Non-speciesist language conveys moral commitments to animals and evokes do-gooder derogation

Supplemental File

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Open Science and Reproducibility

Data and materials sharing. The raw data and analysis files can be accessed via the *Open Science Framework* (https://osf.io/xr3w8/). The materials are available below.

Declarations. We report all measures and manipulations. No data were analysed prior to reaching the reported sample size. All studies received institutional ethics approval in accordance with the British Psychological Society's code of ethics and conduct.

Computational reproducibility. Statistical analyses were conducted in R (4.2.1; R Core Team, 2022) with the packages pwr (Champely, 2020), afex (1.1.1; Singmann et al., 2022), apa (0.3.3; Gromer, 2020), psych (2.2.5; Revelle, 2022), and ltm (1.2.0; Rizopoulos, 2006). Mediation analyses were conducted using Hayes' PROCESS macro in R (Hayes, 2013).

Pre-registrations. Study 1 was not pre-registered. Study 2 was pre-registered (https://osf.io/y6rbc/). Pre-registrations included: hypotheses, sample target, design, measures, transformations, and statistical analyses. Study 3 was pre-registered and comprises two samples, one of meat-eaters and one of veg*ns (i.e. vegetarians and vegans). We pre-registered our intention to collect the sample of meat-eaters on the 25th of April 2022 (https://osf.io/pky9z/) and the sample of veg*ns on the 29th of April 2022 (https://osf.io/v8dh5/). Both samples were collected on the day they were pre-registered. Pre-registrations included: hypotheses, sample target, design, measures, transformations, and statistical analyses.

Sample size justifications. Study 1's sample target (n = 250) was set on the basis of an a priori power analysis ($1 - \beta > 80\%$, $\alpha = .050$, two-tailed) guided by some general expectations about the likely magnitudes of the effects. A power analysis suggested that this sample would be sufficient to reliably detect the expected effects ($d > 0.36$) of language (non-speciesist vs. speciesist) on social judgements.

Study 2's sample target (n = 350) was set on the basis of an a priori power analysis ($1 - \beta > 80\%$, $\alpha = .050$, two-tailed) guided by the observed effects in Study 1. Following the hypotheses outlined in the Main Text, we expected the largest differences in social judgments to arise in response to those who avoid speciesist euphemisms compared to those who do not (d = 0.50) and little or no differences in social judgments between those who use objectifying language and those who do not (d = 0.00). We were unsure about what differences to expect between those who refer to animals with dichotomized and essentialized categories compared to those who do not and therefore assumed for the sake of the power analysis that this difference would be the average of the two previously mentioned (d = 0.25). These estimates correspond to an overall difference in social judgments between those who use non-speciesist language and those who do not of the following magnitude: η_p^2 = .025. They also correspond to an interaction effect between speciesist-language (non-speciesist vs. speciesist) and language-type (euphemisms vs. dichotomized and essentialized categories vs. objectification) on social judgments of the following magnitude: η_p^2 = .025. Simulating 10,000 samples via the Superpower package for R (Lakens & Caldwell, 2019) suggested that 350 participants would afford greater than 80% power to detect the expected effects.

Study 3's sample target (n_{Total} = 800; $n_{\text{Meat-eaters}}$ = 400, $n_{\text{Veg*ns}}$ = 400) was set on the basis of an a priori power analysis (1 - β > 80%, α = .050, two-tailed) guided by the observed effects in Study S1. A power analysis suggested that these samples would be sufficient to reliably detect the expected effects (d > 0.28) of language and diet on social judgements. Simulating 10,000 samples via the Superpower package for R (Lakens & Caldwell, 2021), suggested that the samples would be sufficient to reliably detect the expected interaction effect (η_p^2 > .012) between language and diet on social judgments. Finally, simulating 10,000 samples via Schoemann et al's (2017) Shiny app (rs: a_1 = .14, a_2 = .30, b_1 = .14, b_2 = -.30), suggested the samples would be sufficient to reliably detect the expected indirect effects within both the sample of meat-eaters and the sample of vegetarians and vegans.

