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ARTICLES

Quantifying the Valuation of Animal Welfare Among Americans

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Abstract

There is public support in the United States and Europe for accounting for animal welfare in national policies on food and agriculture. Although an emerging body of research has measured animals' capacity to suffer, there has been no specific attempt to analyze how this information is interpreted by the public or how exactly it should be reflected in policy. The aim of this study was to quantify Americans' preferences about farming methods and the suffering they impose on different species to generate a metric for weighing the trade-offs between different approaches of promoting animal welfare. A survey of 502 residents of the United States was implemented using the online platform Mechanical Turk. Using respondent data, we developed the species-adjusted measure of suffering-years (SAMYs), an analogue of the disability-adjusted life year, to calculate the suffering endured under different farming conditions by cattle, pigs, and chickens, the three most commonly consumed animals. Nearly one-third (30%) of respondents reported that they believed animal suffering should be taken into account to a degree equal to or above human suffering. The 2016 suffering burden in the United States according to two tested conditions (poor genetics and cramped confinement) was approximately 66 million SAMYs for pigs, 156 million SAMYs for cattle, and 1.3 billion SAMYs for chickens. This calculation lends early guidance for efforts to reduce animal suffering, demonstrating that to address the highest burden policymakers should focus first on improving conditions for chickens.

Keywords Animal welfare · Livestock · Ethics · Surveys and questionnaires · Disability-adjusted life years · Amazon Mechanical Turk

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Introduction

Animal welfare is an issue of importance to a majority of people in the United States and Europe (Gallup 2015; Broad 2018; Johansson-Stenman 2018). While research from the fields of animal science and agriculture has demonstrated that many animals possess the capacity to suffer (Sneddon and Gentle 2000; Dawkins et al. 2004), there has been no specific attempt to analyze how this information is interpreted by the public. If one assumes that policies should reflect the preferences of society, then a major gap in current decision-making is the lack of a standardized tool to measure the size of the problem of animal suffering according to society's values. Given recent and upcoming legislative shifts to farm animal welfare, including the European Union's ban on conventional cages for hens (Appleby 2003), the systematic measurement of animal suffering could have major food and agriculture policy implications.

In global health, to estimate the burden associated with diseases affecting humans, the metric of the disability-adjusted life year (DALY) has been used. A single DALY can be conceptualized as the loss of a healthy life year. DALYs have been used to construct disease burden estimates, allocate resources, set health service priorities, and guide the global health research agenda (Fox-Rushby 2002). Despite substantial disagreement over the ethics, assumptions, and validity of DALY calculations (Anand and Hanson 1997; Nord 2013), few scholars disagree that their normative influence has been large (Li 2014). The primary aim of this study was to apply a modified DALY approach to quantify Americans' preferences regarding animal suffering for different species (cattle, pigs, and chickens) and farming practices (poor genetics and cramped confinement). We also evaluated their preferences regarding slaughter without painkiller and how animal suffering should be treated in public policy relative to human suffering.

Materials and Methods

Survey

A questionnaire ("Appendix") was modelled after population health equivalence questions used to elicit tradeoffs between fatal and non-fatal outcomes in DALYs (Salomon et al. 2015). For the purposes of this study, questions aimed to elicit tradeoffs between the deaths of cattle, pigs, and chickens, and three common practices on concentrated animal feeding operations (CAFOs): poor genetics, cramped confinement, and slaughter without painkiller. Cattle, pigs, and chickens were chosen because they represent the vast majority of farm animals raised on land for meat and dairy in the United States (USDA 2016, 2018). These particular practices were selected on the basis of the following criteria: generalizability to the three species of farm animals considered in this study, likelihood of being a major source of suffering based on animal science and agriculture literature

(Bracke et al. 2002; De Mol et al. 2006), and relevance to ongoing legislative and policy shifts in farm animal welfare.

As an example, a typical condition comparison would ask respondents to pick the lowest number of X chickens from enduring close confinement would avert more suffering than if 1000 chickens in perfect health were prevented from dying. Multiple choice options for X ranged from 1 to 1,000,000, allowing respondents to state that they believe that close confinement is much worse than death (e.g. "1") to not nearly as bad (e.g. "1,000,000"). Throughout the survey, the species and condition under examination was varied, but the comparison was always to 1000 animals dying. This format is largely consistent with DALY surveys (Salomon et al. 2015).

