Final Report

Preferences and Complaints associated with American Lamb Quality in Retail & Foodservice Markets

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EXECUTIVE SUMMARY

Customers' needs and expectations are always changing, and Lamb Quality is a moving target that means different things to the supply chain and sheep/lamb industry stakeholders. Dr. W. Edwards Deming, often considered the father of Total Quality Management, believed in process control in the quest for continuous improvement and that people, not products were the ultimate determinant of quality. Quality may be defined as the satisfaction of the customer, yet an accumulation of quality attributes (while differing) are necessary to provide any product that meets and exceeds expectations. The customer value proposition encourages a quest for the highest quality lamb to meet the price-value relationship of a lamb product that is comparatively expensive to red meat alternatives in both retail and foodservice. Consequently, an understanding of the preferences and complaints of the most important quality attributes at the retail and foodservice sectors can provide a roadmap to reduce quality outliers in a fragmented supply chain and identify the trait(s) that most greatly impact customer satisfaction.

The objectives of this study, funded by the American Lamb Board, were to determine U.S. lamb retail and foodservice rank, definition, and relative preference for seven quality attributes including: 1) Origin (ORG); 2) Sheep Raising Practices (SRP); 3) Eating Satisfaction (ES); 4) Weight/Size (WS); 5) Product Appearance/Composition (PAC); 6) Product Convenience/Form (PCF); and 7) Nutrition/Wholesomeness (NW). Best-worst scaling, shares of preference computation, and a willingness-to-pay (WTP) assessment provided a rank and quantification of attribute preference, the likelihood of "must have" quality attributes for purchase, and an estimate of percent increased value of lamb products when a quality attribute was guaranteed for lamb.

Structured (to generate first impression responses and to prevent "leading responses" to a given answer) interviews (N = 120) were conducted (May 2014 to March 2015) with protein purchaser representatives of retail (n = 60), foodservice (n = 45), and purveyor (n = 15) sectors in the lamb supply chain. Interviews were conducted using an interactive computer software program (Qualtrics®). Interview respondents ranked the most and least important traits defining lamb quality using choice rank sets of three attributes. Multinomial logit models in SAS® MDC and Monte Carlo simulation were used to estimate shares of preference. Open-ended definitions for each quality attribute were qualitatively aggregated to central themes, and WTP probabilities were estimated using the PROC GLIMMIX function in SAS®. Least squares means were calculated and separated at $\alpha = 0.05$.

Shares of preference for all participants (N = 120) indicated that ES was the most important quality attribute (38.90%; most commonly defined as flavor/taste) when purchasing lamb. All seven attributes were statistically different from each other in rank of preference ($P < 0.05$). Two credence attributes, ORG (17.22%; most commonly defined as locally raised, and subsequently American) and SRP (13.55%; most commonly defined as grass-fed) were second and third in rank, respectively. Product Appearance/Composition (10.51%) and WS (8.45%) ranked fourth and fifth, respectively, and were of greater importance to purveyors than either retail or foodservice purchasers ($P < 0.05$). Nutrition/Wholesomeness (7.13%) ranked sixth, and PCF (4.22%) was seventh in relative importance. Origin (25.8%) and SRP (20.0%) had the greatest likelihood of being a non-negotiable requirement for lamb purchasers. Eating Satisfaction was most likely to return a premium (71.7%), and product assurance of ES generated the greatest average WTP premium (18.6%).

When asked to define quality in open-ended questions, over 1/3 of respondents (45 out of 120) identified lamb flavor and/or taste as part of their definition of quality. The most frequent responses were simply “flavor or taste” (n = 23); six respondents answered “good flavor” and another six respondents noted “flavorful” as a definition of quality. Few interview respondents actually chose to describe lamb flavor, reinforcing the vague interpretation of lamb eating satisfaction, yet most common descriptors included “rich flavor” and “mild or medium flavor.” Open-ended questions warranted responses that lamb flavor of American lamb was mentioned 34 times as a strength, 14 times as a weakness, 21 times as an opportunity, and 11 times as a threat to the industry. When lamb industry respondents closest to the consumer were asked what is the image of American lamb, respondents identified lamb as having “good flavor” ($n = 5$), “milder flavor” ($n = 4$), flavorful ($n = 3$), and “different than grass flavor” ($n = 3$). Responses regarding the image of imported lamb resulted in lamb described as “less flavorful” ($n = 6$), “gamey flavor” ($n = 5$), “different flavor” ($n = 5$), “stronger flavor” ($n = 4$), and “consistent flavor” ($n = 3$). According to the retail and foodservice sectors interviewed, an overall perception of American lamb (that is primarily grain-fed) was an overall milder, and more approachable flavor for American consumers. Yet, a perception that a majority of lamb in the U.S. are grass-fed existed among those closest to the consumer.

Compared to the 2011 National Beef Quality Audit (Igo et al, 2013), where food safety ranked first in importance, interview respondents in the present study only ranked the combination of product wholesomeness and nutrition as sixth in importance. Previous experience suggests that most sheep producers believe that product composition is the primary detrimental characteristic causing loss in consumer demand. However, results of the present study suggested that color, attractiveness, and freshness were more important than cutability to those that display lamb at retail, and overall lean to fat challenges of the industry are mitigated at the processing fabrication floor and only were ranked fourth in importance by the retail and foodservice sectors.

Lamb loin and rib chops purchased at U.S. retail markets indicated that U.S. lamb is larger, and more muscular with *Longissimus dorsi* area of loin chops from U.S. origin (3.03 in^2) greater than chops from Australia (2.60in^2), and which were greater than chops from New Zealand (2.25in^2; $P < 0.05$). Rib chops had the greatest area of U.S. loin chops, partially due to increased tail length ($P < 0.05$). Australian loin chops were the trimmest of external fat at the middle (50% location) and closest to the loin tail (100% location), and rib chops were trimmest over the lower rib (100% location; $P < 0.05$). Australian and New Zealand loin and rib chops were more tender than loin and rib chops originating from the U.S. ($P < 0.05$), yet the mean for all chops was well below a threshold considered to be “very tender.”

Nearly, one-third of respondents indicated that an American Certified Lamb program would not be a good idea for a variety of reasons, and there was little agreement on what traits, if any, would be preferred or required. Respondents suggested that a Certified American Lamb program would not benefit the industry.

This research indicated that, across all sectors, Eating Satisfaction, defined as lamb flavor/taste, was the most imperative quality trait to those who purchase lamb. While ES is difficult to visually ascertain, retailers and foodservice representatives identified that credence attributes can be monetarily beneficial. Further, label claims of lamb shoulder chops (N = 148) collected at retail markets from 46 stores in 11states reinforced that source branded product (+$1.94/lb), locally raised designation (+$1.69/lb), and grass-fed lamb (+$1.12/lb) were worth premiums to American consumers ($P < 0.05$).

A strategic emphasis on quality attributes identified in this research should strive to ensure that eating satisfaction and lamb flavor are optimized for American lamb, and to produce lamb with credence attributes that may be valuable for sheep producers and requested by retail and foodservice sectors, and inevitably American lamb consumers. Results from this study can be used to identify areas within each sector, as well as across all sectors, that the sheep and lamb industry needs to focus on to achieve continuous improvement and to increase demand for American lamb.

INTRODUCTION:

Quality audits previously conducted in the beef, pork, and lamb industries were used to determine goals and objectives for livestock producers to implement to improve the quality, consistency, value, and competitiveness of protein products. At the request of the American Sheep Industry Association (ASI), an industry wide quality assurance program was developed in 1991. The mission of the Sheep Safety and Quality Assurance (SSQA) program is to maximize consumer confidence in, and acceptance of, sheep products by using research and education to improve management during the production of safe and high-quality sheep products (Hoffman et al., 2004). The first National Lamb Quality Audit was conducted in 1992. The final report of the 1992 audit focused on lamb and wool quality attributes and identified carcass bruising and excessive fat trim as product defects and the greatest industry meat quality challenges (Cunningham and LeValley, 1992). The 2007 National Lamb Quality Audit, conducted by Colorado State University, evaluated the sheep supply chain from producer to harvest and noted prominent industry quality concerns of seasonal supply, feeder lamb genetics and health, and a need for improvement of overall muscling and ribeye area of lamb carcasses (LeValley et al., 2007).

While previous audits evaluated product quality from production to harvest, the U.S. lamb industry cannot expect improvements in prices offered or quantity demanded for its products when "quality" does not warrant such increases. Without adjusting philosophy of production practices, and given reduced demand for lamb that has manifested during the past 30 years, it is not possible to be optimistic about the future of lamb markets in the U.S. unless changes are made to emphasize lamb quality strengths and identify and correct shortcomings necessary for improved demand.

Lamb has a reputation as a high end protein. However, product cost at the retail, foodservice, and inevitably at the consumer level necessitates high quality American Lamb to fulfill the customer value proposition. It is unclear if development and deployment of the SSQA program, as a strategy to address opportunities for improvement that were identified in previous audits, have had an impact—particularly on the perception of lamb quality at the retail and foodservice levels of the industry.

This current study, for the first time using state-of-the-art data collection technology and design, quantified perceptions regarding lamb quality via structured interviews. In this research, interviews with protein purchaser representatives within the retail and foodservice sectors provided information from those closest to the end consumer of lamb to identify important quality attributes and unbiased results of "What is Lamb Quality?" Interviews and questionnaires, along with sophisticated experimental design and analytical techniques, were utilized most recently in a 2010 evaluation of U.S. Pork Quality in Asia and Mexico and the 2011 National Beef Quality Audit to identify quality concerns, benchmark management practices and product quality attributes, quantify improvements influenced by production, and identify next steps to improve product marketability and consumer demand (Igo et al., 2013; Murphy et al., 2015). Through this interview methodology, perceptions regarding relative importance of lamb quality were ranked, seven quality attributes were defined by interviewees, and willingness-to-pay (WTP) estimates quantified the perceived value for specified lamb quality attributes. Visual appearance and product tenderness characteristics of lamb available at retail and price comparisons of branded and non-branded lamb labeling information were evaluated to characterize the current fresh lamb supply available at retail to American consumers.

OBJECTIVES:

(a) Identify how retail and foodservice customers of U.S. lamb and variety meat products characterize (define) seven specified quality attributes of: (1) Origin; (2) Sheep Raising Practices; (3) Eating Satisfaction; (4) Weight/Size; (5) Product Appearance/Composition; (6) Product Convenience/Form; and (7) Nutrition/Wholesomeness.

(b) Estimate Contingent Valuation willingness-to-pay (WTP) by retail and foodservice customers for the seven specified quality categories (based on their definition of what each category means to them).

(c) Establish a Best/Worst (BW) ranking of the importance of the specified quality categories.

(d) Document any additional quality-related or financial items of concern to each customer of the industry and quantify their importance.

(e) Assess the physical, management and tenderness properties associated with fresh lamb cuts as presented at retail stores.

MATERIALS and METHODS:

STRUCTURED INTERVIEW PROTOCOL:

A dynamic-routing, standardized electronic software was utilized to administer structured interviews with lamb/protein purchasers at the retail, foodservice, and purveyor sectors of the supply chain. A software package (Qualtrics®) was customized to develop a structured order of questions and interviews were administered and recorded with an Apple iPad®. Company demographic information, a rank and definition of seven quality attributes and the associated willingness-to-pay, and open-ended questions were collected from interview respondents (N = 120). Structured interviews were primarily face-to-face (or via telephone if logistics did not permit) to gather gut reaction and input on Lamb Quality, and averaged about 40 minutes in length. Interviews were conducted from May 2014 to March 2015. Designation of interviews included retail (n = 31 supermarkets, n = 11 butcher's markets, and n = 18 direct/farmer's markets), foodservice (n = 23 fine dining and n = 22 casual dining), and purveyors (n = 15). Questions were formulated and asked to obtain as much information as was provided regarding problems faced at the retailer/foodservice level, improvements that can be made, opportunities that may exist, and the consumer demands for lamb.

By addressing, up front, issues associated with economic/financial concerns, interviewee answers regarding quality categories instead concentrated on the quality traits of interest instead of financial concerns. The interview focused on the following seven broad categories of quality attributes for each of lamb cuts, processed lamb products, and lamb variety meats: (1) Origin; (2) Sheep Raising Practices; (3) Eating Satisfaction; (4) Weight/Size; (5) Product Appearance/Composition; (6) Product Convenience/Form; and (7) Nutrition/Wholesomeness. In order to determine a customer's WTP premiums for lamb quality attributes, it is necessary to first determine what quality "means" to each interviewee. This set of questions will address the question: "What is 'quality' and what quality factors drive the company's purchasing decisions?" The "gut" reactions and "top of mind" answers regarding what the category means to them allowed for unbiased interpretation of a specified definition to each respondent. All responses were sorted into one of the seven quality attribute categories identified and narrowed in terms of description to define what each of these generic quality classifications "means" to each company interviewed. Definitions of quality were evaluated qualitatively to determine the likelihood of central themes of open ended definitions for each quality attribute.

Maximum difference or Best/Worst scaling questions were designed and included following administration of WTP questions to measure the importance of the seven quality attributes and compare the true rank of importance with WTP responses. Interview respondents ranked the most and least important trait of the seven specified quality attributes by best/worst scaling and using choice rank sets (seven questions per respondent) of three attributes. Then, the last question asked for the most and least important attribute using the entire list. Multinomial logit (MNL) models in SAS® (SAS Inst. Inc., ver. 9.4, Cary, NC) MDC were used to derive estimates, Monte Carlo simulations, and an ANOVA was used to estimate shares of preference and statistically separate pairwise comparisons ($\alpha = 0.05$). A share of preference (SOP) is a forecasted probability in which a question is preferred as most important. The equation for shares of preference is j $= e^{\lambda_j} / \sum_{k=1}^{j} e^{\lambda_j}$ (Wolf and Tonsor, 2013). The calculated shares of preference sums to one across all attributes, and represented a probability that a quality attribute was chosen as more important more than another. For example, if SOP of "attribute A" was twice as large as "attribute B", then "A" would be twice as preferred as "B" in relative importance (Lusk and Briggeman, 2009). Similarly to how strategic planning systems operate, these response data allowed—for the first time—true objective Best/Worst ranking of individual quality categories based on unbiased perceptions, as well as shares of preference value, or the relative percentage of preference for each of the seven quality attributes.

Respondents were asked whether or not they would pay a given percentage premium for all seven quality attribute categories. Willingness-to-pay (WTP) values were quantified using an unstructured line scale from a 0 to 30% increase of premium if a specified quality attribute could be assured. If a quality category was deemed "Must Have Before I Will Purchase", then percent premium increase was not quantified, as that attribute was considered to be a non-negotiable requirement for lamb purchase. The PROC GLIMMIX procedure (SAS) was used to estimate probabilities associated with non-negotiable and negotiable lamb quality requirements for purchase, along with WTP values. Individual comparisons of sectors within quality categories was performed using least squares means and separated with pairwise comparisons ($\alpha = 0.05$). If a quality category was not deemed to be a "Must-Have Before I Will Purchase" trait, then respondents were asked if the trait warranted a zero value premium increase. Respondents that answered Yes to "Would you purchase the product at a premium percent increase of $ value if this trait could be guaranteed?", then utilized the unstructured line scale to create a continuous variable of % increase of premium. The trait percent increase was aggregated for an average WTP for each quality attribute and reported within each attribute and sector. Upon completion of data collection, probabilities for traits being essential, for willingness-to-pay a premium, and the customer's WTP value was computed. By conducting the interviews in this manner, we were able to quantitatively rank (BW) seven quality attributes, define the true meaning of each quality attribute, and prioritize and establish prices (WTP) for each identified sector as well as across all retail components of the lamb marketing chain.

ASSESSMENT OF RETAIL LAMB ATTRIBUTES:

Fresh, retail lamb cuts were purchased from retail stores in 12 locations: California (San Francisco and Los Angeles), Colorado, Florida, Georgia, Illinois, New York, Ohio, Texas, Utah, Washington, and Wisconsin. Shoulder chops (n = 148) were collected from 46 stores in 11 states. Loin (n = 567) and rib (n = 114) chops were collected from 61 stores in 12 states. A minimum of 4 retail chain stores was sampled in each metropolitan area. Product was obtained from prominent stores in the area, as well as from local butcher markets and farmer's markets. Lamb product was kept fresh, and chilled during shipment. Lamb products were shipped in insulated shipping containers with ice, with priority overnight delivery to Colorado State University and The Ohio State University. Lamb was vacuum packaged and frozen for further analysis.

A digital image of each steak was captured of each cut surface area, muscle dimensions, and external fat thickness was recorded with standardized grid evaluation and computer software. Products were identified with purchase location, store code, and individual identification number. Price per unit and total price also was collected as well as all branded lamb product specifications. Products, specifically from the rack and loin, were vacuum packaged for further shear force analysis the day of arrival at the respective meat laboratories. Warner-Bratzler Shear Force was conducted for rack and loin chops of the *longissimus* muscle. Analysis of visual physical attributes were compared by country of origin (U.S., Australia, and New Zealand) and from production management practice (grass-fed vs. grain-fed). Resulting data were evaluated to characterize the current fresh lamb supply at retail and current lamb quality that represent the U.S., Australia, and New Zealand lamb products that were available at retail for consumers.

Labeling information of lamb products was collected and analyzed for shoulder (blade/arm) chops (n = 148) available for purchase at retail. As shoulder chops were abundantly available at a cross-section of retail markets with customers from low, medium, and high socioeconomic status, and because shoulder chops were most often offered in self-service, it portrayed the best representation of price comparison at the retail level. Retail price per pound was compared and analyzed for country of origin (U.S., Australia, and New Zealand), store location (West, Central, and East), store type (National, Local, and Specialty), and by packaging type (Overwrap, Vacuum Packaged, Rollstock, Modified Atmosphere Packaging, and Full-Service). Shoulder chops were analyzed by price per pound at retail compared to specific labeling claims found on packaging, including local designation (Y/N), production management type (grass-fed/grain fed), No Hormone/No Antibiotic (Y/N), Natural (Y/N), and branded program (Source/Store/None). Statistical analysis was conducted in SAS PROC MIXED; least squares means were calculated and separated at $\alpha = 0.05$.

RESULTS:

Representatives of the retail, foodservice, and purveyor sectors of the lamb industry were asked to "define lamb." The gut reaction, or initial impression, answer was split between descriptions of a young sheep animal and the red meat protein on the plate (Appendix A). Central themes for the definition of lamb included a probability of being described as: 1) Young Sheep (32%); 2) Red Meat

Alternative (25%); 3) Delicious and Flavorful Attributes (20%); 5) Delicacy, High End Meat (9%); 5) Healthy Protein (7%); and 6) Other (7%). The predominant answer was "young sheep"; while the definition of lamb varied by respondent in foodservice, retail, and purveyor sectors of the industry, lamb was most commonly defined as a young sheep less than 12 months of age.

Lamb was identified as both a retail and foodservice alternative to beef, pork, and chicken. Often the versatility and a description of a unique flavor that is slight to mildly gamey resulted in menu flexibility and an alternative meat on menus at restaurants. A common response was "Lamb is delicious!" Another interviewee stated that lamb was "in one word, delicious. Exotic and flavorful. Lamb is like taking a vacation, it is out of the norm and really wonderful all at the same time." Negative connotations were expressed on occasion with both the anthropomorphism of lamb and the mental connection with a baby animal as well as a recurring negative image of older sheep and the term mutton. Also, an additional term that described lamb was "terroir", meaning that much like wine, lamb flavor is a representation of specific location and raising practice. Respondents indicated that lamb currently has the stigma of only being a high end, niche market meat option, and that currently faces the struggle of being considered an everyday protein. A lean meat protein highlighted responses categorized as healthy. Furthermore, there is an important connection of sheep and the environment. One interview respondent reiterated that the "Beauty of lamb is that it is as close to the Earth as possible. If you choose to do the right things the right way you can get less expensive in production with lamb on grass and it is great for the environment." Lastly, while flavor perceptions of lamb vary, numerous respondents indicated that lamb lovers enjoy lamb and seek it out, but a proportion of consumers are hesitant to try the red meat protein and abstain from lamb purchase for myriad reasons.

Quality, in general, is a more ambiguous term to define. Interview responses for "define quality" show a variety of answers for supermarket, butcher, direct/farmer's market, fine dining, casual dining, and purveyor representatives of the lamb industry (Appendix B). Customers' needs and expectations are always changing, and Lamb Quality is a moving target that means different things to the supply chain and sheep/lamb industry stakeholders. Dr. W. Edwards Deming, often considered the father of Total Quality Management, believed in process control in the quest for continuous improvement and that people, not products were the ultimate determinant of quality. Quality may be defined as the satisfaction of the customer, yet an accumulation of quality attributes (while differing) are necessary to provide any product that meets and exceeds expectations. The customer value proposition encourages a quest for the highest quality lamb to meet the price-value relationship of a lamb product that is comparatively expensive to red meat alternatives in both retail and foodservice. Consequently, an understanding of the preferences and complaints of the most important quality attributes at the retail and foodservice sectors can provide a roadmap to reduce quality outliers in a fragmented supply chain and identify the trait(s) that most greatly impact customer satisfaction.

ECONOMIC CONSIDERATIONS:

With quality as the central focus of this research, it was critical to first discuss the economic considerations important to lamb/protein purchasers. People in charge of protein purchase at retail and foodservice make decisions daily that financially impact their respective business. Lamb purchasing decisions related to pricing can range from a white table cloth restaurant that always offers lamb menu options because of customer demands to a price sensitive large grocery chain that simply offers only lamb shoulder and shank at the retail case because of their customer demographics. Interview respondents from both retail and foodservice answered a question regarding the economic concerns that play a role in whether or not their business purchases lamb (Table 1; Table 2). Lamb purchase price was most frequently cited as having the greatest impact from the financial perspective by supermarkets, butchers, fine dining, and purveyors. Customer preferences and advertisement features ranked in the top three conditions as affecting lamb purchasing for both supermarkets and butchers. Price consistency for direct marketers and menu price affordability for casual dining were mentioned as a result of price volatility in the lamb marketplace. However, the importance of quality lamb surpassed price as an issue for nine fine dining establishments and three farmer's markets. Also, the volatility of price and overall cost did not impact lamb purchasing decisions for 27% of butchers, 19% of supermarkets, and 14% of casual dining restaurants. Addressing financial concerns up front allowed for all remaining questions of the structured interview to focus on the quality traits of interest.

Table 1. Frequency of responses for specific economic conditions that determine purchasing behavior of lamb at retail markets

Economic Conditions for purchase of lamb for Retail Markets (n = 60)					
Supermarket	**n = 31**	**Butcher**	**n = 11**	**Direct/Farmer's Market**	**n = 18**
Lamb Purchase Price	18	Lamb Purchase Price	5	Price Consistency/Volatility	4
Customers & Ad Features	6	Pricing, No Impact	3	Quality more Important	3
Pricing, No Impact	6	Customers & Ad Features	2	Production Cost	2
Inventory Availability	4	Seasonality	2	Inventory Availability	2
Exchange Rate	3	Inventory Availability	1	Seasonality	2
Seasonality	3	Lamb Selling Price	1		

Table 2. Frequency of responses for specific economic conditions that determine purchasing behavior of lamb restaurant or purveyor sectors

Economic Conditions for purchase of lamb for Restaurants (n = 45) and Purveyors (n= 15)					
Fine Dining	**n = 23**	**Casual Dining**	**n = 22**	**Purveyors**	**n = 15**
Lamb Purchase Price	10	Menu Pricing Affordability	10	Lamb Purchase Price	6
Quality trumps Price	9	Lamb Purchase Price	7	End User Profitability	3
Inventory Availability	2	Middle Meat Cost	3	Product Demand	3
Seasonality	2	Pricing, no Impact	3	Supply	2
Production Costs	2	Supply	3	Lamb Selling Price	2

SHARES OF PREFERENCE:

Best/Worst scaling questions of the structured interviews quantified the importance of quality categories through a total of seven comparisons of three traits; choosing the most important and least important. A final comparison asked interviewees to identify only the most important and least important of all seven quality categories in a single contrast. A Multinomial Logit (MNL) model was constructed to estimate a beta-coefficient that was used to calculate shares of preference (SOP). The SOP is a forecasted probability and a relative percentage of preference for each of the seven quality attributes. The ranking of the seven specified quality attributes as related to their importance to lamb quality for the accumulated interviews of retail, foodservice, and purveyor sectors (N = 120) are summarized in Table 3.

Eating satisfaction was the most important ($P < 0.05$) quality attribute for interviewed protein purchasers across all sectors in this research. The total share of preference (relative percentage of preference) for all interviews for eating satisfaction in this study was 38.9%. The emphasis on eating satisfaction was apparent for U.S. lamb industry stakeholders as the consumer-focused attribute was more than double the next closest quality attribute. Results for lamb differed from results of audits for beef and pork, in which food safety was identified as the most important attribute (Igo et al., 2013;

Murphy et al., 2015). Eating satisfaction ranked as the second most important quality trait in the 2011 National Beef Quality Audit (NBQA) for U.S. beef industry sectors including packers, retailers, and foodservice, distributors, and further processors. Comparatively, the retailer sector in the NBQA resulted in a nearly 10% lower (SOP = 29.2%) preference for eating satisfaction than lamb quality interview respondents. Eating quality ranked third overall in the evaluation of U.S. pork for importing countries and only rated second for Hong Kong/China and Japan (Murphy et al., 2015).

Credence attributes and production management traits of origin (17.2%) and sheep raising practices (13.6%) ranked second and third overall, respectively ($P < 0.05$). Comparatively in the 2011 National Beef Quality Audit, how and where the cattle were raised ranked third (10.0%) among retailers and fourth (9.6%) for foodservice, distributor, and further processor purchasers of beef (Igo et al., 2013). The emphasis of local, regional, and domestic origin of lamb was important to interviewees. Sheep raising practices and the potential for specific labeling claims of lamb at retail and on restaurant menus resulted in greater shares of preference for production history than either of the other studies that evaluated beef and pork quality.

Table 3. Coefficient estimates and shares of preference for all interview respondents (N = 120) relative to Product Convenience/Form.

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	2.221*	38.9[4a]
	(0.102)[2]	[1.8][3]
Origin	1.406*	17.2[b]
	(0.095)	[1.0]
Sheep Raising Practices	1.165*	13.5[c]
	(0.093)	[0.9]
Product Appearance/ Composition	0.912*	10.5[d]
	(0.083)	[0.6]
Weight/Size	0.694*	8.5[e]
	(0.090)	[0.6]
Nutrition/Wholesomeness	0.524*	7.1[f]
	(0.089)	[0.5]
Product Convenience/Form	0.000	4.2[g]
	(0.000)	[0.3]
N individuals	120	
N Choices	1080	
Log likelihood	-1764	
Pseudo R^2	0.1867	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference after Monte Carlo simulation.
[2] Numbers in ( ) are standard errors
[3] Numbers in [ ] are standard deviations
[4] Mean of simulated shares of preference of 1,000 observations drawn from a multivariate normal distribution parameterized by using the coefficients and variance-covariance terms estimated by the MNL models in SAS® MDC.
* implies that the mean importance of the coefficient estimate is different from Product Convenience/ Form when ($P < 0.05$)
[abcdefg] Percentages in the same column lacking a common superscript differ ($P < 0.05$)

Physical product characteristic traits of product appearance/composition (10.5%) and weight/size (8.5%) were ranked fourth and fifth in the shares of preference, respectively ($P < 0.05$). These results mirror findings from the National Beef Quality Audit that reported visual characteristics, weight and size, and lean, fat, and bone attributes from third to sixth for retailer and foodservice sectors. Consequently, this study showed that product appearance/composition and weight and size were not as important to overall lamb quality as either eating satisfaction or the aforementioned credence attributes.

