







# Exploring Public Support for Farmed Animal Welfare Policy and Advocacy Across 23 Countries

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Supplementary Materials: Code, Data, Materials, Preregistration [see [Index of Supplementary Materials](#)]



## Abstract

Farmed animal policy and advocacy efforts both attempt to generate and depend upon public support. However, relatively little is known about the factors that predict support for animal protection legislation and advocacy across the globe. We analyse data from a large international survey (23 countries,  $n = 20,966$ ) alongside other data sources on animal advocacy to investigate knowledge of factory farming, the connection between attitudes towards animals and the strength of animal protection legislation, attitudes towards animals based on their food status in different countries, and the connection between personal support for policy, animal advocacy, civic activism, and animal advocacy organisations. We found that higher support for animal welfare is associated with stronger farm animal protection legislation across countries and that concerns about specific animals can vary depending on cultural and religious factors. Contrary to study hypotheses, we did not find greater support for advocacy in countries with more advocacy organisations, suggesting important opportunities to pursue advocacy in relatively neglected regions. Results are interpreted in terms of how farmed animal advocates can take advantage of and potentially generate support for animal welfare throughout the world.



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## Keywords

attitudes, cross-country comparisons, animal welfare, legislation, policy, farmed animals

Intensive animal agriculture is linked to a range of environmental and public health issues, including climate change, deforestation, antibiotic resistance, and pandemic potential, as well as significant cruelty to animals (Amiot & Bastian, 2015; Anomaly, 2015; Godfray et al., 2018). Animal advocacy organizations are committed to increasing awareness of these issues to increase support for animal welfare. Because cultures vary in patterns of animal agriculture, the importance they attribute to animal welfare in general (Cembalo et al., 2016), and which animals tend to be the focus of these welfare concerns (e.g., Li et al., 2017), the most effective approaches to animal advocacy depends in part on contextual factors involving culture, norms, geography, and economics.

Varying attitudes and practices with regard to animal consumption across countries or cultures are likely related to varying levels of knowledge, concern, and support for animal welfare among citizens. This variation may in turn be related to institutional and legislative protection of animals. The general goal of this study is to examine how countries differ in their attitudes about farmed animal welfare, and what implications such differences may have for broader social policy and advocacy. We tested several possible connections between culture-based attitudes and support for farmed animal welfare.

First, if we assume that social policies tend to both shape and reflect the public's values (Oreg & Katz-Gerro, 2006), then public support for farmed/aquatic animal welfare should be higher in countries with more progressive government policies on farmed animal welfare (World Animal Protection, 2020). This finding would establish a basic premise in animal advocacy regarding the connection between public attitudes and institutional policies.

Second, we expect that the public's attitudes towards certain animal species will vary depending on their food status within that country. Previous research has shown that people show less concern towards animals that are categorised as food compared to animals categorised as non-food (Krings et al., 2021). However, animal consumption practices vary across cultures: for example, whereas goat meat is commonly consumed across Asia and South America, it is rarer in North America and northern Europe (Mandolesi et al., 2020). Pig meat, while common across Europe and America, is less common in some Asian countries, particularly those in which Islam is a dominant religion (Ritchie & Roser, 2017). Likewise, cow meat is less common in India because many Indians are Hindu, and cows are considered sacred and thus not eaten in Hinduism (Sarkar & Sarkar, 2016). Therefore, there is considerable cultural variation in the animals regarded as food. Given that eating animals is associated with higher cognitive dissonance (Loughnan et al., 2010), people in countries where an animal is not categorised as food may tend to show greater feeling of connection to that particular animal. At the same time,

culture-based reasons for avoiding eating certain animals may also be important. For example, cow meat is generally shunned in Hinduism, which regards cows as sacred. In contrast, pig meat is forbidden in Islam because it is regarded as impure. While both religions restrict the consumption of certain animals, the underlying basis for doing so is very different, and thus it is possible that their adherents regard those animals very differently. Specifically, Hindus would be expected to show an increased feeling of personal connection to cows whereas Muslims would tend to show a decreased feeling of personal connection to pigs. Understanding how cultural and religious values are linked with attitudes about specific animals could help advocates tailor their efforts to certain species in certain regions where advocacy efforts may be most effective.

