

Kansans' Preferences for Sheep and Goat Meat Products

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August 2024

This research was conducted through a collaborative effort between K-State and the Kansas Department of Agriculture.

This research was funded by USDA Award #AM22FSMIPKS1009-00.

Summary

Motivation

Specialty livestock production is a growing sector within the state of Kansas, including but not limited to sheep, goat, poultry, rabbit, bison, alpaca, and others. Due to changing demographics within the United States, the palate of the U.S. consumer is broadening to other sources of protein, but consumer preferences have not been adequately measured. Limited studies explore regional or state dynamics of consumer attitudes and behaviors toward specialty livestock meat products. This research study examined sheep and goat meat product perceptions and purchasing intentions of meat consumers in Kansas.

Approach

We distributed an online survey instrument via Qualtrics to collect 2,500 responses from meat consumers in Kansas, Nebraska, Missouri, Colorado, Oklahoma, and the Texas Panhandle. This report only includes data from 349 respondent Kansans. Responses were collected March through June 2024. This survey was deemed exempt by the Kansas State University Institutional Review Board (KSU #12032).

The survey instrument asked participants to respond to questions regarding their demographic information; current sheep and goat meat consumption patterns; perceptions of sheep and goat meat product nutritional value; cooking self-efficacy; attitudes, subjective norms, perceived behavioral control, and intention related to purchasing sheep and goat meat; as well as respond to a meat product choice experiment with variables that included species, price, source, preparation method, and state of origin. All scales are based on previous literature. The survey was assessed for suitable validity and reliability by a pilot study prior to the full launch.

Key Findings

- The strongest predictor of future intention to purchase sheep and goat meat was respondents perceived subjective norms related to the behavior.
 - Promoting buying sheep and goat meat as a common behavior among Kansas consumer's friends, family, and peers may increase purchasing of such products.
- Respondent Kansas consumers are confident in their cooking skills, especially when it comes to following a recipe. Recipes were identified as the most important pathway to encouraging their willingness to prepare sheep and goat meat.

- Sheep and goat meat labeled as in-state, grass-fed products are preferred over alternative attributes. Respondent consumers prefer, and are willing to pay more for, sheep meat products more so than goat meat products.
- Price premiums for products with sheep meat, in-state, and kosher prepared attributes range from \$3.70 to \$5.28 per lb.

Detailed Results

Kansas Respondent Demographics (N = 349)

- Age
 - Range: 18 to 86 years
 - *Average = 46.86 years, Standard Deviation = 17.46*
- Gender Identity
 - Female: 51.3%
 - Male: 48.4%
 - Non-binary / third gender: 3%
- Nationality/Ethnic Background
 - Caucasian: 68.8%
 - African American: 11.5%
 - Hispanic/Latino: 10.9%
 - Asian: 6.3%
 - Native American descent: 2.6%
- Residence Status
 - City/Suburb >50,000: 31.2%
 - Town, City/ Suburbs 10,000 to 50,000: 25.2%
 - Town <10,000/Rural, Non-Farm: 21.8%
 - City-Central, >50,000: 17.2%
 - Farm: 4.6%
- Household Size (n = 343)
 - Adults in the household
 - Range: 1 to 11 adults
 - *Average = 2.11 adults Standard Deviation = 1.12*
 - Children in the household
 - Range: 0 to 6 children
 - *Average = 0.68 children Standard Deviation = 1.11*
 - Total household size
 - Range: 1 to 12 people
 - *Average = 2.79 people Standard Deviation = 1.60*

