent sexism in part because nature itself is seen as delicate, fragile, nurturing, and crucial for human happiness. These benevolent nature beliefs mirror the paternalistic views expressed in benevolently sexist attitudes towards women. Therefore, we tested whether benevolent nature beliefs could (partly) explain the relationship between the perceived connection of women to nature and benevolent sexism.

2.5.1 Methods

Participants. Participants were 400 adults based in the US and recruited via MTurk (62.5% men, 37.0% women, 0.3% selected "prefer not to answer") and were paid $0.85. Participant age ranged from 20 to 70 years with a mean age of 35.82 years (*SD* = 10.66).

Measures. Human supremacy beliefs (α = .90; *M* = 3.68; *SD* = 1.36), benevolent (α = .91; *M* = 3.81; *SD* = 1.48) and hostile sexism (α = .87; *M* = 3.42; *SD* = 1.49), women's connection to nature (α = .83; *M* =4.78; *SD* = 0.97), subtle dehumanization (*M* = 0.30; *SD* = 1.36), and blatant dehumanization (*M* = 13.49; *SD* = 21.84) were measured as in the previous studies.

Benevolent nature beliefs (α = .75; *M* = 5.48; *SD* = 1.06) were measured with five items tapping into beliefs that nature is fragile, requires human protection, and is needed in order for humans to be happy (see Appendix C). An example item is 'Nature is fragile and needs to be protected'. Participants indicated their responses on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale.

2.5.2 Results and Discussion

Zero-order Correlations. Human supremacy beliefs, women's connection to nature, and blatant dehumanization were significantly correlated with both types of sexism (Table

2.5), while subtle dehumanization was positively associated with hostile sexism. As expected, benevolent nature beliefs were positively associated with women's connection to nature and benevolent sexism, but not with hostile sexism.

Table 2.5

Zero-order Correlations between Variables in Study 4

		1	2	3	4	5	6	7
1.	Human supremacy beliefs	/	.22***	.07	.16**	-.18***	.45***	.40***
2.	Women's connection to nature		/	-.09	.16**	.24***	.45***	.23***
3.	Subtle dehumanization of women			/	-.23***	.26***	.01	.10*
4.	Blatant dehumanization of women				/	-.11*	.35***	.41***
5.	Benevolent nature beliefs					/	.14**	-.05
6.	Benevolent sexism						/	.66***
7.	Hostile sexism							/

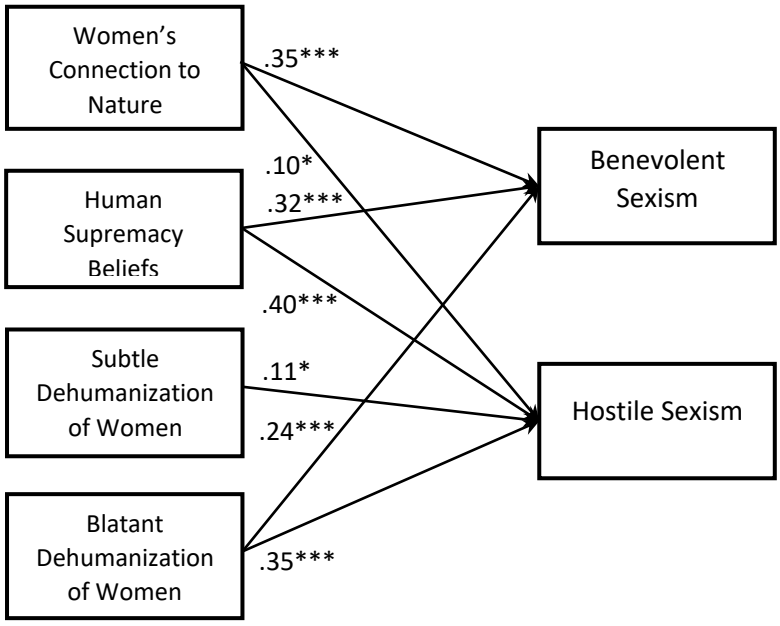
Note: *$p < .05$; ** $p < .01$; *** $p < .001$.

Hypotheses Test. Conducting identical analyses as in the previous studies showed that human supremacy beliefs predicted both types of sexism (Figure 2.6 and Table 2.6). Women's connection to nature predicted benevolent, but not hostile sexism, with a significantly stronger association for benevolent sexism than for hostile sexism ($\Delta b = .39$, $SE = .06$, $p < .001$). Blatant dehumanization predicted both types of sexism, yet the association with hostile sexism was significantly stronger than with benevolent sexism ($\Delta b = .01$, $SE = .00$, $p = .003$), corroborating Hypothesis 3. Subtle dehumanization predicted only hostile,

but not benevolent sexism, although the strength of these paths was not significantly different (Δb = .05, *SE* = .06, p = .427).

Figure 2.6

Results of Study 4 Showing the Associations of Women's Connection to Nature, Human Supremacy Beliefs, and Subtle and Blatant Dehumanization of Women with Benevolent and Hostile Sexism



Note. N = 399. Figure shows significant standardized path estimates, controlling for gender (see Table 2.6). * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2.6

Results (standardized estimates) of Path Models in Study 4, Testing the Associations of Human Supremacy Beliefs, Women's Connection to Nature, and Subtle and Blatant Dehumanization of Women with Benevolent and Hostile sexism, Controlling for Gender (coded 0 = male, 1 = female).

	Benevolent sexism		Hostile sexism	
	β [95% CIs]	*p*	*β* [95% CIs]	*p*
Human supremacy beliefs	.315 [.226, .404]	< .001	.404 [.319, .489]	< .001
Women's connection to nature	.350 [.267, .434]	< .001	.097 [.007, .187]	.035
Subtle dehumanization of women	.068 [-.035, .170]	.196	.109 [.019, .200]	.019
Blatant dehumanization of women	.239 [.156, .322]	< .001	.345 [.270, .419]	< .001
Gender	-.139 [-.217, -.061]	< .001	-.091 [-.172, -.010]	.028

Testing the Role of Benevolent Nature Beliefs. Next, we tested the theoretical idea that benevolent nature beliefs underlie the association between women's connection to nature and benevolent sexism, explaining why these variables are associated. In statistical terms, this means that when accounting for benevolent nature beliefs, the association between women's connection to nature and benevolent sexism should become weaker. Hence, we modelled benevolent nature beliefs as the common factor underpinning women's connection to nature and benevolent sexism, while controlling for the other predictors included in the study. The results confirmed the pronounced associations of benevolent nature beliefs with both women's connection to nature (β = .31, p < .001) and benevolent sexism (β = .27, p < .001). Importantly, the residual association between women's connection to nature and benevolent

sexism was weaker (β = .34, p < .001) than without accounting for benevolent nature beliefs (β = .40, p < .001). Critically, accounting for benevolent nature beliefs significantly decreased the strength of the relationship between women's connection to nature and benevolent sexism (standardized estimate = .04, 95% BCIs = [.016; .066]).

Taken together, the pattern of results of Study 4 was largely consistent with the findings from Studies 1-3. Moreover, we explored a potential underlying factor explaining why those who more strongly believe that women (relative to men) are connected to nature also show more benevolently sexist attitudes. As expected, beliefs that nature is fragile, in need for protection, and crucial to human happiness (i.e., benevolent nature beliefs) explained a significant part of the variance in this relationship. However, the association between women's connection to nature and benevolent sexism remained substantial and significant even after accounting for benevolent nature beliefs.

2.6 Study 5

In Study 5 we turned to some of the possible implications of our findings. Specifically, we focused on two potential societally relevant correlates of hostile and benevolent sexism: acceptance of rape myths and support for policies restricting pregnant women's freedom.

Since autumn of 2017, more than 80 women came forward with sexual harassment and assault allegations against Hollywood producer Harvey Weinstein. Fashion designer Donna Karan commented: "How do we present ourselves as women? […] Are we asking for it by presenting all the sensuality and all the sexuality?" (Malkin, 2017). The belief that women are harassed and raped because they dress suggestively is one of many myths surrounding rape and sexual violence and is rooted in hostile sexist views (Abrams et al., 2003; Chapleau et al., 2007; Glick & Fiske, 1997). Bohner (1998, p. 14) defined rape myths as "descriptive or prescriptive beliefs about rape (i.e., about its causes, context,

consequences, perpetrators, victims and their interaction) that serve to deny, downplay or justify sexual violence that men commit against women". Given that the dehumanization of women and human supremacy beliefs are associated with hostile sexism, we expected that both variables would be further associated with greater acceptance of rape myths, through hostile sexism.

The implications associated with benevolent sexism are less openly damaging, and even likely perceived as in women's best interest. Yet, they are often responsible for sustaining male dominance, and interfere with women's autonomy, for instance by restricting pregnant women's choices (Murphy et al., 2011; Sutton et al., 2011). Indeed, benevolent sexism predicts increased willingness to intervene should pregnant women engage in behaviors viewed as risky to their pregnancy (Sutton et al., 2011), highlighting the links between benevolent sexism and the perceived importance of women for natural reproduction (Glick & Fiske, 1996; Guttentag & Secord, 1983; Rothman, 1994; Sutton et al., 2011). Given that beliefs in women's connection to nature and human supremacy beliefs predicted benevolent sexism, we expected that these variables would also predict support for policies that restrict pregnant women's autonomy, through benevolent sexism.

Furthermore, the survey also included the SDO scale, allowing us to test the role of SDO in explaining the associations between human supremacy beliefs and both types of sexism, as well as between dehumanization and hostile sexism. This would provide a direct replication of the findings of Study 3.

2.6.1 Method

Participants and Procedure. Respondents were 500 MTurk workers located in the US and were paid $0.70 (50.8% women, 48.8% men, and 0.4% indicated "prefer not to say"). Participant age ranged from 19 to 73 years (M_{age} = 36.75, SD_{age} = 11.81).

Measures. Human supremacy beliefs (α = .93; *M* = 3.69; *SD* = 1.43), benevolent sexism (α = .91; *M* = 3.66; *SD* = 1.34), hostile sexism (α = .93; *M* = 3.17; *SD* = 1.44), women's connection to nature (α = .74; *M* = 4.45; *SD* = 0.79), and SDO (α = .90; *M* = 2.68; *SD* = 1.37) were measured as in the previous studies. Dehumanization was measured with the measure of subtle dehumanization (*M* = 0.26; *SD* = 1.25) used in Studies 1-4.

Rape myth acceptance (α = .96; *M* = 2.08; *SD* = 1.34) was measured using 13 items from the Illinois Rape Myth Acceptance Scale (Payne et al., 1999). Participants indicated on 7-point scales (1, *strongly disagree*; 7, *strongly agree*) the extent to which they agree with statements describing specific rape myths (e.g., 'If a woman is raped while she is drunk, she is at least somewhat responsible for letting things get out of control' and 'Many women secretly desire to be raped'). The items were averaged into a single score, with higher scores reflecting stronger endorsement of rape myths.

Support for the *restriction of pregnant women's freedom* (*M* = 4.24; *SD* = 1.78) was measured with four items based on Murphy et al. (2011). We asked participants to indicate their support for laws that would restrict pregnant women's autonomy on a 1 (*strongly disagree*) to 7 (*strongly agree*) scale. One item was removed from the analysis because of its low item-total correlation (< .30), leaving three items: 'It should be against the law for pregnant women to consume alcohol', 'Pregnant women should not be allowed to consume risky foods', and 'Shops should be legally prohibited from selling cigarettes to visibly pregnant women'. The internal consistency was α = .84.

2.6.2 Results and Discussion

Zero-order Correlations. Human supremacy beliefs were significantly correlated with benevolent and hostile sexism, while women's connection to nature was significantly related to benevolent, but not hostile sexism, and subtle dehumanization was significantly related to hostile, but not to benevolent sexism. Furthermore, both hostile and benevolent

sexism were significantly correlated with support for the restriction of pregnant women's freedom and rape myth acceptance. Women's connection to nature was significantly positively related to support for the restriction of pregnant women's freedom while human supremacy beliefs and subtle dehumanization were significantly positively related to rape myth acceptance (Table 2.7).

Table 2.7

Zero-Order Correlations between Variables in Study 5

		1	2	3	4	5	6	7	8
1.	Human supremacy beliefs		.04	.12**	.35***	.38***	.06	.26***	.40***
2.	Women's connection to nature		/	-.08	.25***	.02	.14**	.00	-.05
3.	Subtle dehumanization of women			/	.02	.26***	.01	.10*	.20***
4.	Benevolent sexism				/	.46***	.30***	.33***	.32***
5.	Hostile sexism					/	.24***	.65***	.61***
6.	Restriction of pregnant women's freedom						/	.19***	.01
7.	Rape myth acceptance							/	.54***
8.	Social dominance orientation								/

Note: $*p < .05$; $** p < .01$; $*** p < .001$.

Hypotheses Test. We tested the same path model as in Studies 1-4, but additionally included rape myth acceptance and support for the restriction of women's freedom as criterion variables. Specifically, to test our additional hypotheses regarding the indirect associations, we included the paths from all predictors to hostile and benevolent sexism, rape myth acceptance, and support for the restriction of women's freedom, as well as the paths

from hostile and benevolent sexism to rape myth acceptance and support for the restriction of women's freedom. Gender was again included as control variable.

Replicating Studies 1-4, human supremacy beliefs were significantly related to both benevolent and hostile sexism (see Figure 2.7 and Table 2.8). Furthermore, women's connection to nature was a significantly stronger predictor of benevolent sexism than of hostile sexism, Δb = 35, *SE* = 07, p <.001. Subtle dehumanization of women was significantly related to hostile sexism, but not to benevolent sexism. The former path was also significantly stronger than the latter path, Δb = .25, SE = .07, p < .001. Furthermore, hostile sexism significantly predicted both greater rape myths acceptance and support for the restriction of pregnant women's freedom while benevolent sexism significantly predicted greater support for the restriction of pregnant women's freedom (see Figure 2.7 and Table 2.9).

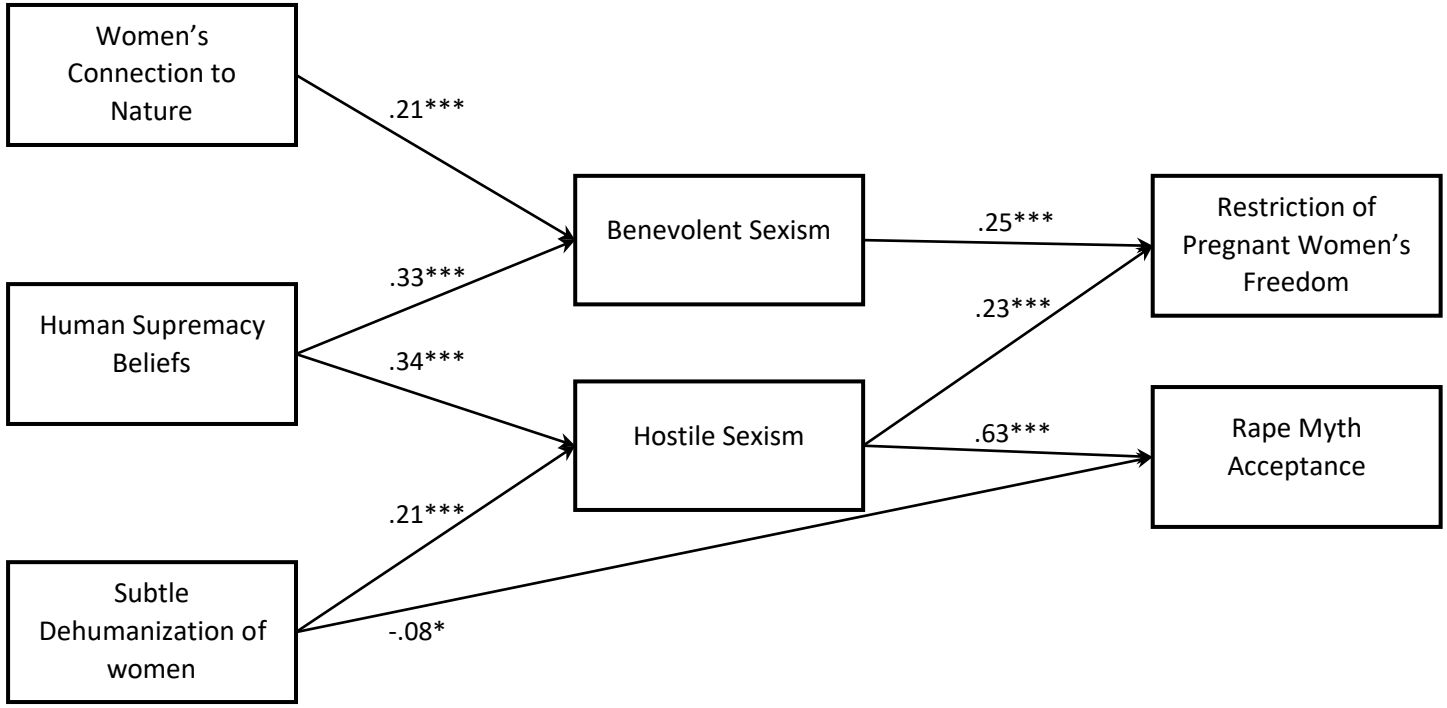
Table 2.8

Results (standardized estimates) of Path Model in Study 5 testing the Associations of Human Supremacy Beliefs, Women's Connection to Nature, and Subtle Dehumanization of Women with Benevolent and Hostile Sexism, Controlling for Gender (coded 0 = male, 1 = female)

	Benevolent sexism		Hostile sexism	
	β [95% CIs]	*p*	β [95% CIs]	*p*
Human supremacy beliefs	.327 [.239, .413]	< .001	.337 [.252, .419]	< .001
Women's connection to nature	.254 [.185, .317]	< .001	.045 [-.032, .122]	.250
Subtle dehumanization of women	-.008 [-.102, .081]	.863	.213 [.132, .298]	< .001
Gender	-.148 [-.228, -.068]	< .001	-.181 [-.258, -.104]	< .001

Figure 2.7

Results of Study 5 Showing the Associations of Women's Connection to Nature, Human Supremacy Beliefs, and Subtle Dehumanization of Women with Benevolent and Hostile Sexism, and with Restriction of Pregnant Women's Freedom and Rape Myth Acceptance



Note. N = 498. Figure shows significant associations (standardized estimates), controlling for gender (see Table 2.8 and 2.9). * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2.9

Model Results (Standardized Estimates) for the Paths from Human Supremacy Beliefs, Women's Connection to Nature, Dehumanization of Women, Hostile Sexism and Benevolent Sexism Predicting Rape Myth Acceptance and the Restriction of Pregnant Women's Freedom in Study 5, Controlling for Gender (coded 0 = male, 1 = female).

	Rape myth acceptance		Restriction of pregnant women's freedom	
	β [95% CIs]	*p*	*β* [95% CIs]	*p*
Human supremacy beliefs	.017 [-.044, .076]	.578	.090 [-.187, .011]	.078
Women's connection to nature	-.017 [-.105, .072]	.705	.002 [-.086, .085]	.961
Subtle dehumanization of women	-.084 [-.154, -.018]	.016	-.034 [-.120, .052]	.437
Benevolent sexism	.025 [-.047, .095]	.489	.248 [.134, .358]	< .001
Hostile sexism	.630 [.562, .696]	< .001	.226 [.122, .329]	< .001
Gender	-.108 [-.175, -.037]	.002	.098 [.014, .184]	.023

Indirect Effects. We estimated the indirect associations of women's connection to nature, subtle dehumanization of women, and human supremacy beliefs (i.e., the three key predictors) with support for the restriction of pregnant women's freedom and rape myth acceptance (i.e., the two criterion variables) via benevolent and hostile sexism (i.e., the two mediators) based on 10,000 bootstrap samples in Mplus. As predicted, both women's connection to nature and human supremacy beliefs were significantly indirectly related to support for the restriction of pregnant women's freedom through benevolent sexism, standardized estimate = .06, 95% BCI = [.033; .100] and standardized estimate = .08, 95% BCI = [.043, .129], respectively. Also as expected, both subtle dehumanization and human

supremacy beliefs were significantly indirectly related to rape myth acceptance through hostile sexism, standardized estimate = .13, 95% BCI = [.083, .187] and standardized estimate = .21, 95% BCI = [.154, .274], respectively.

Furthermore, both subtle dehumanization and human supremacy beliefs showed significant indirect associations with greater support for the restriction of women's freedom via hostile sexism, standardized estimate = .05, 95% BCI = [.024, .082] and standardized estimate = .08, 95% BCI = [.040, .122].