Additional analyses

Study 1. We explored if non-speciesist language was interpreted differently by those with different diets and moral commitments. There was no evidence to suggest that participants interpreted non-speciesist (vs. speciesist) language differently depending on their own dietary and moral commitments. This was true both for the inferences they made about whether the persons was likely to be vegetarian or vegan, $F(5, 238) = 1.19$, $p = .313$, $\eta_p^2 = .02$, and whether they were likely to hold speciesist beliefs, $F(5, 238) = 0.61$, $p = .694$, $\eta_p^2 = .01$. Thus, the social signal conveyed by non-speciesist language about people's moral commitments to animals seems to be equally clear to those who eat meat and those who do not. We also tested if non-speciesist language was interpreted differently by men compared to women, and by those who are younger compared to older. There was no evidence to suggest that men and women viewed non-speciesist language (vs. speciesist) differently in terms of the person's diet, $F(1, 242) = 1.49$, $p = .223$, $\eta_p^2 < .01$, or speciesist beliefs, $F(1, 242) = 1.49$, $p = .223$, $\eta_p^2 < .01$. Likewise, there was no reason to think that younger participants (bottom quantile; ages 18 - 35) viewed non-speciesist language (vs. speciesist) differently than older participants (top quantile; ages 36 - 77) in terms of inferences about diet, $F(1, 245) = 0.87$, $p = .352$, $\eta_p^2 < .01$, or speciesist beliefs, $F(1, 245) = 3.08$, $p = .080$, $\eta_p^2 = .01$.

Study 2. Given the low number of vegetarians and vegans, we were unable to test for the potential moderating effect of perceiver-diet in the present sample. We did, however, test if non-speciesist language was interpreted differently by men compared to women, and by those who are younger compared to older. There was no evidence to suggest that any of the central effects differed between men and women, Fs < 1.26, ps > .228, $\eta_p^2 < .01$. Nor did they differ between younger (bottom quantile; ages 18 - 39) and older participants (top quantile; ages 40 - 80) , Fs < 2.29, ps > .104, $\eta_p^2 < .01$.

Study 3. Non-speciesist language again conveyed information about moral commitments to animals, as it did in Studies 1 and 2. Participants were more likely to believe that someone was a vegetarian or vegan if they adopted non-speciesist language compared to if they did not, $F(1, 797) =$

223.44, $p < .001$, $\eta_p^2 = .22$, and this inference was not moderated by participants' diet, $F(5, 797) = 0.79$, $p = .558$, $\eta_p^2 < .01$. Thus, we again found that non-speciesist language reliably conveyed information about moral commitments to animals, and that this was picked up in largely the same way by those who eat meat and those who do not. Lastly, we tested if non-speciesist language was interpreted differently by men compared to women, and by those who are younger compared to older. There was little evidence to suggest that any of the central effects differed between men and women, *F*s < 3.53, *p*s > .061, $\eta_p^2 < .01$. Although men perceived those who used non-speciesist language as more arrogant (M = 4.29, SD = 1.76) than did women (M = 3.69, SD = 1.75), $t(394) = 3.35$, $p < .001$, $d = 0.34$, 95% CI [0.14, 0.54]. There were few note-worthy differences between younger (bottom quantile; ages 18 - 37) and older participants (top quantile; ages 38 - 80) in how they viewed non-speciesist language, *F*s < 1.77, *p*s > .184, $\eta_p^2 < .01$.

Figure S1

Speciesist and non-speciesist language used in Study 1 and S1.

