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Effects of demographic factors and information sources on United States consumer perceptions of animal welfare

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ABSTRACT: As consumers have become more interested in understanding how their food is produced, scrutiny and criticism have increased regarding intensified food animal production methods. Resolution of public concerns about animal agricultural practices depends on understanding the myriad factors that provide the basis for concerns. An online survey of 798 U.S. households was conducted to investigate relationships between household characteristics (demographics, geographic location, and experiences) and level of concern for animal welfare as well as sources used to obtain information on the subject. Because recent media attention has focused on animal care practices used in the U.S. swine industry, respondents were also asked specific questions pertaining to their perceptions of pig management practices and welfare issues and their corresponding pork purchasing behavior. Respondents reporting higher levels of concern about animal welfare were more frequently female, younger, and self-reported members of the Democratic Party. Fourteen percent of respondents reported reduction in pork consumption because of

animal welfare concerns with an average reduction of 56%. Over half of the respondents (56%) did not have a primary source for animal welfare information; those who identified a primary information source most commonly used information provided by animal protection organizations, the Humane Society of the United States (HSUS), and People for the Ethical Treatment of Animals (PETA). Midwest participants were significantly, at the 5% significance level, less concerned about domestic livestock animal welfare and more frequently reported not having a source for animal welfare information than those from other regions of the United States. Overall, the U.S. livestock and poultry industries and other organizations affiliated with animal agriculture appear to be less used public sources of information on animal welfare than popular animal protection organizations. Improved understanding of the factors that contribute to consumers' evolving perceptions of the care and welfare of farm animals is an essential step toward enhanced sustainability and social responsibility in contemporary food production systems.

Key words: animal welfare, consumer perceptions, information source, pork

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INTRODUCTION

A growing phenomenon in developed Western nations is concern about the care and well-being of livestock animals, including by members of society who consume animal products (Croney and Anthony, 2010; Norwood and Lusk, 2011). In the U.S. livestock and poultry industries, it is not uncommon for public concerns about animal welfare to be dismissed as arising solely from ani-

mal protectionists and extremists who oppose animal use. However, when concern emanates from consumers of animal products, the respective industries are forced to take note. Consumers are increasingly demanding changes in how their food is produced and many are concerned with more than just the nutritional attributes (i.e., protein or fat content) of food; they are also concerned about process attributes, environmental impacts, and animal welfare concerns (Olynk et al., 2009). Plous (1993), Knight et al. (2003), Knight and Herzog (2009) and Serpell (2009) are just a few of the numerous past studies that have focused on attitudes towards animal use and the complexities of human–animal interaction. Norwood and Lusk (2011, p.

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359) note that “concern over the treatment of livestock is unlikely to be a mere fad.”

A number of factors have heightened consumer concerns about livestock well-being including debates over housing of food animals (see Croney et al., 2012), increased availability and access to animal welfare information, and animal abuse scandals revealed via undercover video surveillance (see Croney and Anthony, 2010). As public interest in animal welfare increases and producers’ concerns about the rapidly changing food marketplace collide, it is important to better understand consumer perceptions and desires for livestock products and the latent ethical bases for these. Therefore, the objectives of this study were to determine 1) the level of U.S. public concern about livestock care, management, and welfare practices; 2) primary sources people use to inform themselves about animal welfare; and 3) effects and interrelationships between demographics, geographic location, and animal welfare concerns.

MATERIALS AND METHODS

An online survey of 798 U.S. households was conducted in June 2012 to understand relationships between demographic and geographic characteristics of households and stated concerns for animal welfare. All survey questions pertinent to this analysis are shown in Appendix A. For the survey, in its entirety, see McKendree (2013). Internet surveys are becoming more prevalent due to their speedy completion times and lower costs than are other methods of public data collection (Gao and Schroeder, 2009; Louviere et al., 2008; Olynk et al., 2010; Tonsor and Wolf, 2010; Olynk and Ortega, 2013). Additionally, Hudson et al. (2004) found that internet surveys did not exhibit nonresponse bias.

Decipher, Inc. (Fresno, CA.), a marketing research services provider that specializes in online survey programming, data collection, data processing, and custom technology development, was used to administer the survey online. Participants were recruited from a large opt-in panel by Survey Sampling International (Shelton, CT), which was representative of the U.S. population (in terms of state of residence, gender, age, income, and education level) at least 18 years of age and familiar with their household’s food purchasing behaviors. As of 2012, the population of the United States was 313,917,040 with the total number of households equaling 114,761,359 (U.S. Census Bureau, 2013). In order to be considered representative of U.S. households, a total necessary sample size of 384 people was calculated. The necessary total survey sample size (S) was calculated as $S = X/[1 + (X/P)]$, in which P is the total size of the population from which the sample is being drawn (114,761,359), and $X = Z \times Z[F \times (1 - F)/(D \times D)]$, in which Z is the area un-

der the normal curve corresponding to the desired confidence level (1.96, per a 95% confidence interval), F is the frequency of the factor in the study (0.5), and D is the maximum acceptable difference between the sample and population means (0.05). Therefore, the sample used in this analysis, of 798 respondents, is more than sufficient to offer insights into U.S. households.