Testing the Role of SDO. Following the same analytical procedures as in Study 3, we also tested the role of SDO in explaining the relations between human supremacy beliefs and both types of sexism. Modelling SDO as the common factor underpinning these relationships, confirmed the significant relations of SDO with human supremacy beliefs, benevolent and hostile sexism (Figure 2.5). Critically, when accounting for SDO, the associations of human supremacy beliefs with both hostile and benevolent sexism were significantly weaker than without accounting for SDO (standardized estimate = .19, 95% BCI = [.140, .248] and standardized estimate = .08, 95% BCI = [.046, .130], respectively).

Finally, modelling SDO as the common factor underpinning the association between subtle dehumanization with hostile sexism also confirmed the associations of SDO with hostile sexism ($\beta = .53$, $p < .001$) and subtle dehumanization ($\beta = .16$, $p = .001$). Furthermore, although the residual association between hostile sexism and subtle dehumanization was still significant ($r = .18$, $p < .001$) when accounting for SDO, this association was significantly weaker than without accounting for SDO ($r = .23$, $p < .001$). SDO significantly explained part of the relationship (standardized estimate = .07, 95% BCI = [.030, .119]), confirming the role of SDO as a common ideological factor underpinning the association between subtle dehumanization and hostile sexism.

As hypothesized, both human supremacy beliefs and perceiving women as more closely connected to nature and animals predicted support for restrictive policies, channeled through higher benevolent sexism. Furthermore, both human supremacy beliefs and subtle dehumanization predicted higher hostile sexism, which, in turn, predicted acceptance of rape myths. Study 5 thus extended our findings by showing the implications for the acceptance of rape myths and policies that restrict pregnant women's freedom. Study 5 also confirmed the role of SDO in explaining the relationship between human supremacy beliefs and benevolent and hostile sexism as well as between the dehumanization of women and hostile sexism.

2.7 General Discussion

2.7.1 Theoretical Implications

This research systematically addressed the associations between sexism and beliefs about human-animal hierarchies and women's position relative to animals and nature. Across five studies, using large (highly powered) samples from both the USA and the UK, our findings demonstrated, for the first time, that a) ideologically motivated beliefs about hierarchical structures and inequality in human-animal relations are significantly related to benevolent and hostile sexism and b) beliefs about women's position relative to nature and the dehumanization of women show differential relations with benevolent and hostile sexism.

Specifically, stronger beliefs in human superiority over animals and nature were consistently related to stronger benevolent and hostile sexism, confirming Hypothesis 1. These findings suggest that human supremacy beliefs not only express a sense of entitlement to use animals and nature as resources to be exploited for human benefit but are also related to sexist ideologies. Hence, human supremacy beliefs serve as a justification for the lower status and subordination of both animals and women, thereby highlighting the intertwined connections in people's thinking about animals and women (Dhont et al., 2020; Hodson et al., 2020).

Moreover, the findings extend recent work on the SD-HARM model (Dhont et al., 2016) demonstrating that SDO represents a common ideological motive underpinning both ethnic prejudice and exploitative attitudes towards animals. Indeed, Studies 3 and 5 demonstrated that SDO is also a key ideological factor explaining why beliefs in human superiority over animals and nature are connected to gender-based prejudice.

However, the current focus on gender-based prejudice, rather than ethnic prejudice as in most previous empirical work, required the consideration of a more complex pattern of relations. As outlined by Ambivalent Sexism Theory (Glick & Fiske, 1996; Glick et al., 2000), men and women are more intimately connected than any other two social groups (Fiske & Stevens, 1993), and images and stereotypes of women are not consistently negative (Eagly & Mladinic, 1994; Rudman, 2005). Therefore, considering only a single sexism dimension would have been inadequate (e.g., Glick & Fiske, 1997; Sibley et al., 2007). Indeed, the current findings demonstrated that hostile and benevolent sexism also show differential associations with different ways of how women (relative to men) are viewed in relation to nature and animals.

Specifically, in line with Hypothesis 2, the belief that women are more closely connected to nature than men was more strongly associated with benevolent than hostile sexism. In other words, by portraying women as more 'in tune' with nature, and attributing special qualities of natural purity to them, women seem to be put on a pedestal and admired for these qualities. Yet such views also facilitate patronizing attitudes and the idea that women need protection from men, which further contributes to gender-based social hierarchies. Part of this association between women's connection to nature and benevolent sexism was explained by the benevolent belief that nature itself has a quality of purity that human culture does not and requires human protection (Study 4). The association was, however, still substantial after accounting for benevolent nature beliefs, indicating that other

factors are also at play. For instance, given the crucial role of women in natural reproduction, the idea that women's wellbeing is integral to the wellbeing of men's future offspring might also contribute to why women's connection to nature (and thus natural reproduction) is associated with benevolent sexism.

Indeed, pregnant women seem particularly affected by benevolent sexism and are more likely to experience significant interference with their autonomy and health-related behaviors (Sutton et al., 2011). Consistent with this idea, our findings showed that both women's perceived connection to nature and desires to dominate over animals and nature predict support for the restriction of pregnant women's freedom, through endorsement of benevolent sexism.

Turning to hostile sexism, we established that the dehumanization of women consistently predicted hostile sexism in all five studies using a subtle dehumanization measure based on the denial of characteristics that are assumed to be uniquely human, and in three studies with a measure of blatant dehumanization based on the view of women as not fully evolved. One striking implication of this finding is that, by placing women closer to animals on the animal-human continuum, one can justify women's subordination in society as well as the disproportionate amount of sexual violence they face as a group. Indeed, the dehumanization of women was further related to justifying and trivializing sexual violence through a stronger endorsement of hostile sexism. This extends previous research suggesting that animalizing women is linked to self-reported rape proclivity in men (Rudman & Mescher, 2012).

Interestingly, yet not predicted by the hypotheses, blatant dehumanization of women also predicted benevolent sexism in Studies 2 and 4 (but not in Study 3). This finding suggests that depicting women as more animal-like may also be associated with protective and patronizing attitudes. Lowering women's status by animalizing them might be a strategy

to establish and justify male dominance in ways that could be perceived as well-intended or socially acceptable.

Furthermore, both dehumanization of women and human supremacy beliefs also showed an indirect association with support for the restriction of pregnant women's freedom through hostile sexism. These findings may suggest that support for restricting women's autonomy is driven by multiple motives including motives of protection of women from perceived risks to their wellbeing, motives to assert control over the reproductive process, and hostile motives reflecting antagonistic feelings about women.

2.7.2 Limitations and Directions for Future Research

Notwithstanding the consistent support for the hypotheses, some limitations should be acknowledged. Firstly, our goal was to investigate how views regarding human-animal relations and how women are perceived to be related to animals and nature are associated with sexist attitudes, without implying causality given the correlational nature of our data. Future studies could experimentally manipulate the perceived position of women relative to nature, or the perceived status of animals relative to humans, to test for causal effects on sexism.

Secondly, it should be noted that the measures of dehumanization were not systematically correlated. Previous research has also reported non-significant or weak correlations between subtle and blatant dehumanization (see Kteily et al., 2015), suggesting that these scales measure qualitatively different concepts. Furthermore, these scales have been developed to measure the dehumanization of ethnic outgroups rather than women. Developing more parallel subtle and blatant dehumanization scales could provide a better understanding of the difference between subtle and blatant dehumanization.

2.7.3 Practical Implications and Conclusions

Scholars have argued that in order to effectively combat oppression, different forms of prejudice cannot be seen in isolation, but their interdependency needs to be understood (Adams, 2015, 2018; Adams & Gruen, 2014; C. A. MacKinnon, 2004). Based on the present findings, it can be argued that the objectification of women in campaigns to promote animal rights not only expresses sexist messages, but may be ineffective in addressing animal suffering (see also Bongiorno et al., 2013). Indeed, it may reinforce superiority beliefs in both human intergroup and human-animal relations. Along similar lines, our findings raise important questions regarding the frequent use of media images depicting women in an animalistic way or together with images of nature (e.g., Adams, 2015; Plous & Neptune, 1997; Reynolds & Haslam, 2011). Through strengthening the association of women with animals and nature, exposure to these images might increase and maintain benevolent and hostile sexism.

Taken together, by showing that the way people think about animals is associated with exploitative views about women, our findings move beyond traditional psychological theorizing on gender-based bias and provide, from a psychological perspective, empirical support for the ideas the first key claim of eco-feminist scholars theory that we aimed to test in this thesis, namely that oppressive attitudes towards women (i.e., sexism) and towards animals (i.e., speciesism) are interconnected, and women are animalized to justify their lower status (relative to men) in society. On a psychological level, systems of oppression and exploitation of women and animals are closely connected.

One implication of the interconnected nature of patriarchal gender structures and systems of animal exploitation is the perception that meat consumption symbolizes strength, masculinity, and power (e.g., Adams, 1990/2015). In Chapters 3 and 4, we investigate in detail a second key claim of eco-feminist theory, specifically testing how this meat-

masculinity link is implicated in biased attitudes towards plant-based meat alternatives (Chapter 3) and whether men who abstain from meat consumption (i.e., vegetarians and vegans) are feminized and devalued (Chapter 4).

Chapter 3: Misogyny on the Menu - Gender Role Beliefs Distort Evaluations of Plant-Based Meat Alternatives[9]

3.1 Introduction

Food groups differ vastly in their impact on the environment and climate change. Compared to plant-based food production, animal-based food production disproportionally contributes to the degradation of terrestrial and marine ecosystems and produces significantly higher greenhouse gas emissions (Lamb et al., 2016; Leip et al., 2015; Poore & Nemecek, 2018; Scarborough et al., 2014). Animal-based food production and consumption also pose substantial ethical challenges to people's values and beliefs of avoiding harm to sentient beings (e.g., Bastian & Loughnan, 2017; Dhont & Hodson, 2020). Furthermore, scientists have identified animal agriculture as a significant risk factor for public health because of its contribution to the emergence of antibiotic resistance and outbreaks of infectious disease (Jones et al., 2013; Phillips, 2003; Rohr et al., 2019). Hence, from sustainability, ethical, and health perspectives there is an increasing scientific consensus that a shift from animal-based to plant-based products is urgently needed (Aiking, 2011; Gerber et al., 2013; Godfray et al., 2018; Westhoek et al., 2014; Willett et al., 2019).

However, consumers are often strongly attached to meat (e.g., Graça et al., 2015; Loughnan & Davies, 2020; Macdiarmid et al., 2016) and reluctant to replace it with plant-based meat alternatives (Kumar et al., 2017; Siegrist & Hartmann, 2019; van Loo et al., 2020). Debates such as the 2020 EU Parliament row over whether plant-based burger patties should be called veggie burgers or "veggie discs" (Kwai, 2020) demonstrate that not everyone is excited about plant-based alternatives. Several scholars have highlighted that the symbolic masculine value attached to meat representing strength, health, and virility

[9] The work presented in this chapter was carried out in collaboration with Kristof Dhont, Nadira Faber, and Victoria Candace Krings.

(Nakagawa & Hart, 2019; Rozin et al., 2012) could be a key barrier for many consumers to change their dietary habits. People may expect social backlash in response to quitting meat consumption due to vegetarianism and veganism being associated with femininity. Although there is mounting evidence for the role of perceived masculinity in people's attitudes towards meat eaters and meat abstainers (Ruby & Heine, 2011; Salmen & Dhont, 2021), it is presently unclear how masculinity perceptions of meat and plant-based dishes distort evaluations of food dishes themselves. In the present research, we investigated how masculinity perceptions of plant-based meat (vs. regular meat) may distort evaluations of these food dishes and people's willingness to try them. Furthermore, we investigated the role of individual differences in gender role beliefs in bias towards plant-based meat alternatives.

3.1.1 Meat, Masculinity, and Anti-Vegan Attitudes

Food groups are associated with various symbolic meanings, including gender stereotypes (Sobal, 2005). Meat is arguably the food group most strongly symbolizing power, dominance, and masculinity. Historically, this may be rooted in the male practice of hunting to provide meat (Gelfer, 2013; Rozin et al., 2012) and the fact that meat has been selectively made available for men rather than women, children, and lower classes (Nath, 2011; Rozin et al., 2012; Ruby & Heine, 2011). Selective access to meat for those in powerful positions helped meat become a patriarchal symbol of dominance and masculinity (Adams, 2015; Sumpter, 2015). Although no longer imposed, gender differences in meat consumption prevail. Across cultures, men consume more meat, consume larger portions of meat, and are less likely to be vegetarian or vegan than women (Gal & Wilkie, 2010; Graça et al., 2015; Keller & Siegrist, 2015; Pfeiler & Egloff, 2018; Rosenfeld, 2018; Ruby, 2012; Schösler et al., 2015).

The association of meat with strength, health, and masculinity has also endured and is reinforced through advertisements and other media content (Julier & Lindenfeld, 2005;

Rogers, 2008; Rothgerber, 2013). Both men and women believe that meat is manly, healthy, and necessary for strength (Love & Sulikowski, 2018; Rozin et al., 2012). When asked to justify their meat consumption, men often spontaneously refer to the meat-masculinity link, highlighting that meat consumption is an expression of strength, status, and masculinity, and that meat is necessary to build an idealized muscular masculine physique (Bogueva et al., 2017; Oleschuk et al., 2019). Furthermore, those who avoid meat consumption by following a vegetarian or vegan diet are perceived as less masculine than those who eat meat (Ruby & Heine, 2011; Thomas, 2016). The meat-masculinity link is also reflected in the gendered nature of negative attitudes towards veganism, i.e., anti-vegan bias. For example, while both vegan men and women are subject to bias, vegan men are evaluated more negatively than vegan women, presumably because they violate masculine gender role expectations (MacInnis & Hodson, 2017). Lower perceived masculinity of vegan men is thus associated with greater bias towards them. However, it is currently unclear whether the gendered nature of anti-veganism is only expressed in biases towards vegan men or also expressed in other domains. Specifically, we argue and test the novel hypothesis that the lower perceived masculinity of vegan food is associated with the rejection of vegan foods, even when considering plant-based meat alternatives that look highly similar to regular meat.

3.1.2 Plant-Based Meat Alternatives

Plant-based meat alternatives contain some form of textured plant protein (often fungi, soy, or wheat) and imitate the texture, flavour, appearance, and nutritional value of meat. These products are typically more sustainable and less water- and land-intensive to produce than meat (Hashempour-Baltork et al., 2020; Kumar et al., 2017), and thus have the potential to facilitate global meat reduction without the need for pervasive changes of dietary patterns. Research on consumer acceptance of plant-based alternatives found that acceptance rates increase the more similar products are to meat (e.g., Hoek et al., 2011). However,

consumer acceptance of these products is still low (Siegrist & Hartmann, 2019; van Loo et al., 2020). Given the generally negative attitudes towards veganism (MacInnis & Hodson, 2017), even if meat alternatives are extremely similar to meat (such as the Beyond Burger™), consumer evaluations of them are likely biased. We propose that this is, in part, because they lose the symbolic masculine value afforded to regular meat products.

Plant-based meals and foods are perceived as more feminine compared to dishes containing meat (e.g., Cavazza et al., 2015a, 2015b; O'Doherty et al., 1999). Yet, to the best of our knowledge, no research has investigated the perceived masculinity or femininity of plant-based meat alternatives. Presumably, meat substitutes evoke the symbolic feminine value associated with veganism (e.g., Ruby & Heine, 2011; Sobal, 2005; Thomas, 2016), and may therefore be rejected. Veganism also challenges the dominant hierarchy between humans and animals. The production of plant-based meat requires no killing or butchering of an animal, processes which are arguably integral to meat's symbolic value representing masculinity and dominance over animals and nature (Adams, 2015; Sobal, 2005). Therefore, we expect that people will perceive meat dishes as less masculine if they are labelled as plant-based rather than regular meat. Furthermore, given how strongly people value meat for its symbolic masculine value (e.g., Bogueva et al., 2017), we further expect that the less masculine people perceive plant-based (vs. regular) meat to be, the more biased their evaluation will be. Moreover, we expect that these associations will be particularly pronounced for individuals who endorse traditional gender role beliefs more strongly.

3.1.3 The Role of Traditional Gender Role Beliefs

Given the gendered nature of how people perceive meat and vegan products, their general beliefs about gender roles (i.e., traditional vs. progressive) likely play an important role when it comes to evaluations of meat. Traditional gender role beliefs constitute the stereotypes and prescriptive norms that masculinity is associated with agentic qualities and

positions of power, and therefore more suited for men, whereas femininity is associated with communal qualities, caring responsibilities, and subordinate roles, and therefore more suited for women (Connor et al., 2017; Davis & Greenstein, 2009). Research has found that the meat-masculinity link is stronger in cultures with more traditional gender role beliefs (Schösler et al., 2015). Further, men who identify more strongly with non-traditional notions of masculinity, which are more flexible and allow for characteristics traditionally regarded as feminine, are less attached to meat and more willing to reduce their meat intake (de Backer et al., 2020). It is still unclear, however, how traditional gender role beliefs may distort perceptions of plant-based (vs. regular) meat.

According to Allen et al. (2008), cultural processes ascribe symbolic meanings to foods, which consumers compare to their own beliefs and values. Foods are evaluated more positively when there is congruency between personal values and values symbolized by the food. Indeed, consumers were more favorable towards foods and beverages when their symbolic value matched consumers' personal values and beliefs (Allen et al., 2008). People who strongly value traditional notions of masculinity may thus also strongly value the masculine symbolism of meat, which in turn, can have negative implications for the evaluation and acceptance of meat alternatives and their willingness to reduce meat intake (de Backer et al., 2020). In contrast, those who endorse less traditional notions of masculinity may care less about the masculine symbolism of meat and thus likely consider the perceived masculinity of products (i.e., meat or meat alternatives) less relevant when evaluating products. Therefore, we expected that traditional gender role beliefs would moderate the effect of perceived masculinity of plant-based (vs. regular) meat, such that lower masculinity would predict more negative evaluations especially for those high (vs. low) in traditional gender role beliefs.

3.1.4 The Present Research

In two experiments, we investigated whether and how masculinity perceptions and traditional gender role beliefs distort evaluations of plant-based (vs. regular) meat among omnivores. In Study 1, we used a between-subjects experimental design, presenting participants with photos of food dishes which were either labelled as plant-based meat or regular meat (see also Krings et al., 2022). We tested the following hypotheses:

1) Dishes labelled as plant-based meat will be perceived as less masculine and evaluated as less favorable than dishes labelled as regular meat.
2) Lower masculinity perceptions of plant-based (vs. regular) meat dishes will be associated with less favorable evaluations of plant-based versus regular meat.
3) The association between lower perceived masculinity and less favorable evaluation of plant-based meat dishes (vs. regular meat) will be stronger for those higher (vs. lower) in sexist gender role beliefs.

Study 2 aimed to replicate Study 1 using a within-subjects design while also exploring the perceived masculinity of and bias towards cultured meat.[10]

3.2 Study 1

3.2.1 Method

Participants and Procedure. Participants were 302 adults based in the United States and recruited via Amazon's Mechanical Turk (Buhrmester et al., 2011) who were invited to participate in an online experiment and received $0.50 for their participation. They were told they would be evaluating a range of images and asked questions about their personal beliefs, traits, and attitudes. Given the focus on omnivores' evaluations of plant-based and regular

[10] Both studies received ethics approval from the ethics committee at the researchers' University. In both studies, we tested for outliers (values more than three standard deviations above or below the mean) on all dependent variables and did not detect any outliers.

meat, those who did not identify as meat eaters or flexitarians were excluded from all analyses, resulting in a sample size of 268. Of those, 48.1 % identified as woman and 51.9 % as man, with age ranging from 18 to 80 (M =35.76 years; *SD* = 11.55 years). After providing informed consent, participants were asked to evaluate images of dishes followed by a survey including a measure of traditional gender role beliefs and demographic questions. They were debriefed and thanked upon completion of the survey.

Materials and Design. Participants were all presented with the same six food images in random order. Three images showed dishes made from regular meat from farmed animals (i.e., a regular meat burger, meatballs, and meat tacos), and three images showed parallel dishes with plant-based meat alternatives (i.e., a plant-based burger, meatballs, and tacos), which looked highly similar to regular meat (see Appendix D; Krings et al., 2022). Critically, to test the effect of "regular meat" versus "plant-based meat", while controlling for what was in fact presented in the images, we manipulated how the dishes were labelled and randomly allocated participants to a *meat* or *plant-based* condition. For participants in the meat condition, the six dishes were labelled as regular meat, while for participants in the plant-based condition, the six dishes were labelled as plant-based meat.