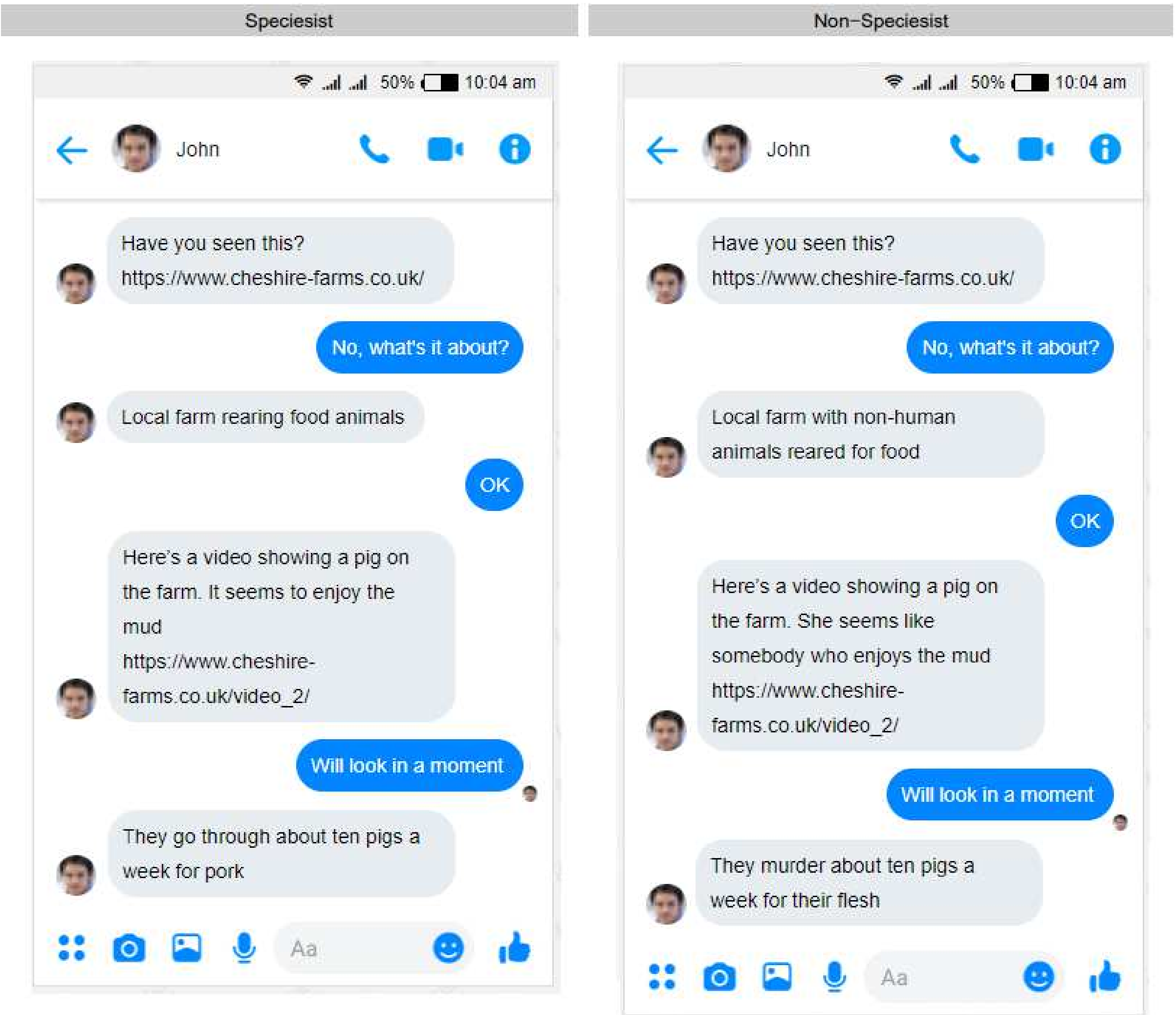

Figure S2

Speciesist and non-speciesist language (euphemisms) used in Study 2.