Nutrition/Wholesomeness (SOP = 7.1%) ranked sixth in the overall ranking of shares of preference ($P < 0.05$). Interviewees reported that lamb has a clean food safety record compared to competitive proteins, and interviewees also stated that lamb quality was driven by factors other than nutritional basis. Product convenience/form (SOP = 4.2%) was ranked seventh, and this rank was consistent across all sectors of retailer, foodservice, and purveyor interview respondents.

Preference and overall rank of quality attributes varied within sectors dependent on priority of quality related traits. The overall rank and probability for shares of preference for specified quality attributes representing six different industry sectors are shown in Tables 4 through 9.

Across all sectors interviewed, eating satisfaction was the highest ranking quality attribute. Furthermore, product convenience/form consistently ranked seventh among all sectors interviewed in the lamb supply chain. Supermarket interview respondents in the best/worst scaling identified the trait of eating satisfaction as most important (SOP = 39.2%), and origin ranked second (SOP = 18.2%) at the retail level. Along with purveyors, supermarkets were the only other sector to have product appearance/composition in the top three quality attributes (SOP = 16.5% for both sectors). Weight/size ranked fourth for supermarkets, and the quality trait that deviated lower in importance for supermarket interviews was sheep raising practices, ranked as the fifth most important quality attribute. Sheep raising practices for supermarkets had the lowest preference value (SOP = 7.0%) across all sectors interviewed. This decrease in relative importance of sheep raising practices for supermarkets indicated that end consumers may not value production management practices and associated labeling claims compared to other retail and foodservice sectors.

Interview respondents representing butchers quantified an increase of 6% greater and 5% greater shares of preference value than the mean across all sectors for origin and sheep raising practices, respectively. In fact, origin was the greatest preference for butchers (SOP = 23.4%) compared to all other sectors, and reiterated the importance of locally raised to interviewed butchers. Also, weight/size surpassed product appearance/composition in the butcher's ranking, but both were lower than the mean value because of the increased emphasis on credence attributes for butchers to sell protein at their marketplace. Butchers rated product appearance/composition (SOP = 5.2%), nutrition/wholesomeness (SOP = 5.1%), and product convenience/form (SOP = 1.3%) lowest among the six sectors.

Interview respondents that represented either direct market lamb merchandisers or farmer's market merchandisers resulted in the greatest shares of preference values for both sheep raising practices (SOP = 22.4%) and nutrition/wholesomeness (SOP = 8.4%). Also, sheep raising practices and origin were 5% and 8% greater for shares of preference than the mean, respectively, for this sector. Direct marketers of lamb were the only sector to rank nutrition/wholesomeness in the top four specified quality traits. While eating satisfaction was the highest ranked quality attribute for direct/farmer's markets, they reported lowest value for eating satisfaction shares of preference (SOP = 27.8%). The preferred attributes of sheep raising practices and nutrition/wholesomeness related to the trust built on farmer and customer interfaces; the producer providing a safe and nutritious lamb product that has a documented production history for which eating satisfaction performance is a function of the raising methods.

Fine dining interview respondents identified eating satisfaction (SOP = 48.8%) as over twice as important as any other quality attribute. The SOP for sheep raising practices was second only in value to direct/farmers markets, and 12% greater than SOP for origin of product for fine dining establishments. This showed an increased preference for how an animal was raised than the origin of production for the fine dining sector. Nutrition/wholesomeness ranked over weight/size in the fine dining sector. Also, the quality attribute of weight/size was rated the lowest (SOP = 4.0%) for all retail market sectors evaluated in this study.

Interview respondents representing the casual dining segment reported the greatest SOP value for eating satisfaction (54.3%) compared to all other sectors. Sheep raising practices passed origin for rank of preference in casual dining entities. Origin received the lowest shares of preference (SOP = 12.1%) for casual dining compared to any other retail marketing sector. The importance of eating satisfaction for the casual dining sector reinforced the critical need to boost lamb consumption for both new and returning consumers.

Product characteristics of weight/size (SOP = 20.4%), product appearance/composition (SOP = 16.5%), and product convenience/form (SOP = 5.5%) received the greatest SOPs by the purveyor sector. Purveyors were the only industry segment that ranked weight/size second and the relative SOP was over twice that of any other sector's value. Supermarkets were the only other retail marketing sector to have product appearance/composition rated in the top three attributes. An apparent emphasis on product characteristics stressed the significance of meeting product specifications and physical quality attributes.

Table 4. Coefficient estimates and shares of preference for supermarket respondents (n = 31) relative to Product Convenience/Form

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	2.074 (0.196)	39.2
Origin	1.308 (0.185)	18.2
Product Appearance/ Composition	1.206 (0.167)	16.5
Weight/Size	0.509 (0.173)	8.2
Sheep Raising Practices	0.354 (0.173)	7.0
Nutrition/Wholesomeness	0.202 (0.174)	6.0
Product Convenience/ Form	0.000 (0.000)	4.9
N individuals	31	
N Choices	279	
Log likelihood	-450	
Pseudo R^2	0.1960	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference.

[2] Numbers in ( ) are standard errors

Table 5. Coefficient estimates and shares of preference for butcher market respondents (n = 11) relative to Product Convenience/Form

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	3.390 (0.437)[2]	38.6
Origin	2.888 (0.428)	23.4
Sheep Raising Practices	2.680 (0.421)	19.0
Weight/Size	1.739 (0.381)	7.4
Product Appearance/ Composition	1.380 (0.343)	5.2
Nutrition/Wholesomeness	1.371 (0.371)	5.1
Product Convenience/Form	0.000 (0.000)	1.3
N individuals	11	
N Choices	99	
Log likelihood	-132	
Pseudo R^2	0.3335	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference.
[2] Numbers in ( ) are standard errors

Table 6. Coefficient estimates and shares of preference for direct/farmer's market respondents (n = 18) relative to Product Convenience/Form.

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	1.923 (0.247)[2]	27.8
Sheep Raising Practices	1.707 (0.255)	22.4
Origin	1.654 (0.253)	21.2
Product Appearance/ Composition	0.724 (0.212)	8.4
Nutrition/Wholesomeness	0.724 (0.234)	8.4
Weight/Size	0.646 (0.234)	7.8
Product Convenience/Form	0.000 (0.000)	4.1
N individuals	18	
N Choices	162	
Log likelihood	-264	
Pseudo R^2	0.1856	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference.
[2] Numbers in ( ) are standard errors

Table 7. Coefficient estimates and shares of preference for fine dining respondents (n = 23) relative to Product Convenience/Form.

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	3.120 (0.287)[2]	48.8
Sheep Raising Practices	2.256 (0.264)	20.5
Origin	1.774 (0.250)	12.7
Product Appearance/ Composition	1.087 (0.211)	6.4
Nutrition/Wholesomeness	0.935 (0.228)	5.5
Weight/Size	0.625 (0.226)	4.0
Product Convenience/Form	0.000 (0.000)	2.2
N individuals	23	
N Choices	207	
Log likelihood	-289	
Pseudo R^2	0.3051	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference.
[2] Numbers in ( ) are standard errors

Table 8. Coefficient estimates and shares of preference for casual dining respondents (n = 22) relative to Product Convenience/Form

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	2.714 (0.278)[2]	54.3
Sheep Raising Practices	1.334 (0.228)	13.7
Origin	1.212 (0.224)	12.1
Product Appearance/ Composition	0.447 (0.192)	5.6
Weight/Size	0.395 (0.210)	5.4
Nutrition/Wholesomeness	0.395 (0.210)	5.3
Product Convenience/Form	0.000 (0.000)	3.6
N individuals	22	
N Choices	198	
Log likelihood	-297	
Pseudo R^2	0.2535	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference.
[2] Numbers in ( ) are standard errors

Table 9. Coefficient estimates and shares of preference for purveyor respondents (n = 15) relative to Product Convenience/Form

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	1.618 (0.250)[2]	27.9
Weight/Size	1.304 (0.257)	20.4
Product Appearance/ Composition	1.091 (0.230)	16.5
Origin	0.951 (0.2483)	14.3
Nutrition/Wholesomeness	0.337 (0.244)	7.7
Sheep Raising Practices	0.337 (0.245)	7.7
Product Convenience/Form	0.000 (0.000)	5.5
N individuals	15	
N Choices	135	
Log likelihood	-232	
Pseudo R^2	0.1430	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference.
[2] Numbers in ( ) are standard errors

An analysis of shares of preference was conducted for small (< 100 lbs. per week; n = 39), medium (101 to 1000 lbs. per week; n = 44), and large (> 1,000 lbs per week; n = 37) retail, foodservice, and purveyor entities. Large merchandisers placed emphasis on product appearance and composition and weight and size compared to either small or medium merchandisers of lamb. Also, as expected, lamb industry representatives that marketed U.S. lamb product returned greater shares of preference for the origin quality attribute than those that imported lamb.

Moreover, a comparison of companies that purchase either branded or un-branded lamb showed that a shares of preference for branded lamb resulted in nine percent greater emphasis on origin and a four percent preference for sheep raising practices (Table 10; Table 11). Sheep raising practices that ensure production of high quality lamb and a known, traceable origin result in added marketing capability for lamb at retail and foodservice markets.

Interview respondents provided designated specifications and requirements for lamb cuts and carcasses merchandised for enrolled branded lamb programs (Table 12). Prominent requirements for lamb merchandised in branded lamb programs included local origin, grass-fed management practices, and domestic, or American, origin of lamb. Also, when interviewees were asked "What is the most important attribute or specification to a branded lamb program?", the locally raised requirement was rated the most commonly described attribute for branded lamb.

Table 10. Coefficient estimates and shares of preference for respondents that purchase/merchandise branded lamb (n = 82) relative to Product Convenience/Form

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	2.190 (0.122)[2]	35.6
Origin	1.625 (0.119)	20.3
Sheep Raising Practices	1.322 (0.115)	15.0
Product Appearance/Composition	0.948 (0.102)	10.3
Weight/Size	0.689 (0.110)	7.9
Nutrition/Wholesomeness	0.551 (0.110)	6.9
Product Convenience/Form	0.000 (0.000)	4.0
N individuals	82	
N Choices	738	
Log likelihood	-1193	
Pseudo R^2	0.1947	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference.
[2] Numbers in ( ) are standard errors

Table 11. Coefficient estimates and shares of preference for respondents that purchase/merchandise non-branded lamb (n = 38) relative to Product Convenience/Form

	Econometric Estimates	Shares of Preference (%)
Quality Attribute[1]	MNL	MNL
Eating Satisfaction	2.373 (0.189)[2]	47.1
Origin	0.982 (0.159)	11.7
Sheep Raising Practices	0.863 (0.158)	10.4
Product Appearance/Composition	0.856 (0.144)	10.3
Weight/Size	0.715 (0.156)	9.0
Nutrition/Wholesomeness	0.476 (0.155)	7.1
Product Convenience/Form	0.000 (0.000)	4.4
N individuals	38	
N Choices	342	
Log likelihood	-557	
Pseudo R^2	0.1885	

[1] Seven quality attributes were compared and reported with economic parameter estimate and shares of preference.
[2] Numbers in ( ) are standard errors.

Table 12. Cut/carcass specifications and requirements for companies currently purchasing branded lamb, and single most important specification or requirement for a branded lamb program

Specifications/requirements for branded lamb programs currently enrolled		Most important specification/requirement for branded lamb program	
Quality Attribute	n of responses (n = 202)	Quality Attribute	n of responses (n = 103)
Local	22	Local	23
Grass-Fed	22	Grass-Fed	10
Domestic-American	20	Domestic-American	9
Antibiotic Free	16	Cut Weight/Size	9
All-Natural	14	Product Attributes	7
Know the Farmer	12	Sheep Raising Practices	7
Product Attributes	12	Consistency	7
USDA Quality Grade	10	All-Natural	6
Cut Weight/Size	10	Know the Farmer	4
Sheep Raising Practices	9	USDA Quality Grade	4
Carcass Weight	9	Carcass Weight	3
Breed Type	9	Breed Type	3
No Hormones	7	Organic/Non-GMO	3
Imported	7	Antibiotic Free	2
Consistency	5	Halal Slaughtered	2
Halal Slaughtered	5	Freshness	2
Organic/Non-GMO	5	USDA Yield Grade	1
Animal Age	4	Value	1
USDA Yield Grade	4		

DEFINITION OF QUALITY ATTRIBUTES:

The seven pre-determined quality attribute (quality buckets) of origin, sheep raising practices, eating satisfaction, weight and size, product appearance and composition, product convenience and form, and nutrition and wholesomeness resulted in different meanings from interview respondents of retail and foodservice sectors. The interview methodology and design in this study provided answers to what each quality attribute means without leading responses. The results were analyzed qualitatively and reported with respect to each sector of the industry interviewed to determine priority of meaning and the most important descriptors of specified traits associated with lamb quality (Table 13).

Eating Satisfaction: Eating Satisfaction was undeniably most often defined as lamb flavor and/or taste (75.8%). Lamb flavor was the primary response to what is important to eating satisfaction for supermarkets, butchers, fine dining, casual dining, and purveyors (Table 14). Tenderness of lamb ranked as the second most frequent response among interview respondents. In general, tenderness of lamb is considered a strength for the industry, and rarely a detriment to overall eating satisfaction. A broader definition of customer satisfaction rated highest for direct/farmer's market respondents, followed secondly by lamb flavor. Various other descriptors included, to a lesser extent, marbling, texture/mouthfeel, and fat content. The results from this study indicated that lamb flavor and taste were the primary definition and of greatest importance to lamb eating satisfaction and lamb quality.

Origin: The most common definition of origin by retail and foodservice representatives was locally raised (44.2%), or a designation of local. Local classification ranked first for butchers, fine dining, casual dining, and purveyors (Table 15). American (25.0%) was the second most common way to define origin and the most frequent term for supermarket respondents. A geographical description of regionality of product, region/state (20%), ranked third. Origin was most often defined by direct/farmer's market interviewee as traceable to the ranch. Overall, retailers and foodservice companies that are the sectors closest to the consumer identified that origin of lamb means local and with the expansion of farmer's markets, the opportunity for direct marketing, and product branding on the label at retail and on the restaurant menu, there may be future marketing opportunity.

Sheep Raising Practices: Sheep raising practices was most commonly defined by industry interview respondents as grass-fed (37.5%; Table 16). Humanely raised (21.7%), or synonyms of humane treatment, rated second in frequency of responses to define sheep raising practices. Feeding regime (15.8%) and animal well-being (15.8%) tied for third, are descriptions that are very close to the initial two mentioned production practices. A variety of responses also related to a connection with the farmer as well as production practices that are considered "natural" such as no added hormones and no antibiotics. Overall, retailer and foodservice entities reinforced the importance of diet of an animal as it was related to lamb quality. A portion of industry respondents were aware that diet impacts lamb flavor profile, but preferences of grass fed and grain fed lamb was highly variable. As noted in responses of "What is the image of American Lamb?", retail and foodservice companies envision sheep being raised on lush green pastures, or in wide open spaces and grazing on mountainside terrain in the American West. Based on industry responses, a preference toward grass-fed and pasture-raised descriptions of sheep production are important to companies closest to the consumer, and the potential for marketing lamb with an emphasis on diet of animal currently exists among retail and foodservice.

Product Appearance/Composition: The quality attribute of Product Appearance and Composition was commonly described by fresh lamb color (31.7%), fat trim level (26.7%), freshness (21.7%), and attractive appearance (20.8%; Table 17). Supermarkets and butchers, merchandisers of lamb in the retail case, indicated fresh lamb color as the most important attribute for appearance of lamb. The direct marketer focused on an overall attractiveness and eye appeal of the lamb product; fresh color ranked third, but often lamb at a farmer's market was merchandised frozen. Fat trim level or trimness ranked in the top three for all categories and stayed very consistent with approximately 30% of respondents considering overall trimness important to how product appearance/composition related to lamb quality. Freshness was the most common descriptor of appearance for fine dining industry respondents, followed by product quality. Overall presentation of lamb inherently varied compared between retail and foodservice sectors. A fresh, attractive appearance with an eye appealing red color was most important at retail, and a consistent, fresh product was preferred with a reasonable fat trim level at the foodservice and purveyor sectors.

Weight/Size: The Weight and Size quality attribute was primarily influenced by consistency and uniformity of lamb product. Consistent cut size and consistent cut weight were of greatest importance for fine dining and casual dining companies (Table 18). The consistency of product that “comes in the door” at restaurants was very critical to their business as plate costs and visual uniformity of lamb served to customers was considered dependent on product weight and size. While consistency ranked high with retailers, live weight of animal for the direct marketer, and carcass weight specifications for supermarkets and butchers were of the greatest importance for lamb weight and size quality attribute. A disconnect exists on preferred size of lamb carcasses and cuts between sectors. A total of 40% of purveyors preferred bigger lamb cuts as they operate a margin business and also cater to restaurants requesting larger sized middle meats. However, carcass and cut size too big was the most common response (38.7%) for protein purchasers representing supermarkets and was noted by 22.2% of direct marketers. This challenge is not new, and in fact, the industry can be commended for finding avenues of sale for all sizes and shapes of lambs produced in the U.S. A purveyor respondent stated, “We need to produce shoulder and legs from lambs with a small hot carcass weight, and the rack and loin from lambs with a large hot carcass weight.” Thus, different markets exist for different sized products, but as consistency and uniformity are also very important, a question remains of how to ensure weight and size specifications for retail, foodservice, and end-user customers.

Nutrition/Wholesomeness: The safety of and healthfulness of lamb was categorized together as a quality attribute in this current study. Healthy was most often used to describe nutrition/wholesomeness for fine dining (26.8%) and casual dining (27.3%), and was rated second for butcher (27.3%) and direct lamb marketers (27.8%; Table 19). Lean was another term used to describe lamb and was the most common answer for butchers (27.3%). Feeding regime, or a description of what the animal ate, was mentioned by all sectors except purveyor. A connection exists with retail and foodservice representatives that what the sheep eats plays a factor with overall lamb product nutrition. In fact, supermarket interview respondents identified grass-fed (16.1%) and all-natural (16.1%) as the first impression of what lamb nutrition/wholesomeness means to them. Also, lamb purchasers from fine dining (21.7%) and purveyor (20%) sectors indicated that consumers do not eat lamb for health or nutrition; instead consumers are more focused on eating satisfaction. Food safety was considered a strength for lamb, and should be considering the clean food safety record compared to competitive proteins. Food safety was most often mentioned by purveyors (26.7%), and occasionally by supermarket (9.7%) representatives. Overall, lamb is considered a wholesome product, and is considered a healthy red meat option for consumption. Additionally, the sheep raising practices of an animal have been associated with end product healthfulness and further consideration of ways to capitalize on this connection may be advantageous.

Product Convenience/Form: The quality trait of Product Convenience/Form was most frequently described by availability, packaging, and lamb product specifications (Table 20). Availability was the most mentioned definition for butchers, direct marketers, and purveyors. These sectors indicated that convenience of the product can be limited by the ability to purchase/merchandise lamb throughout the year. The interview respondents representing the supermarket and casual dining segments of the industry highlighted the need for cut specifications of lamb that fit their company preferences. Additionally, packaging types and methods were important in the supermarket sector, and notably vacuum packaged (29.0%) and pre-packaged cuts (29.0%) ranked tied for second. Portion size uniformity (30.4%) was the most prominent answer for fine dining respondents to characterize a company's first impression related to product convenience and form. Uniformity of product specifications, proper and attractive packaging, and overall availability of lamb were all identified as critical to lamb quality.

Table 13. Categorized responses from interviewed companies defining what seven quality attributes mean to their company as it relates to lamb

Eating Satisfaction		Origin		Sheep Raising Practices		Product Appearance/ Composition		Weight/Size		Nutrition/ Wholesomeness		Product Convenience/Form	
Definition[1]	Freq.[2]	Definition	Freq.	Definition	Freq.	Definition	Freq.	Definition	Freq.	Definition	Freq.	Definition	Freq.
Lamb Flavor/Taste	75.8%	Locally Raised	44.2%	Grass-Fed	37.5%	Fresh Lamb Color	31.7%	Consistent Cut Size	32.5%	Healthy	19.2%	Availability	20.8%
Tenderness	32.5%	American	25.0%	Humanely Raised	21.7%	Fat Trim Level	26.7%	Consistent Cut Weight	24.2%	Lean	14.2%	Cut Specifications	15.8%
Customer Satisfaction	31.7%	Region/State	20.0%	Feeding Regime	15.8%	Freshness	21.7%	Carcass Weight	20.0%	Nutritious	10.0%	Pre-Packaged Cuts	14.2%
Consistency	10.0%	Traceable Product	19.2%	Animal Well-Being	15.8%	Attractive Appearance	20.8%	Cut Specifications	16.7%	Grass-Fed	9.2%	Portion Cut/ Uniformity	14.2%
Product Quality	10.0%	Colorado	10.0%	Antibiotic Free	15.0%	Product Quality	15.8%	Carcass/Cuts Too Big	14.2%	Vitamins	9.2%	Vacuum Packaged	12.5%
Marbling	9.2%	Source Verified	6.7%	No Added Hormones	12.5%	Lean to Fat Ratio	12.5%	Uniformity	8.3%	Protein	7.5%	Frenched Product	5.0%
Texture/ Mouthfeel	7.5%	Where They Are Raised	6.7%	Animal Care	8.3%	Marbling	9.2%	Live Weight	8.3%	Don't Eat Lamb For Nutrition	6.7%		
Fat Content	5.0%	Know The Farmer	5.8%	How They Are Raised	7.5%	Packaging	6.7%	Primal Weight	8.3%	All-Natural	6.7%		
		Australian	5.8%	Humane Slaughter	7.5%	Uniform Size	6.8%	Prefer Bigger Cuts	8.3%	No Added Hormones	6.7%		
		New Zealand	5.8%	Naturally Raised	6.7%	Consistent	5.8%			Customer Satisfaction	6.7%		
				Grain-Fed	5.8%	Trimness	5.0%			Food Safety	6.7%		
				Breed	5.8%	White Fat	5.0%			Freshness	6.7%		

[1] Definition = the interview response for the definition or description of seven quality attributes
[2] Freq. = Most frequent responses (=/> 5.0%) in descending order. Response data were evaluated as the number of times that interviewees in each market sector identified the attribute as a definition or description of the given category divided by the total number of responses (N = 120).

Table 14. Frequency of responses for the definition of eating satisfaction quality attribute for six entities of the retail and foodservice sector

Supermarket (n = 31)		Butcher (n = 11)		Direct/Farmer Market (n = 18)		Fine Dining (n = 23)		Casual Dining (n = 22)		Purveyor (n = 15)	
Lamb Flavor/Taste[1]	80.6%[2]	Lamb Flavor/ Taste	100.0%	Customer Satisfaction	50.0%	Lamb Flavor/Taste	82.6%	Lamb Flavor/Taste	77.3%	Lamb Flavor/Taste	73.3%
Tenderness	38.7%	Tenderness	63.6%	Lamb Flavor/Taste	44.4%	Texture/Mouthfeel	26.1%	Customer Satisfaction	40.9%	Tenderness	46.7%
Customer Satisfaction	35.5%	Product Quality	27.3%	Tenderness	16.7%	Fat Content	26.1%	Tenderness	22.7%	Customer Satisfaction	40.0%
Consistency	16.1%	Delicious	18.2%	Lean	11.1%	Marbling	21.7%	Texture/Mouthfeel	13.6%	Marbling	26.7%
Product Quality	12.9%	Consistency	18.2%	Not Greasy	11.1%	Tenderness	21.7%	Healthy	13.6%	Juiciness	20.0%
		Aroma	18.2%								

[1] The interview response for the definition or description of eating satisfaction for each market sector
[2] Most frequent responses in descending order. Response data were evaluated as the number of times that interviewees in each market sector identified the attribute as a definition or description of the given category divided by the total number of responses for each market sector

Table 15. Frequency of responses for the definition of origin quality attribute for six entities of the retail and foodservice sector

Supermarket (n = 31)		Butcher (n = 11)		Direct/Farmer Market (n = 18)		Fine Dining (n = 23)		Casual Dining (n = 22)		Purveyor (n = 15)	
American[1]	48.4%[2]	Locally Raised	63.6%	Traceable to Ranch	72.2%	Locally Raised	39.1%	Locally Raised	50.0%	Locally Raised	33.0%
Locally Raised	38.7%	American	27.3%	Locally Raised	50.0%	Colorado	26.1%	Traceable source	31.8%	Where They Are Raised	33.0%
Region/State	25.8%	Traceable	18.2%	Know the Farmer	16.7%	Region/State	21.7%	Region/State	27.3%	Region/State	20.0%
Traceability/Source	22.6%	Region/State	18.2%	Region/State	11.1%	American	17.4%	American	22.7%	Australia	20.0%
Product Quality	16.1%	Raising Practices	9.1%	Country of Origin	11.1%	Where They Are Raised	13.0%	How They Are Raised	9.7%	New Zealand	20.0%

[1] The interview response for the definition or description of origin for each market sector
[2] Most frequent responses in descending order. Response data were evaluated as the number of times that interviewees in each market sector identified the attribute as a definition or description of the given category divided by the total number of responses for each market sector

Table 16. Frequency of responses for the definition of sheep raising practices quality attribute for six entities of the retail and foodservice sector

Supermarket (n = 31)		Butcher (n = 11)		Direct/Farmer Market (n = 18)		Fine Dining (n = 23)		Casual Dining (n = 22)		Purveyor (n = 15)	
Grass-Fed/Pasture Raised	41.9%	Grass-Fed	45.5%	Grass-Fed	33.3%	Grass-Fed	21.7%	Grass-Fed	63.6%	Animal Well-Being	40.0%
Humanely Raised	25.8%	Grain-Fed	36.4%	Breed	22.2%	Antibiotic Free	21.7%	Feeding Regime	22.7%	Feeding Regime	20.0%
Animal Well-Being	22.6%	Family Farmer	27.3%	How they are raised	22.2%	Know your Farmer	17.4%	No Added Hormones	18.2%	Humanely Raised	20.0%
How they are raised	16.1%	Environment	27.3%	Humanely Raised	22.2%	Animal Care	17.4%	No Antibiotics	18.2%	Antibiotic Free	20.0%
Feeding Regime	12.9%	Humanely Raised	27.3%	Naturally Raised	16.7%	Humane Treatment	17.4%	Humanely Raised	18.2%	Animal Care	13.3%
Antibiotic Free	12.9%					No Added Hormones	17.4%			Animal Health	13.3%
										Grass-Fed	13.3%
										No Added Hormones	13.3%