- Household Income

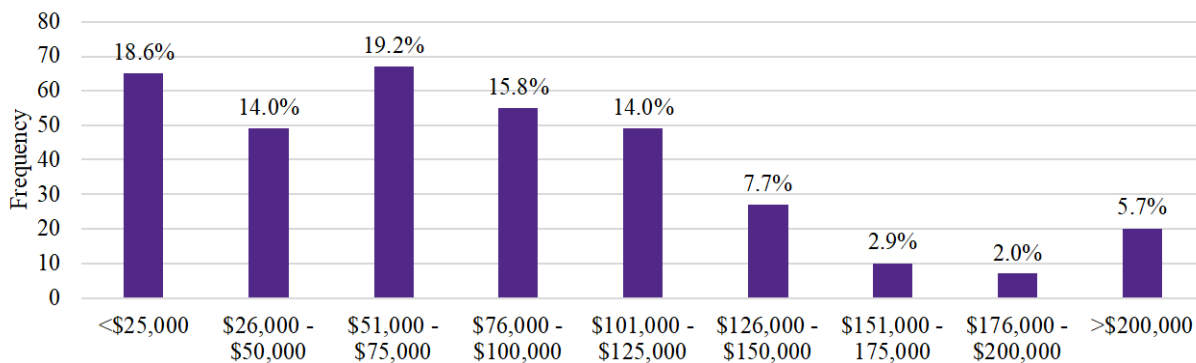


Figure 1. Frequency of Respondent Household Income Level

Meat Consumption Habits

Respondents were asked to provide the number of meals containing the following meat products (or no meat) in their weekly meals, assuming a normal 21 meals per week (breakfast, lunch, and dinner). Chicken and beef were the most frequently consumed as opposed to lamb and goat are the least consumed per week (**Figure 2**). Chicken and beef are consumed at least once a week by 74% and 65% of respondents, respectively, whereas lamb and goat are only consumed at least once a week by 10% and 7%, respectively.

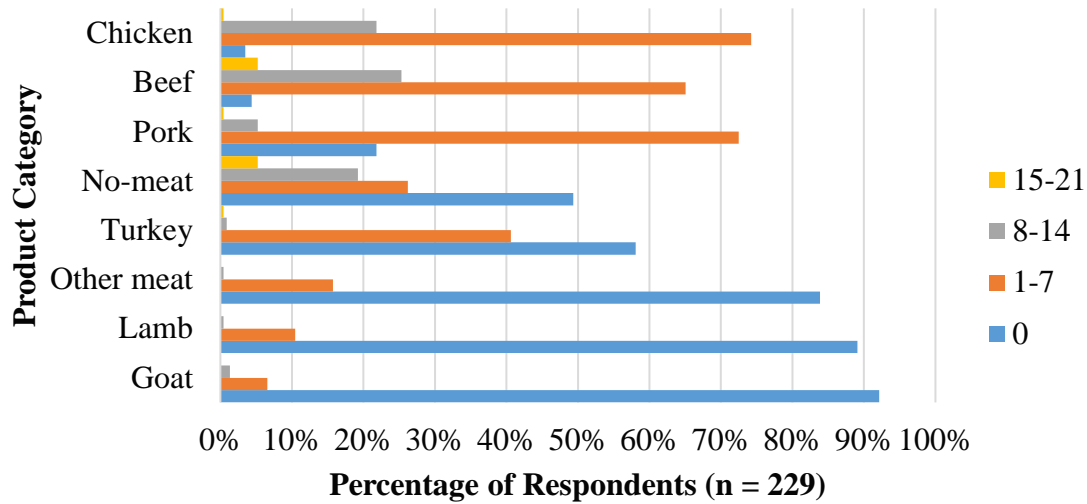


Figure 2. Frequency of Meat Product Included in Weekly Meals by Category

Goat & Sheep Meat Product Consumption Habits

We asked those who reported consuming goat or sheep meat during the average week ($n = 57$) additional questions about their related eating habits.

When asked to select all the **types of goat or sheep meat products respondents have consumed**, ground meat (58%) was the most frequently selected followed by leg (47%) and loin chop (44%).