The goal of this analysis was to collect information about consumer perceptions of animal welfare and livestock rearing practices, animal welfare information sources, and the relationships between these characteristics and demographic factors. Questions were designed to elicit general information regarding household demographic characteristics, including age of respondent, household size, education level, and geographic location. Table 1 details respondents’ demographic information. Income was converted to a continuous variable, resulting in a mean household income of US\$49,223, marginally less than the U.S. Census Bureau’s reported median 2011 household income of \$50,054 (DeNavas-Walt et al., 2012). Respondents were slightly more educated than the U.S. average, with 97% graduating from high school and 33% receiving a bachelor’s degree or higher. In 2010, 87% of Americans over the age of 25 were at least high school graduates and 30% had completed at least 4 yr of college (U.S. Census Bureau, 2012).

People form their perceptions of an issue based on their frame of reference, which is influenced by convictions, values, norms, knowledge, and interests (Te Velde et al., 2002). Therefore, to aid our analysis, in addition to demographic information, information regarding political affiliation, last farm visit, vegetarianism, veganism, and animal ownership were collected. Whether or not respondents consume animal products is of interest given the focus of this analysis. A 2008 study released by Vegetarian Times found that slightly more than 3% of American adults consider themselves vegetarian and less than 1% vegan. Furthermore, they reported that 10% of adults “largely follow a vegetarian-inclined diet” (Vegetarian Times, 2008). In this study, 4% of respondents categorized themselves as vegetarian and 2% as vegan (Table 1). Olynk and Ortega (2013) found comparable results from an online survey with 5% of the participants categorizing themselves as vegetarian and 2% vegan.

Participants were asked about when they last visited a farm on which animals were being raised for meat, milk, or egg production, to gauge their familiarity with modern livestock operations. They were then asked multiple questions regarding concern for the welfare of domestic and internationally raised livestock animals. Because agriculture is a global industry and livestock products are shipped all over the world, participants were asked to rank their concern for the welfare of animals used in domestic (U.S.) food production and those

produced outside the United States on a scale from 1 (not concerned) to 7 (extremely concerned).

Views on specific pork industry practices as well as concern for pork industry segments were specifically solicited given recent public discussions and undercover exposés related to sow housing and other aspects of pork production. Because of the highly contentious debates currently taking place relative to U.S. swine production practices, several questions were presented that were related to consumer perceptions of pork production practices. Therefore, participants were asked, on a scale from 1 (very strongly agree) to 7 (very strongly disagree), the level to which they agreed or disagreed that a production practice reduced the welfare of pigs. A definition of animal welfare was not provided to participants during the survey to avoid creating bias in participants' responses. However, for clarity, participants were provided definitions of gestation crates, farrowing crates, and group pens. The definition shown for gestation crate was "A crate or cage in which a sow is individually confined during the animal's 4-mo pregnancy until the time of farrowing (giving birth to piglets)." The definition shown for farrowing crate was, "A crate or cage in which a sow is individually confined at time of farrowing (giving birth to piglets)." The definition shown for group pen was, "A pen in which a group of sows is placed during the animal's 4-mo pregnancy until the time of farrowing (giving birth to piglets)."

Participants were also asked to rank 4 pork industry segments from their highest concern about animal welfare and handling (1) to their lowest concern about animal welfare and handling (4). To gain a better understanding of participants' exposure to animal welfare information, respondents were also asked about which, if any, source they primarily used to obtain information about animal welfare. In addition, they were asked if they recalled seeing any media stories regarding pig welfare on/in the television, internet, printed newspaper, magazines, and books. Respondents could select multiple media story outlets or they could select "I have not seen any media stories regarding pig welfare."

Interrelationships between variables, including demographics, views on animal welfare, and primary information sources used were of interest. To look at interrelationships between variables, cross-tabulations were developed; a *z*-score was used to calculate statistical differences in cross-tabulations.

RESULTS AND DISCUSSION

Animal Experience

Ownership or even nonownership of animals, especially companions, may potentially offer insights into

Table 1. Demographic information and summary statistics

Variable description	Value
Mean age of survey respondent	47
Percent of male respondents	48%
Adults per household	1.93
Total children in household	0.50
Annual household pretax income	
Less than \$20,000	19%
\$20,000–\$39,999	31%
\$40,000–\$59,999	22%
\$60,000–\$79,999	12%
\$80,000–\$99,999	7%
\$100,000–\$119,999	3%
\$120,000–\$139,999	2%
\$140,000 or more	4%
Education level of respondent	
Did not graduate from high school	3%
Graduated from high school; did not attend college	23%
Attended college; no degree earned	26%
Attended college; associates or trade degree earned	14%
Attended college; bachelor's (BS or BA) degree earned	23%
Graduate or advanced degree (MS, PhD, or law school)	10%
Other	1%
Geographic region ¹	
Northeast	25%
South	25%
Midwest	27%
West	23%
Political affiliation of respondent	
Democratic Party	35%
Republican Party	25%
Independent	29%
None of the above	11%
Vegetarian	4%
Vegan	2%

¹Northeast included Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; Midwest included Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; South included Alabama, Arkansas, Delaware, the District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; and West included Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

one's perceived obligations to other animals, such as livestock and poultry. A total of 530 (66%) households in the survey reported owning at least 1 animal. Out of the total sample of respondents, 386 (48%) households owned dogs, 324 (41%) owned cats, 20 (3%) owned horses, and 80 (10%) owned other animals. Interestingly, all horse owners also owned a cat and/or a dog.