Third, we expect that consumers generally underestimate the extent of factory farming, given that this information is typically not made readily available, and that consumers are generally motivated to minimize the harm they view themselves as taking part in (Bastian & Loughnan, 2017). For example, the Sentience Institute reported that the majority of Americans believe most farmed animals are treated well before slaughter (Reese-Anthis, 2017). Similarly, research suggests that rates of farmed animals living on large factory farms may be underestimated throughout the world (Anthis & Reese-Anthis, 2019). Greater knowledge of the rates and practices of large factory farms could be important for redressing these perceptions and potentially encouraging support for animal welfare (Sparkman et al., 2022). It is thus important to know whether and in which countries consumers underestimate these rates and practices.

Fourth, we might expect higher levels of animal advocacy in more activist countries with more support for animal welfare. If we assume that animal advocacy organizations increase awareness of animal issues, and are dependent on the financial support of the public, we would expect greater support for animal welfare in countries with more such organisations. Likewise, it is likely that people are more willing to engage in activism on behalf of animals in countries where there is a high level of overall civic engagement. It is established that people with higher solidarity with animals at an individual level are more likely to intend to help animals, even where this means withdrawing human privileges (Amiot et al., 2020). However, it is less clear how such individual differences measure relate to commitment toward animals across different countries. We expected that support for, and personal commitment to, animal advocacy would be positively correlated with civic engagement in general and with the number of animal advocacy organizations observed within a country in particular.

Although many of these expectations are consistent with previous research on individual differences in attitudes towards animals (Amiot et al., 2020, Heise & Theuvsen, 2017), relatively little research has been done in large international studies to examine how culture and region shape attitudes about animal welfare (Randler et al., 2021). Moreover, attitudes about animal welfare may change quickly (Dhont et al., 2019; Grassian, 2020), and both researchers and animal welfare advocates benefit from regular updates

about patterns during particular windows in time. By collecting relatively large and demographically diverse countries from four continents, this study can provide a relatively comprehensive and current snapshot of cross-cultural trends in the factors that shape support for animal welfare. This study sought to test the following specific hypotheses:

- **H1a:** People will have higher **support for farmed animal welfare** in countries with stronger animal welfare legislation (according to the Animal Protection Index; [World Animal Protection, 2020](#)).
- **H1b:** People will have higher **support for aquatic animal welfare** in countries with stronger animal welfare legislation (according to the Animal Protection Index; [World Animal Protection, 2020](#)).
- **H2a:** The feeling of personal connection to **goats** will be significantly higher in non-goat-eating countries (Brazil, Canada, Chile, Colombia, Germany, Indonesia, Korea, Malaysia, Mexico, Poland, Russia, Singapore, Spain, Thailand, USA) compared to goat-eating countries (Argentina, China, India, Mexico, Singapore, Russia, Spain, France, Netherlands, UK).
- **H2b:** The feelings of personal connection to **pigs** will be significantly higher in non-pig-eating countries (India, Singapore) compared to pig-eating countries (Canada, France, Germany, Netherlands, UK, USA, Argentina, Brazil, Chile, China, Colombia, Italy, Indonesia, Japan, Korea, Malaysia, Mexico, Poland, Russia, Spain, Thailand).
- **H2c:** The feelings of personal connection to **cows** will be significantly higher in a non-cow-eating country (India) compared to cow-eating countries (Canada, France, Germany, Netherlands, UK, USA, Argentina, Brazil, Chile, China, Colombia, Indonesia, Italy, Japan, Korea, Malaysia, Mexico, Poland, Russia, Singapore, Spain, Thailand).
- **H2d:** The feelings of personal connection to **pigs** will be significantly lower among Muslims compared to non-Muslims in countries with high Muslim populations (Indonesia, Malaysia).
- **H2e:** The feelings of personal connection to **cows** will be significantly higher among Hindus compared to non-Hindus in a country with a high Hindu population (India).
- **H3:** People's **knowledge of farm conditions** will tend to represent an underestimate of factory farming within their own country, such that the majority (more than half) of survey estimate percentages are lower than the actual percentages for the given country (as estimated by Sentience Institute; [Anthis & Reese-Anthis, 2019](#)).
- **H4a:** There will be higher **support for animal advocacy** in countries with more animal advocacy organizations per capita (according to the World Animal Net Directory; [World Animal Net, 2017](#)).
- **H4b:** There will be higher **personal commitment to animal advocacy** in countries with higher levels of civic activism (according to the Civic Activism Index; [International Institute of Social Studies, 2020](#)).