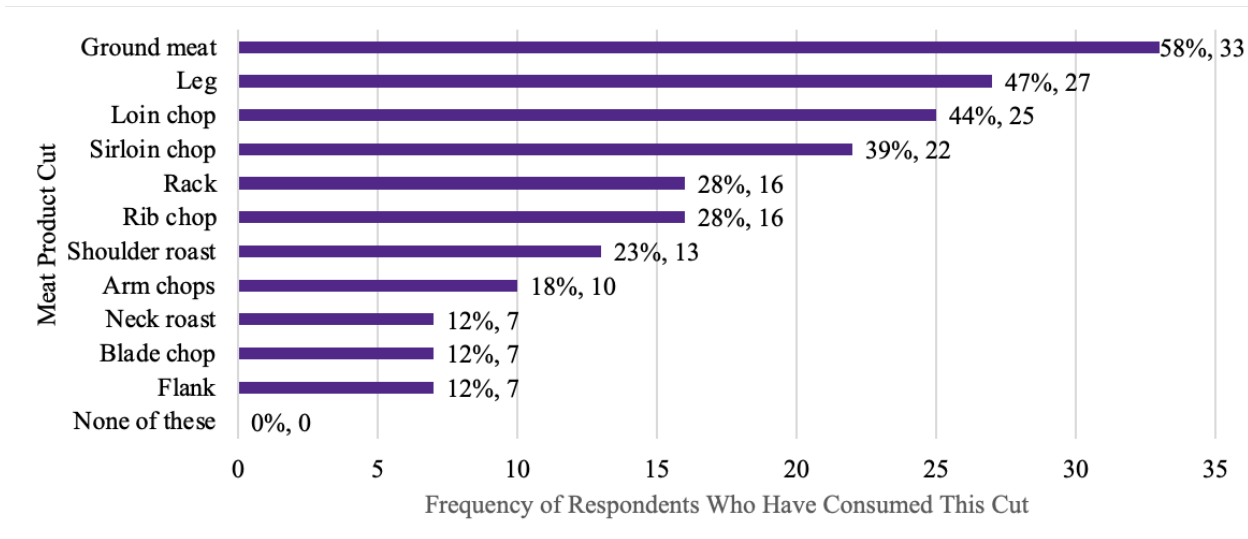


Figure 3. Frequency of Respondent Kansan Consumers Who Have Consumed Sheep and Goat Meat Cuts

Respondents were asked to select all the **special occasions during which they typically consume sheep or goat meat products**. The most frequently selected holiday was Christmas (46%), followed by Thanksgiving (44%), family re-unions (37%) and the Fourth of July (37%).

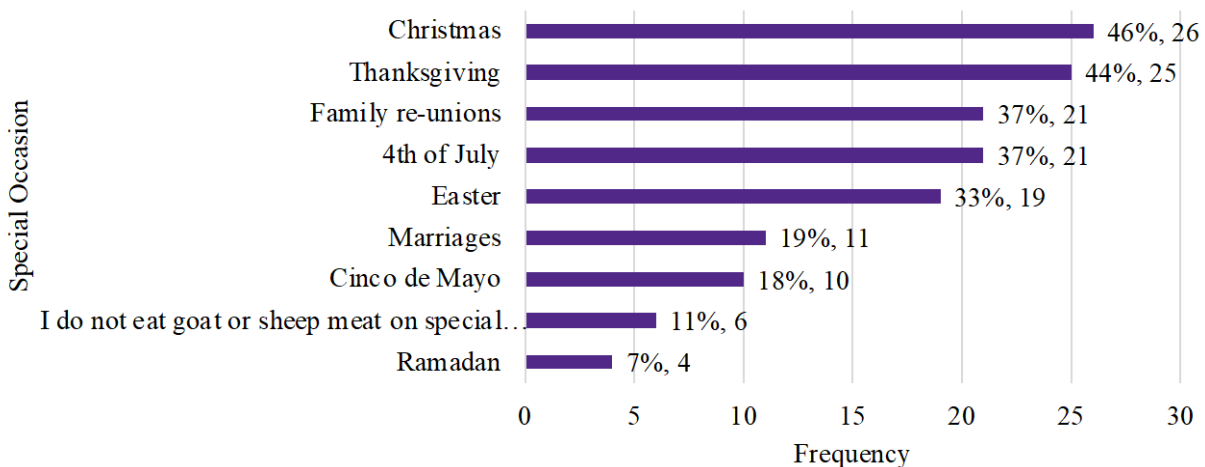


Figure 4. Special Occasions During Which Respondent Kansan Consumers Typically Consume Sheep or Goat Meat