Farm visits may potentially provide a frame of reference into the participants' familiarity with agriculture production and modern production technology, which is hypothesized to influence perceptions of animal welfare and well-being. Therefore, participants were also asked when

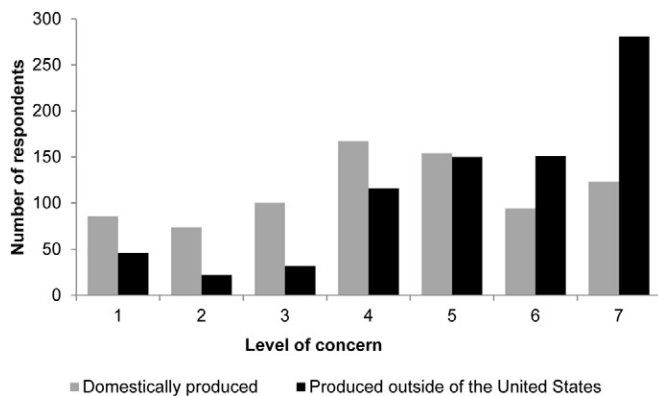


Figure 1. Concern for animal welfare in domestic (U.S.) production and production outside the United States, where 1 indicates not concerned and 7 extremely concerned.

they last visited a farm on which animals were raised for milk, meat, or egg consumption. Fourteen percent of participants had visited a farm with animals being raised for milk, meat, or egg consumption in the last year, 16% had visited 1 to 5 yr ago, 7% had visited 6 to 10 yr ago, 31% visited over 10 yr ago, and 31% had never visited such a farm. In short, over 75% of participants reported they had not visited a farm with animals raised for milk, meat, or egg consumption in the past 5 yr.

General Concerns about Animal Welfare

Understanding consumer perceptions of animal welfare can help provide legislators, farmers, and other livestock industry members with an idea of how concerned consumers are regarding current livestock care and welfare. In addition, such information may provide insights into how to shape animal welfare policies, product offerings, and industry practices that are deemed publicly acceptable.

Concern about food animal welfare outside the United States was higher (mean of 5.4) than for domestic animals (mean of 4.3; a *P*-value comparing means of 0.000 indicates means are statistically different from one another via *t* testing). However, investigating the distributions of responses in Fig. 1 offers insight beyond the mean levels. Nearly half of the respondents (46%) were somewhat to extremely concerned (the number of consumers ranking their level of concern as 5, 6 or 7) about the welfare of U.S. livestock animals, while a total of 584 (73%) of respondents indicated the same level of concern about the welfare of livestock animals outside the United States. More specifically, over one-third of all participants indicated that they were extremely concerned (value of 7) about the welfare of livestock animals outside the United States while only 15% were extremely concerned about the welfare of livestock in the United States. Follow-up questions were not asked about why participants were more concerned about animals produced

abroad than domestically; therefore, the reasons for those differences are not fully understood. Nevertheless, this finding is consistent with previous work, which reported higher levels of concern for food safety for imported food versus domestic foods (McKendree et al., 2012). It is hypothesized that U.S. consumers' greater trust in U.S.-based government and third-party agencies to ensure food safety and quality than in assurance from foreign nations could be extended to animal welfare attributes (McKendree et al., 2012). If so, the current findings would be consistent with previous research indicating that U.S. consumers report increased general concern for foreign production as compared to domestic production.

Cross-tabulation results by stated level of concern for animals used for domestic food production are depicted in Table 2. Those who indicated concern for the welfare of animals used in domestic (U.S.) food production were statistically more frequently women and younger than the participants who were neutral or not concerned. Similar findings that women tend to be more concerned about animal welfare have been reported (Broida et al., 1993; Taylor and Signal, 2005; Heleski et al., 2006; Kendall et al., 2006; Herzog, 2007; Wilkie, 2010; Deemer and Lobao, 2011). Deemer and Lobao (2011) note that women's concern for animal welfare could be related to their social roles as caretakers. Additionally, those who reported welfare concern for domestic food animals statistically more often reported reducing pork consumption due to animal welfare concerns. Those who were not concerned about the welfare of domestic food animals statistically more frequently self-reported as Republican. Deemer and Lobao (2011) likewise found that political affiliation was related to level of concern for animal welfare, with those who were Democrat or of a liberal political orientation being more concerned about farm animal welfare. Additionally, past studies have found that Democrats appear to more highly value the preservation of wild animals than those of different political affiliations (Czech and Borkhataria, 2001) and those who oppose vivisection tend to be more liberal (Broida et al., 1993; Heleski et al., 2006). Collectively, these findings suggest that political affiliation may relate to inclination toward environmental concerns, such as animal welfare, and that politics unrelated to food production may be associated with or may actually influence perceptions of acceptable food animal production practices.

Welfare Issues in U.S. Pork Production

When asked if participants had reduced their overall pork consumption in the past 3 yr due to animal welfare and handling concerns, 14% of respondents indicated that they had reduced consumption with an average reduction of 56% from their previous consumption. This reduction

Table 2. Cross-tabulations for concern for the welfare of animals used in domestic food production

Demographic characteristics	Concern for welfare of domestic food animals ¹		
	Not concerned ²	Neutral ³	Concerned ⁴
	A n = 260	B n = 167	C n = 371
Male	60% BC	48% c	39%
Female	40%	52% A	61% Ab
I am ____ years old	50.18 BC	44.28	45.02
Over the past 3 yr have you reduced your overall pork consumption because of animal welfare/handling concerns?			
Yes	7%	13% A	20% AB
No	93% BC	87% C	80%
Political affiliation			
Democratic Party	28%	29%	43% AB
Republican Party	33% BC	22%	20%
Independent	27%	35% a	28%
None of the above	12%	14% c	9%

¹The capital letters (A, B, and C) in the table represent a statistically significant difference at the 5% level and the lowercase letters at the 10% level. The letter that indicates a significant difference is always located next to the highest value of the 2 different numbers being compared. For example, when reading the “male” row, column A is significantly different than columns B and C at the 5% level and the letter indicating a statistically significant difference appears in the A column because A has that largest value, 60%. Likewise, column B is different than column C at the 10% level, so the lowercase letter c appears in column B because its value is larger.