For each image, participants were asked to imagine they had the dish in front of them and to evaluate the dishes in terms of appeal (1, *extremely appealing; 7, extremely repulsive),* smell (1, *smells extremely good;* 7, *smells extremely bad),* and taste (1, *tastes extremely good;* 7, *tastes extremely bad*). Participants were also asked how likely they would be to eat the dish (1, *extremely likely;* 7, *extremely unlikely*) if it was offered on a buffet. The four items were averaged across images into a single score with higher scores indicating more favorable evaluations of the dishes (α = .95, *M* = 5.04, *SD* = 1.15).

Participants rated the *masculinity* of the depicted dishes on a 7-point scale ranging from *extremely masculine* to *extremely feminine*. Scores were averaged across images and reversed so that higher scores reflect higher masculinity (α = .79, *M* = 4.39, *SD* = 0.88). We measured *traditional gender role beliefs* using the 22 items of Glick and Fiske's (1996) Ambivalent Sexism Inventory. The Ambivalent Sexism Inventory comprises both hostile (e.g., "Many women are actually seeking special favors, such as hiring policies that favor them over men, under the guise of asking for 'equality'") and benevolent sexism (e.g., *"*A good woman should be set on a pedestal by her man"). Participants indicated their agreement with the statements on 7-point scales (1, *completely disagree; 7, completely agree*). We had no differential predictions for hostile and benevolent sexism and averaged all items into a single sexism score, where higher scores reflect a stronger endorsement of sexist gender role beliefs (α = .93, *M* = 3.55, *SD* = 1.21).

3.2.2 Results

First, to test Hypothesis 1, we investigated the differences in masculinity ratings and evaluations of the dishes in the plant-based compared to the regular meat condition. As expected, a univariate ANOVA confirmed that the dishes in the plant-based meat condition (*M* = 4.27, *SD* = 0.86) were perceived as significantly less masculine than the dishes in the regular meat condition (*M* = 4.50, *SD* = 0.89), $F(1, 266) = 4.33$, $p = .038$, $\eta^2 = .016$). Furthermore, participants evaluated the dishes less favorably in the plant-based meat condition (*M* = 4.84, *SD* = 1.18), than in the regular meat condition, (*M* = 5.23, *SD* = 1.08), $F(1, 266) = 8.84$, $p = .003$, $d = \eta^2 = .032$.

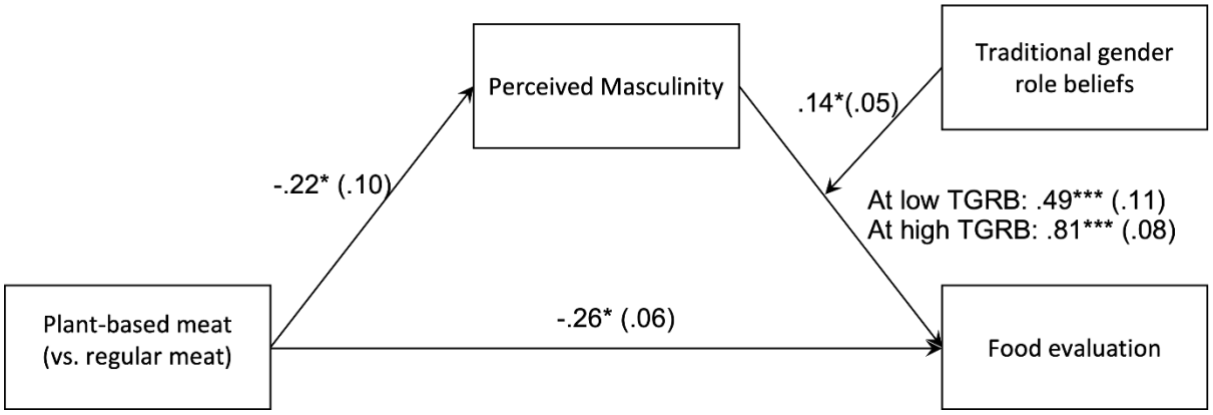
Next, we tested Hypotheses 2 and 3, by testing whether the label effect on perceived masculinity was associated with dish evaluations and whether this association was stronger for participants higher on traditional gender role beliefs. To this end, we tested a moderated mediation model in SPSS (using model 14 in Process; Hayes, 2017) with label condition

(plant-based vs. regular meat) as the predictor of masculinity perceptions, which in turn was associated with dish evaluations. Furthermore, we entered gender role beliefs as a moderator of the association between masculinity perceptions and dish evaluations. Perceived masculinity and gender role beliefs were mean-centered prior to the analysis. Figure 3.1 shows the results of this analysis, which confirmed that lower perceived masculinity of the dishes was significantly associated with less favorable evaluations, b = .65, *s.e.* = .07, $t(263)$ = 9.39, $p < .001$, 95% CI = [.514, .787]. The strength of this association depended on participants' gender role beliefs: We found a significant interaction between perceived masculinity and gender role beliefs, b = .14, *s.e.* = .05, $t(263) = 2.52$, $p = .012$, 95% CI = [.029, .241], such that the association between masculinity and dish evaluation was stronger for participants higher in traditional gender role beliefs, b = .81, *s.e.* = .08, $t(263) = 10.13$, $p < .001$, 95% CI = [.656, .972], than for those lower in traditional gender role beliefs, b = .49, *s.e.* = .11, $t(263) = 4.51$, $p < .001$, 95% CI = [.274, .699]. Furthermore, dish label had a significant indirect effect on dish evaluation through perceived masculinity of the dish, but only for those higher in traditional gender role beliefs, b = -.18, 95% BCI = [-.362, -.012], not among those lower in traditional gender role beliefs, b = -.106, 95% BCI = [-.242, .001].[11]

[11] Traditional gender role beliefs were not significantly associated with dish evaluation, b = -.05, *s.e.* = .05, $t(263) = -0.96$, $p = .336$, 95% CI = [-.142, .048].

Figure 3.1

Results of Moderated Mediation Model in Study 1



Note. TGRB = Traditional gender role beliefs. * $p < .05$, ** $p < .01$, *** $p < .001$.

3.2.3 Discussion

The results of Study 1 demonstrated, in line with Hypothesis 1, that participants showed a clear bias against plant-based dishes: Dishes were evaluated as less masculine and more negatively when labelled as plant-based than as regular meat. Furthermore, lower perceived masculinity of the dishes showed a pronounced association with less favorable dish evaluations of plant-based compared to regular meat dishes, especially among those higher (vs. lower) in traditional gender role beliefs. Critically, all participants saw identical images, demonstrating that vegan meat replacements are perceived as less masculine not because they look different from "real" meat dishes, but simply because they are not made from animal flesh, stripping them of their symbolic masculine status.

3.3 Study 2

The aim of Study 2 was to replicate the results of Study 1 using a within-subjects design, with the same participants evaluating dishes labelled as plant-based as well as dishes labelled as regular meat. Furthermore, we included a third condition to explore the

evaluations of *clean meat*. Clean meat, also known as lab-grown or cultured meat, is meat grown from animal-cells in a cell culture and has been proposed as a possible solution to the problems of excessive global meat consumption (Post, 2012). Although there is a growing body of research on consumer acceptance of clean meat (see Bryant & Barnett, 2018; Krings et al., 2022), no study has investigated whether masculinity perceptions play a role in the acceptance of clean meat. We had two competing expectations. Therefore, On the one hand, because the production of clean meat does not involve the killing of animals, clean meat may be viewed similarly to plant-based meat, with lower masculinity ratings and less favorable evaluations than regular meat. On the other hand, because clean meat consists of actual animal flesh, it might retain the symbolic masculine status of meat and thus receive higher masculinity ratings and more favorable evaluations than plant-based meat, but no marked differences with regular meat.

3.3.1 Method

Participants and Procedure. Participants were 246 undergraduate university students in the UK who participated as part of an experimental demonstration session for course credit. Those who did not self-identify as omnivore or flexitarian were removed from the analyses, resulting in a sample size of 216. Of those, 81.9 % identified as woman, 17.6 % as man, and 0.5% selected "prefer not to say". Participant age ranged from 17 to 19 years (M = 19.09, SD = 1.75). Participants first gave their informed consent and then evaluated nine food images, followed by the completion of a questionnaire that included the measure of gender role beliefs and demographic questions. Afterwards, they were debriefed and thanked.

Materials and Design. Participants were presented with nine images of food, including three images of regular meat dishes, three images of plant-based meat dishes, and three images of clean meat dishes. Similar to Study 1, the dishes included meatballs, burgers, tacos, and fried nuggets (see Appendix D). For all participants, three dishes were labelled as

regular meat, three dishes were labelled as plant-based meat, and three dishes were labelled as clean meat. Critically, to be able to test the effect of dish label ("regular meat" *vs.* "plant-based meat" *vs.* "clean meat"), while controlling for what was in fact shown in the photos, the label assigned to each dish varied across participants. Specifically, the dish labels were counterbalanced across participants such that each dish was presented as regular meat to one third of the participants, as plant-based meat to another third of the participants, and as clean meat to another third of the participants.

The descriptions of regular and plant-based meat were identical to Study 1. The description for clean meat read: *"The food in these pictures is made from clean meat, which is structurally identical to traditional meat but cultured in the laboratory."*

Participants evaluated the perceived masculinity of each dish, as well as their appeal, expected taste and smell, and willingness to eat, using the same items as in Study 1. Gender role beliefs (α = .91, M = 3.20, SD = 1.02) were also measured as in Study 1.

3.3.2 Results

First, to test the effect of dish label, we conducted two repeated-measures ANOVAs with dish label (regular vs. plant-based vs. clean meat) as the independent within-subjects variable, and perceived masculinity and dish evaluation as the dependent variables, respectively (Table 3.1 and Figure 3.2). The first analysis revealed a significant effect of dish label on perceived masculinity of the dishes, $F(2, 214) = 24.43$, $p < .001$, $\eta^2 = .19$. Specifically, dishes labelled as regular meat were perceived as significantly more masculine than dishes labelled as plant-based meat, $F(1, 215) = 48.39$, $p < .001$, $\eta^2 = .18$, and also than dishes labelled as clean meat, $F(1, 215) = 8.17$, $p = .005$, $\eta^2 = .04$. Furthermore, clean meat was perceived as significantly more masculine than plant-based meat, $F(1, 215) = 22.61$, $p < .001$, $\eta^2 = .10$.

The second analysis also revealed a significant effect of dish label on dish evaluation, $F(2, 214) = 27.61$, $p < .001$, $\eta^2 = .21$. Participants evaluated the dishes labelled as plant-based meat and as clean meat significantly less favorably than dishes labelled as regular meat, $F(1, 215) = 46.53$, $p < .001$, $\eta^2 = .18$, and , $F(1, 215) = 32.98$, $p < .001$, $\eta^2 = .13$, respectively. There was no significant difference in dish evaluation between clean meat and plant-based meat, $F(1, 215) = 1.25$, $p = .265$, $\eta^2 = .01$.

Table 3.1

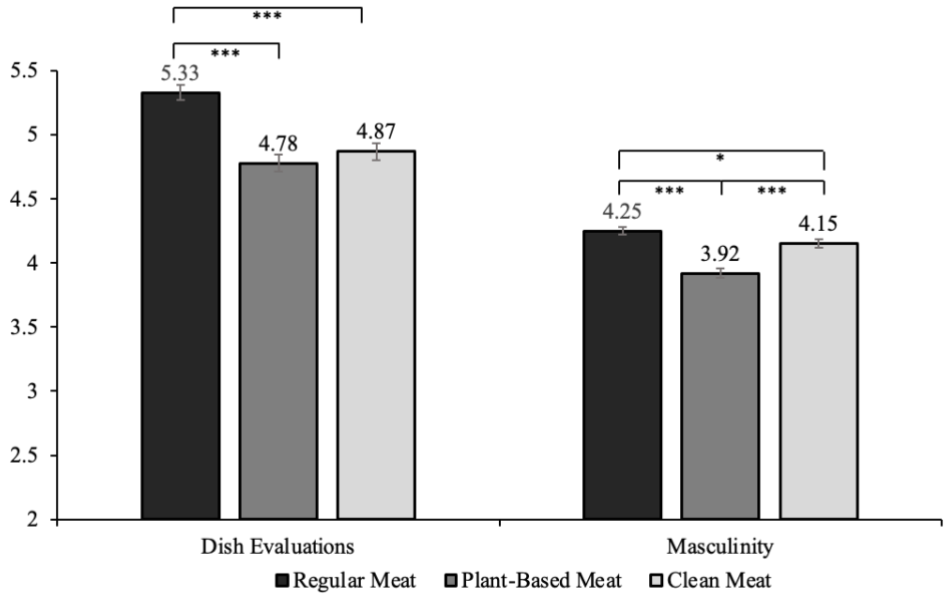
Means and Standard Deviations of Dependent Variables for Each Label Condition in Study 2

	Regular meat			Plant-based meat			Clean meat		
	α	*M*	*SD*	*α*	*M*	*SD*	*α*	*M*	*SD*
Dish evaluations	.87	5.33^a	0.95	.88	4.78^b	0.99	.89	4.87^b	1.04
Masculinity	/	4.25^a	0.48	/	3.92^b	0.57	/	4.15^c	0.53

Note. Means not sharing the same letter are significantly different from each other.

Figure 3.2

Dish Evaluations and Masculinity by Condition in Study 2



Note. Bars show standard errors. * $p < .05$, ** $p < .01$, *** $p < .001$.

Next, we tested the hypothesis stating that labelling dishes as plant-based (vs regular) meat would lead to lower masculinity ratings and, in turn, to less favorable dish evaluations, yet especially among those scoring higher (vs. lower) on traditional gender role beliefs. To test this hypothesis, we followed the analytic approach for moderation and mediation analysis in within-subjects designs proposed by Montoya (2018; Montoya & Hayes, 2017) in Mplus (Version 8, Muthen & Muthen, 1998-2017). In statistical terms, we entered the perceived masculinity of plant-based vs. regular meat dishes (i.e., the mediator), the centered scores of traditional gender role beliefs (i.e., the moderator), and the interaction term between perceived masculinity and sexism (i.e., mediator × moderator interaction), as predictors of dish evaluations of plant-based vs. regular meat dishes (i.e., the dependent variable). We also controlled for the average of perceived masculinity across both conditions (grand mean centered).

In this model, the main effect of perceived masculinity of plant-based (vs. regular) meat dishes was not significantly associated with more positive evaluations of plant-based (vs. regular) meat dishes, β = .02 , *b* = .04, *se* = .13, *p* = .77, 95% CI = [-.217, .293]. More critically, however, we found a significant interaction between traditional gender role beliefs and perceived masculinity on dish evaluations, β = .17, *b* = .25, *se* = .12, *p* = .037, 95% CI = [.011, .485], such that the association between perceived masculinity and dish evaluations was significant for participants higher in traditional gender role beliefs, *b* = .29, *s.e.* = .13, *p* = .027, 95% CI = [.033, .548], but not for those lower in traditional gender role beliefs, *b* =-.21, *s.e.* = .22, *p* = .322, 95% CI = [-.640, .210]. Furthermore, corroborating our hypothesis, the indirect effect of label on dish evaluations via perceived masculinity was significant for participants higher in traditional gender role beliefs, *b* = .10, *s.e.* = .046, *p* = .035, 95% CI = [.007, .185], but not for those lower in traditional gender role beliefs, *b* = -.07, *s.e.* = .07, *p* = .326, 95% CI = [-.213, .071]. In other words, for those higher in traditional gender role beliefs, but not for those lower in traditional gender role beliefs, plant-based (vs. regular) meat received less favorable evaluations partly because the dishes labelled as plant-based were perceived as less masculine than the dishes labelled as regular meat.

Finally, we tested similar models to further explore the effects of plant-based (vs. clean) meat and of clean (vs. regular) meat. The results showed that lower perceived masculinity of plant-based (vs. clean) meat dishes was associated with more negative evaluations of plant-based (vs. clean) meat dishes, *b* = .35, *se* = .14, *p* = .013, 95% CI = [.075, .635], and similarly, that lower perceived masculinity of clean (vs. regular) meat dishes was associated with more negative evaluations of clean (vs. regular) meat dishes, *b* = .35, *se* = .18, *p* = .048, 95% CI = [.004, .706]. These association were, however, not significantly moderated by traditional gender role beliefs, *b* = -.02, *se* = .12, *p* = .854, 95% CI = [-.529, .215] and *b* = -.35, *se* = .18, *p* = .059, 95% CI = [-.711, .014], respectively.

3.3.3 Discussion

Replicating the findings of Study 1, Study 2 demonstrated that participants were biased against plant-based relative to regular meat dishes, and perceived plant-based meat dishes as less masculine and evaluated them less favorably than regular meat. Extending these findings, clean meat was perceived as less masculine than regular meat, but more masculine than plant-based meat, which may indicate that clean meat retains some, but not all, of the symbolic masculine qualities of meat. Despite the higher masculinity ratings for clean meat than for plant-based meat, participants did not evaluate clean meat as significantly more favorable than plant-based meat and as less favorable than regular meat.

3.4 General Discussion

3.4.1 Theoretical Implications

Plant-based meat alternatives could play an integral part in global meat reduction. Their popularity is growing, and new products are developed at a steady rate (e.g., He et al., 2020). Yet, consumers still largely prefer farmed meat over plant-based alternatives (e.g., van Loo et al., 2020). Despite the increased research attention to consumer acceptance of plant-based meat alternatives, the present investigation is the first to test whether consumers are in fact *biased* against plant-based (vs. regular) meat.

The findings of two experiments confirmed that people evaluate an identical image of a meat dish more negatively when labelled as plant-based rather than regular meat. That is, participants attributed less positive sensory qualities, such as taste and smell, to dishes labelled as plant-based meat. Importantly, the results of both studies emerged while counterbalancing which images were labelled as plant-based versus regular meat and were thus independent from whether the image actually showed a regular or plant-based meat dish. Hence, the mere association with veganism seems to evoke lower expectations of sensory qualities and lower intentions to try the product. This is plausible given the societal stigma

associated with plant-based diets (e.g., MacInnis & Hodson, 2017), and significant given the crucial role sensory aspects play in the acceptance of plant-based meat alternatives (e.g., Hoek et al., 2011). Biased perceptions of sensory qualities might thus in part explain why consumers show a low preference for plant-based meat alternatives, even though food technology has allowed them to look and taste highly similar to farmed meat (He et al., 2020). Thus, our findings indicate that developing products that are highly similar to regular meat might not be sufficient to promote meat reduction and plant-based diets as long as a majority of consumers hold negative attitudes towards plant-based diets.

Critically, we investigated perceived masculinity as a potential explanatory factor for the relatively lower appeal of plant-based meats. In Western diets, meat products have long been associated with masculinity, strength, and dominance (Adams, 2015; Rothgerber, 2013; Rozin et al., 2012; Sobal, 2005), which is in part attributed to the fact that meat production requires dominance over and violent acts towards animals (Lupton, 1996). In line with the hypothesis that plant-based alternatives lack the valued masculine status of meat, participants evaluated identical dishes as significantly less masculine if they were labelled as plant-based meat than if they were labelled as regular meat. These lower masculinity perceptions of plant-based meat were further associated with less favorable (i.e., more biased) evaluations of plant-based (vs. regular) meat. Moreover, the association between perceived masculinity and dish evaluations was especially pronounced for participants who endorse traditional gender role beliefs more strongly, whereas this association was weaker (Study 1) or not significant (Study 2) for participants lower on traditional gender role beliefs.

3.4.2 Perceptions and Evaluations of Clean Meat

We also explored participants' attitudes towards clean meat. Rather than being produced through slaughtering animals, cultured meat is grown from animal cells in a culture medium (Post, 2012). Theoretically, clean meat drastically reduces the need for the use of

animals in meat production (e.g., Hopkins & Dacey, 2008). Clean meat might also be safer to consume than regular meat and could potentially reduce the negative environmental impact of meat production, but research investigating this is inconclusive (Chriki & Hocquette, 2020). A major problem of clean meat is consumer acceptance. Overall, consumers seem willing to try clean meat, but are unlikely to regularly substitute regular meat with it (see Bryant & Barnett, 2018). Given that the main focus of our studies was on masculinity perceptions of plant-based (vs. regular) meat, we also explored masculinity perceptions of clean meat and found that participants perceived clean meat to be more masculine than plant-based meat, but less masculine than regular meat. Nevertheless, they significantly preferred regular meat over clean meat, and showed no preference between plant-based and clean meat. It seems likely that other factors, beyond the scope of the current research, are more important when it comes to the acceptance or rejection of clean meat. For example, common concerns about clean meat are its perceived safety because of the use of new food technologies (Krings et al., 2022) and its perceived "unnaturalness" (e.g., Bekker et al., 2017; Laestadius, 2015; Marcu et al., 2015). Thus, participants in our studies rejected clean meat to the same extent as plant-based meat, but likely for different reasons.