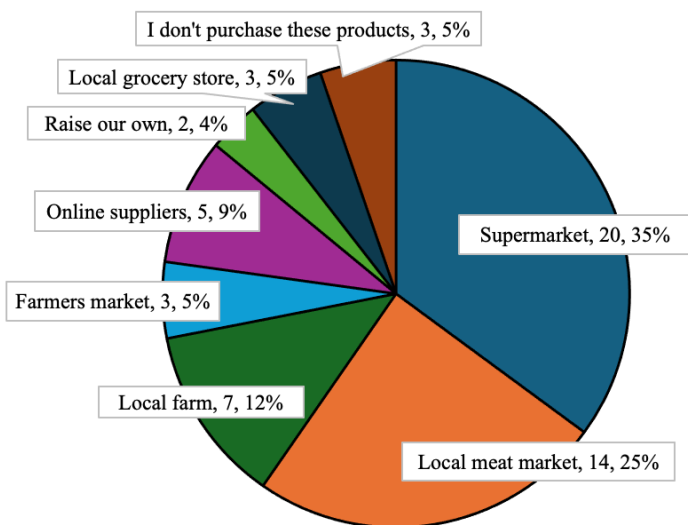


Figure 5. Breakdown of Sources of Sheep and Goat Meat Purchases

More than a third (35%) of respondents **typically purchase sheep and goat meat** at a supermarket, whereas 25% typically make such purchases as their local meat market. Respondents indicate they **currently drive around 36 minutes on average** to purchase lamb or goat, but they are willing to drive 48 minutes on average for these meat products (**Table 1**).

<i>Variable</i>	<i>Number of Responses</i>	<i>Average (Minutes)</i>	<i>Standard Deviation (Minutes)</i>
Current Drive	28	35.68	92.00
Willingness to Drive	28	47.53	91.30

Communication of Sheep and Goat Meat Information

When asked **where participants typically get information about sheep and goat meat products**, more than a quarter (27.6%, n = 99) reported never getting such information. Those that do cited friends and family were their most frequently used sources, followed by in-store grocery promotions.

Table 2. Frequency of Sources Consumers Use to Get Sheep and Goat Meat Information

Information Sources	Average	Standard Deviation	Interpretation
Family	2.08	1.23	Sometimes
Friends	1.99	1.19	Sometimes
In-store grocery promotions	1.94	1.16	Sometimes
Social media	1.86	1.18	Sometimes
TV	1.73	1.14	Sometimes
Colleagues	1.70	1.95	Sometimes
Mailed grocery advertisements	1.70	1.05	Sometimes
Newspaper articles	1.60	0.98	Sometimes
Radio	1.56	1.08	Sometimes
Magazine articles	1.52	0.92	Sometimes
Books	1.52	0.91	Sometimes

Note: N = 349. Real limits were set for the interpretation of responses: 1.00 to 1.49 = Never; 1.50 to 2.49 = Sometimes; 2.50 to 3.49 = Neither; 3.50 to 4.49 = Most of the time; and 4.50 to 5.00 = Always.

Intention to Purchase Sheep and Goat Meat Products

To determine participant's **attitudes toward sheep and goat meat products**, responses were collected using a 5-point scale ($\alpha = 0.73$) between six sets of bipolar descriptors (**Table 3**). Responses were coded from -2 to +2, and a construct average was computed to represent overall attitude. Respondents' average attitudes were = -0.14 (standard deviation = 0.83) which indicates very slightly more negative than positive attitudes toward consuming sheep and goat meat products.