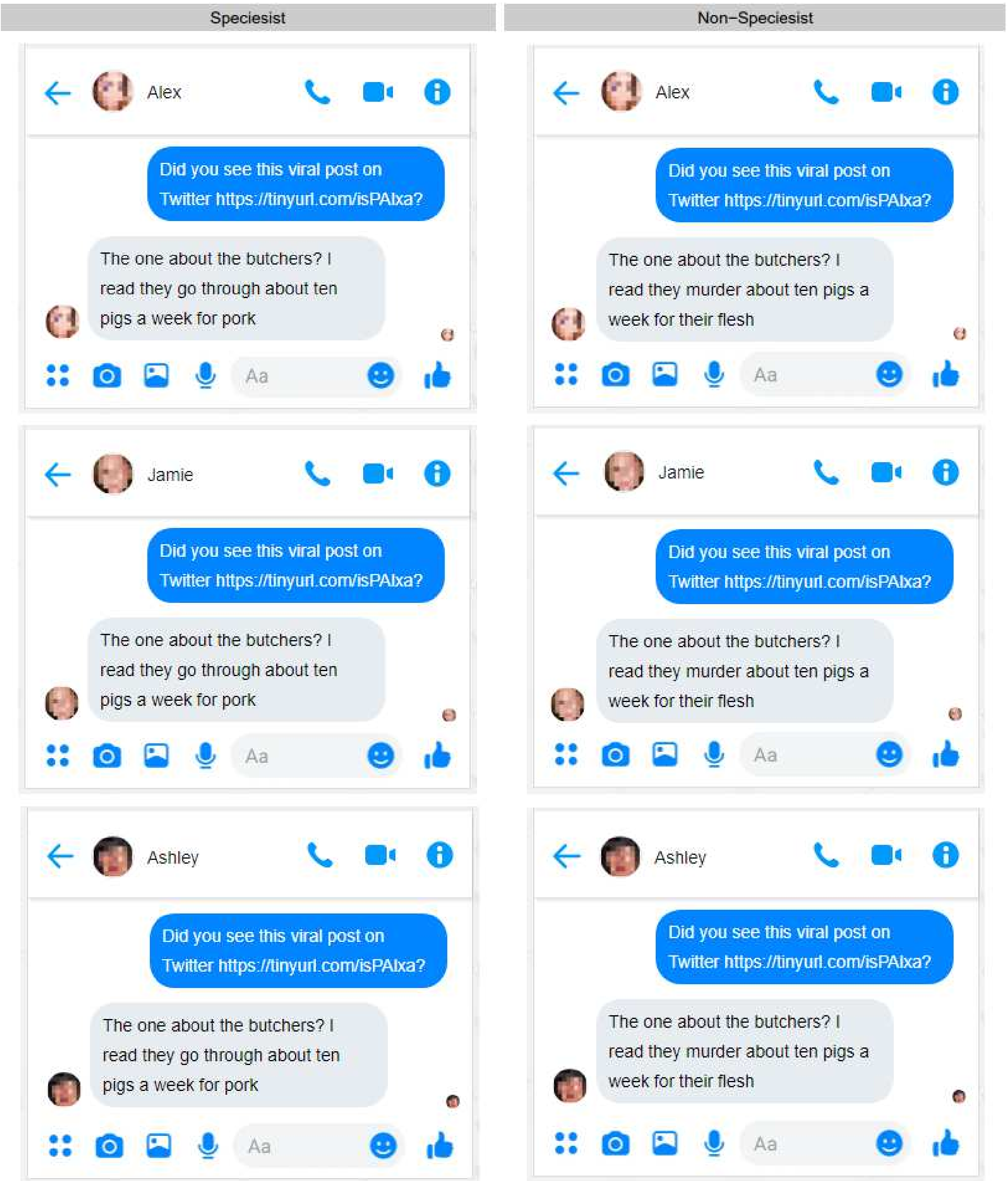

Figure S3

Speciesist and non-speciesist language (dichotomized and essentialized categories) used in Study 2.