## Method

To investigate these hypotheses, we used data from the animal rights organization Mercy For Animals' 2021 Multinational Survey which examined individuals in 23 countries around the world. The Codebook describing the overall study and its measures can be found at Hopwood et al. (2023).

### Participants

Participants from 23 countries (Table 1) were recruited using a stratified sampling approach created by the survey platform Cint, such that participants from each country were representative of the nation in terms of gender, age groups, and other indicators per the standard Cint algorithm. Participants gave their consent to take part in the study using a checkbox in the online survey, and were paid according to the Cint incentive scheme as described at <https://www.cint.com/esomar28>. Recruitment was set to 1000 participants per country. Once this quota was met, the study team went through the responses to remove any incomplete responses as mentioned above. Once incomplete responses were counted, the survey was reopened to reach 1000 responses per country. This was done two times during the data collection period. One final assessment was done at the end of the study to remove any incomplete surveys that may have been missed as the study team felt they would not be able to get any more complete responses. Only complete responses were recorded and compensated. Participants who did not complete 100% of the survey, failed an attention check item (i.e., not selecting the option 'apple' after being instructed to do so), or provided nonsense responses to two open-text questions (e.g., single word responses, reusing the same response, blank responses) were considered incomplete and removed. This led to an initial overall sample size of 28,229 participants to account for incomplete surveys. Using our data quality checking procedures mentioned above resulted in a usable sample of 20,966 participants from the larger project. For the purpose of this study, we additionally removed participants who identified as non-binary or another gender outside male or female as sample sizes were low (Total  $n = 164$ ). The final sample size of this study was 20,802 participants. The country samples for this study ranged from 553–987. We only used these participants for our analyses. Table 1 includes the demographic breakdown for each country and the overall final sample.

**Table 1***Country-Level Demographics*

Country	<i>N</i>	Mean age ( <i>SD</i> )	% Female	Mean years of education ( <i>SD</i> )
Argentina	924	41.60 (14.61)	50.00	13.76 (5.78)
Brazil	983	39.36 (13.55)	50.86	14.19 (5.85)
Canada	867	45.92 (16.28)	52.94	12.59 (5.46)
Chile	932	41.50 (14.80)	50.75	11.83 (5.96)
China	884	39.13 (12.40)	50.57	15.35 (3.19)
Colombia	975	36.64 (11.78)	52.21	13.41 (5.11)
France	909	47.48 (15.07)	53.03	11.64 (6.29)
Germany	968	47.44 (15.21)	52.38	11.73 (2.49)
India	894	36.53 (12.95)	44.18	15.55 (6.00)
Indonesia	987	36.68 (12.28)	49.04	13.78 (4.33)
Italy	947	47.21 (14.64)	51.00	14.27 (4.77)
Japan	553	51.14 (15.84)	50.45	14.33 (2.99)
Korea	917	41.79 (13.96)	49.95	15.38 (9.92)
Malaysia	932	38.49 (13.22)	48.28	13.87 (5.73)
Mexico	973	38.31 (13.48)	51.39	15.13 (5.06)
Netherlands	903	47.80 (16.10)	52.05	9.55 (5.85)
Poland	962	43.99 (15.04)	52.29	15.17 (4.25)
Russia	959	40.43 (13.39)	53.49	11.03 (4.82)
Singapore	730	42.34 (13.87)	53.15	15.08 (4.08)
Spain	971	44.84 (14.46)	49.12	14.22 (6.08)
Thailand	942	40.07 (14.67)	51.06	16.43 (8.66)
United Kingdom	828	46.95 (15.95)	49.15	13.85 (4.57)
United States	862	46.37 (16.69)	51.39	13.01 (4.59)
<b>Overall</b>	20,802	42.48 (14.92)	50.81	13.68 (5.81)

**Materials**

This paper focuses on participants' knowledge and support for farmed animal welfare. The specific question wording and answer options are shown in [Table 2](#), as are data from several external sources.

