

# A survey to determine public opinion about the ethics and governance of farm animal welfare

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**Objective**—To determine the attitude of the public toward farm animal welfare and identify beliefs regarding how decisions about farm animal welfare should be made.

**Design**—Telephone survey.

**Study Population**—A random sample of 1,019 US households.

**Procedures**—US households were contacted by telephone and asked to take part in a survey consisting of 48 items.

**Results**—A majority (437/773 [56.4%]) of respondents believed decisions about farm animal welfare should be made by experts rather than being based on the views of the public. Such advocates of expert decision making were less likely to believe the government should regulate farm animal welfare. Most (420/773 [54.3%]) respondents believed decisions about farm animal welfare should be based on scientific measures of animal well-being, as opposed to moral and ethical considerations. Those individuals who believed farm animal welfare decisions should be made by experts and be based on scientific measures were the least concerned about farm animal welfare issues. People who believed animal welfare decisions should be made by experts and be based on scientific measures were most responsive to information about use of gestation crates for sows.

**Conclusions and Clinical Relevance**—These results should help increase recognition that changing public opinion is not simply a matter of convincing the public to support positions established by veterinarians and animal scientists. People's views about the role of the democratic process in regulating technologic change are important determinants of whether people accept the changes in animal agriculture that have occurred during the past century. (*J Am Vet Med Assoc* 2008;233:1121–1126)

Vigorous and ongoing debate about farm animal welfare takes place at the intersection between science and public opinion. A common sentiment espoused by many policy makers, veterinarians, animal scientists, and members of the agricultural industry is that decisions about the treatment of farm animals should be based on sound science.<sup>1</sup> However, there are some questions that science cannot definitively answer, such as questions related to people's values about the kind of society in which they and farm animals live and questions about the trade-offs people are willing to make between the price they pay for meat, milk, and eggs and the well-being of farm animals. Thus, moral and ethical concerns are a prominent factor that affects what people think about modern livestock production practices.

Questions exist about the role that science should play in the debate of animal welfare, and there is substantive disagreement on how and to what extent farm animal welfare should be regulated. In some cases, as in the example of the Egg Producers Board, animal production industries have voluntarily made changes, which were based on recommendations of groups of experts and scientists, that parties on both sides of the

debate found beneficial.<sup>2,3</sup> Other organizations have created voluntary programs and standards to advertise their concerns and that of producers for use of improved animal production practices.<sup>4</sup> In other cases, as in the ballot initiatives to ban gestation crates in Florida and Arizona, the public decided about the suitability of a particular production practice. Much of the controversy in the animal welfare debate stems from controversy over who should have the authority to decide the manner in which farm animals are raised.

Modern agricultural practices have served to lower the price of animal products to consumers, but this increased efficiency has, in some ways, lowered the well-being of farm animals,<sup>5</sup> even in ways that are objectionable to some veterinarians.<sup>6</sup> Much of this change happened without the knowledge of the general public, many of whom still imagine a more agrarian agricultural production system.<sup>7</sup> The increase in popularity of animal welfare advocacy groups can partly be attributed to the public's belief that their views need to be heard and be factored into the decision-making process related to technologic change.<sup>8</sup>

Although many have argued that people's values and ethics should be evaluated in conjunction with scientific evidence for animal well-being,<sup>1,8–10</sup> there is little empirical research on what the US public believes about the governance of farm animal welfare. The purpose of the study reported here was to determine the

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extent to which people believed scientific findings versus moral and ethical considerations should factor into the animal welfare debate and to determine the extent to which people believed decisions about animal welfare should be made by scientists and experts versus the public. Furthermore, we investigated whether people's social values and views on the governance of science influenced their beliefs about how farm animals should be treated.

## Materials and Methods

**Survey description**—In June and July of 2007, a nationwide telephone survey of a random sample of US households was conducted. Telephone surveys were administered by the Bureau for Social Research at Oklahoma State University. The study was approved by the Oklahoma State University Institutional Review Board (Application No. AG0720).