[1] The interview response for the definition or description of sheep raising practices for each market sector

[2] Most frequent responses in descending order. Response data were evaluated as the number of times that interviewees in each market sector identified the attribute as a definition or description of the given category divided by the total number of responses for each market sector

Table 17. Frequency of responses for the definition of product appearance/composition quality attribute for six entities of the retail and foodservice sector

Supermarket (n=31)		Butcher (n = 11)		Direct/Farmer Market (n = 18)		Fine Dining (n = 23)		Casual Dining (n = 22)		Purveyor (n = 15)	
Fresh Lamb Color[1]	51.6%[2]	Fresh Lamb Color	45.5%	Attractive/Eye Appeal	44.4%	Freshness	39.1%	Fat Trim Level	31.8%	Fresh Lamb Color	33.3%
Fat Trim Level	32.3%	Attractive/Eye Appeal	27.3%	Trimness	33.3%	Product Quality	34.8%	Consistent	18.2%	Fat Trim Level	33.3%
Freshness	32.3%	Fat Trim Level	27.3%	Fresh Lamb Color	22.2%	Fat Trim Level	30.4%	Fresh Lamb Color	13.6%	Lean to Fat Ratio	26.7%
Lean to Fat Ratio	22.6%	Freshness	18.2%	Packaging	22.2%	Uniform Size	26.1%	Freshness	13.6%	Muscling	26.7%
Attractive/Eye Appeal	16.1%	Lean to Fat Ratio	18.2%	Product Quality	16.7%	Fresh Lamb Color	21.7%	Butchery	13.6%	Consistent	20.0%
White Fat	16.1%	Product Quality	18.2%								

[1] The interview response for the definition or description of product appearance/composition for each market sector
[2] Most frequent responses in descending order. Response data were evaluated as the number of times that interviewees in each market sector identified the attribute as a definition or description of the given category divided by the total number of responses for each market sector

Table 18. Frequency of responses for the definition of weight/size quality attribute for six entities of the retail and foodservice sector

Supermarket (n = 31)		Butcher (n = 11)		Direct/Farmer Market (n = 18)		Fine Dining (n = 23)		Casual Dining (n = 22)		Purveyor (n = 15)	
Carcass/Cuts Too Big[1]	38.7%[2]	Carcass Weight	36.4%	Live Weight	44.4%	Consistent Cut Size	39.1%	Consistent Cut Weight	36.4%	Cut Specifications	46.7%
Consistent Cut Size	38.7%	Consistent Cut Size	27.3%	Carcass Weight	27.8%	Consistent Cut Weight	30.4%	Consistent Cut Size	31.8%	Consistent Cut Size	40.0%
Consistent Cut Weight	19.4%	Consistent Cut Weight	27.3%	Carcass too big	22.2%	Carcass Weight	13.0%	Cut Specifications	22.7%	Bigger Cut Preferred	40.0%
Carcass Weight	19.4%	Primal Weight	18.2%	Consistent Cut Weight	22.2%	Uniformity	8.7%	Primal Weight	13.6%	Consistent Cut Weight	33.3%
Primal Weight	12.9%	Uniformity	18.2%	Prefer bigger carcass	16.7%	Portion Size	8.7%	Portion Size	9.1%	Uniformity	33.3%
Cut Specifications	12.9%					Cut Specifications	8.7%				

[1] The interview response for the definition or description of weight/size for each market sector
[2] Most frequent responses in descending order. Response data were evaluated as the number of times that interviewees in each market sector identified the attribute as a definition or description of the given category divided by the total number of responses for each market sector

Table 19. Frequency of responses for the definition of nutrition/wholesomeness quality attribute for six entities of the retail and foodservice sector

Supermarket (n = 31)		Butcher (n = 11)		Direct/Farmer Market (n = 18)		Fine Dining (n = 23)		Casual Dining (n = 22)		Purveyor (n = 15)	
Grass-Fed[1]	16.1%[2]	Lean	27.3%	Protein	27.8%	Healthy	26.8%	Healthy	27.3%	Food Safety	26.7%
All-Natural	16.1%	Healthy	27.3%	Healthy	27.8%	Feeding Regime	21.7%	Lean	22.7%	Don't Eat Lamb For Nutrition	20.0%
Nutritious	12.9%	Grain-Fed	18.2%	Nutritious	22.2%	Lean	21.7%	Feeding Regime	18.2%	USDA Inspected	13.3%
Feeding Regime	12.9%	Customer Satisfaction	18.2%	Grass-Fed	16.7%	Eating Satisfaction	21.7%	Freshness	13.6%	All-Natural	13.3%
Raising Practices	9.7%	Chemical Free	18.2%	Lean	16.7%	Don't Eat Lamb For Health	21.7%	Fat Content	13.6%	Customer Satisfaction	13.3%
No Added Hormones	9.7%										
No Antibiotics	9.7%										
Food Safety	9.7%										

[1] The interview response for the definition or description of nutrition/wholesomeness for each market sector
[2] Most frequent responses in descending order. Response data were evaluated as the number of times that interviewees in each market sector identified the attribute as a definition or description of the given category divided by the total number of responses for each market sector

Table 20. Frequency of responses for the definition of product convenience/form quality attribute for six entities of the retail and foodservice sector

Supermarket (n=31)		Butcher (n = 11)		Direct/Farmer Market (n = 18)		Fine Dining (n = 23)		Casual Dining (n = 22)		Purveyor (n = 15)	
Cut Specifications	32.3%	Availability	27.3%	Availability	33.3%	Portion Size Uniformity	30.4%	Cut Specifications	31.8%	Availability	33.3%
Vacuum Packaged	29.0%	Inaccessible	18.2%	Portion Cut/Uniformity	27.8%	Pre-Packaged Cuts	21.7%	Trimmed Product	13.6%	Packaging	26.7%
Pre-Packaged Cuts	29.0%	Service/Delivery	18.2%	Packaging	16.7%	Availability	13.0%	Consistency	13.6%	Vacuum Packaged	13.3%
Availability	19.4%	Freshness	9.1%	Further Processed	16.7%	Timely	13.0%	Packaging	13.6%	Frenched Product	13.3%
Packaging	16.1%	Block Ready Cuts	9.1%	Product Size	11.1%	Packaging	8.7%	Availability	9.1%	Boneless Cuts	13.3%

[1] The interview response for the definition or description of nutrition/wholesomeness for each market sector
[2] Most frequent responses in descending order. Response data were evaluated as the number of times that interviewees in each market sector identified the attribute as a definition or description of the given category divided by the total number of responses for each market sector

Table 21. Probability of non-negotiable requirement, no premium, and premium, and willingness to pay for seven quality attributes across retail, foodservice, and purveyor sectors

Location	WTP[1]	Origin	Sheep Raising Practices	Eating Satisfaction	Weight/ Size	Product Appearance/ Composition	Product Convenience/ Form	Nutrition/ Wholesomeness
Supermarkets	Requirement	0.39[ab]	0.23[ab]	0.13	0.16	0.19	0.13	0.06
	No Premium	0.23[ab]	0.32[ab]	0.29	0.61	0.35	0.52	0.52
	Premium	0.39	0.45	0.58	0.23[b]	0.45	0.35	0.42
	Premium, %	13.24%	10.95%	15.63%	10.64%	18.04%	17.37%	12.18%
Butchers	Requirement	0.45[a]	0.45[a]	0.00	0.19	0.09	0.00	0.00
	No Premium	0.18[ab]	0.18[ab]	0.09	0.36	0.36	0.55	0.45
	Premium	0.36	0.36	0.91	0.45[ab]	0.55	0.45	0.55
	Premium, %	12.12%	15.83%	21.27%	16.76%	23.18%	12.64%	18.43%
Direct/Farmer's Market	Requirement	0.28[abc]	0.22[ab]	0.00	0.33	0.00	0.06	0.00
	No Premium	0.22[ab]	0.11[b]	0.22	0.50	0.44	0.56	0.61
	Premium	0.50	0.67	0.78	0.17[b]	0.56	0.39	0.39
	Premium, %	9.89%	10.77%	15.84%	6.40%	8.46%	14.54%	8.60%
Fine Dining	Requirement	0.26[abc]	0.22[ab]	0.13	0.00	0.04	0.04	0.00
	No Premium	0.09[b]	0.13[b]	0.09	0.43	0.43	0.48	0.35
	Premium	0.65	0.65	0.78	0.57[a]	0.52	0.48	0.65
	Premium, %	19.43%	20.29%	24.83%	16.65%	17.08%	11.99%	18.45%
Casual Dining	Requirement	0.09[c]	0.09[b]	0.14	0.05	0.05	0.05	0.00
	No Premium	0.27[ab]	0.36[ab]	0.09	0.59	0.27	0.55	0.55
	Premium	0.64	0.55	0.77	0.36[ab]	0.68	0.41	0.45
	Premium, %	15.64%	15.99%	19.72%	14.95%	12.55%	8.61%	13.59%
Purveyors	Requirement	0.07[bc]	0.07[b]	0.07	0.13	0.13	0.00	0.00
	No Premium	0.40[a]	0.53[a]	0.33	0.53	0.47	0.80	0.60
	Premium	0.53	0.40	0.60	0.33[ab]	0.40	0.20	0.40
	Premium, %	9.00%	8.42%	11.24%	10.58%	11.33%	5.57%	5.97%
ALL Interviews	Requirement	25.83%	20.00%	9.17%	13.33%	9.17%	5.83%	1.67%
	No Premium	22.50%	27.50%	19.17%	52.50%	38.33%	55.83%	50.83%
	Willing to Pay a Premium (SE)	51.67% (0.046)	52.50% (0.046)	71.67% (0.041)	34.17% (0.043)	52.50% (0.046)	38.33% (0.045)	47.50% (0.046)
	Average WTP Premium	14.17% (n = 62)	14.17% (n = 63)	18.59% (n = 86)	13.82% (n = 41)	14.88% (n=63)	12.66% (n =46)	13.64% (n = 57)

[abc] Means in the same column for each attribute lacking a common superscript differ ($P < 0.05$)
[1] Requirement = odds of category identified as a non-negotiable requirement; No Premium = odds a sector would not be willing to pay a premium; Premium = odds a sector would be willing to pay a premium; Premium, % = average percent premium WTP.

WILLINGNESS TO PAY:

The probability of a non-negotiable requirement, or a result of either no premium or a potential premium, as well as a willingness-to-pay for seven quality attributes for lamb are reported in Table 21. The scenario for determining willingness-to-pay for a specified attribute was first dependent if the trait was a non-negotiable requirement, meaning that under no circumstances would the business be interested in purchasing lamb without that assurance of that specific trait. Next, the interview respondents answered whether they were willing to pay a premium, and average premium percentages within sector were calculated and recorded.

The likelihood of an attribute being a non-negotiable requirement was the most frequent for credence attributes of origin (25.83%) and sheep raising practices (20%). Butchers identified that origin was a non-negotiable requirement, or a "must have", 45% of the time which was greater than casual dining (9%) and purveyors (7%; $P < 0.05$). Also, supermarket representatives considered origin (39%) a must have more than casual dining ($P < 0.05$). Also, butchers (45%) considered sheep raising practices a non-negotiable requirement at a greater probability that casual dining (9%) and purveyor (7%) representatives ($P < 0.05$). Due to purveyors often carrying both domestic and imported lamb product, purveyor interview respondents (40%) chose not to offer a premium for origin compared to fine dining establishments (9%; $P < 0.05$). Purveyors (53%) were not willing to pay a premium for sheep raising practices compared to fine dining (13%) and direct/farmer's market (11%; $P < 0.05$). Further, since fine dining lamb purchasing decisions for a menu and portion size uniformity are extremely important, a uniform weight and size of the product warranted a greater probability (57%) for weight and size than either supermarkets (23%) or direct/farmer's markets (17%; $P < 0.05$).

Butchers (23.18%), supermarkets (18.04%), and purveyors (11.03%) were willing to pay the greatest premium percent for the product appearance/composition quality attribute. This reinforced the importance for these sectors to not only provide an attractive package for a retail case, but also have a reasonable (trimmed) amount of external fat on product that was merchandised within these sectors. Interview respondents from casual dining, fine dining, casual dining, and direct farmer's market emphasized the importance of eating satisfaction as their most important quality attribute and highest percent premiums with an average willingness-to-pay if eating satisfaction could be assured at 24.83%, 19.72%, and 15.84%, respectively. This eluded to the fact that eating satisfaction, most commonly defined as lamb flavor, was of the utmost importance to lamb industry representatives that focused on foodservice consumption of lamb.

Within each sector of the industry, the quality attribute that garnered the least potential premium for butchers was origin (12.12%), and if supermarkets and direct/farmer's markets were willing to pay a premium for an attribute, it was the lowest for weight and size with premiums of 10.64% and 6.40%, respectively. Additionally, product convenience and form had the lowest average willing to pay premium (12.66%) among those that wish to assure the quality trait compared to all traits, and fine dining (11.99%), casual dining (8.61%), and purveyors (5.57%) indicated the lowest average percent willingness-to-pay for quality traits that were characterized for product convenience/form.

Eating satisfaction (71.67%) easily resulted in the greatest percent of respondents willing to pay a premium if quality could be assured, and the greatest percent premium (18.59%). Across all segments of the lamb industry interviewed, sheep raising practices (52.50%), product appearance/composition (52.50%), origin (51.67), and nutrition/wholesomeness (47.50%) were similar for being willing to pay a premium for a specific quality attribute. Product convenience/form (38.33%) and weight/size (34.17%) quality attributes resulted in the least likelihood of a company being willing to pay a premium for the specified quality attribute.

For each respective quality attribute it was also important to evaluate which segment of the industry would have the greatest percent willingness to pay for each respective quality attribute described in this study. Fine dining establishments were willing to pay the greatest premium when compared to other sectors for eating satisfaction (24.83%), sheep raising practices (20.29%), origin (19.43%), and nutrition/wholesomeness (18.45%). These results also indicated that consumers of fine dining establishments that purchase lamb would be willing to absorb the menu price increase and purchase a quality lamb product if they could be assured the aforementioned quality traits. The traits that were most often defined by the fine dining sector for these attributes included lamb flavor, grass-fed and no antibiotics, locally raised, and healthy. Butcher's markets were willing to pay the greatest premiums when compared to other sectors for product appearance/composition (23.18%) and weight/size (16.76%) attributes of lamb quality. These results showed that product composition related to fresh lamb color, product attractiveness, and reasonable fat trim level along with carcass weight specifications and consistent cut size and weight are of the most value to butchers in the lamb supply chain. Supermarket interview respondents identified the importance of vacuum packaging and pre-packaged cuts along with correct cut specifications as having the greatest potential value and willingness-to-pay premium for the product convenience and form (17.37%) quality attribute.

With all interview respondents (N = 120), not only did eating satisfaction have the greatest number willing to pay a premium, but also had the greatest average willingness to pay(18.59%), more than three percent greater than all other attributes. A total of interviews from companies that were willing to pay a premium for a specified quality attribute to be assured identified quality attributes in order of: product appearance/composition (14.88%), origin (14.17%), sheep raising practices (14.17%), weight/size (13.82%), nutrition/wholeness (13.64%), and product convenience/form (12.66%). With an aggregated premium percent if ALL attributes could be assured, the order of greatest willingness to pay in descending order was: 1) Fine Dining (81.4%); 2) Butcher (65.6%); 3) Casual Dining (57.6%); 4) Supermarket (41.0%); Direct/Farmer's Market (39.2%); and Purveyor (26.5%). This indicated that fine dining restaurants were willing to provide the greatest economic incentives for producers and the supply chain to assure quality attributes of lamb. Additionally, customers at fine dining establishments expect the highest quality lamb, and are willing to pay for it. As an executive chef of a high end steakhouse stated, "We provide celebrations in life. Lamb is part of that celebration."

LAMB LOIN/RIB PHYSICAL & TENDERNESS ATTRIBUTES:

Analysis of visual physical attributes were compared for loin chops purchased at retail from origins of U.S. (n = 383), Australia (n = 67), and New Zealand (n= 115; Table 22). The American lamb loin chops had a greater mean loin eye area (3.03 in^2) than chops from either Australia or New Zealand, and mean loin eye area of Australian chops (2.60 in^2) was greater ($P < 0.0001$) than the mean loin eye area of loin chops from New Zealand (2.25 in^2). While the mean area of the tenderloin (*Psoas major*) did not differ by country ($P > 0.05$), the mean *Longissimus dorsi* length was different for all countries ($P < 0.00001$). The full length, full width, and total area of loin chop were different for America compared to Australian, and New Zealand ($P < 0.0001$). Chops of U.S. origin had a greater amount of exposed bone than either chops from Australia or New Zealand ($P = 0.0008$).

Lamb loin chops of New Zealand origin had the greatest amount of fat nearest the lumbar vertebra compared to U.S. and Australia ($P = 0.0137$), and chops from New Zealand and the U.S. had greater amount of external measurable fat at the 50% location and the distal portion (or closest to the tail of a lamb loin chop) compared to trimmer Australian lamb loin chops ($P = 0.0027$). Also, U.S loin chops were merchandised with the most tail length (0.35 in), and Australian loins (0.29 in) had greater ($P < 0.0001$) tail length than New Zealand lamb loins (0.18 in). Overall, U.S. lamb loin chops had the most muscle and red meat, and Australian loin chops were the trimmest products available at the U.S. retail meat case.

Table 22. Comparison of product dimensions of loin chops purchased at U.S. retail markets from origins of U.S., Australia, and New Zealand

	U.S. (n = 383)	Australia (n = 67)	New Zealand (n =115)	*P* - Value
Longissimus Dorsi Area	3.03^{a}	2.60^{b}	2.25^{c}	$P < 0.0001$
	(0.04)	(0.09)	(0.07)	
Psoas Major Area	1.11	0.91	0.96	$P = 0.1839$
	(0.05)	(0.13)	(0.10)	
Total Area	7.88^{a}	6.41^{b}	6.15^{b}	$P < 0.0001$
	(0.19)	(0.44)	(0.34)	
Kidney Pelvic	0.30^{a}	0.25^{ab}	0.20^{b}	$P = 0.0008$
	(0.01)	(0.03)	(0.03)	
Bone	0.94^{a}	0.80^{b}	0.83^{b}	$P = 0.0033$
	(0.02)	(0.05)	(0.04)	
Longissimus Dorsi Width	1.29	1.17	1.18	$P < 0.0001$
	(0.01)	(0.03)	(0.02)	
Longissimus Dorsi Length	2.57^{a}	2.43^{b}	2.18^{c}	$P < 0.0001$
	(0.02)	(0.06)	(0.04)	
Psoas Major Length	1.20	1.19	1.184	$P = 0.9233$
	(0.02)	(0.06)	(0.04)	
Psoas Major Width	1.21^{a}	1.16^{ab}	1.10^{b}	$P = 0.0431$
	(0.02)	(0.05)	(0.04)	
Fat – 0% Location	0.26^{b}	0.25^{b}	0.31^{a}	$P = 0.0137$
	(0.01)	(0.02)	(0.02)	
Fat – 50% Location	0.33^{a}	0.25^{b}	0.34^{a}	$P = 0.0027$
	(0.01)	(0.02)	(0.02)	
Fat – 100% Location	0.30^{a}	0.23^{b}	0.34^{a}	$P = 0.0122$
	(0.01)	(0.03)	(0.02)	
Tail Length	0.36^{a}	0.18^{c}	0.29^{b}	$P < 0.0001$
	(0.02)	(0.04)	(0.03)	
Full Length	3.45^{a}	3.13^{b}	3.04^{b}	$P < 0.0001$
	(0.02)	(0.05)	(0.04)	
Full Width	2.59^{a}	2.32^{b}	2.41^{b}	$P < 0.0001$
	(0.02)	(0.05)	(0.04)	

[abc] Least squares means in the same column lacking a common superscript differ ($P < 0.05$)

An evaluation of rib chops purchased at U.S. retail markets is shown in Table 23. Results indicated that chops from U.S. origin had the greatest *Longissimus dorsi* area (2.37 in^2) compared to chops of New Zealand origin (1.95 in^2; P = 0.0026), and American rib chops had the greatest surface area (P < 0.0001). No difference was found for fat at the 0% or 50% location (P > 0.05), but Australian product (0.12 in) had the least fat (P = 0.0027) at the most distal location of the rib chop compared to chops from New Zealand (0.32 in) and the U.S. (0.38 in). U.S. rib chops showed increased full width (P = 0.0005) and tail length (P = 0.005) measurements than either Australian or New Zealand chops. The tail length of the U.S. chop would attribute to greater plate waste from purchased rib chops. Overall, U.S. lamb rib chops had the greatest surface area of product, however this was partially due to increased ribeye area as well as increased tail length. Australian rib chops were the trimmest chops available in the U.S. retail case.

Table 23. Comparison of product dimensions of rib chops purchased at U.S. retail markets from origins of U.S., Australia, and New Zealand

	U.S. (n = 71)	Australia (n = 16)	New Zealand (n = 25)	*P* - Value
Longissimus dorsi Area	2.37^{a}	2.07^{ab}	1.95^{b}	P =0.0026
	(0.08)	(0.17)	(0.14)	
Total Area	8.17^{a}	6.34^{b}	6.00^{b}	P < 0.0001
	(0.27)	(0.57)	(0.45)	
Longissimus dorsi Width	1.45^{a}	1.14^{b}	1.25^{b}	P =0.0022
	(0.04)	(0.09)	(0.07)	
Longissimus dorsi Length	2.08	2.21	1.93	P = 0.1616
	(0.06)	(0.12)	(0.09)	
Fat – 0% Location	0.46	0.29	0.48	P = 0.1905
	(0.04)	(0.09)	(0.07)	
Fat – 50% Location	0.39	0.22	0.36	P = 0.0602
	(0.03)	(0.07)	(0.05)	
Fat – 100% Location	0.38^{a}	0.12^{b}	0.32^{a}	P = 0.0027
	(0.03)	(0.06)	(0.05)	
Tail Length	1.08^{a}	0.28^{b}	0.55^{b}	P = 0.0050
	(0.13)	(0.22)	(0.27)	
Full Length	5.37	5.00	5.10	P = 0.3167
	(0.13)	(0.26)	(0.21)	
Full Width	2.40^{a}	2.02^{b}	2.07^{b}	P = 0.0005
	(0.05)	(0.11)	(0.09)	

^{ab} Least squares means in the same column lacking a common superscript differ (P < 0.05)

Table 24. Comparison of product dimensions of loin chops purchased at U.S. retail markets from lambs that were finished on grain or from U.S., Australia, and New Zealand and marketed as finished on grass-based diets

Measurement	Grain (n=297)	Grass (n=73)	*P* - Value
Longissimus dorsi Area	3.168[a]	2.547[b]	*P* < 0.0001
	(0.044)	(0.089)	
Psoas major Area	1.146	0.968	*P* =0.1943
	(0.061)	(0.122)	
Total Area	8.239[a]	6.701[b]	*P* = 0.0076
	(0.254)	(0.513)	
Kidney Pelvic	0.298	0.335	*P* = 0.3486
	(0.018)	(0.036)	
Bone	0.950[a]	0.803[b]	*P* = 0.0044
	(0.023)	(0.046)	
Longissimus dorsi Width	1.314[a]	1.183[b]	*P* < 0.0001
	(0.0148)	(0.0298)	
Longissimus dorsi Length	2.648[a]	2.289[b]	*P* < 0.0001
	(0.027)	(0.054)	
Psoas Major Length	1.213	1.181	*P* = 0.5843
	(0.026)	(0.052)	
Psoas Major Width	1.215	1.223	*P* = 0.8967
	(0.026)	(0.052)	
Fat – 0% Location	0.264	0.251	*P* = 0.5296
	(0.009)	(0.019)	
Fat – 50% Location	0.334[a]	0.289[b]	*P* = 0.0444
	(0.010)	(0.020)	
Fat – 100% Location	0.299	0.308	*P* = 0.7884
	(0.015)	(0.031)	
Tail Length	0.354[b]	0.461[a]	*P* = 0.0230
	(0.021)	(0.042)	
Full Length	3.518[a]	3.259[b]	*P* < 0.0001
	(0.026)	(0.052)	
Full Width	2.631[a]	2.380[b]	*P* < 0.0001
	(0.024)	(0.048)	

[ab] Least squares means in the same column lacking a common superscript differ ($P < 0.05$)

Loin chops available for purchase at retail may be designated by production management and finishing protocol (i.e., grass-fed and grain-fed lamb). A comparison of visual physical attributes for loin chops that originating from lamb that were either grass-fed or grain-fed are reported in Table 24. Overall, loin chops originating from grain finished lambs were more muscular and had greater *Longissimus dorsi* length, width, and total area measurements ($P < 0.0001$). Results indicated that loin chops did not differ (*P* > 0.05) at either 0% (closest to vertebra) or 100% (closest to loin tail) locations, but loin chops from grass-fed animals showed less fat over the middle of the loin chop (*P* = 0.0444). While loins from grain-fed lambs had a greater overall length and width (*P* < 0.0001), loins from grass-fed origin were merchandised with a greater tail length, or accessory muscles and fat at the end of a loin chop (*P* < 0.023).

Table 25. Comparison of Warner-Bratzler Shear Force of loin and rib chops purchased at retail from U.S., Australia, and New Zealand and Warner-Bratzler Shear Force from loin chops that from labeled as grass-fed and USA grain fed chops

	U.S. (n = 71)	Australia (n = 13)	New Zealand (n = 22)	*P* - Value
Warner Bratzler Shear Force (Rib Chop)	1.90^{a} (0.06)	1.52^{b} (0.015)	1.57^{b} (0.12)	*P* = 0.0091
	U.S. (n = 191)	Australia (n = 34)	New Zealand (n = 56)	
Warner Bratzler Shear Force (Loin Chop)	1.78^{a} (0.03)	1.51^{b} (0.08)	1.56^{b} (0.06)	*P* = 0.0003
	Grass-Fed (n = 125)	Grain-Fed (n = 294)		
Warner Bratzler Shear Force (Loin Chop)	1.80 (0.04)	1.74 (0.03)		*P* = 0.2126

[ab] Least squares means in the same column lacking a common superscript differ (*P* < 0.05)

Tenderness of lamb chops purchased from U.S. retail markets was compared by Warner-Bratzler Shear Force by country (U.S., Australia, and New Zealand) for loin and rib chops and by finishing diet for products of U.S. origin (Table 25). Lamb chop *Longissimus* muscle tenderness evaluation showed a lower WBSF value (more tender) for product of Australia and New Zealand origin than product from the U.S. for rib (*P* = 0.0091) and loin (*P* = 0.0003) chops. In perspective, the tenderness values obtained in this research were uniformly low indicating that lamb available for purchase at retail is extremely tender. Furthermore the muscle tenderness difference found, while significant, would doubtfully be distinguishable by consumers. As result of visual and tenderness evaluation of lamb loin and rib chops in this study, we can conclude that American lamb is more muscular than Australian, and New Zealand is the least muscular. Furthermore, lamb originating from Australia is the leanest lamb option available to U.S. consumers. Also, the mean scores for tenderness evaluation reconfirm that product tenderness (loin and rib chops) was a strength of lamb.