**Table 2**  
*Survey and External Measures*

Hypothesis	Measure	Items/Description	Scale	Alpha
<b>Survey measures</b>				
<b>H1a</b>	<b>Support for farmed animal welfare</b> (mean of 4 items). Adapted from Vanhonacker et al. (2008).	<ol style="list-style-type: none"> <li>1. Corporations should commit to treating farm animals well.</li> <li>2. My government should pass laws to ensure that farm animals are treated well.</li> <li>3. My government should pass laws to ensure that farm animals' needs are met.</li> <li>4. Corporations should commit to ensuring that farm animals' needs are met.</li> </ol>	Strongly disagree (1) – Strongly agree (7)	.93
<b>H1b</b>	<b>Support for aquatic animal welfare</b> (mean of 4 items). Adapted from Vanhonacker et al. (2008).	<ol style="list-style-type: none"> <li>1. Corporations should commit to treating farmed aquatic animals well.</li> <li>2. My government should pass laws to ensure that farmed aquatic animals are treated well.</li> <li>3. My government should pass laws to ensure that farmed aquatic animals' needs are met.</li> <li>4. Corporations should commit to ensuring that farmed aquatic animals' needs are met.</li> </ol>	Strongly disagree (1) – Strongly agree (7)	.94
<b>H2a, H2b, H2c, H2d, H2e</b>	<b>Feeling of personal connection to animals</b> (individual scores for 6 animals).	<p>Which statement best describes how you feel about farm animals?</p> <ol style="list-style-type: none"> <li>1. Cows</li> <li>1. Pigs</li> <li>1. Goats</li> <li>1. Chickens</li> <li>1. Fish</li> <li>1. Other farmed aquatic animals</li> </ol>	No personal connection at all (1) – Strong personal connection (7)	–

Hypothesis	Measure	Items/Description	Scale	Alpha
H3	Survey estimate of factory farming (percentage).	1. In industrialized farms, a large number of animals are kept indoors in conditions intended to maximize production at a minimal cost. What percentage of farm animals do you think are raised in large industrialized farms in your country?	0%, 10%, 20%, ... 100%	–
H4a	Support for animal advocacy (single item).	1. If you learned that an organization working to protect farm animals and encouraging people to eat food from plant sources started in your country, how favorable would you be towards their work?	Very unfavorable (1) – Very favorable (7)	–
H4b	Personal commitment to animal advocacy (mean of 6 items).	How likely are you to engage in each of the following forms of animal advocacy? 1. Volunteer. 2. Donate money. 3. Like or follow on social media. 4. Share content with friends via social media. 5. Sign a petition urging a corporation or the government to better care for farm animals. 6. Participate in a peaceful protest to encourage better care for farm animals.	Very unlikely (1) – Very likely (7)	.93
<b>Control variables included in analyses</b>				
All	Age	In what year were you born? (converted to years)	18 – 110	–
All	Gender	What is your gender?	Male (0), Female (1)	–
All	Education	How many years of education have you completed?	0 – 50	–
<b>External measures included from other sources</b>				