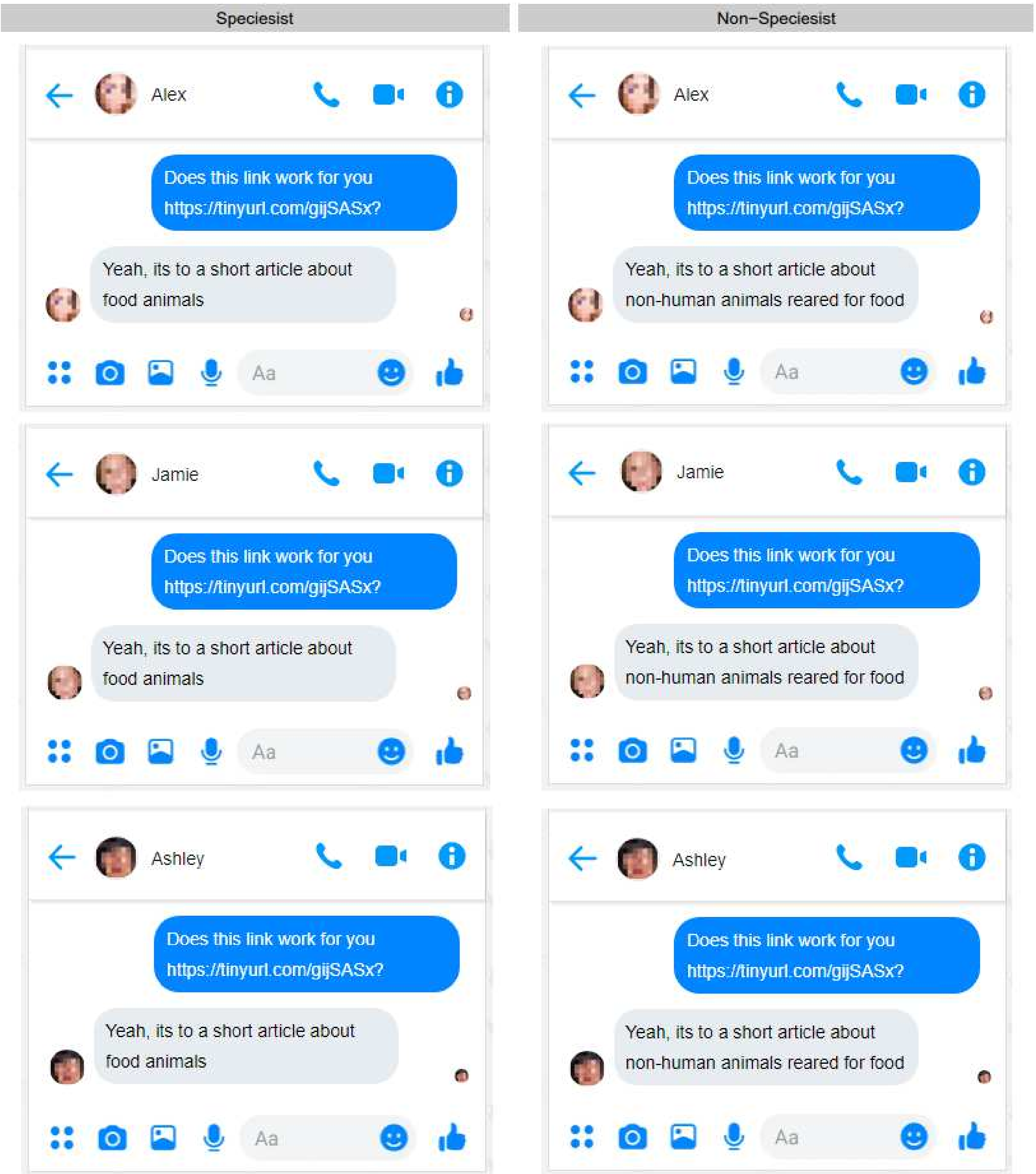

Figure S4

Speciesist and non-speciesist language (objectification) used in Study 2.

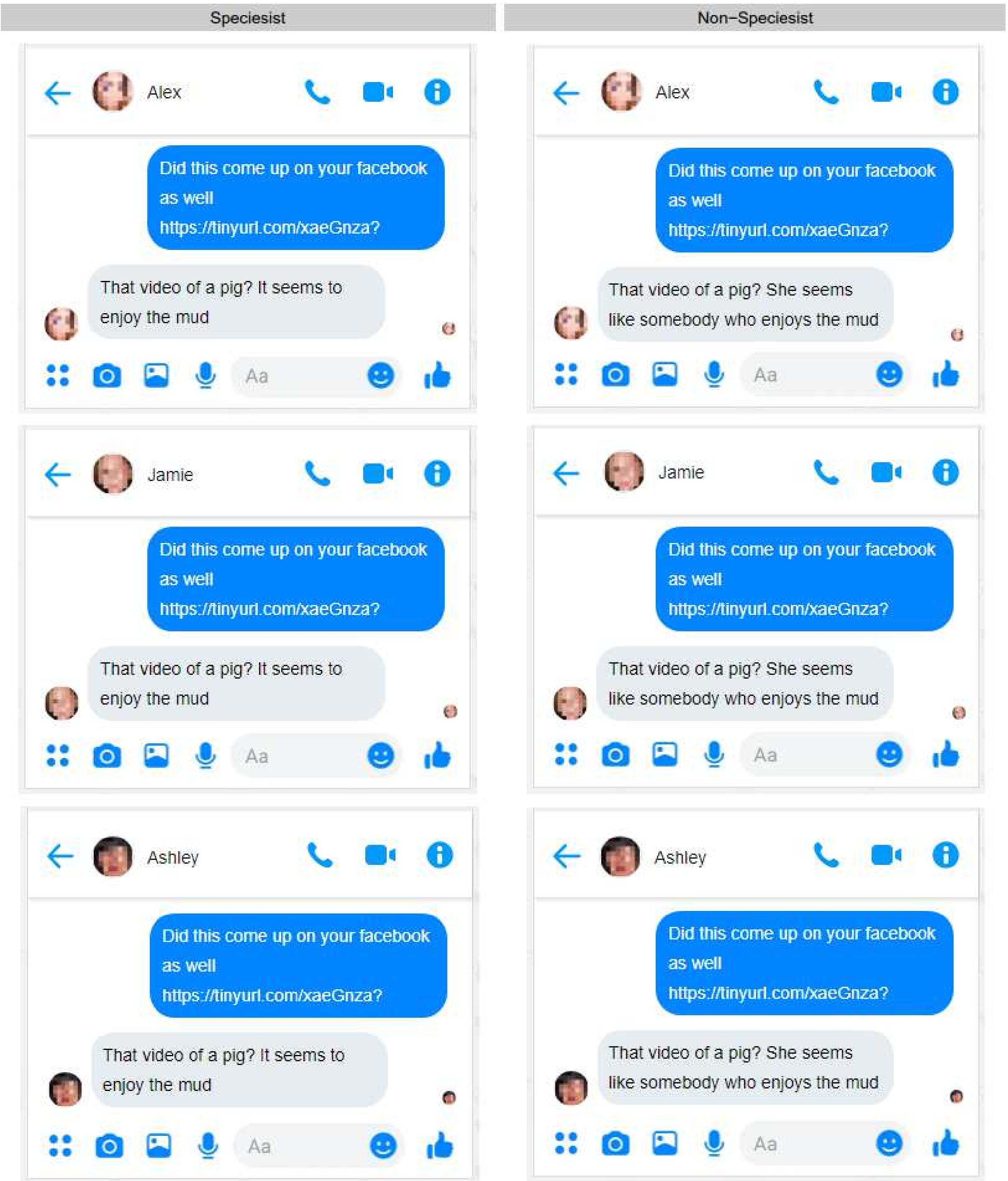

Figure S5

Speciesist and non-speciesist language used in Study 3.