LAMB SHOULDER RETAIL DATA:

Researchers on this current study purchased lamb throughout the U.S. at the retail level; a total of 148 shoulder chops from 46 stores in 11 states. Lamb shoulder chops were the best representation of price comparison at the retail level because chops were offered in self-service and abundantly available at a cross-section of retail markets with customers from low, medium, and high socioeconomic status. Retail price per pound comparisons for country of origin (U.S., Australia, and New Zealand), store location (West, Central, and East), store type (National, Local, and Specialty), and packaging type (Overwrap, Vacuum Packaged, Rollstock, Modified Atmosphere Packaging, and Full-Service) are reported in Table 26.

Shoulder chop classification of either blade ($7.65) or arm chop ($7.73) did not differ ($P > 0.05$) for retail price per pound, and were analyzed together for the remainder of comparisons. Country of origin of lamb indicated U.S. product ($8.41/lb) was merchandised at the greatest price in retail, while lamb of New Zealand origin ($7.70/lb) was greater in price than lamb of Australian origin ($5.74/lb; $P < 0.0001$). Lamb shoulder chops purchased indicated that lamb in East and Central locations cost more per pound than lamb in the West region of the U.S. ($P < 0.05$). However, further evaluation showed that a greater proportion of product purchased from the West region was Australian and lesser in price. Origin of product and store type sampling distribution differences were accounted for, and a true comparison of similar (origin and store type) products, predicted that the mean retail price per pound for product from the East was \$8.19/lb greater than both product available at retail in the Central (\$7.15/lb) and West (\$7.15; $P < 0.05$). Lamb shoulder chops purchased at specialty stores (e.g., Whole Foods) were merchandised (\$9.63/lb) at over \$2/lb greater price than either lamb sold at national chain stores (\$7.62/lb; e.g., Kroger, Safeway) or locally owned retail stores (\$7.15/lb; $P < 0.05$).

Packaging types of lamb shoulders presented in the retail case varied between stores, and twenty blade chops were purchased from the full-service counter. Lamb shoulder chops packaged in modified atmosphere packaging (MAP; \$10.04/lb), or a sealed tray with a combination of CO, CO_2, and O_2 in the package, had the greatest price, and was more than full-service counter (\$8.77/lb), rollstock (\$8.59/lb), and overwrap packaging (\$6.46/lb; $P < 0.05$). While modified atmosphere packaging does present the fresh lamb color that people associate with quality at the retail case, some retailer commented on the price of packaging being greater, and certainly some appeared to be passed on to the consumer. It should be further noted though that source branded product (e.g., Musillami Meats from Strauss) was more prone to be packaged with MAP technology. Lamb product with overwrap packaging (\$6.46/lb) was merchandised at the lowest price point among offerings available to U.S. consumers at retail. While overwrap was the most common packaging of shoulder chops, sparse production and labeling claims on the package accompanied the product compared to other packaging types. Supermarkets previously indicated vacuum packaging as important to lamb convenience, yet popularity of vacuum packaged and rollstock (package absent of oxygen with a firm underlying tray) could continue to grow if consumers accept the absence of the fresh lamb color that they are accustomed to purchasing at retail.

Table 26. A price comparison of lamb shoulder chop purchased at U.S. retail markets based on cut type, country of origin, store location, store type, and packaging type

		N = 148	Price per Pound	Standard Error	*P* - Value
Shoulder Chop	Blade Chop	n = 97	\$7.65	0.33	$P = 0.8378$
	Arm Chop	n = 51	\$7.73	0.24	
Country of Origin	U.S.	n = 95	\$8.41[a]	0.22	$P < 0.0001$
	New Zealand	n = 34	\$7.70[b]	0.48	
	Australia	n = 19	\$5.74[c]	0.36	
Store Location	East	n = 46	\$8.00[a]	0.34	$P = 0.0097$
	Central	n = 58	\$8.18[a]	0.30	
	West	n = 44	\$6.81[b]	0.35	
Store Type	National	n = 63	\$7.62[b]	0.28	$P < 0.0001$
	Local	n = 64	\$7.15[b]	0.28	
	Specialty	n = 21	\$9.63[a]	0.48	
Packaging Type	Overwrap	n = 78	\$6.46[c]	0.22	$P < 0.0001$
	Modified Atmosphere Packaging	n = 19	\$10.04[a]	0.45	
	Vacuum Packaging	n = 16	\$8.84[ab]	0.48	
	Rollstock	n = 15	\$8.59[b]	0.50	
	Full-Service Counter	n = 20	\$8.77[b]	0.44	

[abc] Least squares means in the same column lacking a common superscript differ ($P < 0.05$)

While geographic and store demographics influenced lamb pricing, sheep producers may be more interested in the associated label claims that are of greater value in today's marketplace. Lamb products that were source branded (\$9.08/lb) were worth more at retail than store branded (\$7.24/lb) or non-branded (\$7.14/lb). At the 46 stores visited across America, only 16 of the 148 purchased shoulder chops exhibited a local designation on the package. Yet, those with a local classification (\$9.21/lb) were priced at more than a \$1.50/lb premium to non-local branded product (\$7.52; $P < 0.05$). Furthermore, there was a limited number (n = 24) of shoulder chops classified as grass-fed at retail; however, grass-fed shoulder chops (\$8.64/lb) were marketed at over a \$1/lb premium over shoulder chops of grain fed origin (\$7.52/lb; $P < 0.05$). Consumer perception of the definition of "natural" is vague at best, but from a labeling perspective we quantified retail price difference of two labeling claims: "Never-Ever 3", (no added hormones, no antibiotics, and no animal by-products) and "All-Natural" or "Natural", (minimally processed, no artificial ingredients). Slight numerical differences existed with lamb shoulder price; however, products labeled with either Never Ever 3 or All-Natural/Natural in the U.S. retail case showed no statistical difference of retail price per pound ($P > 0.05$). While there was an evident price premium for source branded, local, and grass-fed products, the proportion available to U.S. consumers currently at retail is most likely below market saturation, and opportunity exists for future marketing and increased sale of these production authenticity traits.

Table 27. A price comparison of lamb shoulder chop purchased at U.S. retail markets based on cut type, country of origin, store location, store type, and packaging type

		N = 148	Price per Pound	Standard Error	*P* - Value
Branded Program	Source Branded	n = 40	$9.08[a]	0.35	$P < 0.0001$
	Store Branded	n = 58	$7.24[b]	0.29	
	No Brand	n = 50	$7.14[b]	0.31	
Origin Description	Local Designation	n = 16	$9.21[a]		$P < 0.0001$
	No Designation	n = 132	$7.52[b]		
Production Type	Grass-Fed	n = 24	$8.64[a]	0.48	$P < 0.001$
	Grain-Fed	n = 124	$7.52[b]	0.21	
Management Claim	No Antibiotics/No Hormones/ No Animal By-Products	n = 45	$8.03	0.35	$P = 0.2612$
	No Designation	n = 103	$7.56	0.23	
Natural Claim	Minimally Processed, No Artificial Ingredients	n = 56	$7.80	0.32	$P = 0.6939$
	No Designation	n = 92	$7.64	0.25	

[ab] Least squares means in the same column lacking a common superscript differ ($P < 0.05$)

Product quality attributes were considered important to retail, foodservice, and purveyor sectors of American Lamb, still U.S. lamb must be careful to not price itself out of a consumer's shopping cart or menu choice. Researchers in this study asked interview respondents "At what price would you decrease or eliminate your lamb purchase?" for rack, loin chop, leg, and ground lamb (Table 28). Lamb price was often mentioned as a weakness or threat to the U.S. lamb industry, and the feeder and fed lamb price spikes of 2011 and 2012 were not advantageous to lamb volume, consumer acceptability, and marketability for many respondents at retail and foodservice. Sixteen of sixty retail and foodservice interview respondents stated that there was no price limit for rack price as the required rack in their store and on their menu, while another sixteen companies confirmed that we are already past the preferred price limit. Respondents stated they would decrease or eliminate rack from their sales at an average price of $18.00/lb for retail and $18.53 lb for foodservice sectors.

Loin chops were the only cut of the four evaluated that resulted in more people saying that the price was too high (n = 8), and that there was no price limit (n = 6). Interview respondents showed a greater price limit at retail ($15.69/lb) than at foodservice and purveyor ($12.81/lb) sectors. Lamb leg purchases were considered to have an upward price limit of $9.02/lb for retail and $8.42/lb for foodservice and purveyor entities. The price limit threshold for ground lamb was determined at $7.68/lb for retail and $7.92/lb for foodservice and purveyor companies. As an American Lamb industry, price point can and will be a challenge to keep lamb at the center of the plate both at home and on restaurant menus. Currently, increases in competitive protein prices may soften the comparison of lamb only being considered an exclusive protein for high end occasions. Furthermore, numerous respondents in open-ended questions emphasized the current foodie culture and that The Food Network is an ally as several shows and cooking programs feature lamb on nationally televised cable programs. It is important to realize that a segment of American lamb consumers will purchase lamb regardless of cost, while another segment of the population already believes that American lamb is too expensive at the current prices.

Table 28. Responses from interviewees for "At what price would you (and your customers) decrease or eliminate your lamb purchase?" for rack, loin chop, leg, and ground lamb

Lamb Cut / Location	Total Responses	No Price Limit	Adjust Accordingly	Price Responses	Price Value	Already Past the Price Limit
Rack						
Retail	n = 42	8	3	n = 23	$18.00/lb	8
Foodservice/Purveyor	n = 38	8	4	n = 18	$18.53/lb	8
Loin Chops						
Retail	n = 29	3	0	n = 23	$15.69/lb	3
Foodservice/Purveyor	n = 20	3	1	n = 11	$12.81/lb	5
Leg						
Retail	n = 26	2	3	n = 20	$9.02/lb	1
Foodservice/Purveyor	n = 16	4	2	n = 9	$8.42/lb	1
Ground Lamb						
Retail	n = 23	2	0	n = 21	$7.68/lb	0
Foodservice/Purveyor	n = 25	4	2	n = 17	$7.92/lb	2

DISCUSSION and CONCLUSIONS:

The “Preferences and Complaints associated with American Lamb Quality” can be used to determine goals and objectives for producers to implement to improve the quality, consistency, value, and competitiveness of lamb. Information from this research provided a rank and quantification of quality attribute preference, the likelihood of "must have" quality attributes for purchase, and an estimate of percent increased value of lamb products when a quality attribute was guaranteed for lamb.

Most importantly from this study, market sectors closest to consumers placed a continued emphasis on eating satisfaction, primarily described as lamb flavor. Eating Satisfaction garnered the greatest shares of preference, greatest likelihood to pay a premium, and the greatest dollar value premium offered if the quality trait could be assured.

When asked to define quality in open-ended questions, over 1/3 of respondents (45 out of 120) identified lamb flavor and/or taste as part of their definition of quality. The most frequent responses were simply “flavor or taste” (n = 23); six respondents answered “good flavor” and another six respondents noted “flavorful” as a definition of quality. Few interview respondents actually chose to describe lamb flavor, reinforcing the vague interpretation of lamb eating satisfaction, yet most common descriptors included “rich flavor” and “mild or medium flavor.” Open-ended questions warranted responses that lamb flavor of American lamb was mentioned 34 times as a strength, 14 times as a weakness, 21 times as an opportunity, and 11 times as a threat to the industry. When lamb industry respondents closest to the consumer were asked what is the image of American lamb, respondents identified lamb as having “good flavor” (n = 5), “milder flavor” (n = 4), flavorful (n = 3), and “different than grass flavor” (n = 3). Responses regarding the image of imported lamb resulted in lamb described as “less flavorful” (n = 6), “gamey flavor” (n = 5), “different flavor” (n = 5), “stronger flavor” (n = 4), and “consistent flavor” (n = 3). According to the retail and foodservice interviewed, an overall perception of American lamb (that is primarily grain-fed) induced an overall milder, and more approachable flavor for American consumers. Yet, a perception that a majority of lamb in the U.S. are grass-fed existed among those closest to the consumer.

Compared to the 2011 National Beef Quality Audit, where food safety ranked first in importance, interview respondents in the present study only ranked the combination of product wholesomeness and nutrition as sixth in importance. Previous experience suggests that most sheep producers believe that product composition is the primary detrimental characteristic causing loss in consumer demand. However, results of the present study suggested that color, attractiveness, and freshness were more important than cutability to those that display lamb at retail, and overall lean to fat challenges of the industry are mitigated at the processing fabrication floor and only were ranked fourth in importance by the retail and foodservice sectors.

Lamb loin and rib chops purchased at U.S. retail markets indicated that U.S. lamb is larger, and more muscular with *Longissimus dorsi* area of loin chops from U.S. origin (3.03 in^2) greater than chops from Australia (2.60in^2), and which were greater than chops from New Zealand (2.25in^2; $P < 0.05$). Rib chops had the greatest area of U.S. loin chops, partially due to increased tail length ($P < 0.05$). Australian loin chops were the trimmest in external fat at the middle (50% location) and closest to the loin tail (100% location), and rib chops were trimmest over the lower rib (100% location; $P < 0.05$). Australian and New Zealand loin and rib chops were more tender than loin and rib chops originating from the U.S. ($P < 0.05$), yet the mean for all chops was well below a threshold considered to be “very tender.”

The image of American lamb was strong with a majority of retail and foodservice markets. A predominant image was of sheep grazing in the Mountain West, or lambs frolicking in lush, green pastures. The sheep/lamb industry has an advantage compared to competing proteins as interview respondents indicated that environmental stewardship of the American sheep rancher/farmer resulted in a perceived greater sustainability marketing angle.

Credence attributes of origin and sheep raising practices also proved important to retail and foodservice sectors of the lamb supply chain. A segment of consumers hold an allegiance to American lamb, yet origin was most commonly defined by industry respondents as local or locally raised. A recurring theme of this study was a request for locally- and regionally-produced lamb for the retail case and restaurant menus. Nearly, one-third of respondents indicated that an American Certified Lamb program would not be a good idea for a variety of reasons, and there was little agreement on what traits, if any, would be preferred or required. Respondents suggested that a Certified American Lamb program would not benefit the industry. The specified quality attribute of sheep raising practices was most commonly defined as grass-fed by retail and foodservice sectors of the industry. An evident disparity in preferences for sheep raising practices existed between current for U.S. grain-finishing management versus grass-finishing of lamb. Results from the lamb shoulder chops available at retail identified premiums for lamb with source branded (+$1.94/lb), locally raised (+$1.69/lb), and grass-fed (+$1.12/lb) labeling claims. A strategic emphasis on quality attributes identified in this research should strive to ensure that eating satisfaction and lamb flavor are optimized for American lamb, and to produce lamb with credence attributes that may be valuable for sheep producers and requested by retail and foodservice sectors, and inevitably American lamb consumers. Results from this study can be used to identify areas within each sector, as well as across all sectors, that the sheep and lamb industry needs to focus on to achieve continuous improvement and to increase demand for American lamb.

Appendix A.1. Define Lamb for U.S. Retailers

Interview responses categorized by central themes when asked to "Define Lamb." Retailers (n=60) include supermarket, butcher, and direct/farmer's market sectors.	
Young Sheep	[1]Small sheep [1]A young sheep. Meat with flavor. I love lamb and it is a great eating experience. Richness. It is what you want from a restaurant type eating experience you can have two or three chops and great experience without eating a whole beef steak. [1]Baby sheep. Rib and Loin chop. [1]Just a little baby sheep. A specialty meat. [1]An animal. Mammal. Livestock. Europeans like to eat. [2]Sheep under 12 months. [2]Meat from young sheep. [3]Meat from a sheep under 12 months of age. [3]Eight months or younger. [3]Where the break joint breaks. [3]Lamb is under 12 months of age, a USDA yield grade of 3 or less. A carcass less than 85 lbs. Emphasis on 12 months of age. Leanness and tenderness. [3]Lamb is under a year old. It is considered an animal and it is lamb meat that we are selling. I am worried about the connection of the animal to the protein. Lamb means sheep meat, and war people ate mutton. Can't name it mutton. Other side is tough to sell lamb as they think of baby lambs with flowers around their neck in grassy pastures. [3]Young sheep with a break joint. [3]Meat from lamb. [3]Lamb is a sheep that is less than 18 months old and weighs less than 140 pounds. [3]Lamb is a young sheep that has been domesticated and is harvested for meat. Lamb is flavorful and provides a good eating experience for customers. [3]Lamb is a sheep product less than a year old. [3]It has to be young. Unique eating experience. Different. I have people that love lamb, because it is tender and you can cut it with a fork.
Healthy	[1]A protein. [1]A source of protein. [1]It is a good tasting meat full of omega 3 fatty acids. Reasonably priced. [3]Lamb to my customers is a wholesome, nutritious meal. Ethnics like taste or flavor that is desirable for them.
Red Meat Alternative	[1]Best of the rest. What's left after beef pork and chicken. Niche. [1]The other meat. It is actually has a captured audience and has the capability to be promoted and gaining customer support if priced properly. You can capture other customers if priced right and increases to other customers that would not otherwise purchase it. People have slightly shifted to fish in comparison to the whole increase in red meat as of late.

[1] Interview responses for define lamb for supermarket sector; [2] Interview responses for define lamb for butcher sector; [3] Interview responses for define lamb for direct/farmer's market sector

Appendix A.1 (cont.) Define Lamb for U.S. Retailers	
Red Meat Alternative (cont.)	[1]The other meat. It is actually has a captured audience and has the capability to be promoted and gaining customer support if priced properly. You can capture other customers if priced right and increases to other customers that would not otherwise purchase it. People have slightly shifted to fish in comparison to the whole increase in red meat as of late.
	[1]Really like lamb. Another protein that taste good not for everyone.
	[1]Comparable to beef, but with more gaminess flavor. Product not for everybody. For me, high end yuppie meat. Most people haven't tried lamb in their life.
	[1]A great product that if we don't as an industry take it to the next level with education, product awareness, and ease of preparing and cooking, it is going to be a category that will phase out and be smaller and smaller. It has the potential of growing in the retail sector.
	[1]Food that was more common decades ago, before then it was mutton and it was bad. Lamb dwindled over time but resurged with foodies.
	[1]The other, other red meat. 1% of overall beef sales. Different eating experience. Don't eat it every day. Alternative dish. Lamb is for special occasions.
	[1]Lamb is the largest consumed meat animal in the world. It is vastly underrated in the United States. It has a tremendous potential in the US.
	[1]Gamier than beef.
	[1]Other red meat. Personally like it, but you either love it or you don't.
	[1]A variety in the meat case.
	[1]Lamb is a great red meat alternative to beef. Second only to beef in flavor. And it offers from a catering standpoint a lot of latitude and options when discussing menus. From a cost standpoint, there are certain cuts that a retailer can make friends with their customers. The richness of lamb shanks as an alternative to veal for osso bucco. I prefer pork, then lamb, then veal for osso bucco.
	[1]Lamb appeals to older customers. Younger customers do not eat it, understand how to cook it or wish to eat it. It doesn't appeal to the masses, but those that do like it spend a lot in our store.
	[1]Lamb to me is 5% of my business. I like to make it a little more relevant. It is what it means to me business. I am a lamb lover and have struck a chord with my consumers by providing domestic and not switching over to imported.
	[1]Protein offering that makes up small percentage four percent of our overall meat department.
	[2]Lamb is more complex and leaner than beef. Nothing like a roasted leg of lamb.
	[2]Lamb is an extremely viable protein because of the way it interacts with the land. It is very responsible because the practices are typically very good ones. Versatile protein and with a little guidance most people can cook lamb. Very marketable. Works in Texas.
	[2]Red meat. Local, native to Colorado.
	[2]It is a complement to our whole animal protein line up which is very valuable to have available year round of consistent quality.
	[1]Beautiful nice tender piece of meat with slight gaminess to it.

[1] Interview responses for define lamb for supermarket sector; [2] Interview responses for define lamb for butcher sector; [3] Interview responses for define lamb for direct/farmer's market sector

Appendix A.1 (cont.) Define Lamb for U.S. Retailers	
Delicious and Flavorful	[1]Good, chops, Juicy and tender. [1]U.S. raised, fascinating delicious and nutritious animal that I enjoy cutting a lot. Cook like beef, but tastes like lamb. [1]I love lamb. Not everybody loves lamb, not everybody eats lamb. We know that lamb consumers have a bigger basket share than other protein consumers. Is it because they are more affluent or more foodie? It is important to have lamb in the store so consumers can go to stores and get it? Any store can sell lamb if they work at it. [2]Rack of lamb. [2]USDA choice, Colorado product. [2]If raised right and shorn, looks good. Have nice carcass. Can tell if worth eating. [2]American product, American lamb, good flavor for dinner. [3]"The very best meat product that we can eat and there is no reason not to grow a whole bunch more good sheep. We are going into the area where people are respective of the quality of lamb. As producers we are given the responsibility to raise the very best products. The real future is in high quality lamb, and nobody wants to eat extra lamb fat." [3]A unique eating opportunity. Stand-alone flavor. [3]Lamb is delicious! In one word, delicious. Exotic and flavorful. Lamb is like taking a vacation, it is out of the norm and really wonderful all at the same time. Lamb has a cute connotation. Mutton has a strongly negative connotation. Beauty of lamb is that it is as close to the Earth as possible. If you choose to do the right things the right way you can't get less expensive in production than lamb on grass and great for the environment. [3]Delicious. Locally grown. Good for you. Good protein for high protein, and alternative red meat.
Delicacy and High End	[1]A gourmet meal that is real high quality, good tasting protein. Not an every day experience and something that is special occasion. [2]Tender, juicy, tasty. Quality [3]Very flavorful product that although does require additional prep is well worth the time for the flavor.
Other	[1]Greasy and doesn't taste good. [2]They stink. [3]My whole life. [3]The responsibility is for purebred producers to grow really good sheep and we need quality in order to compete in the global market.

[1] Interview responses for define lamb for supermarket sector; [2] Interview responses for define lamb for butcher sector; [3] Interview responses for define lamb for direct/farmer's market sector

Appendix A.2. Define Lamb for U.S. Foodservice/Purveyors

Interview responses categorized by central themes when asked to "Define Lamb." Foodservice and Purveyors (n=60) include fine dining, casual dining, and purveyor market sectors.

Young Sheep	[4]Baby sheep. [4]Tasty Baby sheep. [4]A young sheep. [4]Lamb is a farm animal that can be used for meat and milk. [4]A sheep under one year of age. A red meat protein with gamey flavor. [4]Sheep under a year old. It is a bolder, and more adventurous meat. It is not super gamey, but actually has more flavor. It has terrior, or means that it's taste like where it came from and how it is raised. [4]A young sheep. A unique protein, a lot of people don't carry it. Unique product we can offer to people at a competitive price where people can something different. Serve lamb at affordable product for people to enjoy. Different texture and flavor. [5]A young sheep. [5]Young sheep. [5]Baby sheep. Gamey red meat. [5]A little animal. Think of a shepherd. [5]A four legged animal that goes baa. [5]Any sheep up to a year and a half of age. A yearling is still tender. Delicious. [5]It is a sheep less than nine months of age without a second set of teeth in. Real delicious, and faintly gamey. Denser red meat and lower fat content than beef. A good alternative for beef on the menu. Extremely versatile for the whole animal. [6]Young sheep. [6]A baby sheep. [6]Young sheep. [6]A sheep under a year old. Tasty. [6]12 months of age or less. [6]Ovine, a livestock that produces many products including wool, hides and edible product .
Healthy	[4]Protein [4]A good alternative red meat that has good nutritional value, it is versatile, can be very sustainable, harvested at young age and requires less feed. [5]Lean meat. Healthy meat. Delicious! [5]Four legged wooly animal. Somewhat loud. Appeals to older generation.
Red Meat Alternative	[4]A tasty flavorful meat that is the perfect option between venison and beef. It is a meat that really brings out the flavor of its origin. You have an idea of the flavor based on what the animal ate. It has a very distinctive flavor. [4]Lamb has the highest level of integrity than any other protein. [4]Premium product. Great nutritional source. Has a lot of diversity of cuts and utilization.

[4] Interview responses for define lamb for fine dining sector; [5] Interview responses for define lamb for casual dining sector; [6] Interview responses for define lamb for purveyor market sector

Appendix A.2. (cont.) Define Lamb for U.S. Foodservice/Purveyors

	[4]A meat, a challenging protein that offers a lot of opportunities for new and creative items, a lot of uses for cooking opportunities.
	[4]Meat!
	[4]An exceptional ingredient that enables limitless creativity and truly defines the enjoyment of being a chef. Lamb and bison are my favorite proteins. Lamb is riding this great place of being wild game and an easily accessible main line protein. You can be high end and special, and others can know lamb is lamb. Lamb can special occasion, but it is also on the menu every day. It has universal appeal. With global culinary immersion from Morocco and Colorado lamb is the most enjoyable protein. So much easier to find lamb that is raised properly than any other protein. Where do you get that ratio with farms doing it correctly. Every farm or ranch is doing it right with pasture grazing and open space.
	[4]Flavor. Diversity and creating different dining experience for guests. Makes it special for people.
	[5]Lamb is something I grew up on my life eating. It used to be considered wild game, now it is very commonplace. It is a misunderstood protein. Consumers say My grandma made it and it was terrible. It goes from I had a bad lamb experience to holy crap it is expensive and I don't eat it a lot.
	[5]Being a middle eastern restaurant it is very, very central to our cuisine, and it is the most important protein that we serve.
	[5]The other red meat, unique flavor.
	[6]Just a species we handle.
	[6]Underrated protein that needs bigger presence in the U.S.
	[6]Retail opportunity and an unmet need.
	[6]Meat. Regionally raised alternative.
Delicious and Flavorful	[4]Delicious, sweet red meat. Mild in flavor. Succulent. A hint of gaminess.
	[4]Good tasting.
	[4]Flavorful meat. Great alternative to beef. It goes back to family. Every other Sunday we had a lamb roast and reminded me of my childhood.
	[4]Delicious.
	[4]Delicious. Versatile. Flavor.
	[4]Flavor!
	[5]Lamb chops. Whole roasted. Yummy.
	[5]The best ever tasting protein in the Whole World! I don't need beef, pork, poultry, I would be happy with just lamb.
	[5]With lamb, the people that like lamb love lamb. In fact, people will come to our restaurant, Fogo de Chao just to eat our lamb.
	[5]Lamb chops! Cut that most Americans have not tried or had a bad experience. Don't know how good it can be if done correctly.
	[6]Flavorful, versatile and lean protein.
	[6]A flavorful, versatile meat that can be used in most applications and specifically quality is determined by origin.