Hypothesis	Measure	Items/Description	Scale	Alpha
H1a, H1b	<b>Strength of farmed animal welfare legislation</b> (World Animal Protection, 2020).	A 'grade' given by World Animal Protection based on an assessment of existing animal protection legislation in 50 countries. Specifically, Indicator 3 relates to laws applying to animals used in farming.	A grade (1) – G grade (7)	–
H2a, H2b, H2c	<b>Animal-eating or non-eating countries</b> (Ritchie & Roser, 2017).	A country is determined as 'non-eating' if their annual per capita consumption of the animal is less than 1kg or less than 1% of all meat consumed according to Our World in Data.	Eating (1), Non-eating (0)	–
H3	<b>Actual estimates of caged hens</b> (Anthis & Reese-Anthis, 2019).	Estimates by Sentience Institute of the proportion of egg-laying hens living in cages in 35 countries. While this is an imperfect representation of all farmed animals, poultry make up the vast majority of farmed land animals, so it is likely a reasonable proxy.	0% – 100%	–
H4a	<b>Animal organizations per capita</b> (World Animal Net, 2017).	The number of animal protection organizations counted in the World Animal Net directory, divided by the population of each country.	0 – 1	–
H4b	<b>Civic Activism Index</b> (International Institute of Social Studies, 2020).	A measure of engagement with matters of societal concern compiled by the International Institute of Social Studies, including engaging with news media, participating in petitions or boycotts, and attending protests and demonstrations.	0 – 1	–
All	<b>Gross Domestic Product per Capita</b> (World Bank Group, 2021).	The wealth of a nation as measured by the economic output of the nation	USD\$	–

## Analysis

We preregistered our hypotheses (see [Hopwood et al., 2022](#)). Data were cleaned and analysed in R ([R Core Team, 2021](#)). We primarily used multilevel models to test study hypotheses as participants were nested within countries (note that this deviation from our preregistration followed reviewer suggestions). For comparisons that included two countries or fewer (i.e., H2d and H2e), we used multiple regression models. We ran multilevel models with random intercepts using the nlme package ([Pinheiro et al., 2022](#)) and multiple regression models using the stats package ([Revelle, 2022](#)). We fit secondary models that included control variables including age, gender, education, and Gross Domestic Product (GDP) per capita for each country for all hypotheses. We country-centred age and education variables for each individual participant to the mean value of the participant's country. Countries for which data were unavailable on relevant external variables were not included in analyses.

To test H1a and H1b, we examined the relationship between the strength of existing farmed animal welfare laws and reported support for both farmed and aquatic animal welfare, respectively. We used the Animal Protection Index (API; [World Animal Protection, 2020](#)) as a measure of animal welfare laws. The API rates countries from A (best) to G (worst).

To test hypotheses H2a–H2c, we examined whether there were significant differences in the feelings of personal connection to goats, pigs, and cows in countries that do or do not tend to eat those animals, respectively (note that, in line with reviewer suggestions, this differs from our pre-registration where the variable is labelled 'concern for [animal] welfare'). Countries were coded as either eating (1) or non-eating (0) for the specific animals of interest. To test hypotheses H2d and H2e, we examined whether certain religious groups differed in their feelings of personal connection to pigs and cows using multiple regressions. For H2d, we expected that Muslims would report lower feelings of personal connection to pigs than non-Muslims in high-population Muslim countries (Indonesia and Malaysia). For H2e, we expected Hindus to report greater feelings of personal connection to cows than non-Hindus in a high-population Hindu country (India).

To test H3, we compared participants' estimates of the proportion of animals that are factory farmed in each country to the estimates of actual levels of factory farming from the Sentience Institute. To test H4a and H4b, we examined the relationship between support for animal advocacy organisations and the number of animal advocacy organisations per capita (H4a), and the relationship between personal commitment to animal advocacy and the Civic Activism Index (H4b).

## Results

Script, data, and full results for multilevel and regression models are provided at Hopwood et al. (2023). Table S1 in Bryant et al. (2024) provides the results from models with just the predictors of interest while Table S2 provides the results from models with covariates.

### Support for Animal Welfare and Strength of Legislation

Our first analyses determined the degree to which the strength of animal welfare legislation (as determined by the API) was associated with support for farmed (H1a) and aquatic (H1b) animal welfare across countries. We found that countries with weaker animal welfare legislation scored lower in support of farmed animal welfare,  $\beta = -.14$ , 95% CI [-.24, -.04], even when controlling for covariates,  $\beta = -.19$ , 95% CI [-.29, -.08]. For aquatic animal welfare, while countries with worse animal welfare legislation also scored lower on support for their welfare, the results were not significant,  $\beta = -.11$ , 95% CI [-.22, .004]. However, this effect became significant when adjusting for covariates,  $\beta = -.15$ , 95% CI [-.27, -.04]. We interpreted this as mixed support for our hypothesis about aquatic animal welfare.