Table 3. Consumer's Attitudes Toward Sheep and Goat Meat

Attitudes	Average	Standard Deviation
Tastes bad/Tastes good	0.09	1.34
Traditional/Novel	-0.15	1.32
Difficult to cook/Easy to Cook	-0.04	1.15
Expensive/Inexpensive	-0.47	1.10
Isn't a part of my family habits/Is a part of my family habits	-0.69	1.55
Not nutritious/Nutritious	0.42	1.15

To identify participant's **perceived subjective norms regarding buying sheep and goat meat products**, responses were collected using a Likert-type, 5-point scale ranging from *strongly disagree* = 1 to *strongly agree* = 5 across four questions ($\alpha = 0.86$) (**Table 4**). A construct average was computed to represent overall social norms. Respondents' average perceived social norms were = 2.55 (standard deviation = 1.08), which indicates buying sheep and goat meat products is not a strong subjective norm for our respondents.

Table 4. Consumers' Perceived Subjective Norms Towards Buying Sheep and Goat Meat

Subjective Norms	Average	Standard Deviation
My family, partner, and friends approve	2.95	1.31
Most people like me purchase sheep and goat meat products	2.48	1.25
The food industry and/or food supermarkets promote sheep and goat meat products	2.34	1.23
People important to me buy sheep and goat meat products	2.44	1.35

To determine participant's **perceived behavioral control over purchasing sheep and goat meat products**, responses were collected using a 5-point scale between three sets of bipolar descriptors ($\alpha = 0.87$) (**Table 5**). Responses were coded from -2 to +2, and a construct average was computed to represent overall perceived behavioral control. Respondents' average behavioral control was = 0.12 (SD = 1.29) which indicates very slightly positive perceive behavioral control over purchasing sheep and goat meat products.

Table 5. Consumer's Perceived Behavioral Control Toward Sheep and Goat Meat

Attitudes	Average	Standard Deviation
Not available to me/Available to me	-0.14	1.46
Not possible for me/Possible for me	0.09	1.43
Not in my control/In my control	0.40	1.45

To identify participant's **intention to purchase sheep and goat meat products**, responses were collected using three questions with Likert-type, 5-point scales ranging from *very unlikely* = 1 to *very likely* = 5 across three questions ($\alpha = 0.88$) (**Table 6**). A construct average was computed to represent overall intention. Respondents' average intention was = 3.01 (standard deviation = 1.26), which indicates a neutral respondent consumers' intention to purchase sheep and goat meat.

Table 6. Consumer's Intention to Purchase Sheep and Goat Meat

Intentions	Average	Standard Deviation
Likelihood to try a sample at local grocery store	3.48	1.50
Likelihood to purchase if available at favorite food retailer	3.01	1.35
Likelihood to make an effort to purchase in the future	2.82	1.35

Multiple linear regression was used to determine **how attitudes, subjective norms, and perceived behavioral control predict consumers' intention to purchase sheep and goat meat**. Whether or not the respondent reported eating sheep or goat meat in the average week was also included as a predictor variable in the model.

The statistically significant model ($F = 75.64$, $p = <0.001$) revealed the combination of predictor variables explained 46.9% ($R^2=0.469$) of the variance of intention to purchase sheet and goat meat with

a large effect size (Cohen, 1988). Of the predictor variables, a significant and positive relationship was observed between attitude, subjective norms, and perceived behavioral control and intention to purchase sheep and goat meat as shown in **Table 7**. According to the data, respondents' perceived subjective norms were the strongest predictor of future intention to purchase sheep and goat meat.

Table 7. Regression Analysis Respondents' Intention to Purchase Sheep and Goat Meat

Variables	Estimate	Standard Error	p-value
Intercept	1.45	0.151	<0.001*
Previous Sheep or Goat Meat Consumption	-0.188	0.154	0.223
Attitude	0.222	0.067	0.001*
Subjective Norms	0.657	0.057	<0.001*
Perceived behavioral control	0.129	0.043	0.003*

Note. *Statistical significance was set *a priori* at .05.

Healthfulness of Sheep and Goat Meat

Participants were asked about **how healthy they perceive sheep and goat meat products to be** using two questions with Likert-type, 5-point scales ranging from *very unhealthy* = 1 to *very healthy* = 5. Sheep meat was perceived as slightly healthier (average = 3.75, standard deviation = 0.83) than goat meat (average = 3.68, standard deviation = 0.85).