To avoid biasing the sample toward only those types of people with particular views on animal welfare, contacted households were asked to participate in a food preference survey. Of the 2,370 households who were contacted and asked to complete the survey, 1,019 (43%) agreed to participate. Each respondent was asked to indicate their agreement (or disagreement) with 48 statements regarding food preferences and farm animal welfare. The order in which the questions were asked was randomized among respondents to avoid an order effect.

The analysis reported here focused primarily on items related to people's views on the governance of science and animal welfare. Similar to another study,<sup>11</sup> such views were determined by the response to 2 statements. Specifically, people were asked to indicate the extent to which they agreed with the following 2 statements: decisions about animal welfare should be made by experts and should not be based on public opinion; and scientific measures of animal well-being, not moral or ethical considerations, should be used to determine how farm animals are treated. It is worth mentioning that although morals and ethics are not necessarily equivalent terms, both concepts represent a distinctly different decision-making criterion than one based only on scientific measures of animal well-being. Respondents who answered "I neither agree nor disagree" or "I don't know" to 1 or both of these statements were excluded from the study; thus, the effective sample size was 773 respondents.

For each statement, respondents were asked to indicate whether they strongly agreed, somewhat agreed, neither agreed nor disagreed, somewhat disagreed, or strongly disagreed with the statement. One important distinction between the 2 aforementioned items in our survey and items in the previous survey<sup>11</sup> is that those other investigators asked people about their views regarding technology in general, whereas in the study reported here, we specifically asked people about animal welfare.

Based on responses to the 2 statements, participants were assigned to 1 of 4 categories of consumer: scientific elitist (agreed or strongly agreed that decisions should be made by experts, rather than the public, and agreed or strongly agreed that decisions should be made on the basis of scientific measures, rather than

moral considerations), moral elitist (agreed or strongly agreed that decisions should be made by experts, rather than the public, and disagreed or strongly disagreed that decisions should be made on the basis of scientific measures, rather than moral considerations), scientific populist (disagreed or strongly disagreed that decisions should be made by experts, rather than the public, and agreed or strongly agreed that decisions should be made on the basis of scientific measures, rather than moral considerations), and moral populist (disagreed or strongly disagreed that decisions should be made by experts, rather than the public, and disagreed or strongly disagreed that decisions should be made on the basis of scientific measures, rather than moral considerations). To enable comparison of our results with those of other studies, the term for each category of consumer (eg, scientific elitist or moral populist) was designed to conform with those used in another survey.<sup>11</sup>

To determine whether people's views on the role of science and the governance process affected opinions about animal welfare, several additional statements were provided. First, statements were used to ascertain people's views about the ability of government and free markets to address animal welfare concerns. Specifically, people were asked to indicate the extent to which they agreed or disagreed with each of the following 4 statements: the government should take an active role in promoting farm animal welfare, I would vote for a law in my state that would require farmers to treat their animals more humanely, food companies would voluntarily improve animal welfare and would advertise as such if people really wanted it, and low meat prices are more important than the well-being of farm animals.

The response to the last of those 4 statements provided 1 indication of people's concern about farm animal welfare relative to food prices. To provide additional information on this issue, 2 approaches were used. In the first approach, respondents were asked to indicate the extent to which they agreed or disagreed with the following statement: if a new technology were created that could eliminate the suffering of 1 human or eliminate the suffering of  $x$  farm animals, it should be used to eliminate the suffering of the 1 human. The value of  $x$  was randomly varied (1, 10, 50, 100, 500, 1,000, 5,000, and 10,000) among surveys. Interval-censored regression techniques were used to estimate the number of farm animals that respondents believed was equal to the suffering of 1 human. The value of  $X_i$  was the number of farm animals randomly assigned to the survey of respondent  $i$ . When a respondent agreed or strongly agreed with the statement on technology and human and animal suffering, then the number of farm animals the respondent believed was equal to 1 human was in the range  $(X_i, \infty)$ . Conversely, when a respondent disagreed or strongly disagreed with the statement on technology and human and animal suffering, then the number of farm animals the respondent believed was equal to 1 human was in the range  $(-\infty, X_i)$ . The log-likelihood function for a sample of  $N$  respondents was calculated by use of the following equation:

$$\ln L = \sum_{i=1}^N (1 - A_i) \ln (\Phi [(X_i - \beta)/\sigma]) + A_i \ln (1 - \Phi [(X_i - \beta)/\sigma])$$

where  $\ln$  is the natural logarithm;  $L$  is the likelihood function;  $A_i$  is a dummy variable equal to 1 when respondent  $i$  agreed or strongly agreed with the statement and equal to 0 when respondent  $i$  disagreed or strongly disagreed with the statement;  $\Phi$  is the cumulative standard normal distribution function; and  $\beta$  and  $\sigma$  are the mean and SD, respectively, of the estimated number of farm animals equal to the suffering of 1 human. In this equation,  $\beta$  and  $\sigma$  were permitted to vary by category of consumer (ie, scientific elitist, moral elitist, scientific populist, and moral populist). A likelihood ratio test indicated no significant ( $P = 0.93$ ) difference in  $\sigma$  among categories; thus, a single SD was estimated.

The second approach used to determine the relative importance of farm animal welfare in relation to other societal issues relied on a paired comparison method,<sup>12</sup> which has a long history of use in psychologic research. With the paired comparison method, respondents are provided with 2 issues and asked to indicate which issue is more important. In the survey reported here, 7 items or societal issues were evaluated: human poverty, the US health-care system, food safety, the environment, food prices, financial well-being of US farmers, and well-being of farm animals. Respondents were provided with 2 randomly selected issues (from the list of 7 issues) and asked to indicate which of the 2 issues they were more concerned about. For example, a respondent may have been asked, "Which issue are you more concerned about: the well-being of farm animals or the financial well-being of US farmers?" Five additional questions were asked that used exactly the same format, except that for each question, 2 other randomly chosen issues were provided for the respondent. The result was that each respondent answered 6 questions, and among surveys, each of the 7 issues was paired with the other issues numerous times in multiple surveys.

To determine the relative importance of each of these 7 issues, a logistic regression was estimated. In each choice pair, a respondent chose whether issue  $j$  or issue  $k$  was more important. The probability that issue  $j$  was more important than issue  $k$  was calculated by use of the following equation:

$$\text{Probability that issue } j \text{ is chosen as more important than issue } k = e^{\alpha_j} / (e^{\alpha_j} + e^{\alpha_k})$$

where  $\alpha_j$  and  $\alpha_k$  are parameters to be estimated. In a sample of  $N$  respondents making  $C$  choices (each choice had a differing set of issues), the log-likelihood function was calculated by use of the following equation:

$$\ln L = \sum_{i=1}^N \sum_{c=1}^C y_{ijc} \ln (e^{\alpha_j} / [e^{\alpha_j} + e^{\alpha_k}]) + (1 - y_{ijc}) \ln (e^{\alpha_k} / [e^{\alpha_j} + e^{\alpha_k}])$$

where  $y_{ijc}$  is a dummy variable equal to 1 when issue  $j$  is chosen as most important by respondent  $i$  in choice set  $c$  and equal to 0 when issue  $k$  is chosen as most important by respondent  $i$  in choice set  $c$ , and  $e$  is the inverse of the natural logarithm. In this framework, 1 of the 7 parameters ( $\alpha$ ) was standardized to 0 for identification purposes. In this application, we standardized the parameter associated with the well-being of farm animals

to 0 such that the estimated effect of the other issues could be interpreted as the importance of the particular issue relative to the importance of the well-being of farm animals.