### Feelings of Personal Connection to Animals Based on Animal Consumption Norms

The next set of analyses focused on how feelings of personal connection to animals are related to cultural and religious practices across and within countries. We expected that individuals in countries that eat more goat would express lower feelings of personal connection to goats compared to those in non-goat-eating countries (H2a). Results indicated that goat-eating and non-goat-eating countries did not differ in their feelings of personal connection to goats,  $\beta = .18$ , 95% CI [-.31, .67], even when controlling for covariates,  $\beta = .20$ , 95% CI [-.29, .68]. We expected that individuals in pig-eating countries would report lower feelings of personal connection to pigs than those in non-pig-eating countries (H2b). Similar to H2a, we found that pig-eating and non-pig-eating countries did not differ in their feelings of personal connection to pigs,  $\beta = .25$ , 95% CI [-.74, 1.24], even when controlling for covariates,  $\beta = .23$ , 95% CI [-.79, 1.25]. We expected that individuals in a non-cow-eating country (i.e., India) would have higher feelings of personal connection to cows than those in cow-eating countries (H2c). In line with our hypothesis, countries that eat cows reported less feelings of personal connection to cows than a country that do not eat cows,  $\beta = -1.57$ , 95% CI [-2.67, -.47], even when controlling for covariates,  $\beta = -1.36$ , 95% CI [-2.45, -.26]. In this case, India was the only non-cow-eating country.

We next examined whether different religious groups differed in their feelings of personal connection to animals. We expected that Muslims would show less feelings of

personal connection to pigs than non-Muslims in the Muslim-populous countries Malaysia and Indonesia (H2d). Supporting our hypothesis, we found that Muslims showed less feelings of personal connection to pigs than non-Muslims in both the regression models without,  $\beta = -1.78$ , 95% CI [-1.93, -1.63], and with covariates,  $\beta = -1.85$ , 95% CI [-2.01, -1.68]. Conversely, we expected that Hindus would show greater feelings of personal connection to cows than non-Hindus in India (a Hindu-populous country; H2e). Results indicated that Hindus reported greater feelings of personal connection to cows than non-Hindus,  $\beta = .58$ , 95% CI [.27, .88], even when controlling for covariates,  $\beta = .54$ , 95% CI [.23, .84].

## Factory Farming Perceptions and Reality

We next tested the degree to which people in various countries over- or underestimated the percent of factory farms in their country (H3). We expected for people to generally underestimate the percent of factory farms in their countries. Average estimates of factory farming ranged from 50–70% across all of the 21 countries for which both figures were available. In 86% of these countries, people tended to underestimate the rate of factory farming. The exceptions—the UK, the Netherlands, and Germany—had relatively low rates of factory farming (50% or less, in contrast to 75% or higher for other countries in the survey). However, in the overall sample we found no significant differences in estimation, in both the simple model,  $\beta = .04$ , 95% CI [-.05, .12], and the model adjusting for covariates,  $\beta = .03$ , 95% CI [-.07, .14]. We interpret this as mixed support, given that most countries do indeed underestimate the rate of factory farming, even though this effect was not significant in the model, primarily due to comparably low rates of actual factory farming in three countries.

## Support for Animal Advocacy

Our final analyses focused on the hypothesis that countries with more animal advocacy organisations per capita would show greater support for animal advocacy organizations (H4a). However, we found the effect of the number of animal organizations per capita was unrelated to animal advocacy organization support,  $\beta = -.14$ , 95% CI [-.39, .12], even when controlling for covariates,  $\beta = .16$ , 95% CI [-.17, .49]. We additionally expected that countries with greater civic engagement (as measured through the Civic Activism Index [CAI]; International Institute of Social Studies, 2020) would display a greater commitment to animal advocacy. We grand mean centered the CAI for this model. We found no significant results for both the simple model,  $\beta = -7.62$ , 95% CI [-34.19, 18.96], and the model with covariates,  $\beta = 7.60$ , 95% CI [-6.79, 21.98].