[4] Interview responses for define lamb for fine dining sector; [5] Interview responses for define lamb for casual dining sector; [6] Interview responses for define lamb for purveyor market sector

Appendix A.2. (cont.) Define Lamb for U.S. Foodservice/Purveyors	
Delicacy and High End	[4]Customer gets 100% satisfaction at eating/dining experience. [5]Yummy. It is like a filet mignon; high end food. It is like cashmere fiber. [5]Terriorre. [5]Food that is high end meat product. Flavor might take getting used to. [5]The closest thing still to real meat. Generally, it still tastes like meat. It feels like the least furthest down the slope. Chicken, beef, pork, and turkey are a long way into industrial farming. Mass produced meat have like zero flavor left. Flavor of lamb has a flavor that connects you with farming. The smell/aroma takes you there. An earthy flavor. [6]Delicacy. [6]It is an ovine species. Luxury meat and a delicacy. It is specialized and delicious. [6]It is a higher end protein. Ranks above beef. Lamb is an acquired taste. [6]A high end niche market that represents twenty percent of the population with consumers. Only twenty percent even eat lamb. Restaurant driven protein. Most people eat lamb at restaurant and or mom buys lamb for Christmas or holiday experience.
Other	[4]A hanging carcass of sheep. [5]My favorite lamb. [6]Very small markets. [6]Biblical food.

[4] Interview responses for define lamb for fine dining sector; [5] Interview responses for define lamb for casual dining sector; [6] Interview responses for define lamb for purveyor market sector

Appendix B.1. Define Quality for U.S. Retail Supermarkets

Interview responses from supermarket representatives (n = 31) when asked to “Define Quality.”
Consistent.
Consistency. Good taste. Free of hormones and antibiotics. Getting it right the first time every time.
Eat ability.
Good eating experience.
Consistently palatable.
Eating experience is the end game. It has to taste good. The ultimate. Why do people eat lamb?: sustainable story, nutrition, or eating experience. Generally it is the eating experience.
Quality is a combination of grade appearance and consistent sizing.
Wholesome, good eating experience. Tender. Flavorful.
Wholesome.
Quality is the freshness, meet specification. Some intramuscular marbling without too much external fat. Nice lamb flavor without being too overpowering and tenderness.
Should be expected. What you expect.
100% best.
Quality is the aesthetic look, and the eating experience.
Product has correct marbling and nice presentation for purchase.
Color and size.
Fresh, proper size, not frozen.
Brightness of color. Being the best. Eye appearance.
Product freshness, packaging, brand recognition.
Fresh, wholesome flavor.
Fresh, tenderness, flavor.
Color and freshness.
Initial appearance. Color. Appearance of yield. Shelf life. Eating experience.
Richness of flavor and tenderness.
Tenderness, flavor. Intermuscular fat. Trim specifications.
Quality deals with specifications of product. USDA Choice. Product should come in less than 39F and have good shelf life.
Customer are looking for a smaller portion that is of good quality and gives a memorable meal for the price they are going to pay. A nice appearance and good yield and good conformation.
What you are getting for your money. We try to have higher quality so that we can try to charge a little bit more money.
Meat that eats well. Workmanship is there color is good so animal healthy.
A consumer will believe and trust the commentary for the rancher and farmer than the retailer putting the label on it. They believe more in the person that raised it than the person trying to sell it. Quality is the level of value that you get for the product for the amount that you spend on it.
In regards to lamb, quality is a word we use to describe the effort of individuals for a product to be marketed.
Being held to a higher standard than other commodities and accountability.

Appendix B.2. Define Quality for U.S. Retail Butcher's Markets

Interview responses from butcher's markets representatives (n = 11) when asked to "Define Quality."
The grade of lamb.
Healthy looking animal with some fat. When you look at it you want to eat it raw.
Composition, size, and we look for workmanship and freshness.
Consistent appearance and flavor.
Appearance and flavor. Bright red color. Not dry, still moist. Marbling.
Fat is quality. Aged.
Fresh, delicious and healthy.
Pasture raised and slaughtered under low stress conditions. Aged for proper amount of time.
Eating performance, flavor and tenderness are the bottom line.
Product that is treated with a higher standard.
Halal. The holy book Koran. When you slaughter an animal it has to be blessed. God is Great, we appreciate the food that you have gave us. Blood is forbidden in Muslim. Blood creates disease. No Muslim is allowed to eat blood. Take the blood out. Tenderness and juiciness. Look and appearance. Aroma and Flavor. Not too much lean, not too much fat.

Appendix B.3. Define Quality for U.S. Direct/Farmer's Markets

Interview responses from direct/farmer's market representatives (n = 18) when asked to "Define Quality."
Flavorful, wholesome.
Quality is tenderness, flavor, size, freshness.
Quality is a good eating experience.
Texture, taste, and flavor.
Flavor.
The richness of the flavor of the meat. A certain taste. The goodness of it.
Primarily quality is the eating experience of lamb.
It has to taste good. Customers have to be happy. We raise our lambs on our production system. I can taste the difference in grass fed and older lambs. We don't want lambs too fat.
A combination of rich flavor, tenderness and juiciness for customer satisfaction. Sustainable raised also.
Quality is a product that is young lean, tender, mild flavor, consistent size, palatable, consistent taste.
Dorper! Tenderness.
Eating experience. Has to look good, but you can take anything and make it look good. Taste and flavor is what it is all about. We sell 5400 dozens of mutton chislic in four evenings at the local county fair. 150 - 200 ewes and mutton. $10/dozen; 12 sticks with 4 cubes. One dozen sticks weigh 0.65 lb.
Consistent high end reliable sourced product.
Quality is appearance and composition, nutritious and eating satisfaction because they will order it once and want to come back and eat it again as a repeat experience.
The right amount of fat covering and the percentage of meat in the product.
Quality is a good looking package and product that can provide a rich flavor and good experience.
The local thing and the Farmers Market in Massachusetts is a big deal. Everybody thinks because it is close it is better. The butcher does a good job. Important to find USDA plant that will work to meet specifications.
Quality is a product of lamb that you would be proud to serve at you own table.

Appendix B.4. Define Quality for U.S. Fine Dining Restaurants

Interview responses from fine dining representatives (n = 23) when asked to "Define Quality."
Freshness and yield.
Flavor, consistent size.
Ribeye size.
Fresh, tender. Good flavor profile. Consistent size.
Flavor! Tenderness. Price.
Wholesome product. Perception of value. Good flavor, good texture.
Texture of lamb. I don't like flabby lamb. Meat color. It should be firm and red.
Quality lamb is delicious. Fresh, tender.
Fat content, appearance, density of meat tissue, fresh color.
Origin and health of animals. Flavor and nutrition for customer.
The level it is enjoyed. Good, wholesome, and safe.
Relentlessly making the best decisions regardless of cost.
Humanely raised. Hormone free. Free range. Natural.
It is consistently clean, and consistent product.
Tenderness, balanced fattiness. Medium lamb flavor.
From the package of lamb to how it tastes on the plate.
We have to know its origin, rancher raising practices. Eat ability. How does it eat, what does it taste like?
It has to have marbling, right amount of fat, good mouth feel, the right size, raised well.
Customer satisfaction.
What keeps the customer returning to our restaurant.
Customer satisfaction.
The quality of life a sheep has. I am a believer that all of that results in the end product.
Quality is in my opinion is something that will always satisfy you. Quality is something that needs to be pricier. Satisfaction is just not enough. Lots of products are satisfying or correct, quality is something that is impressive. If you have first bite of rack of lamb you say oh my god that is delicious.

Appendix B.5. Define Quality for U.S. Casual Dining Restaurants

Interview responses from casual dining representatives (n = 22) when asked to "Define Quality."
TASTY, one word.
Flavor/taste. Conscience of consumer. In the meat world, it is flavor.
I believe it is in the final tasting.
Proper marbling. Good meat color. Proper packing and storage. Good butchery.
Smell, taste, and mouthfeel.
Taste! It goes back to appearance and how cuts are fabricated. Production and what happens in the kitchen.
Firmness, color, texture, aroma.
Quality is fresh, no excess blood, no off-putting aromas.
Lamb that we get is the best. Fresh. Grass fed. Local.
Quality is that it has to be fresh, it has to fat free, it has to be tender, and it has to flavorful.
Everything from fat content and freshness, color, aroma.
Quality starts with the care and raising of the animal.
Local and grass fed.
Quality is the impression. Flavor and tenderness is very huge. Has to be consistent with flavor and tenderness. Consistency.
The people that grow lamb and that they know about lamb. There is a connection with growing lamb.
Our company mantra is quality, consistency, and price. People know what to expect and that is the best meat quality, flavor, and consistency.
Defined by each person for satisfaction.
Something that the customer will want to come back and tell friends about. Not forgettable.
Provide an optimal eating experience. Flavorful, tenderness, and juicy. With burgers, some places have pre-pattied frozen burger. We have fresh and pattied burger that improves tenderness and texture.
I sell Australian lamb because if you go into people that eat lamb, some will say Colorado, Australian, or New Zealand. Australian fresh lamb. Satisfaction. Flavor. All about flavor!!! It is not about an umbrella on the plate, I am not about the shit.

Appendix B.6. Define Quality for U.S. Purveyors

Interview responses from purveyor representatives (n = 15) when asked to “Define Quality.”
Consistent eating experience.
Consistent flavor appropriate finish. Juice and tender.
Met or exceed expectations.
Quality is eating experience. Tender. Buttery.
Flavorful and tender. Consistent.
Consistency, size, fat to lean ratio, graded.
Consistent in size, fat amount and marbling.
Consistency across the board. Sizing and availability.
Product handled flawlessly. Trimmed and cut to spec w/o flaw. Originated and raised in good environment.
Looks wholesome and is. Tastes good. Right color and conformation.
Marbling choice or better, white fat, close trimmed.
The product should have moderate intramuscular fat, mild flavor, expected tenderness, appropriate external and seam fat.
Everyone has their own idea. Nice appearance, fresh. Reputation of supplier, packer, and rancher.
Raising practices and slaughter.
The intrinsic value of the item at hand. In lamb, it is highest attributes to raw material and the animal.
Conformation, young, tender, flavorful. Size of animal, what is fed.

Appendix C. Definitions of seven quality attributes

Total responses categorized by quality attribute and frequency of response in descending order

Rank	Quality attribute definition	n
	Origin	
1	Locally Raised	53
2	American	30
3	Region/State	24
4	Traceable Product	23
5	Colorado	12
6	Source Verified	8
6	Where They Are Raised	8
8	Know The Farmer	7
8	Australian	7
8	New Zealand	7
11	Product Quality	5
12	Imported	4
12	How They Are Raised	4
14	Country	2
14	Icelandic	2
14	Genetics	2
14	Carbon Footprint	2
18	Grass-Fed	1
18	Integrity	1
18	Sustainability	1
18	Healthy Animal	1
18	Sales Tool	1
	Sheep Raising Practices	
1	Grass-Fed	45
2	Humanely Raised	26
3	Feeding Regime	19
3	Animal Well-Being	19
5	Antibiotic Free	18
6	No Added Hormones	15
7	Animal Care	10
8	How They Are Raised	9
8	Humane Slaughter	9
10	Naturally Raised	8
11	Grain Fed	7
11	Breed	7
13	Environment	5
14	Know Your Farmer	4

Rank	Quality attribute definition	n
	Sheep Raising Practices (cont.)	
14	Family Farmer	4
14	Organic	4
14	GMO Free	4
18	All-Natural	3
18	Halal Slaughter	3
18	Product Quality	3
18	Animal Health	3
22	Tell The Story	2
22	Sustainably Raised	2
24	Animal Age	1
24	Seasonal Breeding	1
24	Source	1
24	No Animal By-Products	1
24	Chemical Free	1
24	Ranch with Sheepherders	1
	Eating Satisfaction	
1	Lamb Flavor/Taste	91
2	Tenderness	39
3	Customer Satisfaction	38
4	Consistency	12
5	Product Quality	12
6	Marbling	11
7	Texture/Mouthfeel	9
8	Fat Content	6
9	Juiciness	4
10	Portion Size	3
10	Healthy	3
10	Lean	3
10	Freshness	3
10	Feeding Regime	3
10	Aroma	3
16	Color	3
17	Delicious	2
17	USDA Choice	2
17	Not Greasy	2
20	Mutton Flavor	1
20	Animal Age	1
20	Aging	1
20	Origin	1
20	Cooking	1

Appendix C. (cont.) Definitions of seven quality attributes

Total responses categorized by quality attribute and frequency of response in descending order

Rank	Quality attribute definition	n
	Weight/Size	
1	Consistent Cut Size	39
2	Consistent Cut Weight	29
3	Carcass Weight	24
4	Cut Specifications	20
5	Carcass/Cuts Too Big	17
6	Uniformity	10
6	Primal Weight	10
6	Live Weight	10
6	Prefer Bigger Cuts	10
10	Prefer Smaller Cuts	4
10	Portion Size	4
12	Lambs Too Old	3
13	USDA Yield Grade	1
13	Yield	1
13	Trimmed Product	1
13	Lamb Too Fat	1
13	Cost	1
	Product Appearance/Composition	
1	Fresh Lamb Color	38
2	Fat Trim Level	32
3	Freshness	26
4	Attractive Appearance	25
5	Product Quality	19
6	Lean to Fat Ratio	15
7	Marbling	11
8	Appropriate Muscling	9
9	Packaging	8
9	Uniform Size	8
11	Consistent	7
12	Trimness	6
12	White Fat	6
14	Aroma	5
15	Lean Meat	4
16	Butchery	3
17	Seam Fat Amount	1
17	No Added Hormones	1

Rank	Quality attribute definition	n
	Product Appearance/Composition (cont.)	
17	No Antibiotics	1
17	Branded	1
17	Feeding Regime	1
	Product Convenience/Form	
1	Availability	25
2	Cut Specifications	19
3	Pre-Packaged Cuts	17
3	Packaging	17
5	Portion Cut/Uniformity	15
6	Vacuum Packaged	11
7	Frenched Product	6
8	Carcass	5
8	Boneless Cuts	5
10	Product Size	4
10	Further Processed	4
10	Full-Service	4
13	Timely	3
13	Block Ready Cuts	3
13	Trimmed Product	3
13	Cooking	3
17	Inaccessible	2
17	Hand Cut	2
17	Freshness	2
20	New Zealand	1
20	Consistent Pricing	1
20	Minimum Orders	1
	Nutrition/Wholesomeness	
1	Healthy	23
2	Lean	17
3	Nutritious	12
4	Grass-Fed	11
4	Vitamins	11
6	Don't Eat Lamb for Nutrition	8
7	Protein	9
8	All-Natural	7
8	No Added Hormones	7
8	Customer Satisfaction	7
8	Food Safety	7

Appendix C. (cont.) Definitions of seven quality attributes

Total responses categorized by quality attribute and frequency of response in descending order

Rank	Quality attribute definition	n
	Nutrition/Wholesomeness	
8	No Antibiotics	6
12	Fresh	6
14	USDA Inspected	5
14	Feeding Regime	5
16	Product Quality	4
16	Flavor	4
16	Local	4
16	Omega 3	4
16	GMO-Free	4
21	Raising Practices	3
21	Grain-Fed	3
21	Fat Content	3
24	Marbling	2
24	Pathogen free	2
24	Chemical Free	2
27	Appearance	1
27	Serving Size	1
27	Aroma	1
27	Color	1
27	No Freezer Burn	1
27	Tenderness	1
27	Attribute Driven	1
27	Tell the Story	1
27	Small Farm	1
27	Domestic	1
27	Nutrient Dense	1
27	Butchered Correctly	1
27	Product Integrity	1
27	Nutritional Labeling	1
27	No Animal By-Product	1
27	Good for Blood Type	1

Appendix D. American certified lamb preferred attributes

Interview responses categorized by central themes from retail, foodservice, and purveyor representatives (n = 120) when asked "What attributes would be of value for product and label of American Certified Lamb?"

Origin

Local
locally preferred
Locally sourced
Local
Can be local product
Local raised
Local, then American
Home grown, local
Farmers, origin
Family farm, story to tell
Texas
Born, raised, and harvested in California
Needs to be state based
Origin, needs to be state
Regionally based
Origin
Origin
American
American Raised
USA
American
USA
American
American
Product of USA

Age Verification

Young
Young
Young age
Age definition of lamb
Maturity
Age and size limits
Maturity
Educate on age of lamb
Age, breed type. Wether not ram
No yearling or spools

Animal Diet

Pasture raised
Maybe pasture raised
Pasture raised
Grass-Fed
Grass fed
Grass fed, open pasture
Certified Grass-Fed Program
Free range
Free range
Free range
Local and grass fed is the answer
Feeding process
Information on diet; preferred pasture
Make sure grazing mountainside
Production method that people feel good about
Rolling pastures with sheep

Management

Breed
Heritage breed
Heirloom breeds
Heritage breed, and maybe older
All-Natural
No artificial ingredients
Minimally processed
Hormone free NEED to be on label
Antibiotic free
No antibiotics
Never ever program
Organic
Organic, possibility
Organic
Non GMO
Non GMO inputs
Sustainability

Appendix D. (cont.) American certified lamb preferred attributes

Welfare

Animal welfare
Responsibly raised animals
Animal welfare
Humanely raised
Humanely raised
Raised reasonably
Higher standards of raising sheep
Humane practices
Ethical practices

USDA

USDA inspection
Grading system communicated to lamb buyer
USDA Choice
USDA Grades
Improve USDA grading system
USDA Quality Grade

Weight Restriction

Rack and loin out of 70-80 lb carcasses
Shoulder and leg out of 50-60 lb carcasses
Size
Weight limit under 80

Marketing

Recipes
Certified stamp, star and stripe
Packaging
Label it, but grow a better product.
Need advertising
Like certified black angus
Marketing support/demos
Any label is only as good as the definition behind it
Be like CAB
Put marketing behind it

Meat Quality

Quality
Eating Quality
QUALITY
Quality and Eating Satisfaction
high grade/quality grade
choice or better
Choice or better.
Rating system of quality
Consistent quality
Yield and Quality Grade
Yield Grade
Yield grade 2/3
YG 3 or better
YG 2/3
Yield grade
Lean to fat ratio. Not too fat
Trimness
Graded on lean to fat
Bright white fat, YG 3, maybe even Prime
Increase consistency
Appearance
Consistent
Marbling
Well-marbled
Highly marbled
Lean and fat color
Color
Color
Flavor defines lamb, richer and wonderful
Quality, marbling, flavor, color of meat, fat on the animal
Aging, marbling, tenderness and consistency
First and foremost, FLAVOR
Fresh!
Maybe dry aged
Conformation
Size of loin
Certain eye size
Large eyes
Fat Content
Finishing program of consistently knowing end product
Prove taste better

Appendix D. (cont.) American certified lamb preferred attributes

Economics

Affordable
Price
10% margin available
Constant pricing
Affordable price
Price

Miscellaneous

Specifications, designation
Diversity of usage
Halal
Genetically modify so that wool was red, white, and blue
Whatever is going to make people buy
Available
Take pride in the product
specific requirements
Positive plane of growth
Prove to me that is what makes lamb taste better
Top 2 packers should create brands with unique stories
Teach how to cook lamb. Also better price
Truth behind the image
I would love science to tell me what makes lamb taste better
Opportunity through diversity other than Superior and Rosen
Uniquely raised for them
Nutritious and good for you

Bad Idea

No
No
No need for this
No differences
Not beneficial
NOTHING
Not interested
Not beneficial
No need for this brand
No need for brand

Bad Idea (cont.)

Not interested; prefer Australian
Doesn't mean anything, not valuable
Vague idea
Not necessary
Not a lot value in it
It would not affect anything
Too broad of term
Too generalized of a program
No. Do not do it. Maybe regional
That scares me
So much gray area. Too much bullshit
Too broad of a program
Good idea, not going to pay for it
Nothing, we already have American Lamb!
Dangerous, I would like to see standards
There is nothing, just marketing
It is a complete waste of time
Won't make difference
Needs to be uniform, but is not a good idea
Retailers didn't want to do it historically
Do not know what makes lamb taste better
The things that are important are already there
Don't do it, biggest challenge is availability
Be better than Australian, not just slap flag on it
Regional would be good, American is too broad
The lamb industry can't afford to brand and raise prices anymore
There is not a group of attributes that would differentiate a product.
You buy American lamb now, why does it need to be certified American
Already have American certified program, pay enough already

Appendix E. Strengths of the American Lamb Industry

Interview responses from retail, foodservice, and purveyor representatives (n = 120) when asked "What are the strengths of the American Lamb Industry?"

- The product. Quality. The story to tell of the lamb.
- Consistency in size, flavor.
- It is having a selection of lamb that another store may not have. Strength is consistency. The eating experience.
- More palatable, in my opinion, to the consumer.
- Perception of quality. People still think it is the superior product.
- Good quality lamb.
- Product is consistent. Not a lot of variability.
- Flavor.
- Good quality. Consistency. Raising practices.
- Freshness and taste as long as raised properly.
- Flavor of American lamb is more dialed in to the American consumer. Price point is reasonable.
- Good lamb quality. Freshness.
- They consistently deliver a quality product. That is what we need. Pleased that there are family growers that are willing to produce and raise lamb without chemicals and without damage to the environment. Market that sheep have the advantage in environment because of their grazing practices, now market it.
- Opportunity to grow. Should be able to produce best lamb anywhere.
- Flavor. Raising a quality product. Stewardship.
- Taste and flavor.
- Quality of product. Never quality issues. Flavor texture fat. Strength is lamb is a delicious, healthy choice. In an ever changing consumer that focuses on healthiness and quality, grass-fed lamb has the opportunity to be the delicious healthy choice that consumers now demand.
- The end product is excellent.
- Raising lamb that taste like lamb. Unique flavor.
- Consistent size and flavor profile. Cleaner flavor. Taste what lamb is eating instead of gaminess.
- Quality of product and flavor.
- Flavor.
- Fresh.
- Consistency of product.
- Flavor. Consistency.

Appendix E. (cont.) Strengths of the American Lamb Industry

- A good product. Nobody associates lamb with antibiotics and hormones. Lamb can be forward to marketing. Clear platform for wholesomeness to present it as a good, quality protein. An older generation prefers the lamb with mint jelly. Now, we have to harness lamb in varying cuisines. Some people like a lamb forward flavor, others it is complemented with flavors.
- Restaurant industry. More lamb is purchased through restaurants than grocery stores. People fear lamb, fear the unknown.
- I look at it as being not as convenient as Australian and New Zealand related to sizing and portioning. I like its flavor of American lamb. It has a little bit of marbling sometimes. It is a great product.
- Name. They are serving lamb in the restaurants in Paris. Colorado lamb in Paris. More eatable than imported lamb. Flavor that Americans are not afraid of.
- Very good product.
- It is excellent quality product, not imported. Domestic. Milder flavor profile. Chefs prefer that lamb is physically a little larger and more pleasing to guests.
- The reason people want American lamb is that nice corn fed flavor. Appearance size, and performance. Flavor!!!! Grain Fed.
- The best quality in the World. Local. Freshness.
- Perceived high quality. High level of wholesomeness. High quality flavor profile. Logistically there is a lot of strength to be had that lamb is available. Can be offered as fresh product instead of frozen.
- Sheep are raised in a variety of locations. People see sheep in the countryside and they can relate to lamb. Lamb racks are premium product. Perceived value and exclusivity of the product. Great product with a lot of flavor. Food movement should benefit American lamb because it is produced regionally. Consumers open minded to consuming different products. Young people and adults want to try new products because of the attention brought to cooking.
- Quality and size.
- Currently, strength is the price of competition of beef. Lamb can slide in as a more economical product to get the brand and name of lamb out there to consumers. The strength is the flavor and tenderness and grain finished product has an eating satisfaction advantage to consumers. American lamb needs to be consistent and be careful lamb weight and size must be monitored, specifically leg in America.
- It is better tasting, easily available, better to cook, and preferred flavor. Nutritional strength as it is high in protein.
- Flavor! Size of product. Richness and fattiness. Availability.
- Producing high quality healthful product that promotes lower consumption of meat and made in more diverse environments. Easier to manage. Entry point for smaller farmers. Promote small farmer development of livestock ideal entry point.
- Flavor is the biggest reason that people are speculative for lamb. It may be too gamey, too pungent. More local product that is delivered fresh. The quality and flavor of American Lamb.

Appendix E. (cont.) Strengths of the American Lamb Industry

- More local than the imported product. Flavor. It is a protein that young people wish to experiment with, specifically when at restaurants. It is local. It is more environmentally friendly than other proteins. You hear of negative perceptions of even beef, pork, and poultry. Lamb does not have production negative promotions. Lamb is gangster!
- They have done great promotion through Colorado Chefs Association. Great promotion of showing farms for the Foodservice industry. Flavor and size and variety of uses, versatile. Meets the needs of ethnic markets.
- Wholesomeness and finish of product where fed. Location. Flavor.
- Size of product. Locale. Overall quality.
- Quality of product. Value is good. Image of product is good. People like domestic more than imported.
- Strength is high quality and it is a U.S. Product. Colorado lamb is wonderful, beautiful and is on menus across the nation. We just have to get the message out to consumers. We need lamb to be on household menus and educate them how to cook it and get them to eat lamb in their homes.
- Domestic product, best tasting, size.
- Freshness, USDA inspected, quality.
- It is rising and becoming more popular. Positive image. Because taken up by better than average restaurants, local restaurants and chefs. Every good restaurant has one or two lamb dishes. Still a very new dish. Also very safe food safety record. Lamb is one of the most delicate flavor of all the proteins.
- Availability. Quality of product.
- Flavor. Integrity. Accessibility.
- The strength is there are a lot of young people in the industry and they are educated. Older sheep ranchers are rebuilding their flocks. Education has gotten better through extension service. The fact that it is American. Good consistent product. Pleasantly surprised of having lamb on our menu. Every year we gain ground and is now a cornerstone of our menu. Lamb chislic is our third highest appetizer, and lamb burger is sixth highest burger option of twelve.
- Some producers that are creating a good product. Can service demand year round. Pretty consistent product.
- It is local, regional, and supporting the local farmer and rancher. The local regional aspect. Call out specifics such as Dorper in Texas. We are growing it here because this is where we live and this is what works specifically with breeds.
- Local raised product. Sizing good. USDA choice.
- Vacuum packaged product that allows attractive look in the retail case. Appearance and quantity of products in case. Came a long way in packaging and putting labels on packages to make it better for consumers. Knowledge of nutrition. People are asking about lamb nutrition. Image that lambs are raised right compared to other proteins.
- Local. Price. Carbon footprint. Fire retarder because of grazing of sheep.