Sheep and goat meat **healthfulness in terms of nutritional benefit, naturalness of the product, and ease of digestion** were asked using three questions with Likert-type, 5-point scales ranging from *strongly disagree* = 1 to *strongly agree* = 5. Averages and standard deviations are presented for each item in **Table 8**.

Table 8. Agreement with Reasons Sheep and Goat Meat Healthful Products

Intentions	Average	Standard Deviation
Nutritionally beneficial	3.58	1.05
A natural product	3.77	0.99
Easy to digest	3.40	0.89

Respondents were asked about the **importance of the nutrients** in sheep and goat meat and were neutral to positive about their importance (average = 3.31, standard deviation = 1.28). When asked to **rank the importance of nutrient categories** in sheep and goat meat from 1 (most important) to 4 (least important), respondents indicated protein (average = 1.50, standard deviation = 0.78) was the most important followed by vitamins (average = 2.49, standard deviation = 0.89), minerals (average = 2.91, standard deviation = 0.87), and fats (average = 3.10, standard deviation = 1.07).

Improving Willingness and Ability to Cook Sheep and Goat Meat

To identify **informational pathways to improve respondents' willingness to prepare** sheep and goat meat products at home, they were asked about the importance of recipes, cooking tutorials, nutritional information, and sheep and goat rancher stories were to that endeavor. The question was asked using a 5-point, Likert-type scale from *not at all important* = 1 to *extremely important* = 5. The most important information to Kansan respondents was recipes (**Table 9**).

Table 9. Importance of Information to Support Preparing Sheep and Goat Meat at Home

Information Type	Average	Standard Deviation
Recipes	3.19	1.31
Nutrition Information	3.05	1.26
Cooking tutorials	2.99	1.25
Sheep and goat farmer or rancher stories	2.40	1.29

To determine the **level of confidence respondents had in their cooking skills and ability to prepare sheep and goat meat**, 6 items ($\alpha = 0.83$) were asked on a 5-point, Likert-type scale from *not at all confident* = 1 to *completely confident* = 5 (**Table 10**). A construct average was computed to represent overall cooking confidence skill level, which interpreted to determine respondents were *somewhat confident* (average = 3.14, standard deviation = 0.98) in their cooking skills.

Table 10. Respondents' Confidence in Cooking Skills

Information Type	Average	Standard Deviation
Following a recipe	3.99	1.15
Cooking a healthy meal	3.79	1.13
Cooking from scratch	3.23	1.42
Oven-baking or roasting goat or sheep meat	2.70	1.37
Grilling goat or sheep meat	2.57	1.44
Panfrying goat or sheep meat	2.57	1.41

Grocery Spending

Respondents were asked, “what **percentage of household grocery purchases are you responsible for making?**” Responses ranged from zero to 100%, with the average responsibility being 78.08% of the household grocery shopping.

Respondents reported spending an average of \$161.40 per week on groceries, with an average of \$64.36 (39.9%) of their total spend going towards meat products.



Willingness to Pay Dynamics

To assess willingness to pay (WTP) for goat and meat products, respondents participated in a double-bounded dichotomous choice question. Initially, participants were asked, “**You are ordering a lamb chop from a restaurant that claims 100% of its supplied lamb are from sheep in the area. Would you be willing to pay \$X more for a lamb chop from this restaurant compared to one from an alternative restaurant?**” Respondents answered either “yes” or “no”. With the response option being yes or no, and the price premium (\$X) varied randomly among participants, with values set at \$0.50, \$1.50, \$2.50, \$3.50 or \$4.50. About half of respondents saw this question in the context of sheep and the other half with goat.

The follow-up question was contingent on the response to the initial query. If the respondent answered “yes”, the follow-up asked if they would pay double the initial price premium for the same product. Conversely, if they answered “no,” the follow-up offered half the initial premium. This methodology helps to refine the estimated WTP.