The preceding equation was estimated for the entire sample and then for each category of consumer (ie, scientific elitist, moral elitist, scientific populist, and moral populist), and a likelihood ratio test was used to determine whether the parameters differed among categories. To index the amount of concern for each issue on a ratio scale of measurement, the parameters obtained from the equation could be substituted into a multinomial logit equation to indicate shares of preference, which indicated the percentage of respondents who would choose issue  $j$  as the most important of the 7 issues. This was calculated by use of the following equation:

$$\text{Share of people believing issue } j \text{ is most important} = e^{\alpha_j} / \sum_{k=1}^J e^{\alpha_k}$$

To determine whether people who had different views on the governance of animal welfare reacted differently to information about livestock production practices, half of the survey respondents were randomly selected and asked to indicate the extent to which they agreed with the following statement: housing pregnant sows in crates is humane. The other half of the respondents were asked to respond to a similar statement, but a reason for the crates was provided. In particular, those respondents were asked to indicate the extent to which they agreed with the following statement: housing pregnant sows in crates for their protection from other hogs is humane. The effect of information was determined by calculating the difference in the percentage of people who agreed or strongly agreed between the 2 statement formats. This information effect was then compared among the 4 categories of consumer (ie, scientific elitist, moral elitist, scientific populist, and moral populist) to determine the category for which information had the largest effect.

Finally, respondents were asked a number of questions related to socioeconomic and demographic characteristics, and these were compared among categories of consumer to determine whether differences existed. To determine whether there were differences in categories across the United States, respondents were requested to indicate the state in which they resided; respondents were then classified into 1 of 4 US regions (West, Midwest, South, and Northeast) that corresponded with regions defined by the US Census bureau.

## Results

A majority (437/773 [56.4%]) of respondents believed that decisions about animal welfare should be made by experts, rather than being based on public opinion. Slightly more than half of respondents (420/773 [54.3%]) also believed that decisions about animal welfare should be based on scientific measures of animal well-being, rather than on moral and ethical considerations.

The percentage of respondents who were classified into each of the 4 categories of consumers on the basis of their opinions toward the governance of animal welfare was determined. Of the 773 respondents, 276 (35.7%) were scientific elitists, 161 (20.8%) were moral elitists, 144 (18.6%) were scientific populists, and 192 (24.8%) were moral populists. In contrast, investigators in another study<sup>11</sup> found that with regard to technology in general, 54% of US citizens could be classified as scientific elitists. This implies that the public is more interested in public opinion and moral concerns when it comes to the issue of farm animal welfare, compared with their interest and concerns about technology in general. Despite the fact that the percentage of the population classified as scientific elitists in this study on animal welfare and the study on technology<sup>11</sup> differed by approximately 20%, the 2 studies are in agreement in terms of the relative sizes of the segments, with scientific elitists being the largest group, followed by moral elitists and then by moral populists. Both studies revealed that scientific populists are the smallest segment of the population, comprising 18.6% of the respondents for our study on animal welfare and 11% of the respondents for the study on technology.<sup>11</sup>

The percentage of respondents who agreed with various statements regarding the role of government and markets to address animal welfare issues was determined (Table 1). Regardless of category of consumer, > 60% of respondents believed that the government should take an active role in promoting farm animal welfare. The percentage of respondents agreeing or strongly agreeing to this statement differed significantly ( $P = 0.003$ ;  $\chi^2$  test of independence) among categories of consumer. Scientific and moral populists were more likely to take this view than were scientific and moral elitists. Results also revealed that scientific and moral populists were more likely (approx 20% more likely) to vote for a law in their state requiring farmers to treat their animals more humanely, compared with results for scientific and moral elitists.

Despite the seemingly overwhelming support for government involvement in regulating farm animal welfare, most consumers believed food companies would voluntarily improve animal welfare and would advertise as such if people really wanted it (Table 1). This view was more likely to be held by scientific elitists,

compared with moral populists (73.9% vs 59.4%, respectively). Whereas populism versus elitism appeared to explain most of the difference in responses for the questions related to government regulation of animal welfare, results for the statement regarding the ability of markets to respond to animal welfare concerns were driven by a strong interaction between populism versus elitism and science versus morals. For example, moral elitists and scientific populists both responded similarly to this statement, with approximately 68% in each category agreeing that food companies would improve animal welfare if it were profitable.