Following the health equivalence questions, respondents were asked to answer a question regarding their opinion on how animal suffering should be treated in public policy relative to human suffering (Johansson-Stenman 2018). Lastly, they were asked a series of socio-demographic questions drawn from the U.S. Census and Gallup polls. Demographic information collected included city size (< 10,000 people, between 10,000 and 100,000 people, between 100,000 and 1,000,000 people, and > 1,000,000 people), region of the United States (South, Northeast, West, and Midwest), gender (male, female, and other), age, educational attainment [high school incomplete, high school graduate, or general equivalency diploma (GED), some college, 4-year college degree, and some post-graduate education or more], political orientation (very conservative or conservative, moderate, liberal or very liberal), and religion (agnostic, atheist, or nothing in particular, Roman Catholic or Orthodox, Protestant, Hindu or Buddhist, and Jewish, Muslim, Mormon, or something else).

This survey was implemented using Mechanical Turk (MTurk), a crowd-sourced online marketplace. Researchers have previously published extensively on the reliability of MTurk samples as compared to community and student samples (Casler et al. 2013; Goodman et al. 2013; Hauser and Schwarz 2016). Survey questions were piloted with a convenience group and 20 MTurk workers to test its comprehensibility. In the final version of the survey, an attention check question was included to improve internal validity by indicating if respondents were appropriately paying attention. Survey answers were collected until the quota of 500 was reached, which took a total time of 3 h. MTurk provided two additional survey responses, without additional cost or time.

Statistical Analysis

Results of the survey were used to calculate weights for each of the three species and farming conditions. Weights were arithmetic means of all respondents' answers to each of the species and farming condition comparisons. Together with U.S. Department of Agriculture (USDA) annual slaughter statistics and age of slaughter for each species evaluated, these weights were used to calculate "Species-Adjusted Measure of suffering-Years" (SAMYs). In order to calculate the overall burden of farm animal suffering in the United States associated with each condition examined, we multiplied each condition weight by the corresponding species weight, the number

of each species slaughtered annually (USDA 2016, 2018), and the duration of their life (USDA 2015; National Pork Council 2016, 2017), and then summed the results within each species. This approach gives a rough approximation of the suffering caused by two major conditions on CAFOs for each of the three species considered. Slaughter without painkiller was not considered in the SAMY calculations because of the short length of time during slaughter and lack of reliable estimates of the duration of slaughter to death.

Pearson's Chi square tests were used to evaluate differences in (1) the species and condition weights and (2) respondents' opinion on how animal suffering should be treated in public policy relative to human suffering, across socio-demographic groups including city size, U.S. region, gender, age, educational attainment, political orientation, and religion. All analyses were conducted in Stata v. 14.2 (College Station, Texas, USA). $P < 0.05$ was considered statistically significant.

Ethics Committee Review

The Harvard T.H. Chan School of Public Health's Office of Human Research Administration reviewed the study protocol (#: IRB18-0287) and deemed it exempt on February 20, 2018. The study was carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki). Prior to beginning the survey, participants received information regarding the purpose of the research, what participation in the study would entail including duration of the survey, potential risks and benefits, and confidentiality. Respondents received $0.80 for completing the survey.

Results

Most participants were aged 25–44 years, 53% had a 4-year degree or higher education, and 41% were liberal or very liberal (Table 1). Eight percent of the sample failed the attention check question. In a sensitivity analysis excluding these participants, results were largely consistent (data not shown) and so they were retained in the final analysis presented here.

Approximately 39.9% of participants valued cattle more than chickens, and a similar proportion (38.8%) valued pigs more than chickens (Table 2). Nearly half of participants (45.6%) considered cattle and pigs to be similarly capable of suffering. Across all three species, having poor genes was perceived to cause more suffering than close confinement (Table 3). Slaughter without painkiller was ranked higher than both poor genetics and close confinement for all species.