Speciesist	Non-Speciesist
Hi, I'm John. I'm in my second year at uni in the south of the UK. I like going on day trips organized by the societies on campus. Last weekend we went to a local farm. They mostly rear food animals, like pigs and such. Its a small local farm that goes through about ten pigs a week for pork. I got to feed one of the pigs by hand, something I'd never done before. It seemed to enjoy it.	*Hi, I'm John. I'm in my second year at uni in the south of the UK. I like going on day trips organized by the societies on campus. Last weekend we went to a local farm. They mostly had nonhuman animals which they rear for food, like pigs and such. Its a small local farm that murders about ten pigs a week for their flesh. I got to feed one of the pigs by hand, something I'd never done before. She enjoyed it.*

Homogeneity of variance

Figures 1 and 2 suggest that judgements about non-speciesist language may be more variable than those about speciesist language. Because of this, we conducted additional analyses to test if our findings were robust to violations of homogeneity of variance. All findings reported in the Main Text hold when tested via models which do not assume homogeneity of variance (i.e., Welch t-tests). A summary is provided below in Tables S1-S5.

Table S1

Study 1: Comparison of statistical models which assume equal variance (Student's T-Test; Report in the Main Text) and do not (Welch's T-Test).

Judgement	Descriptives		Test	
	Speciesist	Non-Speciesist	Student's T-Test	Welch's T-Test
Diet	4.50 (1.68)	5.94 (1.38)	$t(248) = 7.41, p < .001, d = 0.94$	$t(237.63) = 7.40, p < .001, d = 0.94$
Speciesism	2.85 (1.16)	2.19 (1.11)	$t(248) = -4.65, p < .001, d = -0.59$	$t(247.09) = -4.65, p < .001, d = -0.59$

Table S2

Study 2: Comparison of statistical models which assume equal variance (Student's T-Test; Report in the Main Text) and do not (Welch's T-Test).

Judgement	Language-type	Descriptives		Test	
		Speciesist	Non-Speciesist	Student's T-Test	Welch's T-Test
Diet	Euphemisms	4.45 (1.65)	5.74 (1.29)	$t(341) = 8.66, p < .001, d = 0.93$	$t(336.07) = 8.65, p < .001, d = 0.93$
	Dichotomized/Essentialized	3.91 (1.36)	4.31 (1.37)	$t(341) = 2.77, p = .006, d = 0.30$	$t(341.00) = 2.77, p = .006, d = 0.30$
	Objectification	3.58 (1.20)	3.31 (1.09)	$t(341) = -2.20, p = .029, d = -0.24$	$t(337.99) = -2.19, p = .029, d = -0.24$
Social Attractiveness	Euphemisms	3.70 (1.05)	3.05 (1.25)	$t(341) = -5.17, p < .001, d = -0.56$	$t(331.53) = -5.17, p < .001, d = -0.56$
	Dichotomized/Essentialized	3.73 (1.05)	3.51 (1.06)	$t(341) = -1.89, p = .060, d = -0.20$	$t(340.99) = -1.89, p = .060, d = -0.20$
	Objectification	4.02 (1.00)	4.04 (1.03)	$t(341) = 0.13, p = .896, d = 0.01$	$t(340.79) = 0.13, p = .896, d = 0.01$

Table S3

Study 3 (Confirmatory Analyses): Comparison of statistical models which assume equal variance (Student's T-Test; Report in the Main Text) and do not (Welch's T-Test).

Judgement	Diet	Descriptives		Test	
		Speciesist	Non-Speciesist	Student's T-Test	Welch's T-Test
Social Attractiveness	Meat-eaters	4.28 (1.21)	3.05 (1.32)	$t(396) = -10.59, p < .001, d = -0.94$	$t(482.74) = -10.68, p < .001, d = -0.97$
	Veg*ns	3.48 (1.80)	3.66 (1.80)	$t(298) = 1.03, p = .304, d = 0.12$	$t(259.03) = 1.02, p = .309, d = 0.12$
Compassion	Meat-eaters	4.73 (1.08)	4.45 (1.45)	$t(483) = -2.38, p = .018, d = -0.22$	$t(459.29) = -2.40, p = .017, d = -0.22$
	Veg*ns	3.53 (1.36)	4.45 (1.80)	$t(298) = 5.03, p < .001, d = 0.58$	$t(267.95) = 4.99, p < .001, d = 0.58$
Arrogance	Meat-eaters	1.77 (0.93)	4.28 (0.99)	$t(483) = 19.46, p < .001, d = 1.77$	$t(382.39) = 19.80, p < .001, d = 1.77$
	Veg*ns	1.97 (0.99)	3.59 (1.76)	$t(298) = 9.92, p < .001, d = 1.15$	$t(223.52) = 9.75, p < .001, d = 1.15$

Table S4

Study 3 (Confirmatory Analyses): Comparison of statistical models which assume equal variance (Student's T-Test; Report in the Main Text) and do not (Welch's T-Test).