The importance of farm animal welfare relative to food prices was also evaluated (Table 1). Scientific elitists were much more likely to agree that low meat prices are more important than the well-being of farm animals, compared with results for the other categories of consumer. Moral populists and scientific populists were least likely to agree that low meat prices are more important than the well-being of farm animals. These results are consistent with the pattern found in another study<sup>11</sup> in which scientific elitists were the most accepting of technologies (such as computers, nanotechnology, and biotechnology), whereas moral populists were the category with the lowest acceptance. One of the metrics used by investigators in that other study<sup>11</sup> to measure the degree of controversy surrounding an issue is the ratio of the percentage of scientific elitists who agree with an issue to the percentage of moral populists who agree with that issue. Controversy indices in the United States for stem cell research and use of genetically modified foods were 2.37 and 1.90, respectively, in that other study.<sup>11</sup> The ratio of the importance of food prices to animal well-being (26.81:10.42) implied a controversy index of 2.57 for animal welfare. This finding suggests that public controversy surrounding the issue of farm animal welfare is on par with issues such as stem cell research and use of genetically modified foods.

Further confirmation that scientific elitists were less concerned about farm animal welfare, compared with the concern of other consumer types, was evident in estimates of the log-likelihood equation for the number of suffering farm animals equivalent to 1 suffering human. A likelihood ratio test indicated that there was a significant ( $P = 0.05$ ) difference in the value placed on animal and human suffering among the 4 categories

Table 1—Beliefs about the role of government and the market on the basis of agreement with statements about the governance of animal welfare for each of 4 categories of consumer.

Statement	Scientific elitist (n = 276)	Moral elitist (n = 161)	Scientific populist (n = 144)	Moral populist (n = 192)	P value*
The government should take an active role in promoting farm animal welfare	64.1	64.0	78.5	75.0	0.003
I would vote for a law in my state that would require farmers to treat their animals more humanely	69.2	68.9	88.2	84.4	0.001
Food companies would voluntarily improve animal welfare and would advertise as such if people really wanted it	73.9	67.1	68.1	59.4	0.012
Low meat prices are more important than the well-being of farm animals	26.8	13.0	10.4	10.4	0.001

Results reported are the percentage of respondents in each category of consumer who indicated that they agreed or strongly agreed with each statement.  
\*Results of  $\chi^2$  test of independence; values were considered significant at  $P \leq 0.05$ .

of consumer, as determined on the basis of 651 respondents who provided usable answers to this question. Moral populists were most sensitive to animal suffering and equated the suffering of (mean ± SE) 8,489 ± 1,967 farm animals with the suffering of 1 human. The scientific elitists were the least sensitive to animal suffering and equated the suffering of 14,310 ± 2,878 farm animals with the suffering of 1 human. Scientific populist and moral elitists had intermediate values that equated the suffering of 11,085 ± 2,447 farm animals and 10,264 ± 2,346 farm animals, respectively, with the suffering of 1 human.

The value placed on the 7 societal issues differed significantly ( $P = 0.03$ ) among the 4 categories of consumers (Table 2). Results for share of preference indicated that only 3.4% of scientific elitists believed the well-being of farm animals was the most important societal issue. By contrast, 5.7% of moral populists believed the well-being of farm animals was the most important societal issue. Results revealed that scientific elitists, in general, believed human poverty was 6.4 times (21.9/3.4) as important as the well-being of farm animals; however, moral populists believed human poverty was only 4.7 times (26.8/5.7) as important as the well-being of farm animals. All categories of

consumer rated the financial well-being of US farmers higher than the well-being of farm animals. Populists ranked the well-being of farm animals as higher in importance than food prices, but elitists had the opposite ranking.