²Not concerned was indicated by 1 to 3 on a 7-point Likert scale.

³Neutral was indicated by 4 on a 7-point Likert scale.

⁴Concerned was indicated by 5 to 7 on a 7-point Likert scale.

in pork consumption due to welfare concerns is larger than the reduction found for dairy products in previous work. McKendree et al. (2012) reported that 5 to 7% of respondents, depending on the specific dairy product in question, reportedly reduced dairy consumption in the 3 yr preceding the survey due to animal welfare concerns. Potential differences between pork and dairy consumption changes may stem from the differences in the products themselves (i.e., meat versus milk), differences in affinity or care for pigs versus dairy cows (Olynk et al., 2010), or the variation in the harvest methods used.

Specific to pigs, respondents were asked about their concern for various production practices. The distributions of responses for level of agreement that certain production practices reduce the welfare of pigs are shown in Fig. 2, with means presented in bold. Overall, respondents were most concerned with hog housing. Furthermore, it is likely that participants were exposed to some of these issues via legislative and ballot initiatives, such as Proposition 2 in California (Crony et al., 2012). Participants were asked to rank 4 pork industry segments/production stages from most concerned (1) about animal welfare and handling concerns to least concerned (4). The mean level of concern for processors was 1.85, for farmers was 2.62, for transportation was 2.66, and for auction market was 2.87. It is hypothesized that most participants

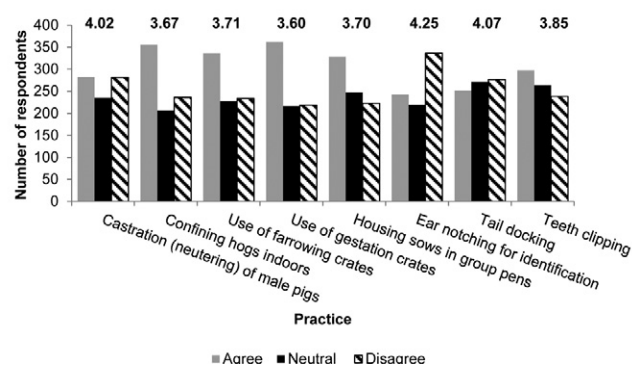


Figure 2. Number of respondents in agreement that practice reduces the welfare of pigs. Participants were shown these practices and asked to rank them on a 7-point Likert scale with 1 meaning strongly agree that the practice reduces the welfare of the pig and 7 indicating strongly disagree. To easily convey the information, in the table “agree” represents those indicating 1 through 3, 4 represents “neutral,” and 5 to 7 represents “disagree” on the scale. Farrowing crate: A crate or cage in which a sow is individually confined at time of farrowing (giving birth to piglets). Gestation crate: A crate or cage in which a sow is individually confined during the animal’s 4-mo pregnancy until the time of farrowing (giving birth to piglets). Group pen: A pen in which a group of sows is placed during the animal’s 4-mo pregnancy until the time of farrowing (giving birth to piglets).

were least concerned about auction markets because they were probably the least familiar with this segment of animal production. It is plausible that they were most concerned about slaughter houses due to recent undercover videos in the media or that they may have latent discomfort or ambivalence about animals being killed and the methods used to do so.

Animal Welfare Information Source

According to Kendall et al. (2006, p. 401), “One difficulty in studying attitudes about animal well-being is that most Americans do not question their customary relationships in the use of animals nor seek out information about animals’ quality of life” (Herzog, 1993; Plous, 1993). However, for those individuals seeking information surrounding animal welfare, to whom do they look for their information? Figure 3 details the responses regarding the primary source participants reported using to obtain information on animal welfare. Fifty-six percent of respondents indicated that they did not have a source for animal welfare information. This finding supports Knight et al. (2003, p. 317), which found “[p]articipants talked about avoiding information concerning animal use because it led to unpleasant feelings of discomfort.” Of those who reported a primary source, the Humane Society of the United States (HSUS) and People for the Ethical Treatment of Animals (PETA) were the most common with 12 and 7% of participants reportedly using these sources, respectively. Five percent of survey takers selected federal government agencies, 2% selected state government agencies, and 1% selected univer-

Table 3. Cross-tabulations for concern for domestic food animals with media sources and media stories

Participant response	Concern for animal welfare of domestic animals ¹		
	Not concerned ²	Neutral ³	Concerned ⁴
	n = 260 A	n = 167 B	n = 371 C
Animal welfare information source			
Information source not the Humane Society of the United States (HSUS) or People for the Ethical Treatment of Animals (PETA)	17%	25% a	31% A
HSUS or PETA	12%	13%	26% AB
No animal welfare source	71% bC	62% C	43%
Have you seen media stories regarding the welfare of pigs on/in:			
Television	11%	12%	31% AB
Internet	11%	13%	31% AB
Printed newspaper	5%	4%	11% AB
Magazines	3%	3%	13% AB
Books	1%	4% A	8% Ab
I have not seen any media stories regarding pig welfare.	82% bC	74% C	49%

¹Statistically significant differences between 2 measures at the 5% level are indicated by a capital letter, while 10% is indicated by a lowercase letter. The letter that indicates a significant difference is always located next to the highest value of the 2 different numbers being compared.