## Discussion

This study aimed to explore the country-level links between (a) public support for farmed animal welfare and advocacy and (b) the robustness of animal welfare laws, the food status of different animals, the prevalence of factory farming, and the level of civic activism and of animal advocacy. As shown in the table, four out of 10 of our hypotheses were supported by the analyses, four were not, and there was mixed support for two (Table 3).

**Table 3**

*Hypotheses and Results*

Hypothesis	Result
1a. People will have higher support for farmed animal welfare in countries with stronger animal welfare legislation	Supported
1b. People will have higher support for aquatic animal welfare in countries with stronger animal welfare legislation	Mixed Support
2a. The feelings of personal connection to goats will be significantly higher in non-goat-eating countries compared to goat-eating countries	Not supported
2b. The feelings of personal connection to pigs will be significantly higher in non-pig-eating countries compared to pig-eating countries	Not supported
2c. The feelings of personal connection to cows will be significantly higher in a non-cow-eating country compared to cow-eating countries	Supported
2d. The feelings of personal connection to pigs will be significantly lower among Muslims compared to non-Muslims in countries with high Muslim populations	Supported
2e. The feelings of personal connection to cows will be significantly higher among Hindus compared to non-Hindus in India	Supported
3. People's knowledge of farm conditions will tend to represent an underestimate of factory farming within their own country, such that the majority (more than half) of survey estimate percentages are lower than the actual percentages for the given country	Mixed Support
4a. There will be higher support for animal advocacy in countries with more animal advocacy organizations per capita	Not supported
4b. There will be higher personal commitment to animal advocacy in countries with higher levels of civic activism	Not supported

First, we observed significantly more robust farmed animal welfare laws in countries with higher support for farmed and aquatic animal welfare. This may imply that public opinions on animal welfare tend to translate into regulation of animal agriculture, that stronger animal welfare laws influence public attitudes, or both. The cross-sectional design utilized in this study cannot parse these possibilities. However, the link between animal welfare laws and countries' public support for animal welfare is important for

advocacy organizations, who must decide whether to dedicate limited resources to influencing governmental policies or individual attitudes. Institutional advocacy is generally considered more effective than individual advocacy, since it impacts a far greater number of animals (Broad, 2018). However, if public support leads to policy, it would suggest that advocacy for animals is likely to be more successful in countries where the public considers this a priority and lends support to the importance of individual advocacy to enable institutional change. Future research should focus both on determining the directionality of this effect, and more specifically on the efficacy and cost-effectiveness of animal advocacy focused on individual or public support as opposed to (or together with) institutional or legal policy.

Second, we observed mixed results with respect to personal connection to specific animals in countries where those animals are/not generally consumed. While we did observe significantly higher connection to cows in a non-cow-eating country (i.e., India) compared to cow-eating countries, we observed no significant difference in connection to pigs in non-pig-eating countries compared to pig-eating countries. The disparity between the findings on cows and pigs may be attributable to the differing religious reasons for avoiding consumption of these animals. As hypothesized, we observed significantly higher personal connection to cows among Hindus compared to non-Hindus in India, and we observed significantly lower personal connection to pigs among Muslims compared to non-Muslims in countries with large Muslim populations. While cows are regarded as holy in Hinduism, pigs are regarded as impure in Islam. Hence, while both religions avoid consumption of specific animals, different reasons underlie these avoidances, and this may explain the differing country-wise results on consideration of these animals.

We also observed no significant difference in personal connection to goats in goat-eating compared to non-goat-eating countries. Previous studies have observed that people tend to attribute higher moral status to non-food animals compared to food animals (Krings et al., 2021), but that was not reflected here on a country-level basis. One possible interpretation is that for meat products that are embedded in a given culture, familiarity with the product renders meat-animal reminders and associations morally less problematic (Benningstad & Kunst, 2020; Possidónio et al., 2022). It may be the case that a higher proportion of people from goat-eating countries live rurally in close proximity to livestock compared to people from non-goat-eating countries. In other words, a feeling of personal connection to goats may develop as a result of spending time with goats, but this went hand-in-hand with having goats as livestock, and therefore eating them. In this instance, a feeling of personal connection to an animal appears not necessarily to imply a belief that the animal ought not be eaten.