In bivariate analyses, none of the socio-demographic predictors were associated with species comparisons (all $P > 0.05$) with the exception of religion ($P < 0.001$ for all three species comparisons) for which participants who identified as agnostic, atheist, or nothing in particular were more likely to report similar suffering across all species, whereas participants who identified as Hindu or Buddhist were more likely to report that cattle were more capable of suffering than chickens. With regards to

Table 1 Socio-demographic characteristics of participants (n = 502)

	% (n)
Gender[a]	
Male	52% (260)
Female	48% (240)
Age	
18–24 years	5% (25)
25–44 years	64% (321)
45–64 years	28% (140)
65 + years	3% (16)
U.S. region of residence	
South	37% (186)
Northeast	29% (145)
Midwest	23% (113)
West	12% (58)
Resident city size	
< 10,000 people	22% (112)
Between 10,000 and 100,000 people	41% (208)
Between 100,000 and 1,000,000 people	25% (123)
> 1,000,000 people	12% (59)
Educational attainment	
High school incomplete or less and high school graduate or GED	12% (59)
Some college	35% (176)
Four-year college degree	33% (168)
Postgraduate or professional schooling	20% (99)
Religion	
Agnostic, atheist, or nothing in particular	41% (206)
Roman Catholic or Orthodox	16% (81)
Protestant	28% (143)
Hindu or Buddhist	3% (15)
Other (Jewish, Mormon, Muslim, or something else)	11% (57)
Political orientation	
Very conservative or conservative	29% (145)
Moderate	31% (153)
Very liberal or liberal	41% (203)

[a]n = 2 participants reporting "Other" gender set to missing

the condition comparisons, younger participants were less likely to perceive that cramped confinement was worse than a rapid death ($P = 0.04$ for chickens, $P = 0.02$ for cattle, and $P = 0.03$ for pigs) and that poor genetics was nearly equivalent to a rapid death for pigs ($P = 0.03$). Participants living in large cities (> 1,000,000 people) were the least likely to perceive that painful slaughter was nearly equivalent to a rapid death ($P = 0.02$ for both chickens and cattle).

Table 2 Summary of responses to species and conditions comparisons (n = 502)

	1	500	1500 (ref)	2000	5000	10,000	100,000	1,000,000
Species comparisons								
Cattle (ref) to chickens	6% (29)	17% (83)	38% (189)	13% (65)	10% (51)	10% (51)	4% (19)	3% (14)
Cattle (ref) to pigs	6% (30)	20% (102)	46% (229)	12% (59)	9% (46)	4% (19)	1% (6)	2% (11)
Pigs (ref) to chickens	6% (31)	15% (73)	40% (203)	13% (66)	11% (57)	9% (46)	3% (13)	3% (13)
Conditions comparisons								
Chickens								
Rapid death (ref) to poor genetics	14% (68)	27% (135)	28% (142)	10% (52)	9% (44)	7% (33)	2% (8)	4% (20)
Rapid death (ref) to cramped confinement	13% (64)	25% (125)	24 (122)	11% (56)	11% (53)	7% (37)	2% (12)	7% (33)
Rapid death (ref) to painful slaughter	15% (75)	24% (121)	27% (134)	9% (46)	8% (39)	8% (39)	3% (13)	7% (35)
Cattle								
Rapid death (ref) to poor genetics	13% (65)	31% (158)	24% (119)	12% (58)	9% (44)	5% (27)	2% (12)	4% (19)
Rapid death (ref) to cramped confinement	13% (63)	26% (128)	25% (124)	11% (55)	10% (51)	7% (34)	5% (23)	5% (24)
Rapid death (ref) to painful slaughter	16% (81)	25% (127)	25% (126)	10% (48)	9% (47)	5% (23)	3% (16)	7% (34)
Pigs								
Rapid death (ref) to poor genetics	12% (61)	29% (145)	28% (140)	13% (65)	7% (37)	5% (25)	2% (8)	4% (21)
Rapid death (ref) to cramped confinement	13% (63)	25% (128)	27% (138)	11% (56)	9% (47)	5% (27)	4% (19)	5% (24)
Rapid death (ref) to painful slaughter	14% (70)	27% (135)	28% (142)	10% (48)	7% (35)	5% (25)	3% (16)	6% (31)

Table 3 Summary of calculated species-adjusted measure of suffering-years (SAMYs) for the United States in 2016