Effects of information on the acceptability of housing sows in crates were evaluated (Table 3). Approximately 20% of respondents believed housing sows in crates was humane, and this value did not differ significantly among categories of consumer. However, when informed that housing sows in crates protected them from other hogs, agreement with the statement regarding use of this type of housing increased to approximately 50% for scientific and moral elitists. Differences in the percentage of responses regarding statements on housing sows in crates with and without information on the reason for such a housing choice revealed that such information had the largest effect on scientific elitists (difference of 27.5%) and the smallest effect on moral populists (difference of 18.0%).

Socioeconomic and demographic characteristics for the entire survey sample and for each of the 4 categories of consumer were summarized (Table 4). Although more females than males responded to the survey, other characteristics corresponded well with the

Table 2—Importance of farm animal welfare relative to other societal issues on the basis of opinion about the governance of animal welfare for each of 4 categories of consumer.

Societal issue	Scientific elitist (n = 276; c = 1,438)	Moral elitist (n = 161; c = 841)	Scientific populist (n = 144; c = 777)	Moral populist (n = 192; c = 1,005)	All categories (n = 773; c = 4,061)
Logit estimates*					
Human poverty	1.858 (0.155)	1.824 (0.204)	1.643 (0.206)	1.546 (0.175)	1.727 (0.090)
US health-care system	2.009 (0.156)	1.634 (0.194)	1.516 (0.203)	1.422 (0.175)	1.680 (0.089)
Food safety	1.866 (0.153)	1.533 (0.197)	1.757 (0.204)	1.214 (0.176)	1.614 (0.089)
The environment	1.241 (0.156)	1.330 (0.205)	1.239 (0.206)	0.894 (0.184)	1.175 (0.091)
Food prices	0.604 (0.143)	0.245 (0.198)	-0.108 (0.203)	-0.408 (0.180)	0.163 (0.086)
Financial well-being of US farmers	0.986 (0.154)	0.842 (0.197)	0.455 (0.199)	0.206 (0.177)	0.662 (0.089)
Well-being of farm animals†	0	0	0	0	0
Share of preference (%)					
Human poverty	21.9	25.5	23.0	26.8	24.1
US health-care system	25.4	21.1	20.3	23.6	23.0
Food safety	22.1	19.0	25.8	19.2	21.5
The environment	11.8	15.5	15.4	13.9	13.9
Food prices	6.2	5.3	4.0	3.8	5.0
Financial well-being of US farmers	9.2	9.5	7.0	7.0	8.3
Well-being of farm animals	3.4	4.1	4.5	5.7	4.3

\*Values reported are mean (SE). Values differed significantly ( $P = 0.032$ ; likelihood ratio test) among categories of consumer. †Well-being of farm animals was standardized to 0 to enable interpretation of the estimated effect of the other issues as the importance of the particular issue relative to the importance of the well-being of farm animals.  
c = Total number of choices between the importance of competing societal issues made by respondents in each category.

Table 3—Effect of information about housing sows in crates on the basis of opinion about the governance of animal welfare for each of 4 categories of consumer.

Variable	Scientific elitist	Moral elitist	Scientific populist	Moral populist	P value*
Statement					
Housing pregnant sows in crates is humane (n = 391)	22.5	21.7	16.9	16.7	0.625
Housing pregnant sows in crates for their protection from other hogs is humane (n = 380)	50.0	48.5	39.7	34.7	0.082
Difference	27.5	26.8	22.8	18.0	ND

Results reported are the percentage of respondents in each category of consumer who indicated that they agreed or strongly agreed with each statement.  
ND = Not determined.  
See Table 1 for remainder of key.

Table 4—Mean (SD) values for socioeconomic and demographic variables on the basis of opinion about the governance of animal welfare for each of 4 categories of consumer.