The probit model results indicate that higher price premiums reduce the probability of a respondent being willing to pay for either sheep or goat meat, as reflected in the negative price coefficients. The coefficient for sheep meat (-0.238) suggests that consumers are more sensitive to price changes for sheep than goat meat (-0.106). Yet, the goat coefficient is not statistically significant, indicating these findings should be interpreted cautiously. Additionally, the estimated WTP from the interval-censored model shows that respondents are willing to pay more for sheep meat (\$4.09) than goat meat (\$3.36).

Table 11. Results of Probit and Interval-Censored Models

Parameter	Sheep	Goat
Price Coefficient Estimate	-0.238***	-0.106
Species WTP Estimate	\$4.09***	\$3.36***
Probit Log Likelihood	-102.775	-121.156
Interval-Censored Log Likelihood	-207.787	-250.802
Number of Observations	165	181

Note: *** denotes statistical significance at the 1 percent level.

Attribute Preferences

Respondents were asked a series of questions with varying prices and product attributes for sheep and goat meat under a choice experiment. Each respondent was asked 15 questions in which they had three choices, either two alternative products or neither of the two products displayed. **Figure 6** shows an example of a question, or choice task, within the choice experiment.



Neither Product A nor Product B

Product A

Product B

Price	\$28.75	Price	\$28.75
Species	Sheep	Species	Sheep
Source	Grass-fed	Source	Grain-fed
Prepared	Not stated	Prepared	Halal
State	Out-of-state	State	Out-of-State

Figure 6. Example of Choice Experiment Task within Consumer Survey.

The results from these questions are displayed in **Tables 12**. Respondents showed a preference toward having one of the products rather than opting out. The price coefficient is negative, indicating as product prices increased, the probability of respondents selecting a product decreased. Respondents preferred sheep meat versus goat meat and products label in-state versus out-of-state products. Products labeled as grass-fed were preferred to grain-fed. Products labeled as kosher and halal were preferred to products with no statements about preparation. Yet, the halal estimate was not statistically significant, indicating its estimate should be interpreted carefully.

Table 12. Results of Conditional Logit Model from Choice Experiment Tasks

Parameter	Estimate (Standard Error)	t-Value
Opt Out	-1.7002*** (0.1203)	-14.14
Price	-0.0942*** (0.0049)	-19.13
Sheep Meat (vs. Goat Meat)	0.4213*** (0.0435)	9.68
In-State Product (vs. Out-of-State)	0.4838*** (0.0444)	10.89
Grain-Fed (vs. Grass-Fed)	-0.2898*** (0.0455)	-6.36
Prepared Kosher (vs. Not Stated)	0.3571*** (0.0543)	6.58
Prepared Halal (vs. Not Stated)	0.0332 (0.0538)	0.62
Log Likelihood		-5,625
Number of Observations		(349 x 15) = 5,235

Note: *** denotes statistical significance at the 1 percent level.

Using the model estimates from **Table 12**, confidence intervals were constructed to determine lower and upper bounds premiums (or discounts) for each attribute with the question sets using the delta method (Greene, 2018) at the 95% confidence level. **Table 13** shows respondents are willing to pay a premium for sheep products, those from within Kansas, and those that were prepared kosher. Respondents would require a discount for grain-fed products. The prepared halal results were not statistically significant in the original model, thus the point estimate and bounds constructed are also statistically insignificant.

Table 13. WTP Estimates for Product Attributes with 95% Lower and Upper Bounds (\$/lb.)

Attribute	Point Estimate	Lower Bound	Upper Bound
Sheep Meat	4.47	4.35	4.59
In-State Product	5.14	4.99	5.29
Grain-fed	-3.08	-3.18	-2.97
Prepared Kosher	3.79	3.70	3.88
Prepared Halal	0.35	4.68	5.38

References

Cohen, J. 1988. Statistical Power Analysis for the Behavioral Sciences. Hillsdale: Lawrence Erlbaum Associates, Second Edition.

Greene, W.H. 2018. Econometric Analysis. New York, NY: Pearson Education LLC, Eighth Edition.

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