	Species weight	Condition weight	Activity duration (years)[a, b, c]	Annual # slaughtered (thousands)[d, e]	Total SAMYs
Cattle, Poor Genes	1	0.85	3	31,189	79,531,440
Cattle, Close Confinement	1	0.82	3	31,189	76,387,609
Cattle, Slaughter without Painkiller	1	0.87	0*	31,189	0
Cattle, Total SAMY Burden	–	–	3	31,189	155,919,049
Chickens, Poor Genes	0.71	0.83	0.13	8,909,014	669,207,248
Chickens, Close Confinement	0.71	0.79	0.13	8,909,014	642,442,202
Chickens, Slaughter without Painkiller	0.71	0.91	0*	8,909,014	0
Chickens, Total SAMY Burden	–	–	0.13	8,909,014	1,311,649,450
Pigs, Poor Genes	0.68	0.84	0.50	118,304	33,745,784
Pigs, Close Confinement	0.68	0.81	0.50	118,304	32,310,049
Pigs, Slaughter without Painkiller	0.68	0.90	0*	118,304	0
Pigs, Total SAMY Burden	–	–	0.50	118,304	66,055,833

*Duration of slaughter was considered to be short, although no reliable estimates of this duration were found

[a]USDA (2015)

[b]National Chicken Council (2017)

[c]National Pork Council (2016)

[d]USDA (2016)

[e]USDA (2018)

After accounting for the length of life that each species lives, as well as the number slaughtered annually in the United States, chickens ranked the highest in terms of overall SAMY burden (Table 3). For the two conditions included in SAMY calculations in 2016, there were 66 million for pigs, 160 million for cattle, and 1.3 billion SAMYs for chickens.

Overall, participants viewed animal suffering as an important consideration in public policymaking, but a majority thought that it should be given less weight than human suffering (Fig. 1). Three socio-demographic characteristics were significantly associated with the views of animal versus human suffering: gender ($P < 0.0001$), political orientation ($P = 0.001$), and religion ($P = 0.01$). Women were more likely to report believing that animal suffering should matter in policymaking, as were more liberal and non-religious Americans.

Discussion

This is the first study to incorporate a non-representative sample of Americans' assessment of farm animal suffering in a quantitative, replicable metric. Based on this assessment, even after accounting for their shorter lives, chickens accounted for the vast majority of SAMYs in the United States in 2016: approximately 1.3 billion SAMYs compared to 156 million in cattle and 66 million in pigs for poor genes and close confinement. This is due to the large number of chickens in industrial animal farm production. Slaughter without painkiller was ranked higher than both poor genetics and close confinement. Respondents who identified as female (vs. male), agnostic, atheist, or nothing in particular (vs. some religious affiliation), or more

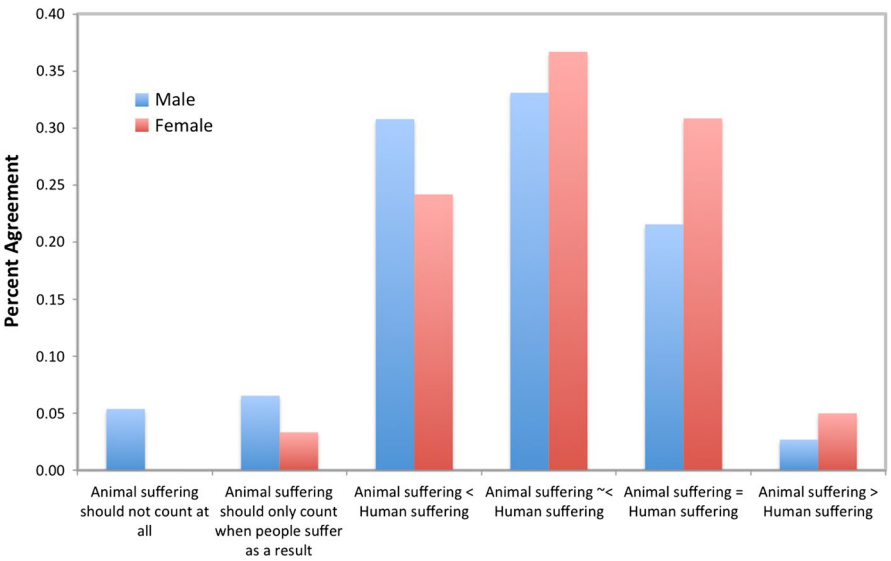

Fig. 1 Views of animal suffering by gender

politically liberal or very liberal (vs. conservative or very conservative) were more likely to indicate support for considering animal suffering in policymaking.