Appendix E. (cont.) Strengths of the American Lamb Industry

- Sales. A lot of local farmers are trying to get me to sell the product.
- Consistency, locally grown flavor and satisfaction.
- Now that consumer is more conscious of where food comes from, the image of farmer/rancher and where the food comes from is advantageous. Personal connection with consumer.
- Proximity to the market. It is really easy to get lamb on the table via distribution. Plenty of pasture in the West and small and medium processors. We don't have a reliance on one breed and have a good diversity of breed to start thinking of meat and carcass quality. We have lots to draw on to create a great product. We have a public that is highly educated on food issues, and is intrigued to try new things. Having lamb well positioned on food network is basically million dollar commercials for free. Everybody watches food network now. Lamb has the opportunity to be at the forefront of the food movement. Anytime a product can get well positioned on the food network, the PR is so powerful. Promotion is so powerful. We have lots of open land.
- It is still strong domestically. Image is very good and lamb industry has done a good job of keeping the active rancher well represented. An image of farm and wholesome. Freshness of product. Size of product compared to import.
- I would like to see more emphasis on local products. I would like to see a focus on pasture and GMO free. Empower the small producer. Humanely treated is a need. Everyone wants to buy as close to home as they can. Price plays a part, but they can see that it is done the right way. Society is really wisening up and learning about what they are consuming. The older generation didn't worry about factory farms, middle generation didn't understand and the second industrial boom changed to factory farming and population was growing. The younger generation is more sensitive to the topic of our environment, the humane treatment of animals, the more health conscience lifestyle. A little more liberal and hippy lifestyle. Young people are more in tune of what is happening. It is a hunger to know and not be left in the dark. Social media impacts as well.
- Proximity. Colorado lamb.
- People like lamb. It's accepted. Not a lot of health issues. Raised better compared to other proteins. Lamb chops.
- The more we do with lamb and land stewardship, the better for all. Sustainability. Tradition goes way back. The resources in place are really good for the lamb industry. Semi-arid climates support sheep and lamb raising operations. Cattle are more intensive. Lambs drink less water.
- Opportunity! It is an untapped market and brand. It has never been looked at bad from the public, so they don't have a bad reputation that they have to get rid of. If I see lamb, I don't worry about the origin. I have never seen films highlighting the problems of the lamb industry.
- It is a strength that it is domestic product and preferred by consumers.
- Very organic and natural, not many factory lamb farms.
- Image, perception.
- The best time for a best practices and market practices with awareness.
- Local, less miles traveled, easily obtainable, origin is easier to relate to.
- They are American. Good for local.
- It's domestic.

Appendix E. (cont.) Strengths of the American Lamb Industry

- Being domestic. Mild flavor, grain finished.
- Domestic. Packaging styles.
- We have opportunity as American consumers to create a better product in our backyard and do it at a better cost. The advantage of Product of USA does hold value to consumers. It is disappointing that imported product can yield better and be cheaper. Fresher product. American lamb does look nice in the case with color, just have to trim the product in-house.
- Strength is the general population will want local and American lamb. American public still wants American product. The lamb consumer can be anybody. The number one question is I want to try something different for dinner. Tired of beef, pork, and chicken. There is a need for convenience items. Provide something unique, lamb can be that protein. Price point can be explained. Get the ranchers in and the labor that it takes in production. People will understand why lamb costs more and that families have been in the business for three generations and my family wants to come back and people are willing to back a product. Much like the farmers market mentality.
- Inherent advantage on distribution. Infrastructure. Ease of access to market. Growing awareness of being domestic product and value of being locally raised there is growing appreciation and demand.
- The red, white, and blue loyalty. The history of sheep and lamb in the U.S.
- It is strong. Lamb guys would like to sell more and at higher prices. There is always the American made idea. Trying to buy locally. Product of USA.
- Strengths are a very good food safety record, domestic pride, good production methods and supply chain, and the efficiency of a growing animal.
- American raised. Best inspection.
- They have gotten better with their sizing. The Australian product is getting bigger and decreasing size difference in the retail case.
- Easy to grow.
- Offer an alternative red meat.
- Strong.
- Efficient at raising sheep in production.
- The strength is the producers. People are dedicated, honest, hard-working. Sheep industry shares information for the benefits of produces. Genetics is best strength. Lambs can gain a pound a day.
- Organized. Supportive. Determined. Aware.
- The strength is that it is such a more elite, educated, and high end people prefer the lamb protein to other sources. A versatile from a range land health and sheep can be used to manage vegetation like no other species. Sheep and lamb are seen as very good for the land and that is a huge advantage.
- How we pasture feed lambs, and then finish them with grain. It provides a nice amount of intramuscular fat, and enjoy that they are bigger than imported product.

Appendix E. (cont.) Strengths of the American Lamb Industry

- The ability to network with chefs and retailers to understand lamb better is a strength, and necessary in order to market it better. I strive to increase the exposure of lamb with consumers. Beef sells itself, it takes active work to promote lamb since it is a specialty product.
- People are coming around to consume healthier options. Consuming healthy options and lamb has a big play in that.
- It is going to grow.
- I don't like it. If there is a strength, I don't know it.
- Extending lambs to an older age to maintain seasonal supply.
- The only one I can come up with is USDA inspection and grade. Freshness of product.
- Customers confident in product, because it is USDA inspected.
- It is USDA inspected. That there are standards. It is quality, it is wholesome.
- Quality of USDA governance and how product inspected.
- It keeps us unified. Politically binding. It is USDA inspected and well-regulated. Never had a food safety scar.
- Has there ever been a safety issue with American lamb? Food safety is the utmost strengths. Integrity of product. Tradition of product. Excellence.
- Availability.
- It is growing and public awareness is growing. Carcass size and year round availability.
- We have a product that can be available year round and be local to any market.
- Product availability.
- Accessibility.
- Availability.
- The people behind the industry. People are passionate about the sheep and lamb industry.
- People being willing to get better. Understanding management practices that reflect improved lamb production. Comradery. The shepherds around the World that work with sheep. We work hard to save every single lamb that hits the ground. We are weaning 165%.
- It is nice that the strength is people are willing to put money in what they believe about sheep and animal production. The locavore movement has increased lamb price point for small producers. Progressive chefs willing to utilize the whole lamb carcass. Foodies are trying gourmet products at restaurants.
- The producers. Very humble and hard-working people. The uniqueness of lamb as a protein product.
- Tight knit bond of lamb companies. Small industry, need each other to stay afloat.
- Supply and demand. USA label. California preferred. Local is good, but there is no laws on local. American lamb consumers prefer lamb because of the flavor profile and the appearance.
- Product of USA. The relationship with the rancher. We need to have the rancher assist to tell the story of environmental stewardship. The sheep rancher does a good job and we should focus on stewardship.

Appendix F. Weaknesses of the American Lamb Industry

Interview responses from retail, foodservice, and purveyor representatives (n = 120) when asked “What are the weaknesses of the American Lamb Industry?”

- Cuts are so large that you drive the price point so high and discourage the purchasing.
- Price and size (too big).
- Price. Barrier on what the company is willing to pay as well as customer. Sizes vary and poor cutting yields. Find a way to stabilize price. Have to get it from different suppliers.
- High cost. Supply may fall short. A few years ago when there was drought. Drove the supply down. Industry infrastructure.
- Price.
- Yield, age of lamb, too fat, and cost of good.
- Size of lamb is too big. Cost. Availability. Consumers may not have enough money to purchase lamb and to try it.
- Price, cost.
- Price.
- Price.
- Price.
- Cost of purchase. It is very expensive.
- Price, too expensive.
- Price.
- Prices are an issue. Foodies willing to pay the money, but everyday people are not willing to pay and cannot afford it.
- Price point.
- Price. Price is extremely important to us! Availability of product needs to be accessible at all times. We offer more lamb in the Spring.
- Price point.
- Price.
- Price fluctuations. 2008 recession changed lamb. Also price changes and increases.
- Price.
- Price. Tough to justify the high prices for various cuts. Consequently we serve lamb shanks. Sometimes it is hard to bring the best product to the table, the price just gets too high.
- That lamb is a specialty product. Pricing is a weakness. Possibilities of negative perception of lamb if cooked improperly. If lamb was more readily available, that would assist stores and marketing in mainstream.

Appendix F.(cont.) Weaknesses of the American Lamb Industry

- Competition from imported products. Very expensive product. Final product with prices is not cost effective.
- Price point of over a dollar per pound higher. Perception of lamb feedlots and grain-fed. Cuts too big and more waste than NZ.
- Expensive. Our Lebanese restaurant group sees consistent pricing and supply as challenges.
- Price.
- It is more expensive. Tough for people to pay for it when they can have other options much cheaper. Not going to find lamb at McDonald's and in the mainstream.
- Pricing. When compare to import, it is more costly. It is never going to be beef or pork.
- Price! Volatility!
- Perception by the consumer, price, lack of marketing, we need to decrease the negative perceptions of the consumers towards the lamb industry, people don't know enough or care enough about it to have it a part of their lives/retail cases.
- Price, sometimes not as consistent.
- Price, too expensive; and availability.
- Price, inconsistent size, lack of innovation.
- Supply and price fluctuation.
- Public consumption. Lamb is not a flavor that everyone has a taste for. It is expensive.
- Right now they put out a poor quality product at a premium price. Lamb cuts and size are too big.
- The overall head count of American lamb. It is a premium protein and is tough to feature. It is price prohibitive due to supply and cost of raising.
- The industry itself. The variation in size. Wild fluctuations in pricing. Size variation representing older over-fed animals. Treatment of lamb as a commodity!
- Currently not telling the story of lamb enough to consumers. Not mainstream in a lot of diets.
- Wait for retailer. The American Lamb Board is doing nothing to promote their product like beef and pork.
- Not enough marketing and information. Not focused in Hispanic. More outreach from American Lamb Board.
- Poor marketing of American lamb industry. They do not go out there and exploit that the customer wants their product. America is allowing the import of lamb to dictate what the lamb consumer buys based on price and availability. Domestic rancher not reaching the need to reach consumer with domestic lamb. Basically shipping their production and sales overseas. Does not do a good job marketing other than Easter, especially summer. Need labeling and currently there is no marketing to catch the eye.
- Not advertised and promoted enough. Beef and pork council promote and educate. They do cooking and promotion. Lamb is not out at grocery stores or truly any level to do anything, promote, educate.
- No advertising. Don't hear lamb a lot.

Appendix F. (cont.) Weaknesses of the American Lamb Industry

- More energy should be applied to everyday campaign should be improved. Enough on high end chefs. Need to convince everyone to have a lamb burger tonight.
- The meat is the same name of the animal is a challenge that is different than other proteins. Direct association, we don't eat piglets. Becoming less of an issue as marketing. Lack of effort to promote meat from the whole life cycle in a better way. Work to promote mutton. Create a market for mutton, it is affordable and wonderful protein.
- Marketing. Awareness.
- Lack of industry jargon, lack of huge marketing stickers and promotion. Lamb is the silent ninja. They can step it up a little bit without looking like a used car salesman. Lamb does not have the ability to sell as much and they are up against big sharks in the protein industry. Without being sleazy, lamb can do promo that was understated and authentic. Beef is so forward with their advertising. The story behind lamb specifically breeds is not as familiar in lamb compared to other proteins.
- Marketing.
- Brand it better.
- Marketing and distribution have been problematic, but growing. Challenge with availability.
- Marketing.
- Unorganized. No marketing campaign. Never put a good spin on it and have a united front. I have never seen the American lamb industry as a whole come together and put a push on lamb for sales.
- More marketing. Poor marketing. Poor qualifying of lamb. Inconsistent product that tastes different.
- Not doing a good job of targeting younger consumer and millennials. The American consumer is dying. Lamb is somewhat affordable compared to other proteins in the retail case. Need to continue to promote how to cook and prepare lamb for younger consumers.
- Recognition. A lot of people have never had it. Need to market better.
- I have never seen an American lamb commercial. The common person does not see advertising such as it tastes good and is easy to cook. Inconsistency. The differences of taste of different lambs that are the same cut of meat from a hair sheep vs. a woolie or an eight month old to an eight year old ewe.
- Stay away from antibiotics. Stay away from factory farms. Unknown protein. There are good selections for American, just need to get name out there. People go to grocery store and buy what they are selling, not what is elsewhere. A lot of people don't realize the presence of the American lamb industry.
- Availability of product.
- Supply. Consistency.
- Distribution and product availability. Lamb is not available and in the retail case at many locations. Very few grocery stores even handle lamb.
- It is an inconsistent product. When I look at it at the store, loin chops are different. Size and weight different at the grocery store. Lack of advertising.

- Appendix F. (cont.) Weaknesses of the American Lamb Industry

- A generation of chefs have not been raised exposed to lamb. There are a lot of chefs that don't cook lamb well. They are not comfortable cooking lamb because they have not raised with it and they have not been exposed to most of cooking techniques of lamb. It is more difficult to get the size and portioning you want. Sometimes too big of portions.
- Amount of fat and inconvenience in size and high price.
- Not common enough.
- Size. Yield grade. Availability and cost.
- Locally, our lamb is late summer and early fall the flavor profile changes. Colorado, I do not see that same problem. Flavor profile changes throughout the year is a problem.
- There are certain areas that have more or less feed, and so lambs are not all raised equally and mature differently. Then we do not have a uniform product not only by size, but also by flavor or taste profile.
- Maybe not as recognized as New Zealand. NZ is the leader in the lamb world. Competition with prices. Limited by scale and infrastructure. Larger infrastructure would allow lamb in America to have cost of scale.
- General population not knowing how to prepare or serve lamb. Not wanting to spend money to take the chance.
- Educating the consumer. Teaching them on how to prepare it correctly. Saying that it is healthy. Price.
- Could be better with recipes and cooking instructions.
- Consumer education. Telling them how to cook it and where it is from.
- Image of lamb to baseline consumers. Those that don't cook much, and providing information.
- It is not something that you can put in the microwave convenience is a challenge. Even younger consumers have a challenge to try and it is too easy to ruin a good piece of lamb by bad cooking.
- Consumer perception of lamb.
- You don't really know much about it. Previously had challenge with product inconsistency. Not a very large product in the protein world overall. Harness the lamb trends and increase product movement. Increase visibility and branding.
- The knowledge of the general public. It is ok to eat, it is humane raised.
- If we could get a more defined feed specifications of time on pasture and time in feedlot from producer to producer to improve consistency of product. Also, more regulation of antibiotics and steroids, and hormones.
- Versatility. Everybody knows rack of lamb and ground burger, and people don't know how to use any of the other parts. You know Grandma's leg of lamb, but that is gone now. There are many other economical parts that can and should be utilized within a lamb carcass.
- Misunderstood product. Consumer outreach is there from marketing standpoint but not there from a cooking standpoint. Need to explain how to cook and have the best lamb experience. Cost is a weakness. People will default to imported because of price.

Appendix F. (cont.) Weaknesses of the American Lamb Industry

- Customer lack of experience with flavor. Doesn't get sold a lot. Under-utilized cuts of lamb.
- We need more education about lamb and using it as a protein source. Need to have greater awareness of American lamb. Beef and pork prices go up, chicken had a shortage, and I was wanting the lamb industry to step up and say “lamb is the alternative!”
- A lot of people have not tried lamb. If they try it more commonly they will like it. It's new to people. Price. Consumer education. No advertisements on the radio and media locations.
- Not a lot of awareness about lamb. People don't know a whole lot about lamb and there needs to be a continued push for more education. Specifically at secondary or smaller locations under 1 million.
- Don't think there is one.
- They do not have any weaknesses now. They did with a different generation of WWII gentlemen. We are past this challenge.
- Can’t think of any.
- 3rd wheel American meat. 2nd fiddle to beef.
- Predators. Land prices.
- Doesn't have wide appeal.
- There isn't any weakness.
- Unless someone thought that quality lamb had to be imported from somewhere else.
- Lack of direction from packer for what is supposed to be produced, resistance to new tech to update industry.
- Flavor and size. Too gamey, not mild.
- Aversion to lamb because it sometimes tastes like the farm.
- The fact that a lot of people have aversions to the flavor simply because it is not prepared properly. Some chefs like the gaminess, but lots of customers do not. Chefs should get off their damn high horses and cook for the masses.
- Still have to deal with an uphill battle with perception. That it is gamey. If the industry can agree to not put those older animals on the menu! Then we could have a sweet flavored lamb that people will enjoy. Beef and pork have marketing campaigns. The industry needs to come together with a marketing campaign, nothing exists compared to other proteins.
- Perception of lamb. Flavor/taste. A lot of people don't believe that they like it. The image of the actual animal.
- Lamb AROMA. The texture is different. On occasion, people said that it was too chewy.
- I haven't tried any lamb lately. It has a smell to it. It has a bad stench. You have to put lots of stuff on it.
- Packers owning their own lambs. Are we going to run out of product with ewe numbers being at a low. The infrastructure and labor and land issues are a challenge. Bureau of land management and government grazing that is an issue for western sheep farmers. Flock size.
- We are losing numbers, labor, and infrastructure. Land issues are big issue.

Appendix F. (cont.) Weaknesses of the American Lamb Industry

- FAT! The other white meat! This industry has a challenge of getting past being a commodity business. Big sheep are a problem. We keep moving big lambs and soon we are going to have a house wife that says we are not going to do it anymore.
- Numbers in general. Producers and sheep numbers. There is some division of western and eastern United States production.
- Could be fragmented. Declining industry.
- Infrastructure of industry. Limitation with fewer producers, and older producers. Challenges with grazing lands and available ground. Marketing of our product.
- A challenge for people to get into the sheep business unless they grew up in it. Need to work on easy care sheep. Weakness is the good shepherds are doing a good job saving all the lambs based on my management practice instead of ewe efficiency.
- A shrinking infrastructure. A shrinking supply of us lambs. A captive supply by large feeders and packers. The LRP is written has not helped. Environmentally, the wolf challenge, the bighorn sheep issue. The big dependence of western producer to graze on BLM lands, and maybe not having access to western lands. Labor and H2A issues. Animal health products and labeling of pharmaceuticals for the minor species health products such as blue tongue and foot rot vaccines. A lack of a uniform product. The lack of industry understanding and agreeing to what is a lamb. There is no definition of lamb here in the U.S. That is a huge problem. Defining lamb and age.
- Weakness is all the kids books and the desire to anthropomorphism of lamb. Cute and delicious, lamb. There is a lot of gamey lamb out there that has to do with both breed and diet. Intensively raised lamb is also a problem on corn based diet and then you end up with something similar of imported lamb like a flavorless meat. Conversely, raising on alfalfa gives lamb a little twang, that consumers don't like. Processing costs are fixed and based on economy of scale and animal efficiency, lamb will always have higher prices than beef. Very few restaurants that can have lamb on the menu each day. Can't hit the casual menu like McDonalds. Lamb is a celebratory protein, but it limits growth in the protein. Can we increase carcass size without getting gamey, strong flavors? Rambouillet has gaminess, can we balance flavor profile.
- Lack of production. The meat industry has gotten away from mobile processing. Production facilities limitation for small to medium sized producers.
- Lamb numbers; declining numbers.
- Availability. Number of producers. Consolidated packers. Lack of supply at certain times of the year. And high prices. Marketing. Pork board and beef council provide marketing efforts. I can't remember the last time I saw something about lamb.
- Marketing of nutrition, flavor, and how open range it is. Heritage farming should be emphasized. Price.
- Not able to keep up with supply.
- Very distinct flavor. No one knows enough on how to prepare it.
- Not moving forward enough with marketing and advertising. Eating quality-gamey, fatty.

Appendix F. (cont.) Weaknesses of the American Lamb Industry
• The size of the product is a limitation. Specifically lamb legs that are large to merchandise consumers with a smaller household size. Brand recognition of American Lamb. We have no marketing slogan. American Lamb is the brand recognition and more emphasis is needed. • A little more expensive than imports and other proteins. • Perception. New Zealand and Australia get a better natural marketing campaign. It seems like a more quality sounding product. Losing the battle of marketing. Fattiness of American lamb can be a weakness.

Appendix G. Opportunities for the American Lamb Industry

Interview responses from retail, foodservice, and purveyor representatives (n = 120) when asked "What are the opportunities for the American Lamb Industry?"

- Branding like beef and pork. Highlight and attributes need to be focused on. Lamb has not made it with the whole consumer. Put it on the forefront of conversation and acclimate lamb with the consumer would go a long way. It is a little bit exotic and not an everyday item. We can do a better job of breaking it down differently and further processed options. Lamb industry needs to do this better.
- Need to promote more of American lamb.
- Advertising and branding. More lines of organic and natural.
- More local offering. Aged sheep making it into other cuts and sausages. Ethnic immigration.
- Find new ways brand so people want to buy it. Easy to cook.
- If we could forward contract lambs, that would help. Our consumer wanted to know where their food comes from. 10,000 miles fresher. We should promote fresh and American. We don't put research dollars into US and we see what Australian and New Zealand does with research.
- It is wide open. The culture in America is changing and the majority of Americans want to know where their food comes from. Seeing the humane treatment of animals and origin of sheep is important. There is opportunity out there for the direct marketer.
- We have a huge opportunity to grow our industry. As much as we are diversified not only by location, but also by type and kind of sheep. There is a huge opportunity if we can make a uniform product. We are local, we are here in America, and we care about the land. We can get that message out to consumers.
- Grow a better product. Regionalization of lamb product.
- Lamb could grab on to the local movement more and menu features.
- Get into lamb production now. Young people are more open to it than their parents. Now is the time for lamb to excel. Lamb needs to market itself as healthy, fresh, and produced here. It is important to people now. The awareness of food and where it comes from is ever important. People are starting to realize the inefficiencies of beef. Lamb is environmentally friendly, there is definite opportunity to capitalize in today's food forward culture.
- As awareness about lamb becomes more prevalent the opportunity for lamb to be an option just like beef on the menu. Health benefits. If I see lamb on the menu, it is something that I will go for. There is the potential to cannibalize into the beef market share. Lamb is often one item on the menu. Big restaurateurs in San Francisco led a charge of where is your food coming from, is it local? There is transparency in the market for lamb. Beef is in lots of places on menu, lamb can grab some.
- Capitalize on the food movement. Interest in local products. Interest in ethnic cooking. Interest in traditional cooking. Old is new again. Grazing of sheep and the potential of lessened environmental impacts of sheep versus other species. Could this environmental advantage be marketed?
- Mimic other countries, free range, pasture range, genetic makeup.

Appendix G. (cont.) Opportunities for the American Lamb Industry

- Brand recognition of American lamb because American is a better product because there is preferred flavor and tenderness because of our production methods. Australia and New Zealand are gamier, and Americans like lamb that is most likely milder and better for our consumer and more preferred for their palate. Promote the flavor of American lamb. Education is key. American is a better product, but may be too big for some restaurant settings. Need to have in your face marketing for environmental ideas and lamb. Push for wholesomeness as well.
- The new rock stars are chefs. The growing popularity of food and the possibilities are endless for lamb. The younger generation is growing up to be quite exotic cookers. It is coming. Breeds like Dorper with milder flavor, bring customers in.
- Becoming more of a niche market. Trying to regain the younger population of millennials. They are more interested in combining new things and flavors. Immigration allows other customers that lamb is a staple. Young people are more adventurous and enjoy trying new flavors.
- Lamb just does not strike me of having the confines of factory meat production. The opportunity to embrace lamb's role in a sustainability and environmentally friendly protein. They are a sustainable critter. Mobile processing is necessary and would help the sheep industry. The experimental consumer is the older folks that grew up with lamb and the younger folks that are really into food and cooking with beef tallow and the earlier hipsters that are more adventurous.
- Right now, and has been happening for a while, the culture of typical Americans is getting into more adventurous eating. People that haven't experienced lamb are more intrigued to buy it. My parents didn't eat lamb, as it reminded them of wet sheep, a rejuvenated consumer and an opportunity to get back on people's plates that did not think that they liked lamb. The adventurous consumer ranges from young kids that want to be chefs to mid to late twenties and into late sixties are the people that are more adventurous. Wow, you have lamb chislic. What is a lost tradition for the older people is a new experience for the younger, more adventurous people. We have a range of demographics from people that have been coming here since 1949, mid 20's to late 60's.
- Demographics in general are expanding a lot. There is a generation that won't branch out that is older. The younger generation is much more open minded when it comes to food. The most common person to try lamb may be from 30-35 and say screw it let's try it. The cooks like our lamb, that is a selling point. Young people in their twenties are open to menu and food more than previous generations and I expect their palate will continue to explore.
- Again, educating the consumer. Food Channel/food networks help.
- Promote and educate.
- If we were a self-serve retail case, I think that the American Lamb Board could do a real service in educating on how to promote lamb. Beef: It's what's for Dinner. Need a catchy slogan. It has to be a characteristic of lamb flavor. Rich Flavor. Lamb is not gamey, it does not have a gamey taste. Depends on the quality of lamb. Certain things are not for everybody. The grain finished flavor of lamb is currently doing it right. The industry could do a lot with inside tips such as butchers saying how to better prepare certain lamb products.
- Educate the consumer.
- Education of customers. Help to educate from the lamb industry.
- Education of the consumer. People don't realize you can cook it like beef. Often seen as exotic.

- Define lamb throughout the process of the industry is a must, and sticking with it as we change and merchandise a young lamb product. Marketing more to the ethnic markets and are interested in lamb. More education for lamb being a healthy meat and promoting it. Work with doctors and health professional for promotion of health advantages of lambs. Environmentally we can do more to show that sheep are good products to have on the ground. We can use them for weed control and fire suppression. I think it is important to stress environmental aspects of lamb. The twenty something's are looking for a new product that is quality and we can provide an opportunity to bring in new consumers with lamb as a protein and come back again and again. If we have a consistent tasting lamb product that young people can depend on, we can build them into lifelong lamb consumers.
- Huge! Informing the general public to utilize. It can still be a lean meat, still part of a great diet.
- To market your product MUCH better. "You should bring a chef like me to market your product." -Chef Bruno Tison. A big marketing effort and having some type of chefs that shows the public how to cook lamb. Create a lamb contest and competition for chefs. Maybe make a cooking book about lamb. Maybe lower the price a little bit.
- A lot of the change can be at to the restaurants. I admire Chipotle and their pork specifications that focus on practices. The sky is the limit with the younger generation. So little is known about it as it is. Have to make it approachable. Pork the other white meat. Lamb and bison both could fill void. Lamb another red meat alternative. Provide marketing toward the more consumer conscience consumer. People are getting sick of eating beef.
- Possibility of other cuts. Expand from racks, grind, and legs. Chef sampling of product in the field so that general public can understand what the Denver rib is and what it tastes like.
- Consumer outreach from a cooking standpoint. Lamb needs to be out there with big events, and support a big lamb competition. People would be excited and wish to try lamb 25 different ways. Colorado lamb is mended nationwide, yet nothing in Colorado to promote Colorado lamb. We need to teach people how to cook lamb. Working with Ace Hardware Grilling Demonstrations.
- As people become more aware of lamb health attributes, lamb can become more popular. If we can get more producers than lamb prices could go down compared to beef. Lamb is raised more humanely in general.
- Educating the consumer.
- Continued education with the public on what lamb is, how. It is raised, and what you can do with it. Find it in consumer venues that can be used. Lamb can have convenience for the consumer; that is a key factor.
- Chefs are getting educated of the flavor and size of American lamb, work needs to be done with education of consumers. Consumers wrongly perceive imported products of increased quality. It is still a challenge for chefs to keep it inexpensive to begin or put it on the menu. The age of people to focus on is after college graduation. College age students are in the transition of comfort food to the young professional that will soon make money that will reach out from the familiar product to the more unique offerings. People are going out to eat with their kids at younger and younger ages.

