Consumer Preferences for and Perceptions of Livestock Production Process Attributes: Animal Welfare and Food Safety Attributes

Nicole J. Olynk Widmar*, Melissa G. S. McKendree, Candace C. Croney

ABSTRACT
Consumers today are increasingly concerned about how their food is produced. In particular, US households are concerned about the handling and treatment of the animals raised to produce their meat and milk products. An online survey was conducted of 798 US household grocery shoppers to characterize meat and dairy shopping characteristics and preferences. Food safety and animal welfare concerns were assessed across multiple livestock products, including meat and dairy products of varying levels of processing. The largest numbers of participants were concerned about food safety and animal welfare in milk, eggs, and ground beef, which are commonly considered staple food products. Animal welfare and food safety concerns differed by animal species, as well as the individual product in question, even if those products come from the same species of animal. Specific to pork, 14% of consumers indicated that they had reduced their pork consumption in the past three years due to animal welfare concerns.

Key words: animal welfare, economics, consumer preferences, consumer perception, meat purchasing behavior

INTRODUCTION
Today’s grocery store shoppers are interested in a multitude of food product attributes, including not only attributes of the food itself, like low-fat or low-calorie, but also attributes surrounding the production processes employed to produce the product. Consumers are increasingly interested in whether food products, and especially meat and milk products, were produced in an environmentally—and socially—responsible manner. Livestock products, in particular, evoke consumer sentiment regarding the treatment of livestock and welfare of animals used to produce meat and milk products (Frewer et al., 2005). Consumers are considering production process attributes when selecting food products, such as environmental impacts, food safety implications, animal welfare impacts, and social implications of production methods.

Consumer confidence regarding the meat and milk products they purchase may depend on a number of factors, including the specific meat or milk product in question, the species of livestock animal employed in the production of that good, which production process attribute was verified, and the source of any available verification information. Consumers will select the bundle of meat and milk (food) products which provides them with the largest utility, as long as they are able to accurately determine the quality attributes of the food products (Caswell, 1998). The type of attribute and how that attribute is perceived by the consumer is key in determining how the consumer values such attributes. Food product attributes have been categorized as either search, experience, or credence attributes, according to Caswell and Mojduszka (1996). A credence attribute was one in which quality could not be assessed even after the product was purchased and consumed (Caswell and Mojduszka, 1996). Specific to raising livestock for meat and milk production, claims surrounding animal rearing, handling, and housing practices all encompass credence attributes of the production process. In contrast to credence attributes, Caswell and Mojduszka (1996) classified an attribute as a search attribute if consumers were able to identify quality before purchase through either inspection or research, while an experience attribute is one in which consumers were able to determine the quality after the product is purchased and consumed, but not prior to purchase.

The USDA (2012) forecasts that red meat and poultry per capita consumption will fall to 198 pounds in 2013, but will rise to 213 pounds over the remainder of their projection period of 2021. The US per capita annual meat consumption is three times the global average (Daniel et al., 2011), at 221 pounds (USDA, 2012). With meat products being such an integral part in American’s diets, it is important to understand US consumers’ perceptions.
of livestock products and the practices used to raise the livestock animals that produce those products. Livestock industries cannot simply dismiss consumer interests and changing consumer demand in the marketplace, whether based on emotions, ethics, science, or simply their perceptions.

Past studies surrounding perceptions of livestock products and practices have focused on meat and milk products, such as pork chops (Olynk, Tonsor, and Wolf, 2010), beefsteak (Gao and Schroeder, 2009), milk (Wolf, Tonsor, and Olynk, 2011), and yogurt and ice cream (Olynk and Ortega, 2013). Consumer preferences for livestock production process attributes have been found to vary across animal species (Olynk, Tonsor, and Wolf, 2010) and across products, even when produced by the same species (Olynk and Ortega, 2013). Therefore, it is important to understand variation in consumer perceptions across products from different animal species, as well as products from the same animal.

This analysis seeks to analyze consumer perceptions and preferences for animal welfare and food safety attributes across a number of animal species and animal products. These perceptions vary not only from consumer to consumer, but also across species and the product in question. This paper seeks to summarize consumers’ reported perceptions/concerns surrounding livestock production, especially animal welfare and safety concerns and to inform livestock and meat industries regarding the implications of these findings.

**RESEARCH METHODS AND DATA**

**Survey Instrument**

An online survey was administered in June 2012 to collect data regarding consumer perceptions, purchasing behavior, and preferences for various meat and dairy products. Decipher Inc., a marketing research services provider that specializes in online survey programming, data collection, data processing and custom technology development, was employed to administer the survey online. A large opt-in panel by Survey Sampling International was used to recruit participants. The sample was recruited to be representative of the US population in terms of state of residence, gender, age, pre-tax income and education level. Additionally, respondents were required to be at least 18 years of age and familiar with their household’s food shopping and purchasing behaviors. Answers provided to respondents throughout the survey were randomized to lessen ordering effects on responses. A total of 798 respondents completed the survey.