Although our study is the first to investigate this question in the United States, the results are broadly similar to other research that has attempted to measure Americans' beliefs regarding animal suffering. For example, in a representative survey in 2015, one-third of Americans reported that animals should have the same rights as people (Gallup 2015), compared to 30% of our survey respondents who reported thinking that animal suffering should be taken into account to a degree equal or above human suffering. A nationally representative study in 2018 found that nearly half (47%) of Americans agree that "animals deserve the exact same rights as people to be free from harm and exploitation," representing a growth in popularity of this view (Broad 2018). Consistently, a 2017 survey found strong support for banning slaughterhouses, with 42% of Americans reporting agreement with this proposal (Reese 2017).

Overall, our sample viewed animal suffering as an important consideration in public policymaking, but a majority thought that it should be given less weight than human suffering. In comparison with Sweden (Johansson-Stenman 2018), a lower proportion of Americans thought that animal suffering should be weighted equally with human suffering. A higher proportion reported that animal suffering should not count at all in decision-making, should only count when humans suffer because of their knowledge of animals' suffering, or should be given much lower weight than human suffering, even when no human beings suffer when knowing that animals suffer. A somewhat higher proportion reported thinking that animal suffering should be taken into account to a fairly high degree in public decisions, albeit with somewhat less weight than human suffering. This study is consistent with psychological research indicating that "speciesism," or the assignment of different moral worth based on species membership, correlates with certain demographic variables (Caviola et al. 2018).

In terms of methodology, several major differences were made to the health equivalence questions used to inform DALY weighting (Salomon et al. 2015) and adopted in this survey, including: the species and conditions under examination, measuring alleviations of suffering rather than health, using multiple choice options as opposed to randomly selecting numbers from a few options, and asking respondents to select the lowest value of an improvement that would be preferable, rather than choosing between which two programs averted a greater improvement in suffering.

Respondents were asked to estimate the *lowest value* of the second program that would result in a greater reduction of suffering compared to the first, rather than simply asking respondents to choose which program produced a *greater alleviation* of suffering (as done in previous DALY research). This alteration was selected to respond to a critique of DALY calculations, which posits that these calculations assume the degree of majority agreement in health equivalence questions is *directly proportional* to the difference in health gain on the ratio scale. In actuality, the degree of majority agreement in health equivalence questions is *correlated* with the difference in health gain at the ratio scale, but is not directly proportional (Nord 2013). This is best illustrated by the following example: "For instance, assume that

the majority in favour of X over Y is 70 versus 30%, while the majority in favour of Y over Z is 60 versus 40%. It does not follow logically that the difference between health losses X and Y is judged to be twice as big—or any other multiple for that matter—as the difference between Y and Z."

The second major difference in approach, which extends from the first, was that respondents were asked to select from a series of multiple choice answers rather than selecting between two programs with a number of beneficiaries randomly selected from a narrow range. This alteration was done to derive a point closer to respondents' point of indifference, as well as to allow respondents to select a wider range of preferences. When considering the suffering experienced by different species, it was hypothesized that respondents may feel that certain species are capable of experiencing vastly more or less suffering than others, requiring a wider range of values than in previous surveys. The third major difference was that the number of potential beneficiaries in this survey extends below 1000 to allow respondents to choose that the second condition is significantly worse than the first (hence, it would take a lower value of beneficiaries to result in a slightly greater reduction in suffering). This allows respondents to select the view that certain conditions are worse than rapid death.

Although this is the first piece of scholarship to measure Americans' valuation of animal suffering in a common metric, past research has attempted to measure the suffering that animals experience (setting aside any valuation of it). One example of empirically-focused measures of animal suffering is the sow welfare (SOWEL) model, a system which aggregates scientific findings on the welfare of pregnant pigs (Bracke et al. 2002). This measure attaches a weight to various aspects of animal housing arrangements based on existing evidence for common practices in animal agriculture. It then generates a score for each housing system from 0 to 10, which reflects their perceived degree of welfare. The model's findings have been validated through surveys of expert opinion, with similar values obtained for each. While SOWEL provides a useful example of empirical measures of animal suffering, a variety of other methods exist to assess the welfare conditions of animals raised by humans and the suffering caused by the food we eat (von Keyserlingk et al. 2009, 2017; Scherer et al. 2017).