Third, we observed that the majority of countries for which data was available (18 out of 21) underestimate the proportion of animals on factory farms. Residents in all countries estimated that 50–70% of animals in their country are factory farmed, while

Sentience Institute's figures typically put the number of caged egg-laying hens at over 80%. It is worth noting that, although chickens make up a disproportionate number of farmed land animals, estimates of the percentage of caged egg-laying hens is a rather imperfect proxy for the extent of factory farming overall. Interestingly, there was not much variance in the survey estimates of factory farming, but some countries (the Netherlands, the UK, and Germany) had substantially lower rates of factory farming than others on this measure, and these are the countries which represented significant overestimates, while all of the other countries represented significant underestimates. Notably, these are among the most progressive countries with respect to animal rights; as well as scoring high on animal welfare law robustness, they are also the biggest markets for plant-based meat substitutes in Europe (Bechtold & Will, 2021).

Fourth, we found no relationship between the support for animal advocacy and the number of animal advocacy organisations per capita, nor between the level of personal commitment to animal advocacy and the Civic Activism Index. The former finding suggests that there are some countries—those with relatively high support for animal advocacy but relatively few animal advocacy organisations—where there is potential for more animal advocacy organisations. This includes China, India, Brazil, and Indonesia. These are all countries where there are relatively few animal advocacy organisations despite a relatively high level of claimed support. Advocates in these countries may be able to draw additional resources from a supportive public. The latter finding may be attributable to the relatively niche status of animal welfare as a political concern; therefore, while people in different countries may be more or less likely to engage in civic activism in general, this tendency may not translate to animal activism depending on the level of concern for animals per se.

This study was limited in several ways. First, the survey data included is the result of self-reported questionnaires administered online, which are subject to data quality concerns including demand effects as well as cultural interpretation of questions. While such concerns can never be entirely mitigated for online surveys, steps were taken to safeguard data quality including attention check questions and removing low-quality responses. Second, some of the analyses included herein may be limited in their scope—for instance, it is possible that the Civic Activism Index would be correlated with personal willingness to take part in animal advocacy if support for animal welfare was also considered, or that support for animal advocacy organisations would be correlated with the number of animal advocacy organisations per capita if GDP per capita were also considered. In general, our use of brief measures that had largely not been validated in previous work and the lack of detail with which some of important issues could be measured (e.g., variation in treatment or prevalence of agriculture pertinent to different species) limited the generalizability and nuance provided by this study.

Future research could explore these more complex relationships between survey data and other animal welfare-related data sources and could additionally explore other

variables in the dataset. The survey data and external data associated with this project are all Open Access, and they can be a valuable source of information for policymakers, researchers, advocates, and public and private organisations. Future research could also consider different ways of affecting the measures in this survey—for example, the optimal way to increase support for animal welfare may be different in different countries, which again has implications for policy and advocacy.

## Conclusions

In conclusion, concern for animal welfare varies around the world, and it is important to understand this variation and its implication for policy and advocacy. Higher support for animal welfare tends to be linked with stronger animal welfare legislation. Cultural and religious factors also impact how people tend to think about animal welfare for certain species. People in most countries tend to underestimate the extent of factory farming, suggesting that education about factory farming may be a promising area of focus for policy and advocacy. Finally, there was no correlation between stated support for animal organisations and the number of animal advocacy organisations per capita, nor between personal commitment to animal advocacy and the level of civic activism more broadly. Regions of the world with relatively high support but relatively few animal advocacy organizations may have high potential to benefit from advocacy work.

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**Data Availability:** Data is freely available, see [Hopwood et al. \(2023\)](#)

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## Supplementary Materials

The supplementary materials provided are the preregistration of hypothesis in [Hopwood et al. \(2022\)](#), the OSF project page containing codebook, script, data, and full results in [Hopwood et al. \(2023\)](#), and additional analyses and tables in [Bryant et al. \(2024\)](#).



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