²Not concerned was indicated by 1 to 3 on a 7-point Likert scale.

³Neutral was indicated by 4 on a 7-point Likert scale.

⁴Concerned was indicated by 5 to 7 on a 7-point Likert scale.

than those who were neutral or not concerned about domestic food animal welfare (Table 3).

Animal Welfare Concern and Information Sources across Demographic Characteristics

In addition to looking at welfare information sources related to level of concern for animal welfare, sources of information were also compared across various demographic variables. Table 4 details cross-tabulations for media sources by a number of demographic characteristics as well as answers to numerous other questions from the survey. When examining Table 4, few statistically significant differences were found between 1) those that used the HSUS or PETA as information sources and 2) those that had a different animal welfare source. Most statistical differences were found between those who had a source for animal welfare information and those who did not. Participants who did not have a source for animal welfare information were statistically more often older, with a lower income and lower weekly food expenditure, and had never visited a farm with animals being raised for meat or milk production than those who had an animal welfare source.

Whether or not participants had a primary source for animal welfare also seemed to influence reduction

in pork consumption due to welfare concerns. Ninety-one percent of those who did not have a primary animal welfare information source did not reduce their pork consumption. Those who did not have a primary source were also concerned about different industry segments than those who had a primary source for animal welfare information. The mean level of concern for farm level swine production was statistically higher for those who did not have a source for animal welfare information; therefore, they were less concerned about on-farm hog production than those who have a source for animal welfare information (regardless of the source).

Similarly, those who did not have a primary source for animal welfare information were overall less concerned about the specific pork industry practices investigated than those who had a primary source for animal welfare information. Unsurprisingly, those who did not have a primary source for animal welfare information statistically more frequently reported not seeing media stories regarding hog welfare. Eighty-seven percent of those not having a source stated "I have not seen any media stories regarding pig welfare" compared to 41% of those who used the HSUS and PETA and 35% of those who used a different source. This suggests that there is a potential link between animal protection groups, such as the HSUS and PETA, and highlighting of specific animal welfare issues.

The last section in Table 4 shows that those who did not have a source for animal welfare information were statistically less concerned about the welfare of domestic food animals and food animals produced abroad than those who had a source for animal welfare information. From this information, it may be hypothesized that if someone is not informed about animal welfare, and especially if they do not have a primary source for animal welfare information, they may have less concern for animal welfare overall. However, it cannot be determined if those who report being less concerned are so due to lower affinity for animals, less inherent interest in animal issues, or reasons beyond those investigated here.

Another interesting finding is that those who reported having any primary information source for animal welfare tended toward higher levels of concern for animal welfare. Of those reportedly having sources of information, those who relied on the HSUS or PETA were not statistically different in reported levels of concern for animal welfare than those using any of the other sources investigated. Therefore, the idea that information provided by these animal protection groups causes greater or different public concerns than that provided by industry, academic, and other sources does not appear to be supported by these data. Although the HSUS and PETA were cited more frequently as primary information sources on animal welfare, it is possible that rather than causing concern, they are more readily identified

Table 4. Cross-tabulations for animal welfare media source

Response to survey question	Media sources not the HSUS ¹ or PETA ^{2,3}	HSUS or PETA	No animal welfare source
	<i>n</i> = 201 A	<i>n</i> = 152 B	<i>n</i> = 445 C
I am ____ years old	41.77	44.20	49.51 AB
Yearly household income			
Lower income ⁴	65%	68%	76% AB
Middle income ⁵	28% C	27% C	19%
High income ⁶	7%	5%	5%
Weekly food expenditure	150.13 C	143.04 c	121.41
Last farm visit			
I have never visited such a farm	22%	25%	36% AB
Over 10 yr ago	24%	29%	36% A
6–10 yr ago	10% c	9%	6%
1–5 yr ago	22% C	22% C	12%
Within the last year	22% bC	15%	10%
Over the past 3 yr have you reduced your overall pork consumption because of animal welfare/handling concerns?			
Yes	21% C	20% C	9%
No	79%	80%	91% AB
Please order the following animal industry segments and production stages in order of animal welfare/handling concerns specific to pigs, where 1 indicates your highest level of concern and 4 indicates your lowest level of concern			
Farmer ⁷	2.49	2.36	2.76 AB
Transportation ⁸	2.70	2.62	2.65
Auction markets ⁹	2.79	3.04 AC	2.84
Processors ¹⁰	2.02 C	1.97 C	1.75
How much do you agree that the following practices seriously reduce the welfare of pigs, where 1 indicated very strongly agree and 7 very strongly disagree?			
Castration (neutering) of male pigs	3.76	3.82	4.22 AB
Confining hogs indoors	3.61	3.39	3.79 B
Use of farrowing crates ¹¹	3.60	3.53	3.82
Use of gestation crates ¹²	3.66 b	3.26	3.69 B
Housing sows in group pens ¹³	3.56 b	3.22	3.92 AB
Ear notching for identification	4.08	3.94	4.43 AB
Tail docking	4.10 b	3.75	4.16 B
Teeth clipping	3.82	3.50	3.99 B
Have you seen media stories regarding the welfare of pigs on/in:			
Television	32% C	38% C	9%
Internet	39% C	38% C	7%
Printed Newspaper	17% C	11% C	2%
Magazines	17% C	16% C	0%
Books	13% C	8% C	0%
I have not seen any media stories regarding pig welfare.	35%	41%	87% AB
Please indicate your level of concern regarding the welfare of livestock animals used in food production, where 1 indicates not concerned and 7 extremely concerned			
Domestically produced	4.75 C	5.01 C	3.78
Produced outside of the United States	5.72 C	5.86 C	5.02

¹HSUS = Humane Society of the United States.