This research is not without limitations. First, several data limitations prohibit precise estimation of the annual SAMY burden. For example, USDA does not track the age at slaughter for individual animals raised for food, so it is difficult to know how much variation exists in terms of age. Furthermore, since some dairy cattle and egg laying hens are included in USDA slaughter statistics, it is possible that incorporating the length of their lifespan could alter the final SAMY burden in the United States. Second, fish were excluded from this survey because of the differences in practices associated with fish farming and the relative difficulty of understanding fish welfare. Animals used in laboratory research, pets, and wild animals were also considered but left out because of the greater variability of their conditions. Similarly, some conditions, such as teeth clipping, de-beaking, tail-docking, and castration were considered, but did not fully meet the selection criteria. Lastly, several issues in ensuring validity and reliability of respondent behavior require further examination. For example,

respondents are asked to conceptualize differences in suffering for thousands of animals, which may be cognitively difficult. Furthermore, current weights may not reflect respondents' precise point of indifference between two programs because this may lie between the multiple-choice answers provided. It is important also to note that these SAMY weights are not be generalizable to the U.S. population, as this sample was younger, more politically liberal, male, educated, likely to live in the Northeast, and less likely to identify with almost any religion compared to the general population. More research is needed from more representative samples, as well as middle-income countries where demand for meat is increasing substantially (Nierenberg et al. 2011).

In order to build upon this research, future scholarship should test a wider variety of conditions and animal species weights among more representative samples. Similarly, condition descriptions could be improved by working with veterinarians and animal welfare scientists to accurately reflect how each animal is raised, rather than using a universal description for all species. Adjustments for pre-slaughter death could be made in order to more accurately estimate the number of animals alive in each condition annually. Survey validity could also be significantly improved by testing several iterations of question structures, including varying the number of animals in each option and offering choices between two direct comparisons, rather than asking respondents to pick the lowest value from a multiple choice list. Further research could also examine experts in relevant domains to assess whether their preferences differ from non-experts. Qualitative research could attempt to identify the extent to which survey answers truly reflect respondent preferences.

As a result of increased demand for meat, especially in middle-income countries, industrial animal farming has emerged as the predominant form of animal husbandry globally (Nierenberg et al. 2011). The consequences of this dietary and agricultural transition in terms of carbon, water and land footprint, antibiotic resistance, and non-communicable disease risk have been documented (Steinfeld et al. 2006; Bouvard et al. 2015; Weathers and Hermanns 2017). However, the consequences in terms of animal pain and suffering have yet to be systematically evaluated. This research is the first step towards measuring the weight that Americans place on animal suffering so to inform decision-making relating to agriculture and food policy and other relevant fields.

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Compliance with Ethical Standards

Conflict of interest Scott Weathers is a Senior Policy Specialist at the Good Food Institute. The views presented here are his own. We declare no other competing interests.

Appendix: Survey Questions

The following three questions will ask you about your personal beliefs regarding the suffering felt by different animals. There are no right or wrong answers. In all cases, assume that the animals have the same amount of life remaining and that their deaths don't have any side effects (for example, do not consider environmental impacts).

**

The first program prevented **1000 cows** in perfect health from getting an illness that causes rapid death.

The second program prevented **X chickens** in perfect health from getting the same illness.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 cows** in perfect health from getting an illness that causes rapid death.

The second program prevented **X pigs** in perfect health from getting the same illness.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 pigs** in perfect health from getting an illness that causes rapid death.

The second program prevented **X chickens** in perfect health from getting the same illness.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The next set of questions will ask you about your personal beliefs regarding the suffering felt by animals under different conditions. There are no right or wrong answers. In all cases, assume that the animals have the same amount of life remaining and that their deaths have no side effects (for example, do not consider environmental impacts).

**

The first program prevented **1000 chickens** in perfect health from getting an illness that causes rapid death.

The second program prevented **X chickens** from being bred to grow to an unnaturally large and disproportionate size, which would have resulted in bone and joint fractures, respiratory issues, and frequent heart failure.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 chickens** in perfect health from getting an illness that causes rapid death.

The second program prevented **X chickens** from spending their entire lives in a small space packed with other animals and defecating in the same area that they live.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500

- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 chickens** in perfect health from getting an illness that causes rapid death.

The second program prevented **X chickens** from being slaughtered by having their throat slit without any painkiller.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 cows** in perfect health from getting an illness that causes rapid death.

The second program prevented **X cows** from being bred to grow to an unnaturally large and disproportionate size, which would have resulted in bone and joint fractures, respiratory issues, and frequent heart failure.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 cows** in perfect health from getting an illness that causes rapid death.