3.4.3 Implications for Practice

Our results offer insights that can aid the marketing of meat alternatives. For instance, the appearance of meat substitutes can be manipulated to make them look more masculine. Several meat alternatives are already presented in ways that appeal to traditional masculinity. The Impossible Burger™, for example, contains iron heme, which mimics the bloody appearance of a raw beef burger. The present research, however, suggests that simply making plant-based meat replacers *look* more masculine might not be sufficient. In our studies, even when the product depicted consisted of regular meat, the mere fact that we labelled it as

plant-based meat led participants to rate it as less masculine and less appealing than an identical product labelled as regular meat.

Other avenues include framing marketing campaigns in ways that emphasize male ideals of autonomy and self-reliance, encouraging men to think for themselves rather than blindly following societal expectations (Rothgerber, 2013). Marketers could also emphasize characteristics of products that likely appeal to men. Beyond Meat™ for example launched the "Beast Burger", the packaging of shows prominently the promise of "23 grams of plant protein". Studies investigating the effectiveness of such advertising are currently lacking, but the products' perceived masculinity could be of critical importance.

3.4.4 Limitations and Directions for Future Research

Our findings overall support our predictions, using controlled experimental methodology and samples from two national contexts. Nevertheless, several limitations should be noted. Firstly, we measured perceived masculinity instead of manipulating it. Therefore, we cannot conclude that masculinity has a causal effect on the evaluation of plant-based meat alternatives. Future studies could try to directly manipulate the masculinity of plant-based meat alternatives.

Further, it is possible that participants have tried, and not enjoyed, plant-based meat products in the past. These past negative experiences may have influenced dish evaluations. Future research could take wider range of variables into account, including participants' familiarity with plant-based products, their frequency of meat consumption, and how much they are attached to eating meat (Graça et al., 2015). Participants could also try and evaluate plant-based meat dishes, with randomized labels (plant-based vs. regular meat), which would provide an even more robust test of our hypotheses.

3.4.5 Conclusion

The level of global meat consumption is unsustainable, and a transition to more plant-based diets is an integral factor in combatting climate change. There is reason for optimism, as plant-based diets are becoming increasingly socially accepted and thus hold potential to facilitate global meat reduction. However, anti-vegan attitudes and traditional gender role ideals, along with the belief that "meat is manly", are complicating efforts to promote meat substitution. While the development of food technologies that allow meat alternatives to become more and more similar to their meat counterparts is certainly important in order to promote plant-based meat alternatives, it needs to happen alongside interventions to combat anti-vegan stigma and the symbolic masculine status of meat.

Besides being associated with bias towards vegan meat alternatives, the meat-masculinity association also has implications for people's perceptions of vegetarian or vegan men. For instance, several studies showed that men who follow a vegetarian or plant-based diet are perceived as less masculine than omnivorous men (Ruby & Heine, 2011). In Chapter 4, we investigate how the perception that vegan and vegetarian men lack masculinity is related to biased attitudes towards them.

Chapter 4: Not Man Enough - Gender Role Beliefs, Masculinity, and Anti-Veg*n Bias[12]

4.1 Introduction

Gender role expectations prescribe how men and women should behave in myriad aspects of their lives, determining even what they should eat. A prominent example is the idea that "real men eat meat", which is prevalent in pop culture, advertising, and public discourse (e.g., Buerkle, 2009; Rogers, 2008; Rothgerber, 2013). Feminist theorists have also long proposed that meat symbolizes the ideals of dominance, strength, and virility that lie at the core of Western notions of traditional masculinity (Adams, 2015; MacKinnon, 2004). In recent years, these ideas have increasingly been the subject of psychological research, with overwhelming empirical support for the meat-masculinity link (e.g., Cavazza et al., 2015a, 2015b; Love & Sulikowski, 2018; Rozin et al., 2012). However, the question of how the belief that meat is manly is also reflected in people's biases towards those who abstain from meat consumption (i.e., vegetarian and vegans, henceforth referred to as veg*ns) has received little attention. Moreover, the role of individual differences in gender role beliefs in the perception of veg*ns has been largely neglected. The present investigation tests directly how masculinity perceptions and gender role beliefs may distort people's evaluations of veg*ns.

4.1.1 Meat and Masculinity

For early humans, meat was highly valued and consumed to gain strength and health, but difficult to find and only enjoyed on rare occasions (Bunn, 1981; Milton, 1999; Smil, 2002). Given that hunting was largely a male domain, men's ability to provide meat likely granted them status and dominance (Chan & Zlatevska, 2019). Further, the supply and processing of meat requires violent and aggressive actions, inherent to the slaughtering and butchering of animals (see also Lupton, 1996). These factors likely contributed to the

[12] The work presented in this chapter was carried out in collaboration with Kristof Dhont and Nadira Faber.

symbolic value of meat representing status, dominance, and masculinity (Adams, 2015; Allen & Baines, 2002). The association between meat and masculinity has become culturally ingrained in many societies and manifests itself, for example, in food commercials (Buerkle, 2009; Rogers, 2008). A British McDonalds poster advert from 2015, for example, shows a picture of a sausage and bacon sandwich under the slogan "Sausageness, baconness, manliness" (Adams, 2020).

There is also a growing body of empirical evidence demonstrating the meat-masculinity link. A comprehensive investigation by Rozin et al. (2012) found that people implicitly and explicitly associate meat more with maleness than femaleness, and rate meat-related words as more masculine than feminine. Other studies showed that people also associate meat with power, virility, and health (Bogueva & Marinova, 2018; Love & Sulikowski, 2018), and that meat-based dishes are perceived as more masculine than vegetarian dishes (Cavazza et al., 2015a, 2015b). Furthermore, in languages that use gendered nouns, "meat" is more often a masculine noun than a feminine noun (Rozin et al., 2012). Taken together, meat is manly in people's explicit and implicit impressions, their use of language, and in popular media.

The meat-masculinity link is also manifested in the difference between men and women's consumption patterns. Men tend to consume meat more often, consume larger portions of meat, show stronger attachment to meat than women, and are less likely to follow a veg*n diet than women (Gal & Wilkie, 2010; Graça et al., 2015; Keller & Siegrist, 2015; Pfeiler & Egloff, 2018; Rosenfeld, 2018; Ruby, 2012; Schösler et al., 2015). Given that, in social situations, people actively use their food choices for impression management (Herman et al., 2003; Vartanian, 2015) and to affirm their gender identity (e.g., Robinson et al., 2011), men likely also use meat consumption as a strategy to demonstrate masculinity. Indeed, in an imagined dining situation with a female partner, men who more strongly associated

vegetarianism with femininity were more likely to choose a meat dish for themselves and a vegetarian dish for their partner (Timeo & Suitner, 2018). These findings indicate that men consume meat in part to feel and appear like "real men".

Given the gendered nature of meat consumption, people also make inferences about others' masculinity based on their diet. Indeed, people view both men and women who consume "feminine" foods as more feminine than those who consume "masculine" foods (Chaiken & Pliner, 1987; Mooney & Lorenz, 1997; Mori et al., 1987; Steim & Nemeroff, 1995). With meat perhaps being perceived as the quintessential masculine food, men refraining from consuming meat should be perceived as less masculine than their meat-eating counterparts. Indeed, an otherwise identical male target person was perceived as less masculine when following a vegan diet as opposed to an omnivorous diet (Ruby & Heine, 2011; Thomas, 2016). Arguably, eating meat is one of the many behaviors necessary for men to be viewed as "real men", and choosing to eschew it strips men of their masculinity (see also Adams, 2015; Rothgerber, 2013; Twigg, 1983). Violating gender role expectations in this way likely comes with aversive consequences for veg*n men. As Carol Adams (2015, p. 138) puts it: "Men who become vegetarians challenge an essential part of the masculine role. They are opting for women's food. How dare they?".

*4.1.2 Gender Role Violations and Anti-Veg*n Bias*

According to Social Role Theory, men and women hold different roles in society. Men's roles are more strongly associated with status and power than women's roles, which are more strongly associated with domestic duties (Eagly & Wood, 1999). Those who do not adhere to these gender role expectations are often subject to bias and prejudice (e.g., Blakemore, 2003; Blashill & Powlishta, 2009). This is particularly true for men, who face harsher reactions to gender role violations than women (David et al., 2004; Prentice & Carranza, 2002).

Arguably, veg*nism constitutes a gender role violation for men, rendering them easy targets of anti-vegan prejudice. For instance, men are often confronted with gendered mockery when switching to a veg*n diet (Nath, 2011) and, although anti-veg*n prejudice exists against both veg*n men and women, veg*n men are disliked more than veg*n women (MacInnis & Hodson, 2017). Women also tend to evaluate vegetarian men as less attractive than omnivorous men, in part because they perceive them as less masculine than omnivorous men (Timeo & Suitner, 2018). Along similar lines, qualitative research revealed that men report feeling anger, resentment, and even hatred towards vegetarian men, often as a direct consequence of them ostensibly losing their masculine status. One participant suggested that vegetarian men "[s]hould be prosecuted for their unmanly behavior", while another called them a "[…] huge disappointment for the rest of the real masculine men" (Bogueva et al., 2020, p. 36). These findings support the idea that veg*n men (relative to omnivorous men) are perceived as less masculine, which in turn is associated with more negative attitudes towards them. However, no published studies have directly tested this idea. Integrating the findings on the meat-masculinity link with the literature on anti-veg*n bias, the current studies move beyond previous research by providing a direct test of the association between masculinity perceptions and attitudes towards veg*n men. Moreover, we expected that the extent to which people endorse gender role beliefs affects how strongly masculinity perceptions are associated with anti-vegan attitudes.

Theoretically, those who hold more egalitarian gender role beliefs should be more lenient towards gender role transgressions, whereas those with more traditional gender role beliefs judge gender role violations more harshly (Deutsch & Saxon, 1998). Supporting this idea, Gaunt (2013) found that those endorsing traditional gender role beliefs rate women and men who conform to gender expectations (i.e., female breadwinners and male homemakers) more positively than non-conforming men and women, while the opposite pattern emerged

for those endorsing egalitarian gender role beliefs. Similarly, traditional gender role beliefs predict negative attitudes towards men who appear to be violating hetero-normative masculine norms, including towards veg*n men (e.g., MacInnis & Hodson, 2015, 2017). However, it is presently unclear how gender role beliefs interact with masculinity perceptions of veg*n men in predicting bias towards veg*n men.

4.1.3 The Present Research

We conducted three studies with heterogeneous samples of omnivores based in the UK to systematically investigate the roles of masculinity perceptions and gender role beliefs in people's biases towards veg*n men. First, we conducted a survey study (Study 1) to test the associations between masculinity perceptions of veg*n men and attitudes towards them, as well as the moderating role of gender role beliefs. Then, we conducted two preregistered experiments, manipulating the diet of a male target person in a vignette study (Study 2) and a simulated online interaction (Study 3) to provide causal evidence that dietary habits (meat vs. vegan) impact people's perceptions of masculinity and attitudes towards male vegans. Furthermore, we tested the moderating role of gender role beliefs and tested the effects for a wider range of evaluative measures, including measures of perceived warmth, social avoidance, and discrimination intentions. In Study 3, we also manipulated the vegan targets' motivation for following a vegan diet and explored the role of perceived empathy of vegan vs. omnivorous men.

We expected that people who perceive veg*n men to be less masculine would hold more negative attitudes towards them and that veg*n men would be perceived as less masculine and evaluated more negatively than omnivorous men. Critically, we hypothesized an interaction effect between masculinity perceptions and gender role beliefs on attitudes towards veg*n men such that especially among those holding more traditional gender role beliefs, perceiving veg*n men as less masculine would be associated with more negative

attitudes towards them, while this association should be weaker among those holding less traditional gender role beliefs.[13]

4.2 Study 1

The aim of Study 1 was to test a) whether lower levels of perceived masculinity of veg*n men are related to more negative attitudes towards them and b) whether this association is stronger for those higher (vs. lower) in traditional gender role beliefs. Given that we theorized that a veg*n diet violates traditional gender roles for men, but not for women, perceived masculinity of veg*n women was not expected to be associated with negative attitudes towards them.

4.2.1 Method

Participants and Procedure. A community sample of 655 participants was recruited by four undergraduate students in the UK through different social media channels. As we were interested in the attitudes of meat eaters towards vegetarians and vegans, we excluded those who did not identify as omnivores or flexitarians from the analysis, resulting in a final sample size of 455. Of those, 74.1% identified as woman, 25 % as man, 0.7 % as another gender, and 0.2 % selected "prefer not to say". Participant age ranged from 18 to 83 years with a mean age of 37.47 years (*SD* = 17.07). Sensitivity power analysis in G*Power confirmed that this sample was sufficient in order to detect a small interaction effect between perceived masculinity of male veg*ns and participants' gender role beliefs (f^2 >= .02) with 95% power.

After giving their informed consent, participants completed a larger online survey, which included the scales of interest. At the end of the survey, participants were debriefed and thanked.

[13] All studies received ethics approval from the ethics committee at the researchers' University.

Measures. *Perceived masculinity of veg*n men and women* was measured by asking participants to rate the masculinity of nine different social groups, including vegetarian men, vegan men, vegetarian women, and vegan women, on a 7-point scale ranging from *extremely feminine* to *extremely masculine*. The ratings of vegetarian and vegan men were averaged into a single score of perceived masculinity of veg*n men, while the ratings of vegetarian and vegan women were averaged into a score of perceived masculinity of veg*n women (α = .93, *M* = 4.36, *SD* = 1.17 and α = .91, *M* = 3.17, *SD* = 1.06, respectively).

*Negative attitudes towards veg*n men and women* were measured using visual thermometer scales based on MacInnis and Hodson (2017). Participants indicated how warm or favorable vs. cold or unfavorable they felt towards nine different social groups, including vegetarian men, vegan men, vegetarian women, and vegan women on 10-point thermometer scales. The scores were reversed and averaged into a single score for veg*n men (α = .92, *M* = 3.89, *SD* = 2.55) and veg*n women (α = .91, *M* = 3.72, *SD* = 2.50), respectively, so that higher scores represent more negative attitudes towards veg*n men and women.

Gender role beliefs were measured using the 22 items of Glick and Fiske's (1996) Ambivalent Sexism Inventory, which measures both hostile (e.g., "Many women are actually seeking special favors, such as hiring policies that favor them over men, under the guise of asking for 'equality'") and benevolent sexism (e.g., "A good woman should be set on a pedestal by her man"). Participants indicated their agreement with the statements on 7-point scales anchored by *completely disagree* and *completely agree*. Since we had no separate predictions for hostile and benevolent sexism, we averaged all items into a single score with higher scores reflecting a stronger endorsement of traditional gender role beliefs (α = .89, *M* = 3.11, *SD* = 0.94).[14]

[14] In all studies, we tested for outliers (values more than three standard deviations above or below the mean) on all dependent variables and did not detect any outliers.

4.2.2 Results and Discussion

Zero-order Correlations. Table 4.1 shows the zero-order correlations between the variables of interest. Confirming our expectation, perceived masculinity of veg*n men was correlated with more negative attitudes towards them. Masculinity perceptions of veg*n women were, however, not significantly associated with attitudes towards them. Furthermore, more traditional gender role beliefs were significantly correlated with more negative attitudes towards both veg*n men and veg*n women.

Table 4.1

Zero-order Correlations between Variables in Study 1

	1	2	3	4	5
1. Masculinity of veg*n men	/	-.53***	-.23***	-.17***	-.09
2. Masculinity of veg*n women		/	-.01	-.02	-.05
3. Negative attitudes towards veg*n men			/	.93***	.23***
4. Negative attitudes towards veg*n women				/	.21***
5. Traditional gender role beliefs					/

Note. * $p < .05$, ** $p < .01$, *** $p < .001$.

Moderation Analysis. To test our main hypothesis that the relationship between perceived masculinity and negative attitudes towards veg*n men would be stronger for those with more (vs. less) traditional gender role beliefs, we conducted a regression analysis. The centred scores of perceived masculinity of veg*n men and gender role beliefs, as well as their interaction term, were entered as predictors of attitudes towards veg*n men. The results showed that lower perceived masculinity was associated with more negative attitudes towards

veg*n men, *b* = -.41, *s.e.* = .10, *t*(451) = -4.16, *p* < .001, 95% confidence interval (CI) = [-.611, -.219]. Further, more traditional gender role beliefs were associated with more negative attitudes, *b* = .54, *s.e.* = .12, *t*(451) = 4.45, *p* < .001, 95% CI = [.305, .785].

More importantly, as presented in Figure 4.1, the interaction between perceived masculinity and gender role beliefs was significant, *b* = -.20, *s.e.* = .09, *t*(451) = -2.13, *p* = .034, 95% CI = [-.386, -.015]. Corroborating our hypothesis, perceived masculinity predicted negative attitudes at high levels of traditional gender role beliefs (mean +1SD, *b* = -.60, *s.e.* = .12, *t*(451) = -5.00, *p* < .001, 95% CI = [-.840, -.366]), but not at low levels of traditional gender role beliefs (mean -1SD, *b* = -.23, *s.e.* = .15, *t*(451) = -1.56, *p* = .120, 95% CI = [-.523, .059]).

Next, we conducted the same analysis to test the interaction between perceived masculinity of veg*n women and gender role beliefs on attitudes towards veg*n women. This analysis yielded a significant main effect of traditional gender role beliefs, *b* = .54, *s.e.* = .12, *t*(451) = 4.39, *p* < .001, 95% CI = [.297, .779], but neither perceived masculinity of veg*n women nor the interaction with gender role beliefs were significant predictors, *b* = -.04, *s.e.* = .11, *t*(451) = -0.37, *p* = .709, 95% CI = [-.256, .174] and *b* = .11, *s.e.* = .11, *t*(451) = 1.06, *p* = .288, 95% CI = [-.096, .323], respectively.[15]

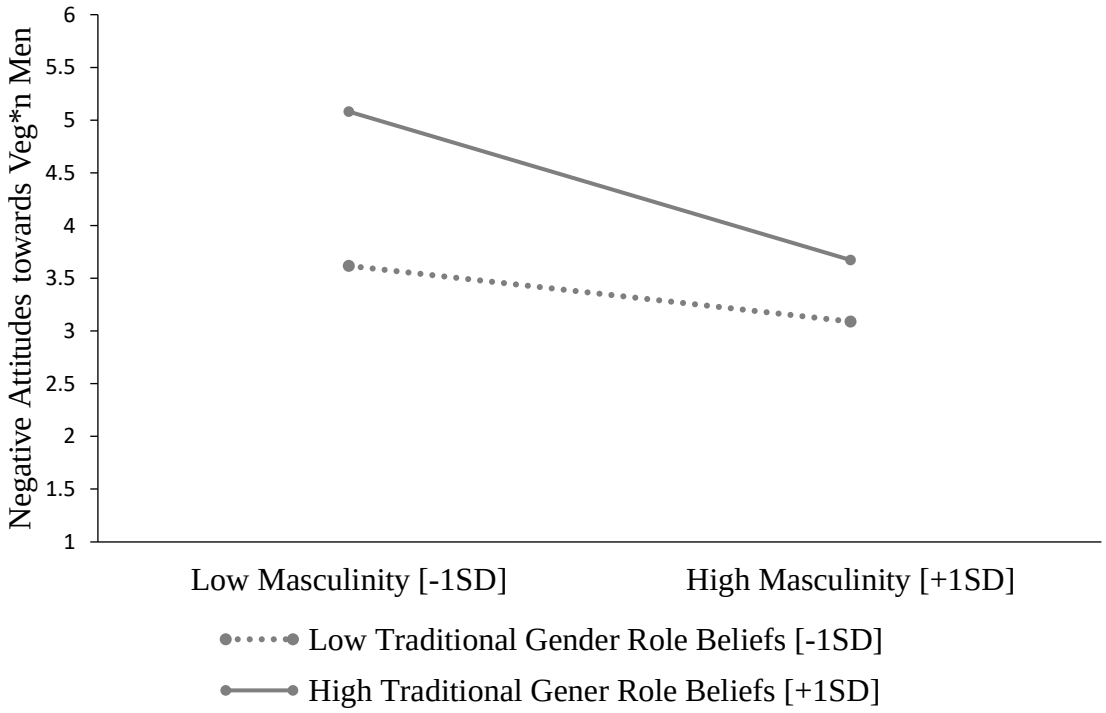
The results of Study 1 confirmed our moderation hypothesis by demonstrating that lower perceived masculinity of veg*n men was significantly associated with more negative attitudes towards them, but only among those holding more (vs. less) traditional gender role beliefs. In other words, Study 1 provides supportive evidence for the idea that especially those endorsing traditional gender role beliefs show greater bias against men who violate the

[15] We also tested whether any of the associations were moderated by participant gender and found no significant interaction effects (all *ps* >= .584).

traditional masculine gender stereotype that ‘real’ men eat meat. Further in line with this idea, we did not find such pattern of results when focusing on attitudes towards veg*n women.