Internet surveys are becoming more popular because of their low costs and fast completion times (Louviere et al., 2008; Gao and Schroeder, 2009, Olynk, Tonsor and Wolf, 2010; Olynk and Ortega; 2013). Hudson et al. (2004) found that Internet surveys did not exhibit nonresponse bias. Fleming and Bowden (2009) and Marta-Pedroso, Freitas and Domingos (2007) have found no significant differences when comparing results of web-based surveys, conventional mail and in-person interview surveys.

**Sample Summary Statistics**

Select demographics from the sample of 798 participants are detailed in Table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>47</td>
</tr>
<tr>
<td>Male</td>
<td>48%</td>
</tr>
<tr>
<td>Adults living in household</td>
<td>1.93</td>
</tr>
<tr>
<td>Total children living in household</td>
<td>0.50</td>
</tr>
<tr>
<td>Household Income</td>
<td></td>
</tr>
<tr>
<td>Less than $20,000</td>
<td>19%</td>
</tr>
<tr>
<td>$20,000 - $39,999</td>
<td>31%</td>
</tr>
<tr>
<td>$40,000 - $59,999</td>
<td>22%</td>
</tr>
<tr>
<td>$60,000 - $79,999</td>
<td>12%</td>
</tr>
<tr>
<td>$80,000 - $99,999</td>
<td>7%</td>
</tr>
<tr>
<td>$100,000 or more</td>
<td>9%</td>
</tr>
<tr>
<td>Education</td>
<td></td>
</tr>
<tr>
<td>Did not graduate from high school</td>
<td>3%</td>
</tr>
<tr>
<td>Graduated from high school, Did not attend college</td>
<td>23%</td>
</tr>
<tr>
<td>Attended College, No Degree earned</td>
<td>26%</td>
</tr>
<tr>
<td>Attended College, Associates or Trade Degree earned</td>
<td>14%</td>
</tr>
<tr>
<td>Attended College, Bachelor's (B.S. or B.A.) Degree earned</td>
<td>23%</td>
</tr>
<tr>
<td>Graduate or Advanced Degree (M.S., Ph.D., Law School)</td>
<td>10%</td>
</tr>
<tr>
<td>Other</td>
<td>1%</td>
</tr>
</tbody>
</table>

The mean age of survey respondents was 47 and 48% of respondents were male. On average, there were 1.93 adults and 0.50 children reported per household. Converting income to a continuous measure resulted in a mean household income of $49,223. Whether or not respondents report themselves to be vegetarian or vegan is of interest given the focus of the survey instrument on livestock product consumption patterns. Four percent of survey respondents categorized themselves vegetarians and two percent were reportedly vegan. Olynk and Ortega (2013) found similar results where five percent of the participants classified themselves as a vegetarian and two percent vegan. Household pet ownership was investigated; the most common household animals were dogs, with 386 (48%) households, followed by cats, with 324 (41%) households owning cats. Only 20 (3%) households owned horses.

**RESULTS & DISCUSSION**

Today’s grocery store shelves offer consumers numerous packaging and preparation options. The average weekly household food expenditure in this study was $132.77, including at home consumption, restaurants and take-out. Would consumers be willing to increase their food expenditures if the products available had the attributes, including packaging attributes, they desired?
Consumers’ attitudes towards handling and preparing meat products were evaluated to provide insight into consumer preferences for meat product packaging and comfort in handling/preparing meat dishes. Participants were asked to directly state how much they were willing to pay per pound to not have to touch or handle raw pork, beef, chicken and seafood (Figure 1). A sizeable number of consumers would be willing to pay to not handle raw meat. However, for each meat in question, over 60% of consumers were not willing to pay additional money to avoid handling raw meat. Overall, participants specified they were willing to pay the most to not have to handle raw chicken and the least to not handle or touch seafood/fish, compared to the other meats evaluated. Understanding the preferences of your consumers in handling/preparing your products is important; today’s meat industries must consider the tastes and preferences of their consumers and offer products that cater to their needs.

**Perceptions of Livestock Welfare**

Information was collected from participants with regards to their experience or values related to animal agriculture in order to better understand their frame of reference. It is hypothesized that respondents’ familiarity with agriculture, and especially livestock production, may impact their perceptions of animal-rearing practices. As a gauge of familiarity with livestock production, participants were asked when they last visited a farm with animals being raised for milk, meat or egg production. Only 31% had visited such a farm within the last five years, seven percent six to ten years ago, 31% over ten years ago, and 31% have never visited such a farm. Therefore, 69% have not visited a farm in the last five years.

The implications of differences in consumer perceptions of animal welfare domestically versus internationally should be considered moving forward, as perceptions of livestock raised domestically versus outside the US can have large implications for where products will be produced and traded in the future. When asked about their level of concern regarding the welfare of livestock animals employed in food production domestically, with one indicating not concerned and seven extremely concerned, the mean level of concern was 4.26. When asked about concern for livestock animals employed in food production outside the US, the mean level of concern was 5.35. Therefore, US consumers are less concerned about animal welfare in the US than other countries, but still indicated some concern for animal welfare of US food animals.