²PETA = People for the Ethical Treatment of Animals.

³Statistically significant differences between 2 measures at the 5% level are indicated by a capital letter, while 10% is indicated by a lowercase letter. The letter that indicates a significant difference is always located next to the highest value of the 2 different numbers being compared.

⁴Household income less than \$20,000 to \$59,999.

⁵Household income of \$60,000 to \$119,999.

⁶Household income of greater than \$120,000.

⁷Or on-the-farm production.

⁸Or hauling and moving of animals between farms or to points of sale.

⁹Or locations where animals change ownership.

¹⁰Or locations of animal slaughter and meat processing.

¹¹A crate or cage in which a sow is individually confined at time of farrowing (giving birth to piglets).

¹²A crate or cage in which a sow is individually confined during the animal's 4-mo pregnancy until the time of farrowing (giving birth to piglets).

¹³A pen in which a group of sows is placed during the animal's 4-mo pregnancy until the time of farrowing (giving birth to piglets).

Table 5. Cross-tabulations for dog and/or cat owners by those who do not own a dog or cat

Response to survey question	Dog and/or cat owners	Not dog or cat owners	Statistically significant difference
	<i>n</i> = 518 A	<i>n</i> = 280 B	
Please indicate your level of concern regarding the welfare of livestock animals used in food production, where 1 indicates not concerned and 7 extremely concerned			
Domestically produced	4.46	3.88	**
Produced outside of the United States	5.46	5.16	**
Animal welfare information source			
Information source not HSUS or PETA ¹	28%	20%	**
HSUS or PETA	23%	12%	**
No animal welfare source	49%	68%	**

¹HSUS = Humane Society of the United States; PETA = People for the Ethical Treatment of Animals.

**Significant at the 5% level; *Significant at the 10% level.

as source points for those already inclined toward being concerned. Additionally, the HSUS and PETA may provide easier public access to information and more attractive sites than some of the other sources investigated.

As consumers are increasingly distanced from production agriculture, most animal interaction comes via interaction with household pets. Potentially, relationships and emotional connections people derive from interactions with pets serve as a basis for concern for animals, including those used for food. Dog and/or cat owners were found to be statistically different from those who did not own a cat or dog regarding concern for the welfare of livestock animals used in food production (Table 5). Dog and/or cat owners were statistically more concerned about the welfare of livestock animals in food production in both domestic and international markets than those who did not own a cat or dog. Dog and/or cat owners also statistically more often reported having a primary source for animal welfare than those who did not own these species. It is hypothesized that owning a pet may predispose one to be more concerned about animal welfare and to seek or attend to information on the topic. Thus, having a bond with companion animal species may potentially influence a person's perceptions regarding food animal welfare.

Regional Differences in Welfare Concerns

Cross-tabulation analysis revealed statistically significant differences across geographic region with respect to animal welfare concerns (Table 6). Geographic regions were defined as follows: Northeast included Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont; Midwest included Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; South included Alabama, Arkansas, Delaware, the District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina,

Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; and West included Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming. Those from the Midwest region were statistically less concerned about pig welfare at the farm level than those from the Northeast and West regions of the United States. However, they were statistically significantly, at the 5% significance level, more concerned about auction markets than those in the Northeast and West. Potentially, concern about auction markets in the Midwest may stem from more auction markets existing in these regions and therefore consumers are more likely to be familiar with them, or at least the role they serve in livestock markets. A stark difference in animal welfare concern for pork industry practices is evident in Table 6. For nearly all pig production practices in question, those respondents from the Midwest region were statistically less concerned than those from other regions of the United States. Additionally, those from the Midwest statistically more frequently reported not having a source for animal welfare information than those from the Northeast or West regions.

The Midwestern states are among the top producing pig states in the United States (National Pork Producers Council, 2012). Potentially, the results in Table 6 suggest that those living in geographic areas highly affiliated with pig farming may be less concerned about pig production practices. These findings are consistent with studies indicating that those connected to farm animal production tend to be less concerned about farm animal welfare (Te Velde et al., 2002). Beyond concern for pork production practices, respondents from the Midwest had a statistically lower mean level of concern for the welfare of livestock produced in the United States. Recognition of regional differences is important because if those who are most likely to interact with livestock animals (or any animals) are not cognizant or aware of concerns surrounding animal welfare, then potential problems may go unrecognized.