Figure 4.1

*Negative Attitudes towards Veg*n Men as a Function of Perceived Masculinity and Traditional Gender Role Beliefs (Study 1)*



4.3 Study 2

Study 1 focused on attitudes towards veg*n men and did not allow for a direct comparison with attitudes towards omnivorous men. Therefore, in Study 2, we used an experimental design to test the causal effect of diet on perceived masculinity of vegan men and negative attitudes towards vegan men, relative to omnivorous men. Specifically, we experimentally manipulated the diet of a male target person described in a vignette by presenting the target as either a vegan or an omnivore. Furthermore, we measured bias towards vegan men with a wider range of measures by including measures of perceived warmth, social avoidance, and discrimination intentions. We preregistered our methods and hypotheses on the Open Science Framework (https://osf.io/9fsqy).

4.3.1 Method

Participants. In order to determine the required sample size, we conducted Monte Carlo simulations in Mplus (Thoemmes et al., 2010). The simulation revealed that a sample size of $N = 110$ participants yielded 95% power (Giner-Sorolla et al., 2020) to detect a small indirect effect ($R = .02$) of the manipulation on attitudes through perceived masculinity. Because we expected that the association between perceived masculinity and attitudes would be moderated by gender role beliefs, we doubled this sample size in order to detect the interaction effect (Giner-Sorolla et al., 2020), resulting in a suggested sample size of $N = 220$. To allow for the removal of participants based on our exclusion criteria, we recruited 251 participants based in the UK on Prolific. Thirty-four participants were removed from the analyses because they reported a diet other than omnivorous or flexitarian or failed the manipulation check, resulting in a final sample size of $N = 217$. Of those, 50.2% identified as woman, 47.5% as man, 1.4% as gender-queer, gender-non-conforming, non-binary, or other, and 0.3% selected "prefer not to say". Participant age ranged from 18 to 65 years, with a mean age of 31.67 years ($SD = 10.79$).

Materials. We manipulated the diet of the target (omnivorous *vs.* vegan) in a between-subjects design using vignettes based on Ruby and Heine (2011). The vignettes described a fictitious person called Jacob and were identical except for Jacob's diet. He was either described as an omnivore or as a vegan, and the examples of foods he eats regularly either included animal products or not, respectively. The vignette for the omnivorous condition read:

> "Jacob enjoys going to the movies, attending concerts for any type of music, and hiking in his spare time. He is average height and college educated. He follows a varied omnivorous diet, eating a broad range of fruits, vegetables, whole grains, dairy, eggs, meat, and fish. He usually cooks for himself."

In the vegan condition, the third sentence was changed to "He follows a varied vegan diet, eating a broad range of fruits, vegetables, whole grains, nuts, and beans (but no meat, fish, dairy, or eggs)".

Perceived masculinity of the target was measured with two items. Participants rated how masculine and feminine they perceived Jacob to be on 7-point scales anchored by *not masculine at all / not feminine at all* and *very masculine / very feminine*. The femininity score was reversed, and the two items were averaged into a single masculinity score ($\alpha = .66$, $M = 4.69$, $SD = 0.99$).

We measured *attitudes towards the target* with three measures following MacInnis and Hodson (2017). *Perceived warmth* was measured with a 10-point visual thermometer scale, on which participants indicated how *cold / unfavorable* or *warm / favorable* they felt towards Jacob. The scores were reversed so that higher scores reflect a more unfavorable impression of Jacob ($M = 4.49$, $SD = 1.88$). We measured participants' *social avoidance* of the target ($\alpha = .81$, $M = 2.82$, $SD = 1.23$) with four items. Participants indicated on 7-point scales how open they would be to interacting with or forming relationships with Jacob (*not at all* to *very much so*). An example item is: "How open would you be to becoming friends with Jacob?". Scores were reversed so that higher scores reflect higher social avoidance. Participants' *discrimination intentions* towards the target ($\alpha = .89$, $M = 2.13$, $SD = 1.03$) were measured with two items. Participants indicated on a 7-point scale how comfortable they would feel to rent to Jacob if they were a landlord, or to hire Jacob if they were an employer (*not at all* to *very much so*). Scores were reversed so that higher scores reflect stronger discrimination intentions.

We measured gender role beliefs with the same scale as in Study 1 ($\alpha = .93$, $M = 3.27$, $SD = 1.13$).

Procedure. Participants were invited on Prolific to participate in an online study about impressions of people. They gave their informed consent before being randomly allocated to either the vegan target condition or the omnivorous target condition. They were then presented with the vignette and instructed to read it carefully. Participants were only able to continue to the next page after 20 seconds to ensure they took the time to read the vignette. Afterwards, they were asked three questions about the content of the vignette, two of which were distractors, and one was the manipulation check, asking about the diet of the target (*a varied omnivorous diet / a varied vegan diet / a varied low-carb diet*). Following our preregistration, participants who failed this manipulation check were excluded from all analyses.

Next, participants evaluated the masculinity of Jacob, and completed the three attitude measures, followed by demographic questions. Finally, participants were debriefed, thanked, and paid £0.70 as compensation.

4.3.2 Results and Discussion

To test whether perceived masculinity of the target and attitudes towards the target differed between condition (vegan vs. omnivorous target), we conducted univariate analyses of variance (ANOVAs), entering perceived masculinity and the attitude measures as the dependent variables. Confirming our hypotheses, the results (see Table 4.2) showed that the vegan target was perceived as significantly less masculine than the omnivorous target, $F(1, 215) = 10.44$, $p = .001$, $\eta^2 = .046$. Also as expected, participants expressed significantly more negative attitudes towards the vegan target than towards the omnivorous target, $F(1, 215) = 19.85$, $p < .001$, $\eta^2 = .085$, and participants were more inclined to socially avoid the vegan target than the omnivorous target, $F(1, 215) = 25.63$, $p < .001$, $\eta^2 = .107$. Discrimination intentions did not differ significantly between conditions, $F(1, 215) = 1.80$, $p = .181$, $\eta^2 = .008$.

Table 4.2

Means and Standard Deviations by Condition in Study 2

	Omnivorous condition (N = 107)		Vegan condition (N = 110)	
	M	*SD*	*M*	*SD*
Negative attitudes	3.93[a]	1.54	5.03[b]	2.03
Social avoidance	2.42[a]	1.05	3.27[b]	1.40
Discrimination intentions	2.00[a]	0.92	2.19[a]	1.11
Masculinity	4.90[a]	0.97	4.48[b]	0.96

Note. Means not sharing the same letter indicate significant differences between conditions.

Next, we tested the moderation hypothesis stating that the differential masculinity perceptions of the vegan and omnivorous target would be associated with differential attitudes and social avoidance towards the target, yet especially so among those holding more traditional (vs. less traditional) gender role beliefs. Statistically, this means we conducted two analyses (using Process, Model 14; Hayes, 2017) to test the effect of diet on a) negative attitudes and b) social avoidance as the dependent variables. Perceived masculinity was included as the mediator of these associations while gender role beliefs were entered as the moderator of the association between perceived masculinity and negative attitudes as well as between perceived masculinity and social avoidance (i.e., second stage moderated mediation model). In both models, gender role beliefs and perceived masculinity were mean-centered prior to the analysis.

Corroborating our hypothesis, and as shown in Figure 4.2, these analyses yielded a significant interaction effect between perceived masculinity and gender role beliefs on both

negative attitudes, *b* = -.22, *s.e.* = .09, *t*(212) = -2.27, *p* = .024, 95% CI = [-.408, -.029]), and social avoidance, *b* = -.14, *s.e.* = .07, *t*(212) = -2.11, *p* = .035, 95% CI = [-.280, -.010]. Specifically, lower perceived masculinity showed a stronger association with more unfavorable attitudes at higher levels of traditional gender role beliefs, *b* = -.87, *s.e.* = .13, *t*(212) = -6.45, *p* < .001, 95% CI = [-1.132, -.601], than at lower levels of traditional gender role beliefs, *b* = -.37, *s.e.* = .18, t(212) = -2.06, *p* = .040, 95% CI = [-.733, -.017]. Along similar lines, perceived masculinity was significantly associated with higher social avoidance, but only at high levels of traditional gender role beliefs, *b* = -.53, *s.e.* = .10, *t*(212) = -5.56, *p* < .001, 95% CI = [-.720, -.344], not at low levels of traditional gender role beliefs, *b* = -.21, *s.e.* = .13, *t*(212) = -1.59, *p* = .112, 95% CI = [-.460, .049].

Furthermore, diet of the target had a significant indirect effect on negative attitudes through perceived masculinity, but only at high levels of traditional gender role beliefs, *b* = .37, *s.e.* = .13, 95% BCI = [.137, .638], not at low levels of traditional gender role beliefs, *b* = .16, *s.e.* = .11, 95% BCI = [-.020, .409]. Along similar lines, diet of the target had a significant indirect effect on social avoidance through perceived masculinity at high levels of traditional gender role beliefs, *b* = .23, *s.e.* = .08, 95% BCI = [.082, .390], but not at low levels of traditional gender role beliefs, *b* = .09, *s.e.* = .07, 95% BCI = [-.039, .251].[16]

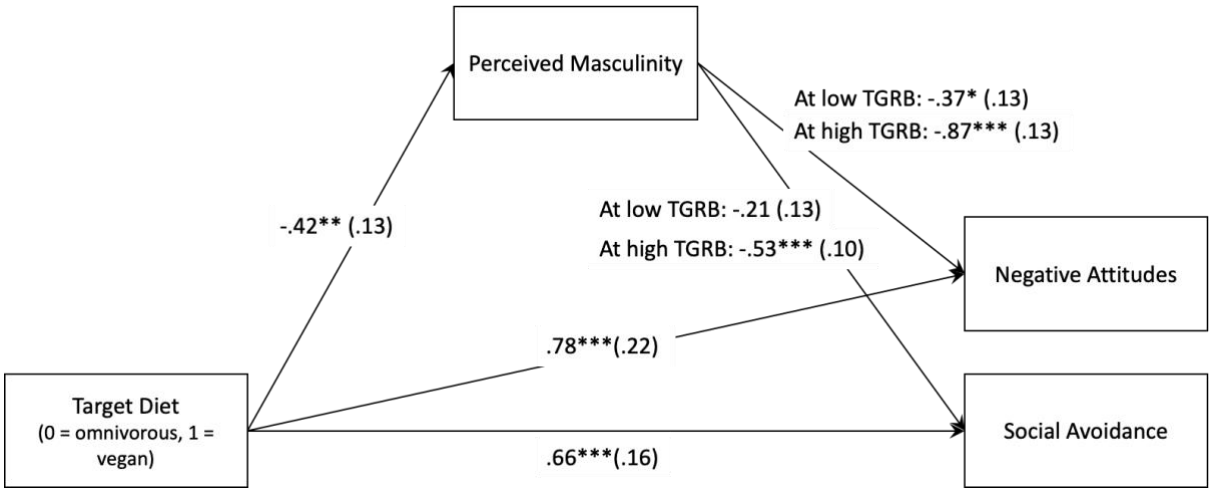
Confirming our expectations, an identical male target was evaluated as less masculine and more negatively when described as being vegan than when described as being omnivore, and participants were less inclined to make friends or socialize with him. Moreover, corroborating our moderation hypothesis, particularly among those holding more traditional gender role beliefs, lower perceived masculinity was associated with more negative attitudes

[16] We also tested whether any of the associations were moderated by participant gender and found no significant interaction effects (all *ps* >= .246).

towards and greater social avoidance of the vegan target relative to the omnivorous target. It should be noted that discrimination intentions did not differ between conditions. While participants were less inclined to socialize with the vegan target, they did not express lower intentions to hire him or rent to him, possibly due to stereotypes about veg*ns as conscientious and well-educated (see also MacInnis & Hodson, 2017).

Figure 4.2

Results of Moderated Mediation Models in Study 2



Note. Figure shows the results of the two moderated mediation models in Study 2 and includes both outcome variables (negative attitudes and social avoidance). TGRB = Traditional Gender Role Beliefs. * $p < .05$, ** $p < .01$, *** $p < .001$.

4.4 Study 3

The aim of Study 3 was threefold. First and foremost, we tested whether the effects of Study 2 replicate beyond fictional characters and apply to interactions with (ostensibly) real people. Secondly, we explored whether the perception of vegan men depends on the motivation for their vegan diet by manipulating the vegan targets' motivations for being vegan. Veg*ns who cite concern for animals as their motivation tend to be disliked more than those who cite health or environmental reasons (MacInnis & Hodson, 2017). This might be

particularly true for men, for whom concern for animals violates gender roles of toughness and dominance, and who therefore may be perceived as particularly lacking in masculinity. Thirdly, we explored the role of perceived empathy. Presumably, veg*ns are perceived as more empathetic than omnivores given that veg*nism signals moral concern for animals and the environment. Indeed, in one study, vegetarian targets were perceived to be more virtuous than omnivorous targets (Ruby & Heine, 2011). We were interested in how perceived empathy relates to evaluations of male vegans.

We conducted a pre-registered between-subjects experiment (https://osf.io/nfp8e/?view_only=d54ea622e830436aae566ce8df0acc75) with three conditions. Participants were ostensibly interacting with another participant who either introduced himself as an omnivore (control condition), as a vegan motivated by concern about climate change (environmental vegan condition), or as a vegan motivated by concern for animals (animal vegan condition). We expected that the vegan targets would be perceived as less masculine and in turn evaluated more negatively than the omnivorous target, in line with the results of Study 2. We also expected that the association between masculinity and evaluation of the target would be particularly strong for participants higher (vs. lower) in traditional gender role beliefs. Furthermore, we tested whether the animal vegan would be perceived as less masculine and in turn evaluated more negatively than the environmental vegan.

Finally, with regards to the role of perceived empathy and compassion, we had opposing expectations. Recent work indicated that omnivores have ambivalent views about vegans in general, perceiving them negatively as annoying and moralistic and therefore as less sociable, but also positively as caring and moral and therefore as more sociable (de Groeve et al., 2021). Based on the findings of de Groeve et al. (2021), it could be expected that vegan men are perceived as more empathetic and therefore evaluated more positively. On

the other hand, based on the current findings, it is plausible that higher empathy among vegan men could be associated with more negative attitudes towards them because it violates masculine gender roles of stoicism and toughness.

4.4.1 Method

Participants. We determined the required sample size based on the smallest effect size from Study 2 we aimed to replicate, which was the small interaction effect between masculinity and traditional gender role beliefs. Power analysis in G*Power revealed a required sample size of $N = 543$ to detect a small interaction effect with 95% power. In order to allow for exclusion based on our pre-registered exclusion criteria, we recruited 603 participants based in the UK on Prolific. Of those, 17 were excluded because they indicated following a restricted diet. Of the final 543 participants, 59.9% identified as man, 39.1% as woman, 0.9% as gender-queer, gender-non-conforming, non-binary, or other, and 0.2% selected "prefer not to say".[17] Participant age ranged from 18 to 63 years, with a mean age of 25.5 years ($SD = 8.06$).

Materials. We manipulated the diet and motivation of the target person in a between-subjects design by presenting participants with introductions ostensibly written by another participant. The introduction of the omnivorous target read:

> "Hi, I'm Jacob, I'm in my second year at uni. I cook for myself most of the time. I'll eat pretty much anything, meat, fish, veg, grains, nuts, I don't really have a

[17] We also included an attention check asking participants about the other participant's diet as well as the reason for their diet. However, we decided not to exclude participants based on the attention check question. The attention check question was not informative given that the questions asked about "Jacob", but one third of participants read about "Alex" (see Footnote 18). However, results with those participants excluded who failed the check are largely consistent with results using the full dataset, except that the interaction effect between masculinity and gender role beliefs on social avoidance becomes marginally significant.

preference. I'm really into hiking and cycling and I play the guitar. Before the Covid pandemic, I enjoyed going to see gigs and movies."[18]

In the vegan conditions, the third sentence was changed to "I'll eat pretty much anything as long as it's vegan. Beans, veg, grains, nuts, I don't really have a preference. I went vegan a while ago because meat production contributes so much to climate change / because there is so much animal suffering involved in meat production.", for the environmental and animal vegan, respectively.

Perceived masculinity of the target (α = 0.79, *M* = 4.84, *SD* = 1.20), negative attitudes towards the target (*M* = 4.25, *SD* = 1.69) and social avoidance of the target (α = 0.71, *M* = 3.25, *SD* = 1.13) were measured as in Study 2.

Perceived *empathy* (α = 0.70, *M* = 5.63, *SD* = 0.93) was measured as the mean of two items. Participants rated how empathetic and how compassionate the target appeared to them on 7-point scales anchored by *not empathetic at all / not compassionate at all* and *very empathetic / very compassionate*, respectively.

Gender role beliefs (α = .91, *M* = 3.43, *SD* = 1.04) were measured as in Study 1 and 2.[19]

Procedure. We invited participants on Prolific to participate in an online study about impressions of people. Only participants who had not participated in Study 2 were able to take part. Participants gave their informed consent before being randomly allocated to either the omnivorous condition, the environmental vegan condition, or the animal vegan condition.

[18] The target was erroneously called "Alex" instead of "Jacob" in the environmental vegan condition.

[19] The study also included measures of participants' levels of speciesism and climate change belief as well as environmental concern as exploratory variables. We also pre-registered that target diet would further affect how much money participants share with the ostensible study partner using a dictator game measure. However, the measure turned out not to be usable due to a lack of variance (about two-thirds of participants shared half of the money with the other participant).

We then informed participants that they would be paired with another participant. To make this cover story more credible, we asked participants to wait for 30 second while they were allegedly paired with the other participant. Next, participants were asked to write a few sentences to introduce themselves. After submitting their introduction, participants waited for 15 seconds, supposedly to give the partner a chance to finish their introduction. Participants were then presented with the partner's introduction and were able to continue to the next page after 20 seconds to ensure they took the time to read it. Afterwards, participants completed the masculinity, empathy, and attitude measures, before completing the gender role belief measure and demographic questions. Finally, participants were debriefed, thanked, and paid £1.50 as compensation.

4.4.2 Results and Discussion

In testing our hypotheses, we followed our pre-registered analysis plan. First, we tested the main effect of diet condition (omnivore, environmental vegan, animal ethics vegan) on perceived masculinity, perceived empathy, social avoidance of the target, and negative attitudes towards the target. To this end, we created two contrast-coded variables to compare a) the two vegan conditions to the omnivore (control) condition (i.e., coded 1, -1, -1) and b) the two vegan (experimental) conditions with each other (i.e., coded 0, 1, -1), and conducted regression analyses with the two contrast variables predicting the outcome variables.

Table 4.3 shows the means and standard deviations of the dependent variables by condition. Confirming our hypothesis, the vegan targets were perceived as significantly less masculine and more empathetic compared to the omnivorous target, b = -.35, *s.e.* = 0.05, $t(583) = -6.85$, $p < .001$, 95% CI = [-.444; -.246] and b = .28, *s.e.* = 0.04, $t(583) = 7.12$, $p < .001$, 95% CI = [.200; .352], respectively. Furthermore, participants also reported stronger intentions to socially avoid the vegan targets and more negative attitudes towards the vegan targets compared to the omnivorous target, b = .18, *s.e.* = 0.05, $t(583) = 3.62$, $p < .001$, 95%

CI = [.081; .272] and *b* = .16, *s.e.* = 0.07, *t*(583) = 2.21, *p* = .028, 95% CI = [.018; .307], respectively. However, no significant differences were found between the environmental and animal ethics vegan for any of the outcome variables, *p*s > .130. For this reason, the two vegan conditions were collapsed to compare them to the omnivorous condition in all subsequent analyses.