The pork industry has been at the center of many animal welfare debates in recent years (Norwood, 2011; Tonsor, Wolf and Olynk, 2009). In this study, 14% of participants indicated that they have reduced their overall pork consumption in the past three years due to animal welfare/handling concerns. Of those indicating that they had reduced consumption in the past three years, the average reduction was 56% from their previous amount consumed. This is a greater reduction than results from past studies with dairy products; McKendree, Olynk, and Ortega (2012) found that “Seven percent of consumers indicated they had reduced their ice cream consumption, while 7 percent reduced butter consumption, 6 percent reduced yogurt consumption, 6 percent reduced cheese consumption and 5 percent reduced fluid milk consumption” due to animal welfare concerns in the past three years. Consequently, further research may be needed to investigate this decrease in demand for pork products due to animal welfare concerns. One potential explanation for the difference in reported reductions is the difference in consumer perceptions of animal welfare associated with meat versus dairy products. Additional research is needed to uncover reductions in specific meat products, and reductions in products by specific species, due to animal welfare concerns.

Participants were asked to rank pork animal industry segments and production stage in order of animal welfare concern, with one being the highest level of concern and...
Participants were also asked about specific pork production practices and if they agreed that the practice reduced the welfare of the pig. Most individuals had a neutral attitude about each practice. This neutrality could indicate that the participant was unfamiliar with the production practice or that they really are neutral regarding the practice. Participants felt that housing types reduced pig welfare; housing sows in group pens\(^1\), use of farrowing crates\(^2\), use of gestation crates\(^3\) and confining hogs indoors had the lowest means, indicating the participants felt these practices reduced pig welfare the most. This could be due to the fact that most media surrounding pig welfare has focused on housing situations (Norwood, 2011; Tonsor, Wolf and Olynk, 2009). Respondents were least concerned about ear notching, castration, and tail docking, of those practices investigated. Potentially, respondents did not associate these practices with lowering pig welfare because they are most familiar with these practices, as they are common for household pets.

It has been hypothesized that consumers have differing animal welfare and food safety concerns across products, species and levels of processing. Products investigated in this analysis included boneless ham, bacon, ham lunchmeat, pork chops, pork sausage, hotdogs, beef steak, ground beef, roast beef lunchmeat, lean finely textured beef, veal chop, boneless chicken breast, chicken nuggets, chicken breast lunchmeat, whole turkey, turkey breast lunchmeat, SPAM™, milk, eggs, leg of lamb, finned fish, and shellfish. For every product in question, except for whole turkey, participants were more concerned about food safety than animal welfare. The most respondents were concerned about animal welfare in ground beef, 415 (52%), boneless chicken breast, 396 (50%), milk, 394 (49%), eggs, 394 (49%) and bacon, 392 (49%). The fewest participants, 264 (33%) and 269 (34%), were concerned about animal welfare in SPAM™ and shellfish, respectively. Similarly, the most concern for food safety was generated by ground beef with 69% of participants indicating concern, followed by eggs (67%), milk (63%), hotdogs (63%) and boneless chicken breast (63%). The least concern for food safety was stimulated by whole turkey (41%) and SPAM™ (48%). These results indicate that consumers could have differing views about food safety and animal welfare across products, even when the products are from the same species.

It has been hypothesized that consumers associate animal welfare and food safety attributes. The livestock products which the greatest number of respondents reported purchasing in the last six months were milk (87%), eggs (87%) and ground beef (80%). Many staple products, such as milk and eggs, have received a great deal of negative media attention in recent years, potentially impacting consumers’ views of those products – even if they are commonly purchased and consumed.

**CONCLUSIONS AND IMPLICATIONS**

Fourteen percent of respondents indicated they had reduced their pork consumption in the past three years due to animal welfare concerns. The reduction in consumption of pork products exceeds past findings on reductions of dairy products due to animal welfare concerns (McEndree, Olynk, and Ortega, 2012) potentially indicating differences in views of meat and dairy products. Animal welfare and food safety concerns differed across animal species, as well as the individual product in question, even if it is produced by the same species. Understanding consumer perceptions of livestock products and livestock product shopping characteristics will aid agricultural industry leaders and policy makers in effective communication with consumers and stakeholders regarding new regulations and legislation surrounding livestock animal welfare.

Further data analysis is underway; additional results will be available for presentation in June 2013.

---

1. Participants were given this definition: A pen in which a group of sows is placed during the animal’s four-month pregnancy until the time of farrowing (giving birth to piglets).
2. Participants were given this definition: A crate or cage in which a sow is individually confined at time of farrowing (giving birth to piglets).
3. Participants were given this definition: A crate or cage in which a sow is individually confined during the animal’s four-month pregnancy until the time of farrowing (giving birth to piglets).
REFERENCES