The second program prevented **X cows** from spending their entire lives in a small space packed with other animals and defecating in the same area that they live.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 cows** in perfect health from getting an illness that causes rapid death.

The second program prevented **X cows** from being slaughtered by having their throat slit without any painkiller.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

Recent research shows that Americans have preferences for which types of animals they keep as pets. Differences in childhood pets, lifestyle, income, and environment can affect this decision. To help us understand these preferences, we are interested in information about you. Specifically, we are interested in whether you take the time to read the directions; if not, some results may not tell us very much about preferences for pets in the real world. To show that you have read the instructions, please ignore the question below and instead check "none of the above" as your answer. Thank you very much.

Please check all animals below that you prefer as pets.

Dog	Cat		Iguana
Fish	Cow		Pig
Mouse/Rat	Hamster	Bird	
Chinchilla	Ferret		Snake
Lizard	Turtle		Snail
Frog	Ants		Crab
Tarantula	Hedgehog		None of the above

**

The first program prevented **1000 pigs** in perfect health from getting an illness that causes rapid death.

The second program prevented **X pigs** from being bred to grow to an unnaturally large and disproportionate size, which would have resulted in bone and joint fractures, respiratory issues, and frequent heart failure.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 pigs** in perfect health from getting an illness that causes rapid death.

The second program prevented **X pigs** from spending their entire lives in a small space packed with other animals and defecating in the same area that they live.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 pigs** in perfect health from getting an illness that causes rapid death.

The second program prevented **X pigs** from being slaughtered by having their throat slit without any painkiller.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

- 1
- 500
- 1001
- 2000
- 5000
- 10,000
- 100,000
- 1,000,000

**

The first program prevented **1000 pigs** from being bred to grow to an unnaturally large and disproportionate size, which would have resulted in bone and joint fractures, respiratory issues, and frequent heart failure.

The second program prevented **X pigs** from spending their entire lives in a small space packed with other animals and defecating in the same area that they live.

What is the **lowest value of X** for which you would say that the second program produced the greater overall reduction in suffering? Select one.

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Society can reduce animal as well as human suffering through various, usually costly, measures. To be able to prioritize, we need to know how great a weight society should place on reducing suffering in an animal (such as a cow) compared with reducing an equal amount of suffering in a human. Which of the following statements is most in accordance with your opinion regarding the weight that should be given to animal suffering in public decisions?

- Animal suffering should not count at all in public decisions.
- Animal suffering should not count per se. However, some people suffer when knowing that animals suffer, and this should be taken into account in public decisions.
- Animal suffering should be taken into account to a certain extent in public decisions, even when no human beings suffer when knowing that animals suffer. However, animal suffering should be given much less weight than human suffering.
- Animal suffering should be taken into account to a fairly high degree in public decisions, even when no human beings suffer when knowing that animals suffer. However, animal suffering should be given somewhat less weight than human suffering.
- Animal suffering should be taken into account to a degree equal to human suffering in public decisions, even when no humans suffer when knowing that animals suffer.

- Animal suffering should be taken into account to a very high degree in public decisions, even when no human beings suffer when knowing that animals suffer. Animal suffering should be given more weight than human suffering.

How large is the city you live in?

- < 10,000 people
- Between 10,000 and 100,000 people
- Between 100,000 and 1,000,000 people
- 1,000,000 people

What region in the United States do you live in?

- South
- Northeast
- Midwest
- West

Please indicate your gender:

- Male
- Female
- Other

Age:
(0–100)
In general, would you describe your political views as…

- Very conservative
- Conservative
- Moderate
- Liberal
- Very liberal

What is the highest level of school you have completed or the highest degree you have received?

- High school incomplete or less
- High school graduate or GED (includes technical/vocation training that doesn't count towards college credit)
- Some college (some community college, associate's degree)
- Four year college degree/bachelor's degree
- Some postgraduate or professional schooling, no postgraduate degree
- Some graduate or professional education
- Postgraduate or professional degree, including master's, doctorate, medical or law degree

What is your present religion, if any?

- Protestant
- Roman Catholic
- Mormon
- Orthodox (such as Greek or Russian Orthodox)
- Jewish
- Muslim
- Buddhist
- Hindu
- Atheist
- Agnostic
- Something else
- Nothing in particular

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