Table 6. Cross-tabulation of geographic area and animal welfare concerns

Response to survey question	Northeast ¹ n = 198 A	Midwest n = 204 B	South n = 212 C	West n = 184 D
Please order the following animal industry segments and production stages in order of animal welfare/handling concerns specific to pigs, where 1 indicates your highest level of concern and 4 indicates your lowest level of concern				
Farmer ²	2.51	2.76 AD	2.69 d	2.48
Transportation ³	2.67	2.61	2.66	2.71
Auction markets ⁴	2.92 B	2.73	2.80	3.03 BC
Processors ⁵	1.89	1.90	1.85	1.78
How much do you agree that the following practices seriously reduce the welfare of pigs, where 1 indicated very strongly agree and 7 very strongly disagree?				
Castration (neutering) of male pigs	3.71	4.25 Ac	3.94	4.21 A
Confining hogs indoors	3.38	4.02 ACD	3.63	3.64
Use of farrowing crates ⁶	3.65	3.95 acd	3.60	3.64
Use of gestation crates ⁷	3.45	3.86 Acd	3.52	3.55
Housing sows in group pens ⁸	3.65	3.95 aCd	3.57	3.61
Ear notching for identification	4.10	4.49 Ac	4.14	4.29
Tail docking	3.84	4.57 ACD	3.84	4.03
Teeth clipping	3.63	4.17 ACD	3.82	3.79
Please indicate your level of concern regarding the welfare of livestock animals used in food production, where 1 indicates not concerned and 7 extremely concerned				
Domestically produced	4.29 B	3.91	4.44 B	4.39 B
Produced outside of the United States	5.37	5.10	5.63 aBD	5.30
Animal welfare information source				
Information source not HSUS or PETA ⁹	28% d	25%	28% d	20%
HSUS or PETA	21% B	12%	19% B	25% B
No animal welfare source	51%	63% AC	53%	55%

¹Statistically significant differences between 2 measures at the 5% level are indicated by a capital letter, while 10% is indicated by a lowercase letter. The letter that indicates a significant difference is always located next to the highest value of the 2 different numbers being compared.

²Or on-the-farm production.

³Or hauling and moving of animals between farms or to points of sale.

⁴Or locations where animals change ownership.

⁵Or locations of animal slaughter and meat processing.

⁶A crate or cage in which a sow is individually confined at time of farrowing (giving birth to piglets).

⁷A crate or cage in which a sow is individually confined during the animal's 4-mo pregnancy until the time of farrowing (giving birth to piglets).

⁸A pen in which a group of sows is placed during the animal's 4-mo pregnancy until the time of farrowing (giving birth to piglets).

⁹HSUS = Humane Society of the United States; PETA = People for the Ethical Treatment of Animals.

Conclusions and Implications

Key findings from an online survey conducted in the summer of 2012 on perceptions of domestic and international livestock animal welfare and sources of animal welfare information used by the public include that those who were concerned about farm animal welfare were more frequently female, younger, and self-reported members of the Democratic Party. Further exploration of the values and interests of people in this demographic is necessary to ensure that their needs and concerns are represented in animal welfare policy development and implementation as well as in outreach and marketing. This is a particularly important consideration for the livestock and poultry industries given that 14% of respondents reportedly reduced their pork consumption in the past 3 yr due to animal welfare concern by an average of 54%. While this study focused specific animal welfare questions only on the swine industry, potentially people with salient con-

cerns about production practices used in the other animal industries may respond similarly in regard to reducing consumption of those industries' respective products.

Another important finding was that when asked about their primary source for animal welfare information, most participants reported that they did not have one. Those who had an animal welfare information source primarily identified the animal protection organizations the HSUS and PETA, as their source. Although few differences were found relative to the level or nature of animal welfare concerns between those who used the HSUS or PETA and those using other sources for animal welfare information, it is problematic that those involved directly in animal production (industry groups) and related subject matter experts (governmental, veterinary, and academic) are less well identified as sources of information used specifically for animal welfare. These results imply that members of the public either do not perceive

these sources as being particularly concerned about animal welfare or that they are less attractive or user friendly than are the animal protectionists' sites. Beyond an individual's perceptions of a source, influences from friends, family members, and other cultural or social stimuli cannot be overlooked. Given the U.S. livestock and poultry industries' interests in connecting better with consumers and providing greater assurance relative to animal care and welfare, additional analysis is needed to determine how to better position themselves as credible, attractive resources to consumers on the subject.

Finally, it was observed that respondents from the Midwest less often reported concern about domestic livestock animal welfare and more frequently reported not having a source for animal welfare information than those from other regions of the United States. While it is difficult to do more than hypothesize about these findings, they raise concerns given the high proportion of livestock and poultry production that occurs in this region. Given the finding that those involved in animal production also tend to be less concerned about welfare (Te Velde et al., 2002), this in turn raises the risk of food (and other) animal welfare scandals occurring regionally that contribute to undermining consumer trust in and support for U.S. food animal production practices. Greater attention and perhaps tailoring of educational and outreach activities is needed for people in the Midwest to protect both food animal well-being and the reputations of the livestock and poultry industries operating in these locations.

"[I]t is essential to acknowledge that people's beliefs about which food production practices are appropriate are tied to diverse, latent value systems" (Croney et al., 2012, p. 1570). Improved understanding of the factors that contribute to consumers' evolving perceptions of the care and welfare of current food animal production is an essential step toward developing enhanced sustainability and social responsibility in contemporary food production.