Judgement	Language	Descriptives		Test	
		Meat-eaters	Veg*ns	Student's T-Test	Welch's T-Test
Social Attractiveness	Speciesist	4.28 (1.21)	3.48 (1.28)	t(349) = 6.11, p < .001, d = 0.62	t(316.30) = 6.15, p < .001, d = 0.64
	Non-Speciesist	3.05 (1.32)	3.66 (1.80)	t(345) = -3.82, p < .001, d = -0.40	t(234.81) = -3.58, p < .001, d = -0.41
Compassion	Speciesist	4.73 (1.08)	3.53 (1.36)	t(388) = 9.61, p < .001, d = 0.99	t(277.62) = 9.18, p < .001, d = 0.99
	Non-Speciesist	4.45 (1.45)	4.45 (1.80)	t(393) = -0.03, p = .972, d = -0.00	t(253.21) = -0.03, p = .974, d < 0.01
Arrogance	Speciesist	3.59 (1.76)	4.28 (1.76)	t(393) = 3.78, p < .001, d = 0.39	t(301.89) = 3.78, p < .001, d = 0.39
	Non-Speciesist	1.77 (0.93)	1.97 (0.99)	t(388) = -2.02, p = .044, d = -0.21	t(315.54) = -2.00, p = .047, d = -0.21

Table S5

Study 3 (Exploratory Analyses): Comparison of statistical models which assume equal variance (Student's T-Test; Report in the Main Body) and do not (Welch's T-Test).

Judgement	Diet	Descriptives		Statistical Test	
		Speciesist	Non-Speciesist	Student's T-Test	Welch's T-Test
Social Attractiveness	Omnivore	4.31 (1.21)	3.00 (1.30)	t(396) = -10.36, p < .001, d = -1.04	t(395.46) = -10.38, p < .001, d = -1.04
	Semi-Vegetarian	4.09 (1.18)	3.24 (1.39)	t(85) = -3.03, p = .003, d = -0.65	t(84.80) = -3.08, p = .003, d = -0.65
	Lacto/Ovo-Vegetarian	4.03 (1.09)	3.12 (1.53)	t(104) = -3.57, p < .001, d = -0.69	t(87.49) = -3.50, p < .001, d = -0.69
	Strict Vegetarian	3.54 (1.02)	3.48 (1.92)	t(44) = -0.12, p = .905, d = -0.04	t(41.37) = -0.13, p = .895, d = -0.04
	Vegan	3.08 (1.33)	4.13 (1.83)	t(146) = 4.07, p < .001, d = 0.67	t(120.14) = 3.97, p < .001, d = 0.67
Compassion	Omnivore	4.84 (1.01)	4.39 (1.45)	t(396) = -3.58, p < .001, d = -0.36	t(360.26) = -3.60, p < .001, d = -0.36
	Semi-Vegetarian	4.15 (1.25)	4.69 (1.48)	t(85) = 1.79, p = .077, d = 0.39	t(84.83) = 1.82, p = .072, d = 0.39
	Lacto/Ovo-Vegetarian	3.99 (1.08)	4.19 (1.77)	t(104) = 0.71, p = .480, d = 0.14	t(79.21) = 0.69, p = .492, d = 0.14
	Strict Vegetarian	3.28 (1.17)	4.40 (1.75)	t(44) = 2.42, p = .020, d = 0.72	t(43.93) = 2.58, p = .013, d = 0.72
	Vegan	3.27 (1.50)	4.67 (1.83)	t(146) = 5.11, p < .001, d = 0.84	t(129.46) = 5.03, p < .001, d = 0.84
Arrogance	Omnivore	1.77 (0.93)	4.35 (1.79)	t(396) = 17.97, p < .001, d = 1.80	t(303.29) = 18.13, p < .001, d = 1.80
	Semi-Vegetarian	1.78 (0.95)	4.00 (1.62)	t(85) = 7.55, p < .001, d = 1.63	t(78.07) = 7.94, p < .001, d = 1.63
	Lacto/Ovo-Vegetarian	1.71 (0.69)	4.17 (1.96)	t(104) = 8.82, p < .001, d = 1.72	t(59.88) = 8.43, p < .001, d = 1.72

	Strict Vegetarian	2.02 (1.07)	3.56 (1.53)	t(44) = 3.78, p < .001, d = 1.13	t(44.00) = 4.01, p < .001, d = 1.13
	Vegan	2.14 (1.11)	3.17 (1.58)	t(146) = 4.65, p < .001, d = 0.77	t(117.41) = 4.53, p < .001, d = 0.77