Table 4.3

Means and Standard Deviations by Condition in Study 3

	Omnivorous condition (*N* = 200)		Environmental vegan condition (*N* = 192)		Animal vegan condition (*N* = 194)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Negative attitudes	4.04^{a}	1.52	4.38^{b}	1.77	4.34^{ab}	1.77
Social avoidance	3.02^{a}	0.96	3.34^{b}	1.20	3.41^{b}	1.19
Masculinity	5.30^{a}	1.06	4.52^{b}	1.17	4.69^{b}	1.24
Empathy	5.27^{a}	0.90	5.75^{b}	0.89	5.89^{b}	0.88

Note. Means not sharing the same letter indicate significant differences between conditions.

Next, we investigated whether lower perceived masculinity of the vegan targets was further associated with more negative attitudes towards them, and whether this effect was moderated by participants' traditional gender role beliefs. In a moderated mediation model using the R package lavaan (Rosseel, 2012), we tested the effect of target diet (omnivorous vs. vegan) on a) social avoidance and b) negative attitudes and modelled masculinity (mean-centred) and empathy as parallel mediators of these effects. Critically, as in Study 2, traditional gender role beliefs (mean-centered) were modelled as the moderator of the

association between masculinity and the outcomes (see Figure 4.3a and 4.3b). We expected that this path would be stronger for participants higher (vs. lower) in traditional gender role beliefs.

In line with our hypothesis, the findings revealed a significant interaction effect of masculinity and traditional gender role beliefs on social avoidance, b = -.08, *s.e.* = .03, p = .025, 95% BCI = [-.145, -.011]. Higher masculinity predicted lower social avoidance at high levels of traditional gender role beliefs, b = -.20, *s.e.* = .05, p < .001, 95% BCI = [-.292, -.103], but not at low levels of traditional gender role beliefs, b = -.04, *s.e.* = .06, p = .483, 95% BCI = [-.147, .070]. The interaction between traditional gender role beliefs and masculinity on negative attitudes was not significant, b = -.07, *s.e.* = .05, p = .184, 95% BCI = [-.173, .030].

Furthermore, the indirect effect of diet of target on social avoidance through masculinity was significantly moderated by traditional gender role beliefs, index of moderated mediation = .03, *s.e.* = .01, p = .036, 95% BCI = [.004; .053]. As predicted, the indirect effect was significant only at high levels of traditional gender role beliefs, b = .07, *s.e.* = .02, p = .001, 95% BCI = [.033, .112], not at low levels of traditional gender role beliefs, b = .02, *s.e.* = .05, p = .446, 95% BCI = [-.024, -.053].

Diet of target also had a significant indirect effect on social avoidance through empathy, b = -.10, *s.e.* = .02, p < .001, 95% BCI = [-.147, -.069]. Specifically, as outlined above, vegan targets were perceived as more empathetic than omnivorous targets, and higher empathetic concern was further associated with lower social avoidance, b = -.34, *s.e.* = .05, p < .001, 95% BCI = [-.445, -.248]. Hence, while vegan diet had an indirect positive effect on social avoidance through lower perceived masculinity, the indirect effect through perceived empathy was negative.

With respect to negative attitudes, we found significant indirect effects of diet of target through both perceived masculinity (positively) and empathy (negatively), b = .11, *s.e.* = .03, p < .001, 95% BCI = [.059, .162] and b = -.10, *s.e.* = .02, p < .001, 95% BCI = [-.134, -.061], respectively. In other words, lower perceived masculinity of vegan targets predicted more negative attitudes, while higher perceived empathy of vegan targets predicted less negative attitudes.

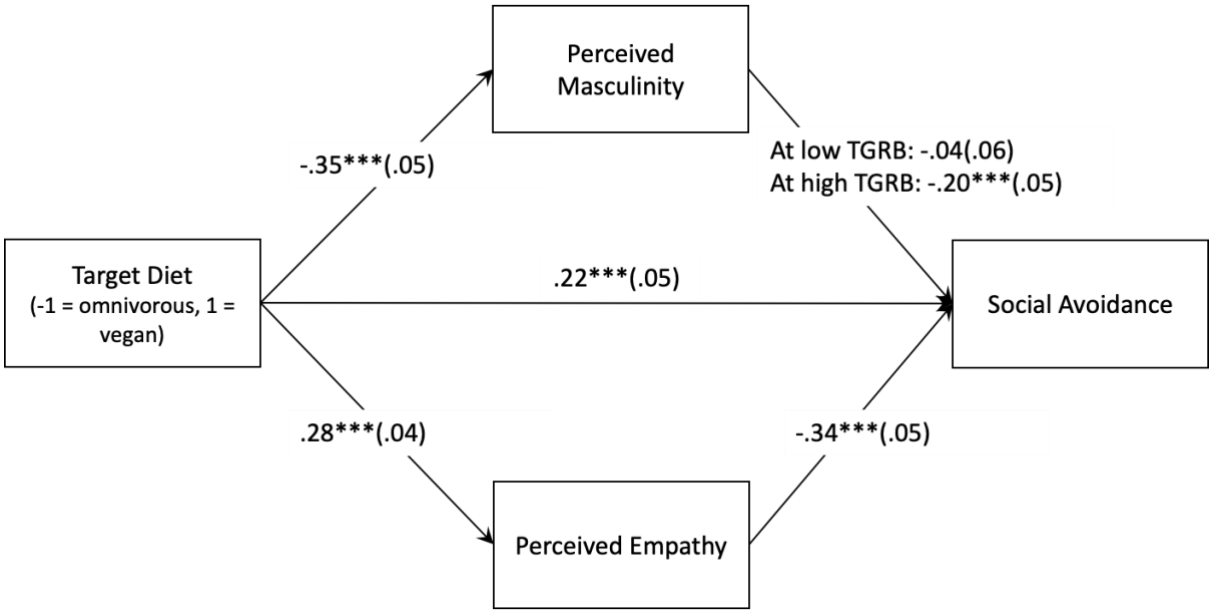
Given the absence of a significant moderation effect between perceived masculinity and traditional gender role beliefs on negative attitudes, the indirect effect of diet of target through masculinity on negative attitudes was also not significantly moderated by traditional gender role beliefs, index of moderated mediation = .02, *s.e.* = .02, p = .201, 95% BCI = [-.011; .063]. However, diet of target (omnivorous vs. vegan) had a significant indirect effect on negative attitudes through lower perceived masculinity for both those higher and lower in traditional gender role beliefs.[20]

[20] We also tested whether any of the associations were moderated by participant gender. There was a significant interaction effect between condition (vegan vs. omnivore) and participant gender on both social avoidance (b = -.22, *s.e.* = .10, t(576) = -2.29, p = .022) and negative attitudes (b = -.29, *s.e.* = .14, t(576) = -1.98, p = .048), with stronger effects for men. No other significant interaction effects were detected (all *ps* >= .133).

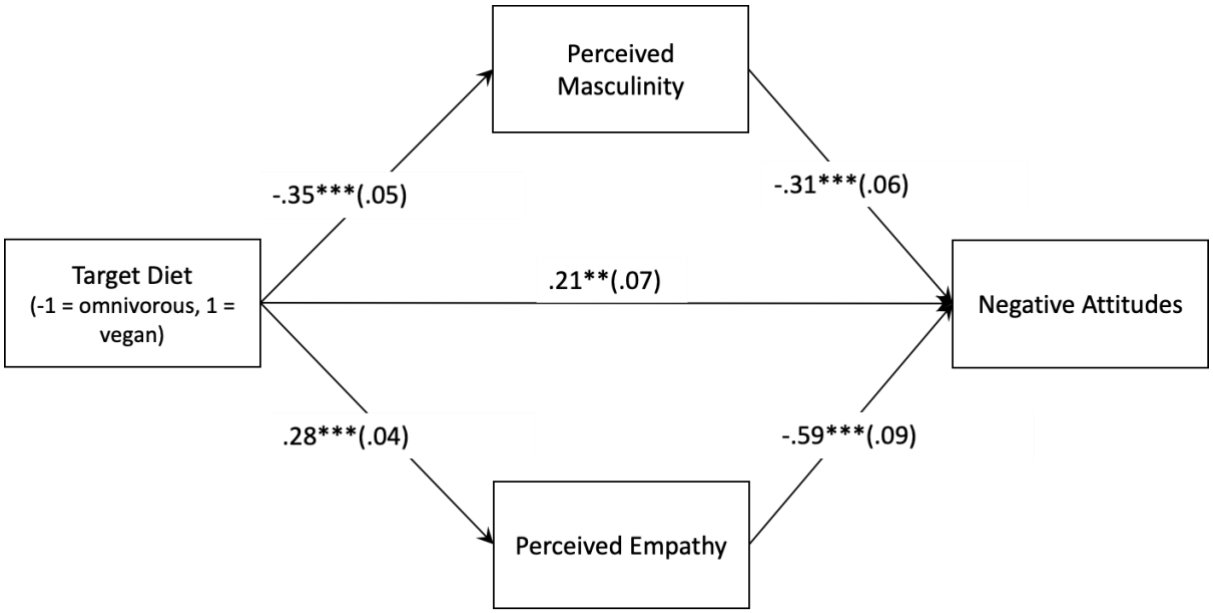
Figure 4.3

Results of Moderated Mediation Models in Study 3

a) Social Avoidance as Dependent Variable



b) Negative Attitudes as Dependent Variable



Note. TGRB = Traditional Gender Role Beliefs. * $p < .05$, ** $p < .01$, *** $p < .001$.

The results of Study 3 largely corroborate our hypotheses and provide a replication of the results of Study 2 in a context that simulates real-world online interactions. Participants rated an otherwise identical ostensible study participant as less masculine, evaluated him more negatively, and had stronger intentions to socially avoid him if he introduced himself as a vegan rather than an omnivore. In line with the results of Study 2, the lower the partner's perceived masculinity, the higher intentions were to socially avoid him, but only for participants who hold more traditional (vs. more egalitarian) gender role beliefs. Perceived masculinity also partly explained why participants expressed more negative attitudes towards the vegan partner, but this effect did not depend on their traditional gender role beliefs. Furthermore, vegan men were perceived as more empathetic than omnivorous men, and the more empathetic participants perceived them to be the more positive their attitudes towards them and the lower their intentions to socially avoid them were. Hence, a vegan diet made our targets appear simultaneously less socially attractive through lower perceived masculinity, and more socially attractive through higher perceived empathy. Finally, men who said they were vegan because of concern for animals were not evaluated any differently from men who said they were vegan because of concern over climate change. This indicates that, at least for our participants, veganism signalled lower masculinity and triggered bias regardless of the motivation behind it.

4.5 General Discussion

4.5.1 Theoretical Implications

Alternative diets which exclude animal products (i.e., veg*n diets) have soared in popularity in recent years, as evidenced for example by record numbers of people signing up for the "Veganuary" campaign in 2021, which encourages people to commit to a vegan diet for the month of January (Carrington, 2021). Despite these developments, veg*ns remain a minority and still face bias and prejudice because of their dietary choices, and this seems to

be particularly true for veg*n men. This research identified some of the key factors associated with bias against male veg*ns.

Specifically, three studies demonstrated that perceiving veg*n men as less masculine is associated with more bias towards them, particularly amongst those who hold more traditional gender role beliefs. Particularly compelling is that Study 2 and 3 experimentally showed that an otherwise identical male target was perceived as less masculine if described as a vegan rather than an omnivore. Further, the less masculine the target was perceived to be, the less likable he was perceived to be, and the more ready our participants were to socially avoid him.

These findings support our hypotheses derived from Social Role Theory (Eagly & Wood, 1999), proposing that men and women are stereotyped to differ in their meat consumption patterns, with men, but not women, being expected to consume large amounts of meat (Rozin et al., 2012; Steim & Nemeroff, 1995). Veg*n men violate traditional gender role norms by eschewing this traditionally masculine behavior of eating meat and, as our findings demonstrate, this norm violation is associated with bias towards veg*n men.

Critically, the studies showed that these effects were qualified by a moderation effect of sexist beliefs. The association between masculinity perceptions of veg*n men and negative attitudes towards them as well as intentions to socially avoid them was strongly pronounced among those who strongly endorse traditional gender role beliefs but was significantly weaker or non-significant among those holding less traditional gender role beliefs, except for the effect on negative attitudes in Study 3. Regarding the latter, lower perceived masculinity was associated with more negative attitudes and higher social avoidance both for participants with more and less traditional gender role beliefs, without significant moderation by gender role beliefs. Taken together, our results highlight the importance of considering individual differences in gender role beliefs when investigating the penalization of gender role

violations. In doing so, we provided an empirical test of the theoretical yet rarely tested idea that gender role beliefs moderate the effect of gender role violations on bias and prejudice (Deutsch & Saxon, 1998).

Finally, in Study 3 we also showed that while a vegan diet predicts negative attitudes through lower perceived masculinity, it also predicts more positive attitudes through higher perceived empathy. This is in line with a recent study on ambivalent stereotypes about veg*ns. While veg*ns are seen as more eccentric and moralistic than omnivores, which in turn predicts viewing them as less sociable and socially attractive, they are also perceived as more moral and compassionate than omnivores, offsetting part of the effects of negative stereotypes on perceived social attraction (de Groeve et al., 2021). Along similar lines, we found that while male veg*ns become targets of bias because they are seen as unmanly, these effects seem to be slightly offset by the fact that they are also seen as empathetic and compassionate. Our research further suggests that stereotypes associated with veg*ns and how they inform attitudes likely differ between male and female veg*ns, which could be tested explicitly in future research.

Crucially, in Study 3, participants were also led to believe that the person they were evaluating was another participant, thus simulating a real-world online interaction. This raises our confidence that bias against vegan men, in part due to perceived gender role violations, can be observed in real-world interactions. Accordingly, the findings substantiate the lived experiences of veg*n men. Specifically, Studies 2 and 3 showed that participants were significantly less likely to want to be friends with or generally socialize with vegans than with omnivores, which mirrors qualitative accounts from both source and targets of this social avoidance. Many veg*ns report having to endure mockery and friends decreasing contact after switching to a veg*n diet (MacInnis & Hodson, 2017), and male veg*ns in particular report that the backlash they face is often based on their perceived lack of

masculinity (Nath, 2011). Our findings are also in line with research showing that omnivores and veg*ns see veg*nism as a barrier towards successful social interactions with others (Chuck et al., 2016; Markowski & Roxburgh, 2019), possibly in part because of the important socially binding role of meat (de Groeve et al., 2021). Given how detrimental social exclusion can be to the emotional and physical well-being of those excluded (Williams & Nida, 2011), anti-veg*n bias can come with grave consequences for veg*ns. Our research thus highlights the importance of reducing gendered anti-vegan bias, which in turn could also pave the way for more men to pursue a veg*n diet.

4.5.2 Practical Implications

Men consume more meat than women and are therefore responsible for a large proportion of global meat consumption. Thus, interventions to tackle meat consumption among men could be particularly impactful. However, men are more resistant to interventions aimed at reducing meat consumption and attachment (Dowsett et al., 2018). As long as meat and masculinity are strongly associated, efforts at decreasing men's meat consumption might be fruitless (de Backer et al., 2020; see also Kildal & Syse, 2017). Indeed, anticipating social exclusion or stigma and lack of social support can deter people from pursuing a veg*n diet (Markowski & Roxburgh, 2019). Uncoupling meat and masculinity could be a promising starting point for interventions to reduce gendered anti-vegan bias and meat consumption among men.

Greater awareness of the meat-masculinity link, and its potential for damaging their message, has led animal and vegan advocates to portray veg*nism as more compatible with traditional masculinity. For example, the Netflix Documentary "The Game Changers" follows plant-based and mostly male athletes with the aim of challenging the claim that animal protein is essential for physical strength and performance. Research on whether such efforts do help to uncouple meat and masculinity is currently lacking. However, even if

successful, they do little to dismantle the expectations associated with traditional masculine stereotypes themselves and might even further substantiate beliefs that men should be strong, athletic, and sexual performers.

As an alternative, to combat the stigma associated with veg*nism, it might be more helpful to promote modern conceptions of masculinity. Modern notions of masculinity are more flexible and inclusive than traditional notions, allowing for characteristics usually regarded as feminine (e.g., Anderson & McCormack, 2016; Bridges & Pascoe, 2014). Indeed, recent research has shown that the more men identify with modern masculinity, the less attached they are to meat, and the more positive their attitudes towards vegetarians (de Backer et al., 2020).

4.5.3 Limitations and Directions for Future Research

Despite consistent support for our predictions, some limitations should be noted. Firstly, even though we found consistent support for the idea that masculinity perceptions shape attitudes towards veg*n men, we did not manipulate masculinity perceptions. Therefore, whether perceived masculinity has a causal effect on the evaluation of veg*n men remains to be shown in future work.

Secondly, while we expected that male veg*ns are particularly devalued if concern for animals is their main motivation, in Study 3 the motivation the targets cited for their veg*n diet did not affect their evaluation. The mere act of abstaining from the traditional masculine act of eating meat could be sufficient to trigger perceptions of low masculinity and negative attitudes, regardless of the motivation behind it. However, it is also possible that participants inferred an animal rights motivation in the environmental vegan condition even though it was not explicit. Future studies could try and use cleaner manipulations of the motives of vegan targets, for example by making explicit that the environmental vegan does not care about animal rights, and vice versa. Future studies could also include additional motivations for

veg*n diets. For example, veg*ns who are motivated mainly by concerns for their personal health might be regarded as particularly lacking in masculinity, given that healthy eating is generally stereotyped as feminine (e.g., Bradbury & Nicolaou, 2012).

Finally, in Study 3, we explored the role of perceived empathy in the evaluation of male veg*ns, suggesting that it might partly offset the negative effect of a veg*n diet on social perceptions through perceived masculinity. However, given that we did not preregister a specific hypothesis, future research should replicate the role of perceived empathy.

4.5.4 Conclusion

Once considered a niche position, it is now widely accepted that animal agriculture has devastating consequences for the planet and its inhabitants (e.g., Grandin, 2014; Huang et al., 2012; Springmann et al., 2018). Still, global meat consumption is rising (OECD/FAO, 2021). Moreover, those who abstain from meat consumption to reduce the harm to other beings are often ridiculed and actively disliked, and this is particularly true for men. Traditional masculinity and the expectations that men should eat meat and not show compassion deters many men from turning vegetarian or vegan and complicates efforts to reduce global meat consumption. If we are to find sustainable ways of food production, we need to foster alternative ideas of what it means to be a man in society. Or, in the words of one participant (Bogueva et al., 2020, p. 45): "The problem is not with vegetarian food […]. The problem is with the century long built perception of what it is to be a man – muscles, strong, sexy meat eaters."

Chapter 5: General Discussion

The aim of this thesis was to test novel hypotheses derived from ecofeminist theory, which, at its core, posits that the subjugation of nature, animals, and women are interrelated. Three related research lines were presented investigating a) the complex associations between human supremacy beliefs over animals and nature, dehumanization of women, and ambivalent sexism (Chapter 2), b) the role of gender of masculinity perceptions and gender role beliefs in the perception of plant-based meat alternatives (Chapter 3), and c) the role of masculinity perceptions and gender role beliefs in the perception of vegetarian and vegan men (Chapter 4). The findings reported in this thesis move substantially beyond current psychological understanding of the interconnections between biases in human intergroup and human-animal relations by revealing the more complex patterns when taking gender-based biases into account. Specifically, Chapter 2 expands current understanding of ambivalent sexism, providing evidence that human supremacy beliefs over animals and nature, as well as perceptions of women as animal-like or connected to nature, are differentially associated with hostile and benevolent sexism. Chapters 3 and 4 demonstrated that bias towards plant-based meat alternatives and veg*n men can in part be explained by perceptions of low masculinity, thereby integrating the literature on anti-veg*n bias with the literature on social roles and gender role violations.

5.1 Summary of findings

Previous research has shown that speciesist beliefs (i.e., prejudicial attitudes towards animals) and beliefs in human supremacy over animals are associated with higher ethnic prejudice (Costello & Hodson, 2010, 2014; Dhont & Hodson, 2014; Dhont et al., 2016). However, although scholars outside of psychology have long theorized that views of animals and nature are also linked with gender-based prejudice, systematic research testing this assumption has been sparse. Across five studies, Chapter 2 tested the associations between

human supremacy beliefs and ambivalent sexism. We expected that human supremacy beliefs would be positively associated with both hostile and benevolent sexism. Building on Ambivalent Sexism Theory (Glick & Fiske, 1996) and the literature on dehumanization (e.g., Haslam, 2006; Kteily et al., 2015), we further expected that animalistically dehumanizing women would primarily predict hostile sexism, whereas perceptions of women as connected to nature would primarily predict benevolent sexism.