- There is opportunity for better placement of value cuts. Place more diverse cuts on menus and allowing better price points. Opportunity to allow new consumers and to educate end users on the benefits of the American Lamb. Lamb board doesn't do a great job telling the rancher story. Highlight the values of agricultural families and ranchers. Focus on telling the rancher story. There could be really good opportunity to look at renaming lamb cuts. Could align with beef cuts, maybe remarket cuts similar to beef.
- Spread the word and start communicating. Value and cooking opportunities.
- Work towards becoming more mainstream. Need to demo more. Product development. Get a cut popular and get it in a restaurant. Develop life cycle.
- Price and sizing consistency. Marketing! Don't see it like with beef and pork.
- It needs to get promoted more. Advertising. The American Lamb Board tell them to spend some money. Just like Beef, it's what for dinner. People haven't always eaten lamb. Prepared right people like the taste. People have the impression when they hear the word lamb, they smell it and that is the perception they have. The fat has a different flavor. There is big lamb sold in food service between lamb racks and shanks. Our customer base wants us to perfect their cuts in the meat case. We fabricate and custom lamb products with a ton of service.
- American industry needs to do more to perpetuate their own business. Need to be out there and be at the retail case with their promotion of their product. Need to get out with a campaign for marketing. Nutritional values not being highlighted. It can be everyday product, not just Easter and kebabs. Recipes that are easy to cook for lamb. Protect our own business. People are willing to pay 15% for added attributes like grass fed and local. People want to know location and where their food comes from. They want it to be from their area, but not a specific ranch. Also, it is much more important to make a connection with the sheep farmer and rancher testimonial on how I raise sheep than just a brand.
- Currently, there is no advertising.
- Marketing. Used to be lamb council 15 years ago. Need a national lamb council like cattlemen. Need Check-off program like beef. Has a good relationship with the local cattlemen association, would like that with lamb. Get recipes from cattlemen, would like that more with lamb.
- Market lamb more. Flavor is good.
- Focus on websites face book, marketing basically.
- Promotion of mutton. Promotion of healthful of smaller protein consumption. The image of lamb on the plate is different than beef on the plate. Opportunity to market whole or half animal sizes. You don't need large freezer. In doing so it is ideal way for people to learn about whole animal usage and can be extrapolated to other animals.
- Marketing of products.
- Marketing.

- They just need to get out there more. Lamb is such a great product, and it is one of those things that if they were able to get more mainstream across America they could utilize it better and get demand higher. I prefer lamb to beef myself. Lamb is perceived as a premium product and for the upper class. It is a part of cultural part of society for upper-class, not the middle and lower class. In the Rockies it may be a usual product, but in the cities it is premium.
- Opportunities are to market sustainability angle to the consumer!!! Really emphasize the flavor profile. Getting it into the mouths of consumer is challenge. Whole animal utilization is important. Chefs can be better educated to feature lamb. Takes technical know-how at culinary schools to teach chefs and would allow restaurant industry and chefs that want to bring the whole lamb. Whole lamb fabrication is prohibitive to kind of wing it and is significant investment. There are very important cuts of lamb that can be further explored. Opportunity is culinary schools and marketing to push through as much as you are pulling through. Lamb is eaten at a much lower rate than everywhere else in the World.
- Limitless. Do a good marketing job, and the sky is the limit. How do they market it? Kale is the example. If you work at the right angle and marketing, lamb could be the next kale. The flavor is the biggest barrier for consumer. Well, we could look at that and say how do we change the flavor, but that may be a slippery slope. If you can teach people to go for the flavor, in the long run it would be good. It would be sad to suck the flavor out of lamb to meet the consumer's palate.
- More marketing, stronger.
- Marketing.
- More aggressive marketing, and research and development.
- Untapped growth. More lamb in people's mouth, people will enjoy it. People can't be afraid of it. It is up to the retailer. If you put it out in the retail case and give it a decent display you can sell it. Need good signage and point of sale materials. The culinary scene is huge.
- Better marketing strategy to get lamb back on people's menus. Marketing focused on local responsible, American. Pricing stability of some sort. Need for producer and supply stability. Mom and Pop slaughtering a few head with their own operations. Small producers can direct market.
- Don’t see changing too much.
- Have to develop a stronger brand. Marketing is important and almost non-existent. There are many things that could be done to reach consumers and convince them to buy our product.
- Expand our product awareness with continued emphasis on getting lamb on the menus and in the retail case.
- If we can get a new word other than lamb, maybe a new marketing tick, maybe around the whole animal. Better utilization of the lamb carcass. Culinary arts people visiting farms and ranches. Conserving resources.
- It is new and different.
- Endless with changes to carcass evaluation improvements.
- Hispanic sales, these grocers buy lots of expensive items. Marketing more to varied consumers.

Appendix G. (cont.) Opportunities for the American Lamb Industry

- Limitless. We can introduce it to new customers all the time. Some customers really like it and others won't try it!
- Opportunities are the retailers. We are willing and open to look at domestic again if they could get weight, age, yield and price in line. Provide value added products in the retail case. If you grew up on lamb you eat lamb, it is hard to grab the consumer that has not are lamb.
- Many people have not tried lamb, and we have the opportunity to open their minds to it with people that haven't tried it. Continue to focus on locally produced lamb.
- They can somehow make it more accessible and affordable. More hip and appeal to a younger crowd. Kind of an old school thing, and doesn't feel young in the crowd. The young crowd is eating lamb at our restaurants. The lamb consumer is someone who generally as an eater knows food, has a more varied diet. Lamb is not first choice of picky eater. People looking for something interesting for newcomers. Potentially cultural or socio economic part with lamb growing up or lamb at parties. Lots of lamb eaters are people interested in trying new things and varied diet or people who have had lamb in the past and have some sort tie to it. There are opportunities to tell the story and expand on the relationships with farmers. Having the special story that sets it apart.
- Off-cut utilization. Ethnic cuisines that Americans really love. Mexican and Middle Eastern are most prominent ethnic cuisines. Falafel and Hummus made it mainstream, let's incorporate lamb mainstream.
- Lots of restaurants that don't serve lamb that should be targeted.
- Continue to grow because of demand of American and World population.
- The high end consumer. People are more concerned about what they put in their mouth.
- It is only 5% of my business. Probably a lot less of the protein that is consumed. There is the opportunity.
- Export American lamb to other countries.
- It is huge. It is lean and people should consider lamb.
- Yes. Ethnic market. Customers that used to go to beef can like lamb.
- Try to maintain niche in American public mind, mostly associated with holiday dinners.
- There needs to be a focus on genetics and breed and there should be a meat breed sire added to all lambs genetics. Keep the product affordable to blue collar public.
- Opportunities of ethnic involvement and lots of ethnicities are lamb eaters. Wool is renewable resource. Skin soft wool products that can be blended with other fibers.
- Unlimited. Exciting. Opportunities are real.
- Keep pushing the vegetation management and the capability of being able to control land with millions of acres of cheat grass. They should be known as the weed eaters out there, and that would increase their acceptance. Continue the lamb kebab advertisements.
- Wide open. Bright opportunity if we get the right people raising the right kind of sheep.

- Appendix G. (cont.) Opportunities for the American Lamb Industry

- Coming up with a lower price per pound product and coming up with broadening the market. Price per pound issue, and maybe lamb can get into a quick casual option like Chipotle. Working really hard to make sure that everyone's first exposure to lamb is a really positive one. Working with the breed and diet to make sure that the twang doesn't really happen.
- Nice alternative to beef and pork.
- Broadening the market. Do not push price out of range.
- Opportunities are tremendous. People should eat more lamb than beef. Consumption should grow. High end restaurant people are not afraid to eat lamb, and they will pay for it. More trust in a high end restaurant and a special occasion such as leg of lamb at Easter.
- It is currently in fine restaurants. Can focus on mid-scale food items.
- Good product; people like it.
- People are very hesitant to order lamb. I tell them to try it, and they respond that is doesn't smell. Response is it is very tender. Aroma of lamb is the challenge. This is because our customer loves Australian lamb. I provide mini samples for people off the menu. Indian spices have the spiciest. We provide lamb sample for people, and from there we go. Why have lots of customers that order lamb chops, and a dish with lamb and spinach. Lamb vindaloo is one of the most popular and is very spicy. With the vindaloo it is hot, you can't actually tell what protein is in there.
- It is huge! If I can sell lamb in rural America. It can be a mainstream protein in restaurants and grocery stores. This is a good product, and great alternative red meat protein. All proteins are good, but lamb can capitalize and be equals on the menu. I have customers that want to know when I feature lamb chops.
- Unlimited.
- Sell to the classes not the masses.
- Big retailers to use. There aren't a lot.
- If you continue to offer a good quality product at a reasonable price, there is opportunity to be on the menu of high end restaurants. High end and priced right lamb.
- Improve supply and compete with global competition domestically. Lamb consumers are health conscious. They are willing to consume a 4 ounce chop. It used to be 1 1/4 inch thick, but now is 3/4" thick. Consumers need to learn and know how to cook lamb. People that were raised with it know how to cook it and people with money.
- Tremendous opportunity, need more farmers and inventory.
- Increasing availability.
- Supply a good product at lower price.
- If it available at a cheaper price, people would buy American than Australian and New Zealand lamb.
- More consistency. Better usage. And more availability.

Appendix G. (cont.) Opportunities for the American Lamb Industry

- Better whole animal utilization. Is lamb fat being used properly as potential lard? Charcuterie could be further integrated. Is lamb getting enough love? Lamb is a healthy protein. Lamb needs to pushed as a wellness protein. It is lean, it is phenomenal.
- Being able to stabilize pricing would be huge; specifically for primal cuts.
- A value chain that can rival what Australia and New Zealand have built. Distribution. Education. Marketing.
- As the pendulum is swing to animal protein and les demonizing of animal fats. There is an opportunity to introduce a new protein. Just branding would do a lot. Just new slogan that can lead the way. When you can eat organic chicken at $4.50, lamb has to get over the price challenge. Lamb has a special occasion price point. In order for people to regularly consume the price must come down a bit to compete. Can make alternative fabrication approaches to lamb legs.
- Pricing. New Zealand prices lamb cheaper.
- There's is a perception that it is strong flavor. People don't eat lamb because they ate it once and it was mutton. Old lamb or mutton is not a flavor profile that people like. Have available lamb that has a sweet, mild, and delicious flavor.
- Opportunity to increase market share. Need to reduce price so that it can be offered more on menus. It is very pricy.
- All there is. Everybody that serves could serve American lamb. In my restaurant, it is not just flavor, I just cannot do it for American because of a dollar per pound increase of the same product.
- Marketing more alternate cuts.
- Always. Flavor and smell need improvement.
- Finding more sheep farmers; subsidize wool? Need more sheep. Carcass numbers needed.
- Increase quality and efficiency. Greater use of NSIP.
- More consistent supply and increase the per capita consumption of lamb in the U.S.
- Opportunity for investment for future production.
- You can get more cuts and do more tastings. LAMB BACON! Meat from on top of the ribs. If we can get better utilization of less used cuts like the flank, breast, and ribs. Then we can get better profit and carcass utilization. Lamb is doing a good job of marketing. Chef with Sysco and a Chef with Kendall College doing video. Keep up the good work.
- Trend of eating less meat, but people are conscious of what meat they eat. Lamb can be the healthy alternative.
- Health food market that lamb needs to be a part of. A lot of direct marketing options.
- Marketing to the millennial and young consumer. Domestic lamb does not have opportunity buys or bargain cuts for the grocer to but specials on. Need to get lamb in people's mouths. Certifiable grass fed program.
- There has to be more supply and more marketing.
- Marketing of product. Need more advertising of American Lamb. Would love to have more educational components for chefs and reaching the Foodservice. If we had more educational materials it would be helpful. Huge opportunity in Foodservice, but lamb is pricing limited.

Appendix H. Potential Threats for the American Lamb Industry

Interview responses from retail, foodservice, and purveyor representatives (n = 120) when asked "What are the threats for the American Lamb Industry?"
• The historical ideas of mutton, but those times are gone but not forgotten. Priced out of consumers mouths. If it gets too expensive you will lose those new customers that are coming in or returning customers will switch proteins.
• The price isn't going down. Pricing means consumers won't grab it off the retail case. People just don't eat it or don't try it. Lack of knowledge. Parents don't expose kids to lamb.
• Price.
• Price competitiveness.
• The industry itself. Price.
• Pricing! Price themselves out of the market. We had to deal with people that would not buy lamb. World War II challenge was real. We know the difference now between spring lamb and yearling lamb. Most butchers don't.
• Agriculture. The drought making everything more expensive. Cost as well.
• Price point is too high. Currently slowing down 30 % of lamb sales. When price was low people bought half or whole lamb. Now they buy 5 pounds of lamb.
• Number one is being tagged as the rich people's food. Beef obvious has marketing it's what's for dinner. Price per pound aspect. The big challenge is don't get tagged as Donald Trump really likes lamb, and that it can't associate with the everyday people. Don't get labeled as so gamey. I spit it out because the flavor profile is so weird.
• They can get priced out of the market.
• Pricing of product for rack of lamb, other cuts are accessible. If we can't afford it, we can't use it. Accessibility and availability. Can't always get enough lamb.
• Undercutting of price of imports.
• Other commodities and proteins. Price is an issue. Keeping it in people's retail case.
• Their own internal chaos. Runaway pricing. Pricing that doesn't reflect the marketplace.
• The competing proteins are more available, and less expensive.
• Foreign lamb industry. Costs of land values. Cost of scale may price itself.
• Price point. Perception of a gamey, crazy mint jelly lamb that your grandparents used to eat. Techniques and update of cuts such that beef changed cutting styles. As a consumer product needs to be familiar enough that one knows what to do with it. Portion sized, and able to utilize at home.
• Negative perceptions. Undesirable flavor. Price.

Appendix H. (cont.) Potential Threats for the American Lamb Industry

- Lambs that get too big and fat are the biggest threat. Product availability in rural areas is poor. At times we may out price our consumers for a lamb purchase. We get such a mentality like lobster. We don't want $2 lamb because we will lose new customer opportunities. The consumer only has so many dollars to spend. We are a protein driven society, but customers will make choices with their dollar.
- Market volatility. Setting operation budget. Predation. Labor. Processing capability and only 2 large packers.
- No threats from general consumer. Possible threat from western rancher, and consistent pricing of lamb. Keeping producers in business.
- People not being able to economically be able to raise sheep. Environmental concern, waste management. Governmental regulations. Lack of food safety of imported products.
- Costco made Australian lamb ok. Seasonality. Price volatility. I am sick and tired of putting it on the menu and taking it off. Lamb is such a small function of the protein industry. Lamb is fourth protein in my arsenal. And as much as important it is for the lamb company, it is not important in the whole protein realm. I don't have time to talk with people and say why rack prices and volatility are problems. Domestic used to be so much better that people would switch back to U.S. Australians are now really good at it. Australian is eating like butter, and is tender due to shipping. People did not put U.S. Back on the menu because just fine with the imported product.
- Continued treatment as commodity. Loss of sheep farmers. Too expensive. Communication with consumer. Speak the truth of availability. Be willing to speak the truth.
- Lack of supply and too high priced.
- Underfunding for marketing and promotion. Price. Lamb is past the point of where consumers will buy it. Already too expensive in the grocery store for families, specifically if it is new for them to try.
- The biggest thing is not getting brand recognition out there in time. People have an allegiance to American, but if we are not there to argue we are better, people will make their decision and become accustomed to the imported product. Lamb product pricing consistency is important. Price spikes makes it difficult to reach consumers that are willing to purchase lamb. Must promote AMERICAN lamb. There is lack of knowledge, but imported products are winning the marketing war on lamb.
- Import price competition.
- Biggest two are relevance in the meat case and imports.
- That it could go away. Cheap imported lamb.
- Imported product. It's cheaper.
- It going away. More imports coming in.
- It could be outside markets wish to capitalize with imported products from Australia and New Zealand. If foreigners want to get aggressive, they can hurt you.
- Imported markets. The big box stores that sell an inferior product cheaply. I don't think that helps grow the image of lamb. Lamb is just not lamb. There has to be something to classify domestic and imported lamb. There is night and day difference.

Appendix H. (cont.) Potential Threats for the American Lamb Industry

- We are in it now. Importing of product alternatives from New Zealand and Australia. The rising age of the current buyers of lamb. As people who grew up on lamb are on upper end of age spectrum, we need to think of a way to bring in the younger crowd. The younger crowd is not eating lamb yet. We are trying to gain the attention of younger generation to make a push with the younger consumer.
- Competition of Australian product, Australia is rebuilding their herd. Foodservice does not seem to be on menus anymore or as often as previously.
- Australia and New Zealand lamb is biggest threat. Also competing proteins and emerging countries. Challenges are that people have tried it and don't like it OR they don't have the money to purchase lamb at retail or foodservice.
- Imports. Imports are cheaper and more plentiful than domestic.
- Cheaper lamb from another country.
- Imports.
- Imports from other countries. Migrants want cheap lamb. If demand goes up and they shut off imports, lamb could become like factory farms.
- Cheaper alternatives meats and imported lamb.
- Australian lamb and international lamb competition.
- World markets, imports, exports that are dynamic.
- Imports. Feed costs. Becoming too small of an industry. Lack of packers.
- Foreign import competition.
- Other countries are doing a better job at a better price. It always comes down to price for consumers.
- Foreign subsidies.
- People choosing to eat too many of the wrong animals.
- Foreign producers.
- New Zealand and Australia.
- Does the guest see the difference, we charge a dollar more for the same product of domestic origin?
- Price of imports. Not a better quality nor as consistent as NZ lamb.
- Imports.
- Imported lamb. It's not as expensive. Another threat is not enough marketing of lamb.
- Australia and New Zealand.
- Tenderness and flavor of Australia lamb.
- Australian product is better flavor.
- Imported product at higher quality and lower prices.

Appendix H. (cont.) Potential Threats for the American Lamb Industry

- Importers.
- Competition of imported product. Population growth. A potential decline in economy because lamb is so expensive. Veganism is on the rise.
- As lamb gets older it gets stronger in flavor. Overseas competition. Flavor inconsistency is a problem. I do not see the same flavor swings with beef or pork as I do in lamb.
- Imports. Declining numbers.
- Quality and perception of quality.
- Competitive proteins. Not accepted as a common protein. Most people taste that lamb that was overcooked. Flavor profile too varied for American lamb!
- Lamb raising practices. Put a negative spin on it and you can lose customers.
- Feeding grain increases the cost of growth. Feedlot production. They have to control the size of the lambs. It has to still be a lamb and not just a sheep. The economy of growing the sheep. Very dependent on grass and seasonal growth of lamb. Lamb ranchers are very stuck on the way they do things. Especially big changes, lamb ranchers are traditionalist. This is the way it has always been done, and not going to change. Traditionalist, not open minded. Need to keep lamb burger lean.
- Slow dilution of lamb flavor by feedlots and try to make it more marketable like beef could backfire. Older and pasture fed have more flavor, corporate push for dilution of flavor. Grass fed beef, like sheep, the conversion of grass with inferior genetics. Pasture raised animals should utilize proper genetics.
- That we don't keep the infrastructure. We are getting too small. Inconsistency. If we don't have a consistent product, we will continue to lose market share, and we will continue to decrease.
- Losing producers. We need to make sure that young people continue to get in the sheep business. Competition of imports. Losing the Western rangeland and availability to forage sheep in arid areas.
- The bighorn sheep and *Pasteurella* threat. Eliminate grazing of sheep in western rangelands. If you make it economically unviable to graze sheep you take most producers out of the business.
- Losing the BLM and forest service ground due to environmental restrictions such as big horn sheep and sage grouse. Reintroduction of predator species without protection of sheep industry. Lack of processing or slaughter facilities. The average age of a sheep producer continues to rise. Many of the operations that change hands at generational transfer are not staying in the sheep. The high value of the cattle market is increasing the number of cattle, and less sheep. Sheep are very labor intensive, H2A is a threat as to how they will define sheep herders. THERE is NO DEFINITION of what lamb is in the United States!
- Contamination or disease that may lead to bad PR. Any potential epidemic.
- Water. Prohibitive costs.
- Problems with feed. Possible health department outbreaks.

Appendix H. (cont.) Potential Threats for the American Lamb Industry

- If they get too big. Best to aim for the other red meat. Don't have mass production and large slaughter. Then everything quickly gets out of control.
- Environment. Supply and Demand and resulting pricing structure.
- Health issues. Maximize profit by raising poor quality sheep.
- Drought, heat, and price point. Possible animal health threats.
- We are losing farms. There are fewer ranchers. The infrastructure has to allow producers to be profitable. The global economy, we need to remember that we need to buy American product and support local farmers. Keep education up and marketing up for the producer profitability.
- Utilizing and conserving farm lands.
- Survival.
- Not available is get a big order. Size is inconsistent.
- Global warming. The ability to keep herd numbers up and availability of lamb to be in the marketplace. Most threats relate to price. Other proteins on the menus. Tough to quickly increase animal numbers. May lose menu placement to other proteins that are more available and more diverse. Recent popularity of game meats. Lamb may be overshadowed by buffalo, elk, and venison. Lamb used to be the game option and now has competition.
- Lack of education. Lack of promotion.
- Lack of awareness. Older generation that grew up with mutton, influenced the younger generation.
- Consumers are biggest threat. Lack of message and misinterpretation of information. Industry needs to fight animal rights groups that negatively portray sheep and lamb. Biggest threat is lack of messaging. Did you know this is how we raise sheep? There has to be messaging, if lacking people come up with their own assumptions. Tell the story from rancher to table.
- Getting stagnate in advertising and marketing.
- Make a little more and sell more than make a lot and sell less. Make sure lamb doesn’t go out of fad. Make sure there is not a misnomer or marketing disaster. Control the pricing.
- Lamb puppet and cute lamb cartoon. Food scare or food borne illness.
- Few advertisements, poor marketing.
- No immediate threats. If they do not continue to promote the brand and the protein, maybe lamb would just maintain and not increase.
- Transparencies. Example-LFTB and beef industry.
- Customer base decreasing, lack of growth.
- Case ready lamb. I am a butcher, and I like butchering.
- Nothing, in particular.

Appendix H. (cont.) Potential Threats for the American Lamb Industry

- Improper inspection.
- Disease. Handling of animals.
- Perceived as only events and holidays. Can it become more every day? Get it past just being for ethnic. Goat will threaten as people are more adventurous in the meat they eat.
- If we lose BLM grazing it would be major downfall. Wolves, drought, urbanization. Numbers of people and producers east of the Mississippi, but numbers of sheep are west of the Mississippi. A majority of people in Washington DC that makes legislation does not understand agriculture. If they ate well, you can state that you should Thank a Farmer.
- Labor, government intervention with our operations. Animal rights activists. Endangered species, land use.
- Our government. Environmental and regulatory issues. Aging population of producers. Transfer of capital to the younger generation.
- Numerous. Most threats are the animal rights and extremists. Maintaining grazing and how we handle and care for our animals.
- Animal activists. Questioning of management practices. People don't understand logic and production practices.
- Overgrowing of the industry.
- Recalls, but never heard of any food safety challenge in lamb.
- Bacteria, disease. Food safety. Mass production.
- People ask if lamb is halal. We would like to offer halal for Muslims. Price competitive is a threat, but is general market dynamics.
- If it is bad no one is going to buy it. Keep producing tasty lamb for consumers in restaurants.
- Beef, pork, chicken, and turkey. Consumer perception.
- PETA, people going to a no red meat diet and limiting meat intakes. Attitude about lamb being butchered at a young age, yet that is not a big force to do damage.
- The growing trend of eating habits by the US, not many are taking time to cook food anymore.
- Tradition. Self-serving nature. Industry leadership.
- Keeping the status quo. Not making an effort to move forward.
- Complacency. And an organized effort by New Zealand or Australia marketing.
- They still think it is gamey. They don't know how to cook the lower cuts. It is about re-informing people. If you grow up and don't eat lamb, you are probably not going to choose it. It's about convincing people and remarketing eating lamb. Beef it is what's for dinner. Pork the other white meat. Better environmental image and preservation of the environment Lamb the other alternative. Promote the nutrition. Promote the green aspect of the farming of lamb that does not affect the environment compared to cattle. Cattle ranching is like 70% of the land being used for cattle ranching and destroying natural habitat of animals and wildlife in mountain states. Wildlife association participating in destroying wildlife around cattle. Air grass water to grow corn and pesticides and fertilizers for land is ten times more dangerous than anything else. Ranching lamb eat grass, don't drink as much. Doesn't pollute the environment like cattle ranching.

Appendix I. The Image of American Lamb

Interview responses from retail, foodservice, and purveyor representatives (n = 120) when asked "How would your company describe the image of American Lamb?"

- The image is raised in the Mountain West. Hits the local picture for consumers. Image of lambs grazing on the range. Don't associate it with feedyards and gestation stalls. Wholesome and natural story. Flavor is most important and domestic lamb is milder. Domestic is a better product.
- Products that are raised by small ranchers with a lot of attention to quality produced.
- We have a good image. We have a biodegradable and renewable fiber with wool. People realize that we utilize the land in a more efficient way with sheep via keeping weeds under control. Overall, good image.
- The American lamb is a local, natural feel that gives an idea of wholesomeness.
- A lamb chop on a plate. American Lamb Board has done a good job with that. You think of sheep out on the range. People do think of lamb out in the pasture. Sheep producers are smaller and we limit pasture. Treat them like our kids and you have to feed them right.
- The image is ranchers producing a quality product that is consistent in age, tenderness, and palatability.
- The image is wide open spaces, pasture land, rugged landscapes. And then bold, exotic flavors of the protein.
- The image is giant pastures in the West. Easter. Not necessarily mainstream, more of a specialty item. Not beef, chicken, or pork. Is it gamey?
- Positive image by lamb lovers.
- Rugged, wild, delicious, sustaining, strong.
- Depends. Some small farms that raise them correctly, large farms don't.
- Beautiful states like Colorado, Wyoming, Utah, and California. You imagine sheep grazing on mountain and meadows with plenty of space. Offering you the possibility to get a quality product. So much space in the U.S., beautiful areas with great potential for ranching and raising lamb. The alternative between beef, bison, and venison. The other alternative to common food.
- It is a strong image. I think the brand of the sexy word Colorado holds more brand allegiance than American. It is a changing image; it is getting stronger as people become more experimental. It is up to chefs now to show people what it is about. It is important to have good memories of lamb and the stronger the image can be. Image starts at fine dining because of price point. The general public prefers a milder flavor.
- It has gotten better. Delicate care of sheep. People are now looking at sheep as mainstream. American Lamb has more respect than it used to have in the past.
- Positive. Image of purity, special type of meat product. Holiday food and not year round.
- The image is a nice full composition of the carcass. Animals grazing in open pasture and ranchers on horseback. Pristine western and country rangeland. Large muscle size, well-marbled chops and pure white fat. Bright red muscle color. Rack and loin needs to have marbling, bigger rack size and muscular carcasses 70-85 lb carcass that can suit Foodservice needs. Domestic lamb is fresher image.