Variable	Scientific elitist	Moral elitist	Scientific populist	Moral populist	All categories	P value*
Affiliation with Republican Party (%)	27.5 (44.8)	29.8 (45.9)	19.4 (39.7)	25.5 (43.7)	26.0 (43.9)	0.188
Female gender (%)	55.8 (49.8)	64.6 (48.0)	64.6 (48.0)	72.9 (44.6)	63.5 (48.1)	0.002
Vegetarian (%)	0.4 (6.0)	3.7 (19.0)	2.1 (14.3)	4.7 (21.2)	2.5 (15.5)	0.017
White race (%)	79.0 (40.8)	84.5 (36.3)	68.8 (46.5)	80.2 (39.9)	78.5 (41.1)	0.008
Attained college degree (%)	39.9 (49.0)	32.3 (46.9)	32.6 (47.1)	40.1 (49.1)	37.0 (48.3)	0.217
Age (y)	55.39 (17.21)	51.75 (15.55)	47.45 (16.53)	49.92 (14.09)	51.80 (16.27)	0.001
Income (\$)	56,422 (30,030)	57,385 (29,096)	52,091 (29,330)	59,285 (28,718)	56,503 (29,428)	0.173
US region (%)†						
West	21.7 (41.2)	15.7 (36.4)	26.2 (44.1)	25.1 (43.5)	22.1 (41.5)	0.117
Midwest	28.1 (45.0)	26.1 (44.1)	25.4 (43.7)	26.3 (44.1)	26.8 (44.3)	0.933
South	39.5 (49.0)	42.5 (49.6)	33.1 (47.2)	0.28 (45.0)	36.1 (48.1)	0.021
Northeast	10.6 (30.9)	15.7 (36.4)	15.4 (36.2)	20.7 (40.6)	15.0 (35.8)	0.037

\*Represents results of an ANOVA; values of  $P \leq 0.05$  were considered significant. †Within each column, mean values for the 4 regions may not total to 100% because of rounding.

US population. For example, the US Census Bureau reported<sup>13</sup> that in 2006, the mean age of a person in a US household was 49.3 years; 80.1% of individuals were white; median and mean household income was \$48,200 and \$66,570, respectively; and 18.3% resided in the Northeast, 22.9% resided in the Midwest, 36.7% resided in the South, and 22.1% resided in the West. Use of poststratification weights to force our sample to match the US population in terms of any of these characteristics had little influence on any of the results reported, which implied that any bias resulting because our sample was not representative of the general US population was extremely small.

Income, education, and affiliation with the Republican Party were not associated with category of consumer; however, gender, age, race, location of residence, and whether the respondent ate meat differed by category of consumer (Table 4). As a group, moral populists had a higher share of females and were typically younger than were scientific elitists. Moral elitists had the largest share of white respondents, whereas scientific populists had the smallest share of white respondents. Moral populists were more likely to reside in the Northeast, compared with results for other categories of consumer, and scientific and moral elitists were more likely to reside in the South.

## Discussion

The study reported here provided information on public opinion regarding who should make farm animal welfare decisions and how the decisions should be made. In many cases, the primary factor that explained people's views toward farm animals was the distinction of who was making the decision (experts vs public), rather than how the decision was made (scientific evidence vs moral or ethical considerations). People who believed decisions about animal welfare should be made by experts were less likely to believe the government should regulate animal welfare and were less likely to rate animal welfare high on the list of societal problems, compared with results for people who believed animal welfare decisions should be made by the public.

In other cases, beliefs about the role of science versus ethics also came into consideration, primarily as that role related to how people were willing to make a trade-off between the suffering of farm animals and humans. People's philosophic views on how decisions about animal welfare should be made are not likely to be strongly influenced by education campaigns. This implies that for the 46% of the public who believed decisions about animal welfare should be based on moral and ethical considerations, as opposed to on the basis of scientific measures of animal well-being, providing more education related to sound science (as advocated by many in the animal production industries) is unlikely to be successful at changing public opinion about current animal production practices.

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