Study S1

Study S1 examined if non-speciesist language evokes similar trait-attributions as does being a vegetarian or vegan. This included: general inferences about social warmth (Fiske et al., 2007; Koch et al., 2016) and more specific inferences about whether one is, for example, kind, intelligent, judgemental, strong, and conceited (Minson & Monin, 2012; O'Connor & Monin, 2016). Off the back of prior work showing do-gooder derogation directed towards those who abstain from meat eating (MacInnis & Hodson, 2017; Minson & Monin, 2012; O'Connor & Monin, 2016; Rothgerber, 2014), we predicted that meat-eaters would perceive those who adopt non-speciesist language as less socially warm.

Method

Transparency, sampling, and design

Open science. Study S1 was not pre-registered. The raw data can be accessed via the *Open Science Framework* (https://osf.io/xr3w8/).

Sampling. We aimed to recruit 300 participants, so as to afford 80% power (α = .050, two-tailed) to detect: d = 0.34 (Champely, 2020). Three hundred and nineteen adults (251 female; M_{age} = 19.89, SD_{age} = 3.90) from a university in the United Kingdom participated online in exchange for course credit. Participants identified their diet as documented in Table S4.

Design. Participants were randomly allocated to one of two conditions in a between-participant design (speciesist vs. non-speciesist language).

Table S4

Sample demographics in Study S1.

Dietary self-identification	n_{Total} (n_{Female})	M_{Age}(SD_{Age})
Omnivore I eat meat and other animals products, like dairy and/or eggs	233 (177)	19.20 (3.47)
Pescatarian I eat fish and/or seafood, as well as dairy products and eggs, but no	10 (8)	19.70 (12.20)

other meat		
Semi-Vegetarian I eat meat, but only on rare occasions or only certain types of meat	53 (47)	19.60 (1.97)
Lacto- or Ovo-Vegetarian I eat dairy products and/or eggs, but no meat or fish	14 (11)	19.20 (0.80)
Strict vegetarian I eat no animal products, including dairy and eggs, but would not consider myself full vegan	6 (5)	19.70 (1.37)
Vegan I eat no animal products, including dairy, eggs, etc., and avoid all non-food animal products	3 (3)	24.00 (7.81)

Procedure and Materials

Participants were presented with the same social-media exchanges as in Study 1. They then reported their impressions of John via a ten-item measure of warmth ("I would describe John as…annoying [loving] [friendly] [cuddly] [cold] [pleasant] [worthless] [cruel] [distant] [soft]"; Fiske et al., 2007; Koch et al., 2016), from 1 (strongly disagree) to 7 (strongly agree). They also reported their perceptions of various traits, studied in prior work on perceptions of vegetarians and do-gooder derogation (Minson & Monin, 2012). Participants were presented with ten bi-polar trait dimensions on seven-point scales ("I see John as someone who is…"): mean-kind, stupid-intelligent, unhealthy-healthy, non-judgemental-judgement, non-religious-religious, dirty-clean, weak-strong, conceited-humble, immoral-moral, and fat-skinny.

Results and Discussion

Factor analyses

We conducted a basic factor analysis to explore the structure of the measures. The ten items tapping perceptions of warmth loaded heavily onto a single factor, and as such, were collapsed into a single index (α = .86, M = 3.67, SD = 0.89). The remaining ten bi-polar trait dimension items did not cohere into a single factor. This is consistent with prior work, which considered some items sufficiently different to not aggregate them with others (e.g., non-religious-religious; Minson & Monin, 2012). Because of this, we opted to analyse these on the item level.

Main analysis

Meat-eaters felt less warm towards someone if they adopted non-speciesist language compared to if they did not, $t(294) = -2.47$, $p = .014$, $d = -0.29$, 95% CI [-0.52, -0.06]. They also perceived someone who adopted non-speciesist language to be less kind, $t(294) = -2.21$, $p = .028$, $d = -0.26$, 95% CI [-0.49, -0.03], more judgemental, $t(294) = 3.43$, $p < .001$, $d = 0.40$, 95% CI [0.17, 0.63] and less humble, $t(294) = -2.52$, $p = .012$, $d = -0.29$, 95% CI [-0.52, -0.06], compared to someone who did not. We found no difference in judgments along the dimensions of: stupid-intelligent, unhealthy-healthy, non-religious-religious, dirty-clean, weak-strong, immoral-moral, or fat-skinny, *t*s < 1.62, *d*s < 0.19. These results confirmed the predictions and echo the findings of Study 3 regarding perceptions of compassion and arrogance.

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