Appendix I. (cont.) The Image of American Lamb

- Positive. We live in a state Utah with a history of sheep production. Definitely positive image.
- Rack of lamb on the grill in the backyard.
- Cute little animals frolicking in the field perception for consumer. One of the challenges is they are adorable. Colorado lamb. Biggest producing lamb state. Primarily feedlot finished. My ideal image is smaller flocks with diverse genetics and raised seasonally.
- Just the lambs are large and grain fed. It is a good product.
- Good.
- Fresh, wholesome, clean.
- We are all USA in our store. We believe that it is something good to stand behind. Customers know from the taste and look.
- This is the challenge. A very challenging protein to sell to people based on past eating experiences. Domestic lamb is a more pleasant eating experience for someone that is not necessarily a lamb lover but has been turned off by a stronger flavor of an imported product. Someone has had a bad experience. The product was a fuller or gamier flavor, and turned off to lamb consumption.
- Better than imported.
- Good, preferred at the store.
- Customers that buy American Lamb know that it is the best.
- Very good. Doesn't have issue, but know some people do.
- The quality is better.
- Very good. Doesn't have issue, but know some people do.
- If people like lamb, American lamb is the absolute Rolls Royce that you can buy and people know that. Since we are full-service branding of product is not necessary, like it would be if we had a self-service meat case.
- California lamb is far better than Australian and New Zealand lamb. Better taste.
- Sweet and delicious.
- Fresh, never frozen, best inspected.
- Great following compared to New Zealand.
- The best in the World. Top notch product. We shouldn't be importing lamb. Ranchers have applied themselves to making it better.
- Light color of young lamb. Freshness.
- Filled out and muscular. Nice frame on the live animal. Foreign breeds look nasty.
- The best meat on the Earth. It is just is. Western slope and cool nights and high mountains raise the best lamb on Earth.
- Nice. Good size.
- Emerging. Lots of potential.

- We are raising a better product than we have ever raised. Producers are more conscious of what we are raising. Pennsylvania used to have lots of producers. Now less, but folks that are left say if we are going to raise lamb we better get better at it. Consumers are seeing a better product. We are not filling enough lamb for what we need, but I don't think that Australia can produce a lamb with their genetics that compare with American.
- Expensive, but worth it.
- The best. I like the bigger size compared to New Zealand and Australia. Nicer flavor.
- Strong. People have a certain threshold for luxury items.
- Healthy. Flavorful. Expensive.
- Tasty. The other red meat.
- Wholesomeness. No food safety challenges. Larger, meatier than imports. Not so gamey.
- We came to the realization that they do taste different. We believe American lamb is a great product. It is not what we are used to at home in Brazil.
- Excellent product, second to none.
- Excellent quality. Holistic management. A little more personal shepherding and stewardship. I believe in lamb as a great alternative for beef.
- Real high. Consistent product. Good flavor. Expensive.
- Another healthy option of red meat alternative.
- Fresh. Wholesome. Good.
- Good, it is a good product.
- Positive, expensive.
- Premium brand.
- It is a good image. No negative thoughts.
- The product is still the best. It is the white table cloth.
- High quality.
- The image is very high. People think that New Zealand and Australian is better, but when they taste it they realize that they like the flavor profile better of American Lamb. In Culinary world, we understand Colorado lamb, people really do not know enough about it as a brand.
- A good image. It is too expensive of a product. Prefer the taste of American Lamb.
- Wholesome, farm raised. Good flavor.
- When available it is good. Our clientele is more worldly, and sometimes prefer other options. However, The more localized you can get it, and closer to home for a Whole Foods customer that means a lot on their purchasing decisions. Some organic lamb options. Fairly easy for people with arid land to provide lamb at Whole Foods. Environmental focus.

Appendix I. (cont.) The Image of American Lamb

- Customers like U.S. lamb, don't like import, with all their proteins. Like how it is local.
- It is superior to Australia and New Zealand. Our customer requests domestic product.
- A premium item compared to Australian. This is based on the cost premium at retail. Certain consumers want USA product. Trust of domestic product.
- In their area, very good. Like local option.
- Local.
- It is great. Local grocery store still only carries American meats. American Lamb Board does great job with brochures and recipes.
- Open range. Very successful is the lamb chop on a plate.
- It is getting more and more positive. It is now more known. Australia is industrial scale and U.S. Lamb is a regional fare.
- More local product.
- Locally raised.
- We have a very concerned group of people that care about where it came from. People want to know where it came from. Local is so very much preferred by our customers. Our business has been built on supporting the local farmers.
- A dying product. It has lost pizazz. People in Salt Lake don't want to know where it comes from such as the backyard and the slaughterhouse. They do want American.
- The image is declining sales, declining herds, not interested in growing sales.
- Under-developed.
- Sadly, I think it is rather non-descript. There is a huge room for marketing American Lamb. You see USDA label steak for beef. There is no U.S. lamb promoted and sold in foreign countries. Sometimes hear labeling of Colorado or Oregon. Problem with lamb, in England, it is often locally grown. Often regionalized.
- Not existent.
- Non-existence. Not popular in consumption.
- As an afterthought.
- Red headed step child. It is inconsistent.
- Depends on education of consumer. Either fine dining lamb product to a poor little baby sheep with a face that is humanely killed. A lot of people change to vegetarianism because they have pets. Lots of uneducated people that don't understand where food comes from.
- It is changing, I think for the worse a little bit. It is still the best, because the advantage and disadvantage we have is size. We have an advantage on loin eye size. We have disadvantage because of fat.
- Inconsistent, high fat, inconsistent muscle size, gamey.

- Poor. Expensive for the quality. Just because it is red, white, and blue does not mean good attributes. We can do better. Regional lamb is going to be the future for all of us. Don't see commodity products working with the millennial generation. It has to be regional if we wish to command a premium price.
- On average, American product is too big. Consumer doesn't rally have an image for American lamb. No marketing campaign like other proteins. American lamb does not have buzz or knowledge of it. Outside restaurants and foodie community that are sustainable and local, other consumers are probably not that aware of American lamb. Our extra size of American lamb has taken us out of that market. Lamb has not marketed product well. Lamb is only species that is infiltrated by international sources for consumers at a big time level. Has to fight international competition.
- American lamb is too big. Lambs are too big, and too old.
- Desirable, but over-priced.
- Overpriced. Yields poorly. Overaged. Consumers see high retail costs. Would prefer American if I could afford it.
- American lamb is not lamb anymore. People seeing bigger and bigger lamb chops. Price at retail is too big and cuts are too big. Consumers don't want to spend $20 to feed 4 people. Efficient production to grow lambs, but it translates to huge dollar values at retail counter. Today's big sheep are not lamb. Trying to raise lamb year round. Seasonality also as sheep are not designed for year round production. Domestic lamb does not have enough supply. Domestic lamb has a good flavor, but may be left with a greasy mouth feel.
- Unobtainable. Scared to use it in their everyday life. They find it to also be expensive.
- Too expensive. high end, white tablecloth.
- It has a lot going for it and a lot against it.
- There is a small subset of people that believe in product of the U.S. Larger subset of customers are based on price. Hispanics buy lamb because it can be affordable with $1.99/lb breasts. Domestic lamb is 75% larger animals and 25% more expensive.
- Americans are intimidated by lamb. Scared to take it home and cook it. Good quality.
- Misunderstood. Misconception with origin that somewhere far away is somewhat better, when reality it is not the case. Like China tea.
- American lamb is up and coming.
- In Austin, Texas, it is doing fine.
- I don't think there is one for a majority of people because they haven't tried it.
- It is struggling, because of lack of consistency. Struggling because people see it as a meat for people of high end incomes. They think it is only for the rich and famous and it could be an everyday protein. A lot of people think they have to be a chef to make lamb. People can do it and succeed. There is a lack of knowledge in preparation to make lamb an everyday meal.
- People see an adult sheep. People do not picture a young sheep. We should promote image of a young sheep as American Lamb.
- Non-existent. Image is a quality of product issue. Freshness issue compared to local.

Appendix I. (cont.) The Image of American Lamb

- American lamb does not have much of an image. Due to the fact of decreased dollars available for promotion, there is not very much advertising that is available for American Lamb. It is a good product and has advantage of being USA.
- Inconsistent product. Lacks uniformity of size and cut weights.
- American lamb for the chef it has size, flavor, and a price that is more expensive. For the consumer, people are aware of the quality of domestic product and flavor profile is more approachable than imported product.
- After working with the American Lamb Board, it is really good. Prior to being invited to Lamb Jam there was no association and it was just a commodity product. Lamb Jam is all foodies, needs to be brought down a level. Globalization and food culture. Exploratory eaters are much more comfortable to eat lamb at times. If we can tap into innovative cookers, we can make progress.
- Somewhat unknown.
- They think of lamb chops and rack of lamb, and don't think of other cuts.
- It is fine. There aren't any drawbacks of American lamb. It is good. Lamb has a little stronger flavor than beef. Some people have never had lamb. It is because it is a stronger flavor. Lambs are kind of eating whatever is there.
- Inconclusive, I don't know but I like it. Customers probably don't know the difference.
- The image is right now the stupid shearing video. Image is mom and dad on vacation and seeing sheep on vacation and sheep are these pretty little animals on the meadow. Hit and miss for people. People default to beef, pork, and chicken because they are comfortable with it. Lamb is a more delicate protein to make sure it is done properly. People are afraid of it and only eat it when out at a restaurant because they don't trust themselves to do it properly. Image is higher quality, and more desirable.
- The image is very good. It is a good product, bigger than imported competitors. Flavor is different from grass-fed. It is not better than New Zealand though.
- Older generation like lamb more. Becoming more popular with the younger generation though.
- For chefs, it is a high quality meat with excellent flavor. We like to market lamb as a lux product. For the consumer, lamb is still perceived as somewhat scary for a big part of the market. That perception is changing pretty quickly in today's landscape. Lamb can be friendly to consumers.
- I do not know.
- We are in sub-cultural pocket where people think of lamb as Greek. People around here think of lamb from the farm and may have grown up with chislic. Luxury product, possibly in Greek and Italian restaurant. I have noticed more lamb in the grocery stores. Hy-Vee has lamb.
- Never liked it. Always disappointed. Every major distributor, I tried their lamb.
- Not good. Because you do not find lamb in secondary markets. Lamb needs a shot of adrenaline and marketing. In metropolitan areas people are more experimental and purchase lamb.

Appendix I. (cont.) The Image of American Lamb

- The caviar of meat. It is inexperienced by most consumers. They are not raised with it. It is not a comfort food, because they were not raised with it. It is not the norm, it is not mainstream. People think of it more of fitting into ethnic cuisine. They don't need to do Indian dish, you could just do chops and burger. Outside of the acceptability of their past experiences. Chefs understand Colorado lamb as quality, and consumers still see imported with an image of quality.

- In the past five years, a rocky roller coaster. The price spike and turmoil that they are trying to correct. They are resilient. Cooperation needed to not have another debacle. Animal husbandry you got the feeders doing one thing, packers doing one thing, need coordinated effort. The volatility of the market is giant challenge! Supply and Demand still fundamental. You are going to do to the lamb industry what the veal industry did. Can't support price in the industry. Mismanaged the industry so bad that you have 100,000 pounds of frozen racks. It wasn't bad product, was just high priced. American lamb is a very important mix in the dining industry. High end perspective. The market did come back after the price hike. The country could survive without lamb. Got all of the market back in food service.

Appendix J. The Image of Imported Lamb

Interview responses from retail, foodservice, and purveyor representatives (n = 120) when asked "How would your company describe the image of Imported Lamb?"

- Australian not different than domestic lamb, just smaller. Consistent weight and size. Availability of product!!! Consistent flavor. Grass-fed, free range lamb is consistent product when they come in and purchase lamb.
- Consistent, high quality product. We are lucky we do have some, because it is a consistent product. In SD, we hate it. There is some protectionism. We didn't used to be 50% imports. Price is part of it, but imported product is consistent quality and led to increases in market share.
- Too often is considered by consumers as the preferred lamb. People see Australian and New Zealand more at grocery stores. Due to availability and accessibility consumers accept imported lamb products.
- More uniform size. Grass fed product.
- Unfortunately, they do a better job of standardization of the product and consistency.
- We use New Zealand because of the consistency of product. We used Australia for shanks because they would not get us hind shank. The U.S. would not give us hind shank as they said they were part of the leg.
- It is a consistent, available product of good quality. It is extremely well packaged, extremely well sized. Flavor is consistent. Australian and New Zealand lamb is fed with a certain combination of feeds that are calculated and measured so that the lamb tests like that all the time.
- Null. Consistent.
- Acceptable and fairly priced. Good quality.
- Top quality.
- New Zealand high quality. New Zealand is milder in flavor.
- New Zealand lamb is the highest quality lamb in the World. Everybody knows the best product is from New Zealand. The animals range free on the mountains and have big spaces to grow. Also, grass fed and provides the highest quality and consistency of rack and leg products.
- Satisfied with product. Positive feedback.
- Australian. They think it is very good. It does not have the aroma. It doesn't have the smell. It is halal and Muslim community approves. Most importantly, the flavor is the same, you cook it with spices. Smell of U.S. Lamb is different, and Australian is more tender product.
- Happy with Australian lamb. I tried it all and happy to get lamb from Costco.
- In the restaurant industry, the idea used to be that it was higher quality than American. It is changing, still some people like utilizing imported.
- High quality perception. Higher grade.
- Good. Better quality.

- Now it is getting better and better. More people are using it, and getting more market penetration. They are producing a less gamey product than before. It is becoming a more desirable flavor, handling is better, and packaging is very good.
- New Zealand lamb is younger, yields better, and offers the opportunity to provide consumers with a reasonable price point. There are attributes of the New Zealand such as pasture raised, grass fed, GMO free. And they like the portion size.
- Small.
- The image is economically less expensive. I don't know how they do that with shipping it that far. Obviously not as fresh, but it is cheap so good to position items such Australian lamb loin. Customers in every category that buy on price and others on attributes.
- People see it as a cheaper version of getting a meat that they like. A cheaper quality. Why pay $10 for something you can get for $7/lb? We should have a cap on how much is imported.
- Cheaper lamb product.
- Surprisingly strong. I feel it should be weak, but the consumer doesn't bat an eye to the imported product as much as they should. Consumer knows imported product is cheaper.
- Economic, still good quality.
- Affordable, yet irresponsible!!! They buy it because it is affordable, but they feel irresponsible to purchase it.
- Negative, our customers want domestic. USA product means a lot to our customers.
- People are pro-American. Distrust of foreign market.
- Most Americans don't like it because not supporting local and domestic. Quality isn't bad though.
- Unpatriotic!
- Overvalued. Over marketed. Marketed with unnecessary reason. Just go away, get out. We are isolationists.
- New Zealand and Australia. Not sure why they have great representation. Image is they have year round grass and they can get it anytime. Oh, great lamb must be produced in New Zealand for reasons that they have no idea about.
- We would not be interested. Customers want it to be local.
- Not very good. People would rather have domestic. Last choice.
- Because it is imported, people understand that they want domestic products whether it is oil, lamb, or anything because it is safe and produces jobs and improves the economy.
- Not locally grown.
- I can't connect with it because I have not seen their production system. A disconnected product for me. Far away, not supporting our local economy. Outsourcing American pride.

Appendix J. (cont.) The Image of Imported Lamb

- I don't think it is better than American. If you say New Zealand they associate the country with lamb.
- People would like it to be local, but it is the kind that they know and are aware of.
- Never considered it. Why would you, we have lamb here.
- People view New Zealand as the best stuff to buy, but I disagree. They expect to pay more for lamb and people don't understand that there is actually domestic lamb born. You only hear about New Zealand and Australia. I only buy as local as I can.
- If we move forward with a lamb menu item, we may pursue an American option. The true flavor of grass fed lamb is similar to the Brazilian steakhouse approach and preference.
- No one cares, yet we serve Australia.
- Why would we do that, there is lamb here. We try to stay close to home, and no reason to eat lamb that is important. They can eat that lamb there.
- New Zealand lamb had a reputation of quality, but I feel that people became excited about Colorado lamb. Now people are more proud of the local product. Local is the selling point.
- Frozen, strong taste, smaller size.
- Grass fed is half the size from New Zealand. Eating experience is different. Australia is muttony.
- Gamey and tough.
- New Zealand is very gamey.
- Bad. Don't like the grass fed. People have grown up eating grain fed.
- Very poor. Smelly. Gamey. Not very appetizing to look at.
- Not very well. Gamey flavor.
- Cheaper not as flavorful.
- Greasy, old grass fed lamb.
- It doesn't taste very good. Restaurant wanted fresh, and Australia and New Zealand still considers them fresh lamb. Troubling, and not fair marketing.
- Imported lamb us both good and bad image. The fact is they are cheaper and they are from a long ways away. It is fairly good product, but it is cheap, and it tastes bad and it turns off the customer of overall lamb. I still don't know how they can ship it here so cheap.
- Leaner and more gamey flavor.
- Not good.
- Cheap. Water added. So much moisture added, didn't have as much flavor. And if it did have flavor it was gamey.
- Gamey. Maybe tough.
- Close second, not a good flavor as American.

Appendix J. (cont.) The Image of Imported Lamb

- In Seattle, it is considered lower end by chefs. It is less expensive. Not necessarily a bad product, but very different. It is like they grew it to be more mild. A second to domestic lamb.
- New Zealand is next best, and Australian is the worst of the big three.
- Smaller animal. Darker, less marbled middle meats. Leaner protein than domestic and less intramuscular fat. More consistent sizing, and do a better job sorting consistent product. Flavor profile is gamier, and not as mild. Stronger flavor profile. Value perception is that it is cheaper. New Zealand and Australian perception is more mass produced and larger flock numbers. Imported lamb sits on a boat for a month or six weeks. New Zealand and Australia are a lot more state of the art in sanitation, food safety, and cutting innovations. Handling and processing in plants is top notch.
- New Zealand and Australia lamb is a lot stronger. Loin chops thinner. Sometimes tougher.
- Behind American.
- Not as high quality as domestic.
- New Zealand. Theory was cheap and mutton back in military. All comes in frozen. Won't sell. It isn't being inspected like USDA stamp. I don't think consumers know how it is raised, that's why they like the USDA stamp.
- Turn off because frozen.
- Not very good, but they are Very good at marketing though. See more advertisements for imported.
- Not quality, a little bit sketchy.
- Second tier.
- Frozen, inferior quality and freshness.
- Frozen.
- Frozen!
- Cheap lamb. Lower grade lamb.
- Because there such an amount that comes in they have a consistency. Imported lamb, you don't know if it is grass or grain fed. You also don't know the age of the lamb and more confident in the age of American because of the genetics and feed systems for lamb.
- I don't have a good image of it. Decreased quality experience, muscle, and fat cover. Merino influence I wouldn't think produce a good product. It makes me boil that marketing states that because it is grass fed is a better product, and it just better and not superior product. Be careful of the grass-fed label.
- Difficult to get fresh. Smaller in size. A bit more fat in ground lamb. Imported is cheaper.
- I don't care for it. I prefer Dorper lamb and American. Not as fresh and who knows what is going on with their practices. It is like buying fish from China.

Appendix J. (cont.) The Image of Imported Lamb

- A negative image spending so much time on the boat. We had quality issues. You could open up a bag and it would be perfect, and next bag not be perfect. Limited size of product.
- I think it is way over-priced. It is not worth ordering because of smaller size, and don't like the flavor. I would never order New Zealand nor Australian off the menu. New Zealand or Australia people believe it is a premium product. They are oblivious, and don't realize the power of Colorado lamb.
- Very high.
- Some people prefer it. It can be seasonal with Icelandic. I don't think there is a negative stigma with imported lamb. Negative stigma with other proteins. We do not get any negative connotations with imported lamb, and sometimes very positive.
- A lot of people think that it is inferior product. 2 or three years ago it was substantially cheaper. There has been a marketing of how cleanly it is raised and marketing of people thinking it is a better product. Imported lamb got a bad rap before. Now it is shown in retail case as fresh, looks good, and the product looks good. Lots of people don't know where it is from, just that it is lamb. Costco and WalMart customers trust them. Depends on how it is marketed. Australian grass finished lamb has a cleaner mouth feel. Certainly, some consumers like the flavor of grass fed lamb product.
- New Zealand is the largest exporter of dairy products. Not bad, but the consumer ultimately has the power to choose.
- New Zealand mostly grass-fed. Grass-fed allows for better image.
- It is better than going without lamb. U.S. Can't supply enough to meet demands. We just need to be in sync.
- Imported lamb has a flavor that is not the same. Some people think because it is imported it is better. Restaurants proudly say that it is from New Zealand or Australia. We need to shift this idea and it is an education thing.
- The image is a necessity, and should be identified as imported lamb. Even if it decreases lamb consumption of American lamb, it is another option for consumers. The challenge is the trade barriers and advantages that they have here in the U.S. We have trade agreements that make it fortuitous for imported lamb. Trade agreements allow it advantage and for the strong dollar it affects imported volume of increasing. Exchange rate and dollar is important.
- Giant farms in New Zealand and Australia. A lot of unanswered questions that people may have. An unknown, yet does not stop people from eating it. Convoluted and unknown image.
- Good reputation, they do a good job.
- Neutral image. People don't really know, and they are both delicious, yet with different flavor profiles.
- A green field in front of a snow capped mountain.
- Industrial scale. Inexpensive, but good. Not as good as American.
- Better perception of consumer.

Appendix J. (cont.) The Image of Imported Lamb

- It has been the standard for a long time. New Zealand has been the standard for most of my career. American has made increase last ten years. Imported product is less flavorful. More processed and shipped in. Consumers, people consider American lamb to be too gamey.
- Icelandic and New Zealand. Atkins out of New Zealand. I have immense trust in the New Zealand sheep operations. They have done a good job naturally on their own of presenting green rolling hills, and quality of life. NZ has 70 million sheep for 3 million people.
- No idea, does not think most people know it is imported.
- Bigger market outside of U.S.
- Grading standards are much higher. Food safety records are much cleaner, wet aged.
- International Chefs Congress had programs sponsored by Meat and Livestock Australia. Australia and New Zealand do good in promotion in the restaurant setting. Our American consumer is now familiar with it, and think it is automatically better. It is a buzzword, and sounds better. Australian is on the menu. They pushed quicker and faster than American promotion did. Consumers naturally think Australian is better. They have seen it more frequently. Australian lamb is supposed to be really good. New Zealand advantage is the size of product. Consumers can afford a small leg of lamb. Then they purchase, and build brand recognition. Then they stick with it.
- It is very high. The image is premium. Australia and New Zealand have done a better job marketing. I will not put New Zealand on our menu, but I think they are kicking our ass. Australia has spotty quality and consistency. New Zealand you know exactly what you are going to get every single time.
- Treat like it's from our backyard. It's lamb.
- Frozen, ok image.
- They may or may not have had imported lamb, but sometimes the location is not mentioned if imported. Some has different flavor and other has been good. It is just another average protein.
- Not much different than chicken and beef. Factory and cookie cutter production. Not worth spending a lot of money on.
- Generic.
- New Zealand and Australia is not a bad product. There is room for both. But I prefer Colorado lamb. Lamb as a category is all good, you are just splitting hairs, it is a $500/bottle or a $10/bottle of Merlot. After two glasses doesn't matter. Lamb, it is all good. New Zealand was designed to raise lambs for meat. Australia was wool focused, and lamb is secondary idea. Australia adjust with meat focus. New Zealand is a little grassier than Australian. New Zealand are going to be smaller. Flavor and tenderness not bad, based on flavor Australian closest to U.S.
- Improved in product, heavier, less gamey, more consistent, better price in general.
- Advantage of food safety. Good value product. Price driven decision making. The reason to go to primarily Australian as a corporate decision of our supermarket chain was primarily dollar and price driven. However, the customer became accustomed to the flavor of Australian product, and they were return customers.
- Necessary for customers because of smaller size and lower costs. Taste factor not taken into consideration.

Appendix J. (cont.) The Image of Imported Lamb

- Still it is good quality, less expensive.
- Australian product has advantages in size and price. Up to a $5/lb difference of lamb cuts.
- Flavorless. Colorless. Odorless. Irresponsible. Nothing should travel that far when we have the same product available next door.
- I enjoy it myself, but there are a few reasons it is not in my counter. There were previous shortages, ultimately it is fuller flavor. I have a better chance at success by putting in a product that I believe my customers will have a better experience with American Lamb. My image is it is a smaller product and a stronger flavor.
- Quite different than American. Not fed the same. Smaller, leaner, and different flavor. Not as preferred flavor.
- Gamey meat flavor. Smaller cut size.
- They are very small chops. Very pungent in smell, very gamey. I had lamb once, it was lamby.
- It is a little bit gamier profile. Leaner, smaller animal. Typically cheaper. Certified halal.
- Consistent. Less flavor for me. Not as clean of flavor. Smaller eyes.
- Smaller and less flavorful. Leaner.

Appendix K. The American Lamb Consumer

Interview responses from selected retail and foodservice representatives (n = 13) when asked "Who is the AMERICAN Lamb consumer?
• The American Lamb consumer is the foodie and the ethnics.
• The American Lamb consumer is people who know how to cook and appreciate variety.
• The American Lamb consumer is more educated, wealthier, and more health conscious people.
• The American Lamb consumer is a younger person and we see it the way they purchase food. They are in tune with nutrition and healthiness.
• The American Lamb consumer is the 30 to 50 year old, middle income consumer. Generation Z has not yet tried lamb.
• The American Lamb consumer is 40, 50, and 60 year old age group. On occasion it is young couple.
• The American consumer is from 40-65 years old. They are buying whole meals together. They are buying cheese, wine, and whole dinner. They are financially well off.
• The American Lamb consumer is an avid home cook that will take on something more adventurous. They are the same people that go to restaurants that are more high end, seasonal, and serve farm focused food.
• The American Lamb consumer is ethnic groups and the younger demographics. More on the coastal states and the Midwest. It is such a small industry. It would be best to target millennials.
• The American Lamb consumer is the upper middle class, ethnic groups, and Caucasian people. The lamb consumer is not the main focus of the world. Age range is early 40's and older. Hipsters and early 30's are not aware of lamb. Lamb should be the product for a unique experience Half of the hipsters haven't had lamb, because they are still stuck on pork belly.
• The American Lamb consumer is a younger consumer than it has been. Lamb chops still have their place in high end fine dining. Improving utilization in hipper restaurants and younger chefs working with items on menu would be beneficial. Lamb is a trendy protein now! There is currently a culinary drive and food revolution. Younger consumers as well as middle to upper class people of society are willing to try new things and lamb can be a part of it. Salary upwards of 75k has options for lamb consumption.
• The American Lamb consumer is now is a thirty something couple. Fairly well to do, young families. The food revolution has assisted that whole lamb growth. People are willing to try things that they have never had. Lamb Jams are the thirty something's at Boston. Farmer's markets are flourishing. Sushi made a rise, lamb and trying new things has opportunity growth. Needs to be more of a regular thing on more menus in restaurants, and then people will go buy it and cook it at home.
• The American Lamb consumer is the ethnic consumer where culturally lamb has been a part of their regular cycle of life. Greek, Arabic, Latinos. The other consumer is the suburban 45 year old, successful, Middle America person who wants to have something interesting in life. It can intriguing and exotic, yet accessible. Make lamb burgers at home to make things a little different. Something like lamb option on the BBQ. College educated, middle educated, white, vanilla life and lamb is their adventure in life. But not too adventuresome. Example braised lamb shoulder with sun dried tomatoes and rosemary. Lamb is too expensive for youngest working group. Lamb is a foreign concept to the twenty something crowd. We risk skipping a generation of lamb consumers because of price point.

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