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APPENDIX A – RELEVANT QUESTIONS FROM SURVEY INSTRUMENT

This is a survey designed to obtain information from U.S. consumers regarding food consumption habits and pork production system issues. *Your participation in this survey is entirely voluntary and your responses will be kept in strict confidence.*

1. **I am:** Male Female
2. **I am _____ years old** (fill-in the blank with whole number allowable entries of 18 yr old to 105 yr old).
3. **My annual pre-tax, household income is: drop down menu with 10 ranges:**
1) Less than \$20,000; 2) \$20,000- \$39,999; etc. up to 10) \$180,000 or more
4. **The best description of my educational background is:**
 - a. Did not graduate from high school
 - b. Graduated from high school, Did not attend college
 - c. Attended College, No Degree earned
 - d. Attended College, Associates or Trade Degree earned
 - e. Attended College, Bachelor's (B.S. or B.A.) Degree earned
 - f. Graduate or Advanced Degree (M.S., Ph.D., Law School)
 - g. Other (please explain): _____
5. **Please fill-in each blank with a whole number representing the number of adults and children within each age bracket living in your household. If no children in a given age bracket are living in your household, please enter 0. Include yourself in the count.**
 _____ adults (over 18years)
 _____ children under 3 yr
 _____ children ages 4 to 6
 _____ children ages 7 to 9
 _____ children ages 10 to 12
 _____ children ages 13 to 15
 _____ children ages 16 to 18
6. **My state of residence is:** _____
(drop down menu of 50 states)
7. **How much would you estimate your household spends each week on total food consumption including at home, in restaurants, take-outs, etc.?**
\$ _____/week (please provide your best estimate).
8. **When was the last time you visited a farm with animals/livestock being raised for milk, meat, or egg production?**
 - a. I have never visited such a farm
 - b. Over 10 yr ago
 - c. 6–10 yr ago
 - d. 1–5 yr ago
 - e. Within the last year
9. **Please circle the number of each animal you currently have in your household:**
 - a. Dogs 0 1 2 3 4 or more
 - b. Cats 0 1 2 3 4 or more
 - c. Horses 0 1 2 3 4 or more
 - d. Other (please describe the type and quantity):

10. **Over the past 3 yr have you reduced your overall pork consumption because of animal welfare/handling concerns?**
 - a. Yes
 - b. No
 - i. If yes, reduced by roughly _____ %
(please give your best estimate).
11. **Please order the following animal industry segments and production stages in order of animal welfare/handling concerns specific to pigs (where 1 indicates your highest level of concern and 4 indicates your lowest level of concern):**
 _____ Farmer/On-the-farm production
 _____ Transportation/Hauling and moving of animals between farms or to points of sale
 _____ Auction Markets/Locations where animals change ownership
 _____ Processors/Locations of animal slaughter and meat processing

12. How much do you agree that the following practices seriously reduce the welfare of pigs?

	Very strongly agree						Very strongly disagree
	1	2	3	4	5	6	7
Castration (neutering) of male pigs	1	2	3	4	5	6	7
Confining hogs indoors	1	2	3	4	5	6	7
Use of farrowing crates (A crate or cage in which a sow is individually confined at time of farrowing (giving birth to piglets).)	1	2	3	4	5	6	7
Use of gestation crates (A crate or cage in which a sow is individually confined during the animal's 4-mo pregnancy until the time of farrowing (giving birth to piglets).)	1	2	3	4	5	6	7
Housing sows in group pens (A pen in which a group of sows is placed during the animal's 4-mo pregnancy until the time of farrowing (giving birth to piglets).)	1	2	3	4	5	6	7
Ear notching for identification	1	2	3	4	5	6	7
Tail docking	1	2	3	4	5	6	7
Teeth clipping	1	2	3	4	5	6	7

13. Which one of these sources do you most frequently use in obtaining information on animal welfare?

- a. Federal Governmental Agencies
- b. State Governmental Agencies
- c. University Scientists/Researchers
- d. United Egg Producers (UEP)
- e. U.S. Poultry and Egg Association
- f. National Pork Producers Council (NPPC)
- g. National Cattlemen's Beef Association (NCBA)
- h. National Milk Producers Federation (NMPF)
- i. The Humane Society of the U.S. (HSUS)
- j. People for the Ethical Treatment of Animals (PETA)
- k. American Farm Bureau Association
- l. Social Media (i.e., Facebook, Twitter, Blogs, etc.)
 - i. If l is selected then have them select from the following two options in a follow up question
 - 1. Social Media from agricultural sources
 - 2. Social Media from non-agricultural sources
- m. American Veterinary Medical Association (AVMA) or other veterinary medicine societies
- n. Other Agricultural Industry Group (please describe): _____
- o. Other (please describe): _____
- p. I do not have a source for animal welfare information

14. Have you seen media stories regarding the welfare of pigs on/in: (select all that apply):

- Television
- Internet
- Printed Newspaper
- Magazines
- Books
- I have not seen any media stories regarding pig welfare

15. Please indicate your level of concern regarding the welfare of livestock animals employed in food production.

Domestically produced:						
Not concerned						Extremely concerned
1	2	3	4	5	6	7
Produced outside of the US:						
Not concerned						Extremely concerned
1	2	3	4	5	6	7

16. Do you consider yourself a vegetarian?

- a. Yes
- b. No

17. Do you consider yourself a vegan?

- a. Yes
- b. No

18. Which mostly describes your political affiliation?

- a. Democratic Party
- b. Republican Party
- c. Independent
- d. None of the above

19. Which best describes your race?

- a. White, Caucasian
- b. Black, African American
- c. Asian, Pacific Islander
- d. Mexican, Latino
- e. American Indian
- f. Other (please describe): _____

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