Across all studies, the results robustly confirmed that human supremacy beliefs over animals and nature were positively related to hostile and benevolent sexism. Further, dehumanizing women (both indirectly through denying them uniquely human qualities and blatantly by perceiving them as less evolved) was primarily linked with hostile sexism, but, in Studies 2 and 4, also predicted benevolent sexism. Across studies, perceiving women as more closely connected to nature than men was more strongly associated with benevolent sexism, while weaker associations with hostile sexism also emerged. In Study 4, we also demonstrated that benevolent perceptions of nature as fragile and in need of protection partly explained the association between women's connection to nature and benevolent sexism. Furthermore, in Studies 3 and 5, Social Dominance Orientation partly explained the association between human supremacy beliefs and both types of sexism, as well as between the dehumanization of women and hostile sexism. In Study 5, we additionally demonstrated that greater dehumanization of women predicted greater acceptance of rape myths, and this effect was mediated by higher hostile sexism. Viewing women as more closely connected to nature predicted support for policies aimed to restrict pregnant women's freedom, and this effect was mediated by benevolent sexism. In all five studies we found support for our hypotheses while controlling for participant gender.

Chapter 3 focused on the role of masculinity perceptions and traditional gender role beliefs in the evaluation of plant-based meat alternatives. While plant-based meals have been

shown to be perceived as less masculine than meat dishes (e.g., Cavazza et al., 2015a, 2015b), little was known about how consumers judge the masculinity of dishes that imitate the appearance and flavour of meat but are made from plant-based protein and therefore do not require the killing or butchering of animals. The main hypothesis tested in Chapter 3 was that identical images of meat dishes would be perceived as less masculine and evaluated more negatively when labelled as plant-based meat as opposed to regular meat. In a between-subjects and a within-subjects experiment, we presented participants with images of plant-based meat alternatives and parallel regular meat dishes. Critically, we randomized whether these were labelled as plant-based meat or regular meat and asked participants to evaluate the appeal of the portrayed dishes (e.g., expected tasted, smell, and intentions to try them).

As expected, participants evaluated dishes labelled as plant-based meat more negatively than dishes labelled as regular meat, and this was partly explained by their lower perceived masculinity. The association between lower perceived masculinity and more negative evaluations was especially pronounced among participants with more (vs. less) traditional gender role beliefs. The second study of Chapter 3 additionally explored evaluations of dishes labelled as clean meat (i.e., meat cultured from animal cells; Post, 2012). Participants evaluated clean meat as less masculine than regular meat, but more masculine than plant-based meat, and more negatively than regular meat with no significant difference to plant-based meat.

In Chapter 4, the focus turned to the implications of the meat-masculinity link for perceptions of men who abstain from meat consumption, i.e., veg*n men. Building on Social Role Theory (Eagly & Wood, 1999) and research showing that veg*n men are evaluated more negatively than veg*n women (MacInnis & Hodson, 2017), we predicted that veg*n men would be viewed more negatively than omnivorous men, and that this effect would be partly explained by their lower perceived masculinity. In line with findings of Chapter 3, we

further expected a stronger association between perceived masculinity and evaluations for those higher in traditional gender role beliefs. We tested these hypotheses with a survey study and two pre-registered between-subjects experiments.

In the first study of Chapter 4, participants rated the perceived masculinity of veg*n men and women and how cold and unfavorable they felt towards them. In line with expectations, for veg*n men, but not women, lower perceived masculinity was associated with more unfavorable feelings, and this association was stronger for participants higher (vs. lower) in traditional gender role beliefs. In the second study of Chapter 4, we presented participants with a vignette describing an otherwise identical male target person either as a vegan or an omnivore. Participants rated how masculine they perceived the target to be, how unfavorable they felt towards him, and much they would socially avoid and discriminate against him. As expected, participants felt more unfavorably towards the vegan target and had higher intentions to socially avoid him, and this was partly explained by his lower perceived masculinity. Critically, and as expected, the link between masculinity and negative evaluations was stronger among participants higher (vs. lower) in traditional gender role beliefs. There were no differences in discrimination intentions towards the two targets. In the third study of Chapter 4, we conceptually replicated the results of the second study in a simulated online interaction where participants ostensibly rated another participant. Additionally, we manipulated the motivation the target cited for being vegan (environmental vs. animal rights motivations) and found no significant differences in masculinity or evaluations depending on motivation.

Taken together, the two central findings of this thesis are:

1) Beliefs about nature and animals, and about women in relation to nature and animals, are associated with gender-based prejudice and

2) beliefs about gender roles and perceptions of masculinity are associated with bias towards vegan meat and vegan men.

In conjunction, the findings provide social psychological, quantitative evidence for the core ideas of ecofeminist theory that gender-based and species-based prejudice are not only correlated, but depend on and mutually reinforce each other.

5.2 Theoretical Implications

5.2.1 Animalizing Women

Research into the dehumanization of women has often focused on objectification, the perception of women as objects for male consumption (Fredrickson & Roberts, 1997). However, research indicates that women are also targets of animalistic dehumanization, i.e., they are likened to animals or denied uniquely human qualities, especially when they are sexually objectified (Morris et al., 2018). Chapter 2 of this thesis focuses explicitly on the animalistic dehumanization of women to test the prediction derived from ecofeminist theory that the animalistic dehumanization of women functions to justify their subordination in society and aggression towards them. Generally, dehumanization is thought to function to place certain groups outside of the boundaries of moral concern that we usually grant other humans (see Bandura et al., 1975; Opotow, 1993). Accordingly, subtly and implicitly dehumanizing women has been linked with intentions to sexually aggress against them (Rudman & Mescher, 2012) and negative attitudes towards female rape victims (Bevens & Loughnan, 2019) among men. We add to this literature by showing that animalistically dehumanizing women is also associated with beliefs in rape myths that justify and trivialize sexual violence against women, mediated through an endorsement of hostile sexism (Chapter 2, Study 5).

Although historically dehumanization was first studied in its most blatant form, the explicit likening of derogated outgroups with animals in the context of war and genocide

(e.g., Bandura, 1999; Kelman, 1973), research then shifted towards studying more subtle and everyday forms of dehumanization. From this perspective, dehumanized outgroups are perceived not necessarily as *non-human*, but as *less human* than someone's ingroup through lower attribution of human qualities to them (Haslam, 2006; Leyens et al., 2000). However, more recently, researchers have highlighted the importance of considering both subtle and blatant forms of dehumanization given evidence that the latter uniquely predicts outgroup hostility and aggression (Kteily et al., 2015; for a review, see Kteily & Bruneau, 2017). While past research has used largely subtle and implicit methods to measure the dehumanization of women (e.g., Baldry et al., 2014; Viki & Abrams, 2003), we followed Kteily and Bruneau's (2017) recommendation and showed, for the first time, that blatantly dehumanizing women by viewing them as less evolved than modern humans (Kteily et al., 2015) is associated with sexist attitudes. Indeed, in Chapter 2 (Studies 3-4), blatantly dehumanizing women predicted hostile sexism over and above subtly dehumanizing them by denying them uniquely human qualities.

Through dehumanization, women are placed on a lower status than men because they are associated with "perhaps the quintessential low-status outgroup" (Dhont et al., 2016, p. 5). Indeed, likening a group to animals is only derogating if animals are devalued as compared to humans (Costello & Hodson, 2010, 2012). The interspecies model of prejudice (Costello & Hodson, 2012) proposes that beliefs in animal inferiority are a prerequisite for outgroup dehumanization. Indeed, perceiving a greater human-animal divide predicted stronger outgroup prejudice through greater animalistic dehumanization, whereas experimentally closing the human-animal divide by highlighting the ways in which animals are similar to humans reduced outgroup dehumanization and, in turn, prejudice (Costello & Hodson, 2010). According to this model, then, gender-based and species-based prejudice are meaningfully linked because the dehumanization of women fundamentally depends on the

low status of animals in society. The evidence we provide for the subtle and blatant animalistic dehumanization of women hence supports the ecofeminist claim that the oppression of animals and women are meaningfully linked (e.g., C. A. MacKinnon, 1989; Wyckoff, 2014).

5.2.2 Linking Human Supremacism and Sexism

Gender relations form a unique intergroup context. Men and women's interdependence for reproduction, and women's disproportionate biological role in reproduction, are thought to render women "dyadic power" (Guttentag & Secord, 1983): Men depend on women to bear their children and fulfil their sexual and intimacy needs. This dependence, according to Ambivalent Sexism Theory (Glick & Fiske, 1996), gives rise to the ideology of benevolent sexism: protective attitudes towards women and a reverence particularly of women who fulfil traditional gender role expectations of being wives and mothers (Glick & Fiske, 1996; Glick et al., 2000). At the same time, the ideology of hostile sexism seeks to maintain male dominance and the exploitation of women as sexual objects by derogating them, and this is particularly directed at women who challenge the existing gender hierarchy (e.g., feminists; Glick & Fiske, 1996, 1997). Chapter 2 presents empirical evidence consistent with claims of Ambivalent Sexism Theory.

Indeed, views of women as connected to nature, including natural reproduction, were indeed associated primarily with benevolent sexism. This perception of women was also associated with support for policies that would restrict pregnant women's autonomy, such as banning the sale of alcohol to pregnant women (see also Murphy et al., 2011; Sutton et al., 2011). This is in line with theorizing that the ideology of benevolent sexism functions to protect and control women's reproductive functions while maintaining an appearance of acting in women's best interest. From this perspective, the protective attitudes inherent to benevolent sexism are afforded to women because their male partners' reproductive success

depends on their safety and wellbeing (Glick & Fiske, 1996; Rothman, 1994). We also found, throughout Chapter 2, that perceptions of women as connected to nature were associated with hostile sexism, albeit less strongly. This suggests, in line with theorizing, that the ideology of hostile sexism is in part based on resentment of women for the "dyadic power" over men their role in natural reproduction grants them (Glick et al., 2000). Overall, Chapter 2 provides the first test of the idea that women's connection to nature, despite its subjectively positive connotations (e.g., Berman et al., 2008; Reynolds & Haslam, 2011; van den Berg et al., 2003), might still undermine women and maintain their lower status in society.

Conversely, views of women as animal-like were primarily related to hostile sexism. Hostile sexism is thought to function, in part, to maintain and justify sexual control over women (Glick & Fiske, 1996, 1997). Given the evidence that the sexual objectification of women triggers their animalistic dehumanization (Morris et al., 2018), animalizing women to justify their sexual exploitation could in fact constitute a critical facet of the ideology of hostile sexism. Indeed, dehumanizing women was further associated with beliefs in rape myths that trivialize, deny, and justify sexual violence against women (Chapter 2, Study 5). Critically, this suggests that the dehumanization of women and their victimization through sexual violence could mutually reinforce each other: Dehumanizing women provides a justification for sexually exploiting them, and reducing women to their sexual functions increases their dehumanization.

Further, across the studies of Chapter 2, viewing humans as superior over animals and nature was associated with both dimensions of sexism. Philosophers and feminist scholars have long proposed that prejudice towards non-human animals and towards human outgroups are parallel expressions of the same oppressive motives (Adams, 2015; Joy, 2010; MacKinnon, 1989; Singer, 1975). In developing and testing the Social Dominance Human-Animal Relations Model (SD-HARM), Dhont et al. (2016) provided a comprehensive test of

these ideas while building on Social Dominance Theory (Pratto et al., 1994; Sidanius & Pratto, 1999). According to Social Dominance Theory, society seeks to promote and maintain intergroup hierarchies through the endorsement of *hierarchy-enhancing legitimizing myths*, i.e., beliefs about subordinate societal groups which justify their low status. The extent to which someone supports intergroup hierarchy and desires for their social group to be superior to other groups is captured in the individual difference variable Social Dominance Orientation (SDO).

SDO is a robust predictor of both prejudicial attitudes in human intergroup contexts (e.g., Kteily et al., 2012; Sibley & Liu, 2010; Sidanius & Pratto, 1999) and exploitative attitudes towards nature and animals (Bilewicz et al., 2011; Dhont & Hodson, 2014; Dhont et al., 2014). Importantly, and as predicted by SD-HARM, SDO is a common underlying factor explaining why ethnic prejudice and species-based prejudice (i.e., speciesism) are positively associated (Dhont et al., 2014, 2016). Expanding the scope of SD-HARM to the context of gender relations, Chapter 2 (Studies 3-4) demonstrated that SDO also constitutes an underlying ideological factor explaining why human supremacy beliefs over animals and nature and gender-based prejudice, i.e., hostile and benevolent sexism, are associated. Specifically, the association between human supremacy beliefs and sexist beliefs became significantly weaker after including SDO as an explanatory variable. Thus, this thesis provides evidence for the generalizability of SD-HARM to other intergroup contexts.

Dehumanization has been described as one of the legitimizing myths that people high in SDO subscribe to in order to justify why subordinate groups deserve their low status (e.g., Esses et al., 2008; Trounson et al., 2015). Indeed, individuals high in SDO dehumanize asylum seekers to a greater extent than those low in SDO, which is in turn associated with more negative emotions towards them (Esses et al., 2008; Trounson et al., 2015). Expanding this literature to gender relations Chapter 2 (Studies 3-4), we show that SDO also explains the

relationship between the dehumanization of women and hostile attitudes towards them. This suggests that, in line with theorizing (e.g., Adams, 2015), likening women to animals constitutes a legitimizing myth that serves to justify their subordinate status in society.

While similarities between prejudicial human intergroup and human-animal relationships are abundant, the differences must also be noted. Crucially, while human outgroups can actively challenge (see Becker & Tausch, 2015; van Zomeren et al., 2008) or contribute to the maintenance of their group's status (Jost & Banaji, 1994), non-human animals are passive objects of derogation and exploitation through humans (Dhont et al., 2016). Thus, humans act on animals' behalf in the form of advocacy or by abstaining from animal exploitation, for example by following a vegan diet, and thereby can themselves become subjected to bias and prejudice. Indeed, there is increasing evidence for societal stigma and negative attitudes towards veganism (MacInnis & Hodson, 2017; Minson & Monin, 2012; Vandermoere et al., 2019). Chapters 3 and 4 show that, as would be expected from an ecofeminist perspective, gender role beliefs and masculinity perceptions are implicated in bias towards both plant-based meat dishes and male vegans.

5.2.3 Plant-Based Meat and Masculinity

While a growing body of research provides robust support for the meat-masculinity link (e.g., Rothgerber, 2013; Rozin et al., 2012; Ruby & Heine, 2011), Chapter 3 presents the first investigation into the perceived masculinity of plant-based meat alternatives. Identical images of meat dishes were perceived as less masculine when labelled as plant-based rather than regular or cultured meat. This also sheds light on potential mechanisms by which meat might obtain and sustain its masculine value. If identical images are viewed as less masculine because the meat depicted is believed not to originate from the killing and butchering of an animal, this implies that aggressive acts towards animals are a prerequisite for the masculine symbolic value of meat (see also Lupton, 1996). This is plausible given that the traditional

masculine gender role inherently encourages displays of aggression (Bosson & Vandello, 2011; Cicone & Ruble, 1978; Eagly & Steffen, 1986; Pleck, 1983). Indeed, the meat-masculinity link seems to be attenuated in cultures and among individuals holding less traditional gender role beliefs (de Backer et al., 2020; Schösler et al., 2015). Overall, it seems that for meat to be masculine a) it needs to originate from aggression towards animals and b) masculinity needs to be associated with displays of power and aggression.

The lower perceived masculinity of plant-based meals was also further associated with more bias towards these meals, and particularly among those with more traditional gender role beliefs. Chapter 3 therefore contributes to the literature in two important ways. First, we show, for the first time, that consumers' relatively negative evaluations of plant-based meat alternatives (e.g., van Loo et al., 2020) are partly biased. That is, identical images were evaluated more negatively if labelled as plant-based, and the mere knowledge that a meat dish is plant-based evoked expectations of lower sensory qualities and lower intentions to try the product. Hence, while past research highlighted that difference in sensory qualities to regular meat are a key barrier to the acceptance of plant-based meat alternatives (e.g., Hoek et al., 2011), the findings presented in this thesis highlight that perceptions of sensory qualities could in fact be distorted by negative attitudes towards veganism, or "vegaphobia" (Cole & Morgan, 2011; Vandermoere et al., 2019).

Secondly, past research suggests that consumers evaluate products and their sensory qualities more positively when there is a match between the values consumers endorse and the values the product is perceived to symbolize (Allen et al., 2008). Furthermore, research has shown that femininity-masculinity is a crucial dimension along which the symbolic value of foods varies (Cavazza et al., 2015a, 2015b; Rozin et al., 2012), but has not tested how this symbolic value interacts with consumers' values, specifically how much consumers value traditional masculinity. This thesis provides novel evidence that evaluations of meat products

indeed depend on the match between consumer values and the symbolic value of meat: The results presented in Chapter 3 suggest that the more individuals value traditional gender roles, the more the perceived masculinity of meat dishes informs their perceived sensory appeal and intentions to try them.

*5.2.4 Feminizing Men: Veg*nism as a Gender Role Violation*

Anti-veg*n bias is evident not only in evaluations of plant-based meat products, but also in omnivores' perceptions of vegetarians and vegans. Vegans are evaluated as negatively or more negatively than other groups commonly subjected to prejudice (MacInnis & Hodson, 2017), and media images of vegans tend to be derogatory, portraying them as eccentric, extremist, or overly sentimental (Cole & Morgan, 2011). Further corroborating the intertwined nature of gender-based and species-based prejudice, anti-vegan bias is more pronounced when the target is male rather than female (MacInnis & Hodson, 2017). Taking a social role perspective (Eagly & Wood, 1999), Chapter 4 provides evidence that this is because vegan men violate gender role expectations.

Social Role Theory posits that gender differences and gender stereotypes in society originate in historical and contemporary distributions of labour, with men inhabiting higher-status roles associated with more power and women inhabiting lower-status roles associated with less power (Eagly, 1987; Eagly & Wood, 1999). Traditional gender role beliefs prescribe that individuals should act in conformance with these roles, with men being expected to display more agentic qualities (e.g., aggression, risk-taking) and women being expected to display more communal qualities (e.g., empathy, caring; Connor et al., 2017; Davis & Greenstein, 2009). Individuals vary in how much they adhere to these traditional gender role expectations (Kachel et al., 2016). Additionally, because gender constitutes such a broad social category, people tend to subdivide gender groups into distinct gender subtypes (Deaux et al., 1985; see Carpenter & Trentham, 1998 or Green et al., 2005 for reviews),

which also vary in the extent to which they conform to traditional masculinity or femininity (Green et al., 2005). Non-traditional gender subtypes (e.g., female leaders or male homemakers) challenge complementary gender roles and tend to be evaluated negatively (e.g., Blakemore, 2003; Blashill & Powlishta, 2009).

Men are penalized more harshly than women for gender role violations (e.g., David et al., 2004), presumably because masculinity is valued more highly than femininity and hence feminine men are viewed as losing their prized masculine status (MacDonald, 1974). Vegan men as a male subtype are viewed as relatively feminine compared to omnivorous men (Ruby & Heine, 2011; Thomas, 2016), and thereby constitute a non-conforming male subtype. Chapter 4 presents evidence that this gender role violation is further associated with negative evaluations and social rejection of vegan men by omnivores, and particularly among those who subscribe more strongly to traditional gender role beliefs.

It has been argued theoretically that gender role beliefs should moderate the association between perceptions of gender conformity and evaluations of male and female subtypes (Deutsch & Saxon, 1998). In support, past research has shown that masculine identification in men predicts negative evaluations of feminine men and endorsement of hostile sexism predicts negative attitudes towards non-traditional men and women (Glick et al., 2015). Those who express more sexist gender role beliefs also tend to evaluate veg*n men more negatively (MacInnis & Hodson, 2017). While past research has largely used correlational designs, Chapter 4 provides experimental evidence that vegan men are evaluated more negatively and people are more strongly inclined to socially avoid them than omnivorous men, an effect which is partly explained by their lower perceived masculinity. Crucially, lower perceived masculinity informed biased attitudes especially amongst those with more traditional gender role beliefs. Thus, the findings of Chapter 4 support the

theoretical but rarely tested idea that gender role beliefs moderate the penalization of gender role violations (Deutsch & Saxon, 1998).

Importantly, the gendered nature of anti-vegan bias also highlights further how the subjugation of women and animals are dynamically interconnected. As discussed above, in line with the interspecies model of prejudice (Costello & Hodson, 2010, 2012), the animalization of women only has derogatory power if animals are devalued. In the same way, the "feminization" of men who abstain from animal exploitation is only derogatory if the feminine is devalued, as is inherent to patriarchal societies where the masculine is viewed as "hegemonic" (Connell, 2005; Connell & Messerschmidt, 2005). Hence, the derogation of women and of animals fundamentally depend on each other, which has wider implications for future research as well as practical implications for efforts to improve women's and animals' status.

5.3 Limitations and Future Directions

5.3.1 Limitations of Measurement

The measurement instruments used in this thesis are, of course, not without limitations. Firstly, and most importantly, all studies included in this thesis used self-report measures, and future research would benefit from using behavioral measures as dependent variables. For example, in Chapter 3, participants indicated their intention to try a plant-based or cultured meat product. However, intentions are imperfect predictors of behavior: Intentions and behavior tend to correlate, on average, only moderately, and the correlations vary substantially between different types of behavior (for a review, see Sheeran & Webb, 2016). Future research could use measures of actual consumption of meat and meat alternatives in lab-based (rather than online) studies. For example, participants could be presented with a plant-based meat product labelled as either plant-based or regular meat, and asked to rate its sensory qualities after trying the product.

In addition to this general measurement limitation, some limitations specific to the scales used should be noted. The "women's connection to nature" scale was created specifically for the studies presented in Chapter 2. While satisfactory internal consistency and confirmatory factor analysis support the unidimensional factor structure of this scale, the scale has not been independently validated and could be improved for future research. Firstly, the phrasing of the items and response scale (e.g., *Women are connected to nature; 1 = a lot less than men* to *7 = a lot more than men*) might bias participants towards agreeing that women are more connected to nature than men. Secondly, although the inter-item correlation is acceptable, one of the items (*Women are closely tied to natural reproduction*) seems difficult to disagree with given the biological reality of women's relatively greater involvement in the reproductive process. Further, inclusion of this item could conflate the concept of women's connection to nature with one of the potential explanatory mechanisms, i.e., women might be viewed as connected to nature *because* of their role in reproduction, as discussed below. Future research could further investigate this psychological construct and develop and validate an improved version of the scale. Other scales used, such as the benevolent nature beliefs scale (Chapter 2, Study 4) and the restriction of pregnant women's freedom scale (Chapter 2, Study 5) would also benefit from validation studies.

The measurement of dehumanization is complex and different researchers have defined and measured dehumanization differently. In Chapter 2 of this thesis, the subtle animalistic dehumanization of women is operationalized as the lower attribution of personality traits that people perceive to be uniquely human (Hodson & Costello, 2007) to women relative to men. This is in line with previous research using the same methodology in the context of immigrant dehumanization (Costello & Hodson, 2010; Hodson & Costello, 2007) as well as Haslam's (2006) integrative framework of dehumanization, which distinguishes between mechanistic and animalistic dehumanization. According to this model,

denying groups traits assumed to be central to human nature (e.g., emotionality, curiosity) constitutes mechanistic dehumanization, whereas denying traits assumed to be uniquely human (i.e., not shared with non-human animals, such as refined emotion and intellect) constitutes animalistic dehumanization.

Evidence pertaining to the validity of Haslam's model is mixed (see also Over, 2020, for a critical appraisal of the dehumanization hypothesis). There is some support for the idea that people perceive animals to lack agency, but not experience (Gray et al., 2007). Further, when participants rated which personality traits were uniquely human or aspects of human nature, the ratings did not correlate, providing evidence for the distinctness of the two dimensions (Haslam et al., 2005). However, the two dimensions do not always emerge in confirmatory factor analysis (e.g., Bastian & Haslam, 2010; Demoulin et al., 2020; Loughnan et al., 2017), and are sometimes correlated when making judgements about outgroups (Kteily et al., 2015). This indicates that there is some overlap between them, and that some groups are both mechanistically and animalistically dehumanized (as is arguably the case for women, as suggested by theorizing and evidence building on objectification theory; Morris et al., 2018). However, this thesis focused on the animalistic, rather than mechanistic, dehumanization of women. The construct validity of Haslam's (2006) conceptualization of animalistic dehumanization is supported by the fact that attributing fewer uniquely human traits to an outgroup relative to the ingroup is negatively associated with experimentally induced as well as spontaneous perceptions of human-animal similarity (Costello & Hodson, 2010). Hence, although some overlap with mechanistic dehumanization likely exists, the subtle measure of dehumanization used in Chapter 2 seems to tap into an important way in which women are animalistically dehumanized.

Finally, in Chapters 3 and 4, the Ambivalent Sexism Inventory (Glick & Fiske, 1996) was used as a measure of traditional gender role beliefs. As an ideology, ambivalent sexism

constitutes benevolent attitudes towards women who adhere to traditional gender roles, and hostile attitudes towards women who do not. Further, in research using the Ambivalent Sexism Inventory, sexism has been shown to predict negative attitudes towards both male and female gender subtypes who do not conform to traditional gender role expectations (Gaunt, 2013; Glick et al., 2015). Thus, the Ambivalent Sexism Inventory appears to tap into beliefs that men and women should behave according to traditional gender stereotypes. However, future research could test whether the results of Chapters 3 and 4 hold up when directly measuring traditional *masculine* gender role beliefs, using, for example, the Male Role Norms Scale (Thompson & Pleck, 1986).

5.3.2 Limitations of Correlational Methodology

Although Chapters 3 and 4 used mainly experimental methods, some of the key hypothesized associations throughout the empirical chapters are demonstrated on a correlational basis. Hence, assumptions about causal directionality remain speculative. Future research could employ more experimental and longitudinal methodology. For example, in Chapter 2 we argued that the devaluation of animals and of women might constitute dynamic processes mutually maintaining and reinforcing each other. Longitudinal studies measuring human supremacy beliefs and sexist beliefs over time could be particularly valuable to test this idea. Further, in Chapter 2 we also showed that dehumanizing women and viewing women as connected to nature differentially predict hostile and benevolent sexism, but the causal direction remains unclear. Experimental studies could shed light on causal relationships and also contribute to confirming the distinct nature of dehumanizing women vs. viewing them as connected to nature. Future studies could, for example, use associative priming procedures to stimulate the association between women and animals and women and nature and test whether distinctive effects on hostile and benevolent sexism emerge. Lastly, in Chapters 3 and 4 we showed that perceived masculinity of plant-based meat dishes and

vegan men statistically *explains*, in part, why they are evaluated more negatively than regular meat dishes and omnivorous men respectively. While the causal direction implied by the mediation models is in line with theorizing, we cannot deduce that perceived masculinity *causes* these evaluations without manipulating masculinity directly.

5.3.3 Underlying Mechanisms and Development

There is currently little evidence pertaining to *why* women are associated with nature more so than men. While theoretically this is assumed to be due to their unique role in natural reproduction, this has not been tested directly. Future research could make salient women's greater role in reproduction to test whether this affects perceptions of their connection to nature more generally. In Chapter 2, we also found that the nature-woman association was correlated with beliefs that nature is fragile and in need of protection, which mirrors common feminine stereotypes (e.g., Glick & Fiske, 1996). Other scholars argue that nature is commonly anthropomorphized as female to soften the dangerous aspects of nature and foster a sense of harmony with nature (Roach, 2003). It remains a question for future research whether nature stereotypes are applied to women or whether feminine stereotypes are applied to nature (or both). Further, future research could also test whether such more negative perceptions of nature as hostile and dangerous are related to more hostile views of women, and therefore to hostile rather than benevolent sexism.

We also currently have few empirical investigations of why meat is associated with masculinity. The evidence presented in Chapter 3 suggests that meat is perceived as less masculine when produced from plant protein or in the lab rather than by slaughtering an animal, which suggests that the killing of an animal is an integral prerequisite for its masculine value. This is in line with the ecofeminist perspective that meat consumption is an expression of dominance, which is an inherent part of traditional masculinity (Adams, 2015). Indeed, higher SDO predicts greater meat consumption (Dhont & Hodson, 2014), and men's

relatively higher SDO explains why they are more supportive of animal exploitation than women (Graça et al., 2018). However, systematic research testing under which conditions meat is perceived as more or less masculine depending on the level of dominance over animals involved in its production is currently lacking.

Further, a developmental approach could shed some light on how the meat-masculinity association is learned over the lifespan. Research suggests that, while children show less preference of humans over animals than adults do in moral dilemmas (Wilks et al., 2021) and find meat eating less morally acceptable (McGuire et al., in press), boys at preschool age already implicitly associate meat with men and vegetables with women and prefer "masculine" over "feminine" foods (Graziana et al., 2021). Longitudinal studies could be particularly valuable to disentangle when and how children learn the meat-masculinity association, and how it relates to their attitudes towards meat and animals (see also Rosenfeld & Tomiyama, 2021).

5.3.4 Intersections with Race

In Chapter 2, we investigated the animalistic dehumanization of women as a group, without specifying race or ethnicity. However, there is reason to expect that women of colour, and especially Black women, could be particularly affected, given that they can be dehumanized because of both their gender and race. Indeed, people associate Black people with animals (i.e., apes) to a greater extent than White people (Goff et al., 2008). However, from an intersectional perspective, the experience of Black women cannot be understood by simply adding the effects of gender and racial identity (Hancock, 2007). Intersectionality addresses the multiple group identities people hold simultaneously (Crenshaw, 1991). These identities are thought to intersect in qualitatively unique ways, so that Black women are stereotyped in ways that are different from both White women and Black men (Ghavami & Peplau, 2012; Hancock, 2007).

Indeed, media images of Black women are sexualized even more so than images of White women (Emerson, 2002; Ward et al., 2013), and dehumanizing images of Black women as "Jezebels" portray them as promiscuous and sexually aggressive (Brown et al., 2013; West, 1995). As discussed in Chapter 2, sexualized images of women trigger animalistically dehumanizing responses (Loughnan et al., 2013; Morris et al., 2018), which Black women could be particularly vulnerable to. Indeed, when people were asked to list attributes associated with men and women from different ethnic groups, some of the 15 most common stereotypes associated with Black women (e.g., unintelligent, unrefined) implied their animalistic dehumanization, whereas no such dehumanizing stereotypes were among the 15 most common stereotypes associated with White women (Ghavami & Peplau, 2012). Future research could test systematically whether Black women are dehumanized more, and differently, from White women.

5.3.5 Beyond Meat

In considering the associations between masculinity and evaluations of animal vs. plant-based products, Chapter 3 focuses specifically on meat products and plant-based alternatives to meat products consistent with most psychological research in this area. To date, the psychological factors associated with the consumption of other animal products have been largely neglected. Adams (2015) argued that, while meat is masculinized, eggs and dairy products are feminized because their production requires the reproductive functions of female animals. Indeed, Rozin et al. (2012) found that participants occasionally spontaneously associated dairy with femininity. Yet, in explicit, direct ratings, dairy and eggs were not perceived as more female than male, and women did not report preferring milk products more than men. Overall, research into the symbolic value of dairy and eggs is sparse. However, egg and dairy production have been linked to destructive environmental outcomes (e.g., Gerber et al., 2013; Hedenus et al., 2014) and involve levels of animal cruelty

comparable to meat production (e.g., Foer, 2009). Thus, exploring how gender and gender role beliefs are associated with the consumption of and willingness to reduce animal products beyond meat is an important avenue for future research.

5.4 Implications for Practice

The findings presented in this thesis suggest two key practical implications:

1) Findings on the gendered nature of meat consumption could inform interventions to promote meat reduction among men and
2) efforts to improve the status of animals and of women could be mutually dependent.

5.4.1 Reducing Meat Consumption in Men

Men consume more meat than women and are thus responsible for the largest proportion of global meat consumption. Hence, interventions tackling meat consumption in men could be particularly fruitful. However, men are more strongly attached to meat (Graça et al., 2015) and more resistant to interventions aimed at reducing meat consumption than women (Dowsett et al., 2018). The findings of Chapter 4 also suggest that concerns about preserving their masculinity might deter men from exploring more plant-based diets. Indeed, qualitative evidence suggests that vegan men are targets of pervasive gendered stigma because of their dietary choices (Bogueva et al., 2020; Nath, 2011) and that anticipated stigma is a key deterrent from plant-based diets (Markowski & Roxburgh, 2019).

One avenue to promote more plant-based diets among men could be to promote veg*nism in ways that are compatible with masculine norms (e.g., Rothgerber, 2013). As outlined in the introduction to Chapter 1, for example, the documentary “The Game Changers” seems to rely on traditional masculine stereotypes of strength and athleticism to combat the derogatory “soy boy” image portraying vegan men as effeminate and physically weak, which is prominent particularly in right-wing spheres (Salmen & Dhont, 2021).

Similarly, the results of Chapter 3 suggest that marketing plant-based meat alternatives in ways that appeal to traditional masculinity, for example by highlighting optimal protein content or by adding "grill marks" to simulate the appearance of grilled meat, could improve their acceptance. However, as Rosenfeld and Tomiyama (2021) noted, validating ideals of traditional masculinity could come with other unwanted consequences given that men's attempts to comply with traditional masculinity have been associated with countless aversive outcomes (Bosson et al., 2009; Weaver et al., 2013; Willer et al., 2013).

Instead, promoting a more inclusive and flexible masculinity that allows for behaviors commonly perceived as feminine could potentially help reduce meat consumption as well as other behaviors that are harmful to men and those around them. Indeed, the more men subscribe to this "new masculinity", the more positive their attitudes towards vegetarianism and the stronger their intentions to reduce their meat consumption in the future (de Backer et al., 2020). Research also found that beef consumption was no longer used as a response to masculinity threat when it was presented as a behavior that women engage in frequently (Mesler et al., 2021). This suggests that men are sensitive to reference group information when evaluating the masculine value of meat. Social norms interventions (Miller & Prentice, 2016) highlighting shifting norms among men away from meat consumption (or, more generally, away from traditional masculinity) could be a promising starting point. Future research could test whether appeals to traditional masculinity can indeed backfire, and how new masculinity and the associated behavior shifts can be promoted.

5.4.2 Linking Women's and Animal Liberation

Scholars have argued that, in order to effectively combat oppression, we need to understand the mutual interdependence of prejudice along different dimensions (Adams, 2015, 2018; Adams & Gruen, 2014; C. A. MacKinnon, 2004; Wyckoff, 2014). When animal rights activists use sexualized images of women to promote animal rights, they not only run

the risk of "exploit[ing] one form of oppression to raise awareness for another" (Wyckoff, 2014, p. 722), but these campaigns could also backfire because the sexualization of women is a key factor underlying their dehumanization (Morris et al., 2018). Indeed, when people viewed animal rights campaign ads featuring sexualized images of women (relative to non-sexualized images), they dehumanized the women more by denying them uniquely human traits, and this was further associated with lower support for the animal rights organization (Bongiorno et al., 2013).

In a similar vein, as discussed above, interventions to reduce men's meat consumption by appealing to traditional masculinity might reinforce the very patriarchal gender structures that prohibit men from expressing compassion for animals. On the flipside, efforts to increase the societal status of animals could have positive downstream consequences for the status of women, and vice versa. Indeed, past research has shown that closing the perceived human-animal divide reduces outgroup dehumanization and, in turn, improves outgroup attitudes (Bastian et al., 2012; Costello & Hodson, 2010). Conversely, raising the status of femininity relative to masculinity might encourage men to explore plant-based diets even if they run the risk of appearing more feminine. Overall, if the oppression of animals and of women are indeed mutually dependent, then campaigns that devalue one group to promote compassion for the other are doomed to fail.

5.4.3 Conclusion

> "Voluptuous vegan Pamela Anderson is proving that all animals have the same parts and encouraging people to ditch meat. In this sexy ad for PETA, the blonde bombshell shows some serious skin and looks as if she's been tagged by a butcher, making it clear that humans and animals are composed of identical parts." (PETA, 2017)

By using quantitative social psychological methods to test thus far neglected predictions derived from ecofeminist theory, this thesis contributes to the growing body of research demonstrating that human-animal and human intergroup relations show important parallels and have the potential to inform each other. Based on evidence that derogatory attitudes towards women are related to their animalistic dehumanization, and that derogatory attitudes towards vegan men are related to their feminization, we argued that the devaluation of animals and nature and the devaluation of women could mutually maintain and reinforce each other. Thus, animal rights campaigns such as the now infamous "All Animals Have the Same Parts" campaign by People for the Ethical Treatment of Animals (PETA) should be a cause for concern. The findings presented in this thesis suggest that adopting a more holistic approach to animal and women's liberation, one that refuses to exploit one group to promote awareness for the other, could be more effective. As summed up by vegan feminist Carol Adams (2015, p. xxvi): "[…] we have to stop fragmenting activism; we cannot polarize human and animal suffering because they are interrelated."

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Appendices

Appendix A (Chapter 2)

Results of Exploratory Analyses to Test Whether the Hypothesized Associations Were Moderated by Gender

Study 1: Moderation analyses revealed one significant interaction effect for the interaction between human supremacy beliefs and gender on benevolent sexism ($b = .16$, $SE = .08$, $p = .045$), suggesting a stronger effect for women than for men ($b = .41$, $SE = .04$, $p < .001$ and $b = .25$, $SE = .07$, $p < .001$, respectively).

Study 2: Moderation analyses revealed that gender moderated the association between women's connection to nature and benevolent sexism, $b = -.36$, $SE = .15$, $p = .020$, suggesting a stronger association for men than for women ($b = .65$, $SE = .12$, $p < .001$ and $b = .30$, $SE = .09$, $p = .001$, respectively). Also the association between blatant dehumanization and benevolent sexism was moderated by gender ($b = .02$, $SE = .07$, $p = .011$). This association was significant for women ($b = .02$, $SE = .005$, $p < .001$), but not for men ($b = .004$, $SE = .005$, $p = .374$).

Study 3: Moderation analyses revealed no significant interaction effects.

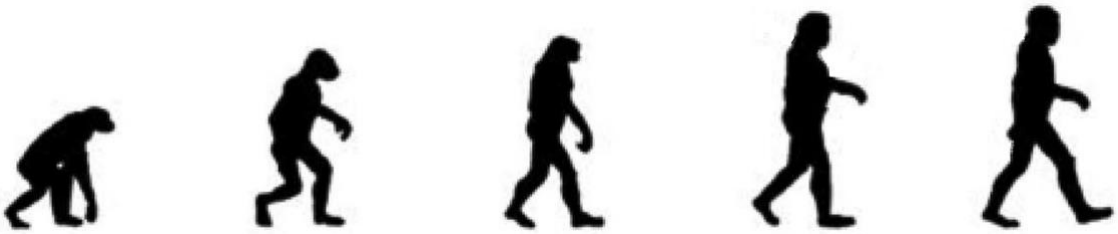
Study 4: The results suggest that the association between blatant dehumanization and benevolent sexism was moderated by gender ($b = .02$, $SE = .006$, $p = .011$) with a stronger association among women ($b = .03$, $SE = .005$, $p < .001$), compared to men ($b = .01$, $SE = .003$, $p < .001$).

Study 5: None of the paths from the predictors to the sexism variables were moderated by gender. Yet, gender significantly moderated the path from hostile sexism to rape myth

acceptance ($b = -.21$, $SE = .01$, $p < .001$, revealing a stronger association for men compared to women ($b = .58$, $SE = .05$, $p < .001$ and $b = .36$, $SE = .05$, $p < .001$, respectively).

Appendix B (Chapter 2)

Image Used for Blatant Dehumanization Scale in Study 2 Based on Kteily et al. (2015)



Appendix C (Chapter 2)

Benevolent Nature Beliefs Scale

(1 = strongly disagree; 7 = strongly agree)

1. People cannot be truly happy without being surrounded by nature.
2. Nature has a quality of purity that human culture does not possess.
3. Nature should be cherished by humans.
4. Humans are incomplete without nature.
5. Nature is fragile and needs to be protected.

Appendix D (Chapter 3)

Images Used in Study 1

Participants saw all six images, with three images depicting regular meat and three images depicting plant-based meat. However, participants were unaware what was actually presented in the photos as the labels assigned to the dishes were counterbalanced across images and participants. *Regular Meat*

Plant-Based Meat

Images Used in Study 2

Participants saw all six images, with three images depicting regular meat, three images depicting plant-based meat, and three images depicting clean meat. However, participants were unaware what was actually presented in the photos as the labels assigned to the dishes were counterbalanced across images.

Regular Meat

Plant-Based Meat

Clean Meat