Korean Consumers' Preferences and Willingness to Pay for Domestic versus U.S. and Australian Beef with Alternative Attributes

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In 2007, consumer focus groups and online surveys using choice sets were conducted to examine South Korean's perceptions of and willingness-to-pay for Australian, U.S. and domestic beef. Consumers indicated higher positive perceptions of Australian beef than of U.S. beef, particularly in the area of environmentally friendly, cleanliness, standards and credibility; and thus Korean consumers discount Australian beef less than U.S. beef relative to domestic beef. The U.S. industry could improve perceptions and their country-image by providing Korean consumers with promotional material pointing out that U.S. beef production systems are comparable to competitors' in terms of "environmental-friendliness" and other quality attributes.

Key words: consumers, Korea, markets, demand, beef, choice sets

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Introduction

Prior to the December 2003 discovery of BSE (Bovine Spongiform Encephalopathy or 'Mad Cow' disease) in the state of Washington, the United States was the largest supplier of imported beef to South Korea (Korea), accounting for about 50% of Korean beef consumption. Upon discovery of BSE, Korea halted imports of U.S. beef, and the U.S. has since struggled to fully re-open this valuable market and resume pre-BSE trade levels. The disruption of U.S. beef exports to Korea created an opportunity for the Australian beef industry to increase its presence in the Korean beef market. Australia has doubled its exports of beef to Korea since 2003 (DAFF, 2007). It has gained a substantial share of the Korean imported beef market; in 2007 approximately 73% of Korea's imported beef products were from Australia, while only 6% were from the U.S. (MLA, 2008).

It is often assumed in the U.S., that Australian beef exported to Korea is relatively lower quality forage-finished beef and is less preferred by the Koreans relative to the grain-fed beef previously imported from the U.S. Therefore many U.S. producers assumed that upon re-opening, Korean consumers would begin to purchase U.S. beef relatively quickly. However, this may be an unrealistic assumption – in the last several years the Australian beef industry has substantially invested in technology and grain-finishing facilities which have improved the quality of Australian beef exported to Asian markets. Additionally, since 2002, major Australian beef exporters through Meat and Livestock Australia (MLA) have focused on creating and marketing "Australian Clean and Safe Beef." This brand was designed to raise awareness of the

high quality and to create an environmentally-friendly image of Australian beef in the Korean market (MLA, 2007).

In order to rebuild the Korean export market for U.S. beef and to reclaim its share of the import market from Australia, it is important for both the U.S. beef industry and exporters to better understand Korean consumers' current beef purchasing characteristics and their perceptions and attitudes towards beef from different countries and with different "marketable" attributes. The primary objective of this research is to determine the factors such as price, quality attributes and socio-demographic and psychographic characteristics of consumers, which explain Korean consumers' willingness to purchase U.S. versus domestic or Australian beef. We also examine the relative importance of these factors in explaining their purchase preferences and willingness-to-pay for beef products from three countries.

Methods:

During May 2007 in-depth focus groups were conducted in Seoul, South Korea. The focus groups were segmented by the age of the primary food shopper who participated. A survey was developed on the basis of insight gained from the focus groups to provide a more in-depth assessment of the issues related to meat purchases, and to determine how the U.S. might address marketing concerns. In total, a stratified, representative sample of 300 Korean respondents fully completed the Internet survey during June 2007. A major Korean consumer market research firm administered both the focus groups and the online survey.

The purpose of the survey was to gain greater insight into the beef demand drivers and factors influencing Korean consumers' meat purchases. In addition to typical socio-demographic information (e.g. age, education, occupation, shopping behavior), consumers were asked to answer several psychographic questions to assess their attitudes, values and concerns regarding

different food safety and beef production issues. This information could then be used to better understand and characterize consumers' preferences for beef products with different attributes (e.g. country of origin).

In order to elicit consumers' preferences for the beef attributes of interest, survey respondents also participated in a choice modeling experiment where they had the opportunity to select between three types (A, B and C) of Korean BBQ beef products. Each product was described by its price and four quality-related attributes: country-of-origin, traceable to the farm, environmentally-friendly, and marbling levels. Countries of origin included were domestic/Korean-origin, U.S.-origin, and Australian-origin. For the traceable and environmentally friendly attributes the product was either labeled with and "verified to contain" the attribute, or the product was "not verified to contain" the attribute. For the marbling attribute, consumers were shown pictures of the levels of marbling (high and low) and were also provided with descriptions of each of the attribute levels that varied. The four quality attributes were selected based on the results obtained from the professional in-depth consumer focus groups.

Choice experiments have been used to explore consumers' willingness-to-pay (WTP) for attributes in numerous other food marketing, transportation and environmental economics studies (e.g. Adamowicz et al., 1998a, 1998b; Alfnes, 2004; Burton et al., 2001; Carlsson et al., 2007; Enneking, 2004; James and Burton, 2003; Loureiro and Umberger, 2007; Lusk et al., 2003; Rigby and Burton, 2005; Scarpa and Del Giudice, 2004; Tonser et al., 2005). Similar to other studies (e.g. Loureiro and Umberger, 2007) the choice set design was created employing fractional factorial design generation (Mitchell, 1974). Consumers' responses to each of the choice alternatives and their corresponding socio-demographic information were utilized to

develop a random utility model to explain consumers' choices for beef products with various attributes. Specifically, a random parameters logit model was used as this type of model accounts for the repeated choices made by respondents and allows for potential preference heterogeneity across consumers (Rigby and Burton, 2005).

The random parameters logit (RPL) model is based on a random utility model where we assume that consumers, *i*, choose a product alternative *j* (either product A, B, C or a "none of these" option) from a choice set, where the probability that consumer *i* chooses product *j* in choice situation *t* over another product alternative, *k* is: :

$P(U_{ijt} \geq U_{ikt}) \qquad where \qquad j \neq k.$

An individual's utility function for alternative *j* from choice set *t* can be written as:

$$U_{ijt} = \alpha_{ij} + \beta_i A_{ijt} + \gamma_j D_i + \varepsilon_{ijt}$$

where α_{ij} is an alternative specific constant for beef product *j*, representing the consumer's intrinsic preference for the product. A_{ijt} is a vector of beef product attributes (price, country of origin, traceability, environmentally friendly, and marbling) for product *j* in choice set *t* evaluated by the consumer; β_i is the related parameter vector which differs across consumers. D_i is a vector of socio-demographic and behavioural characteristics unique to individual *i*; and γ_j is the corresponding coefficient, where $\gamma_j D_i$ deal with preference heterogeneity of consumers. The stochastic error component of this RPL model, ε_{ijt}, is assumed to be independently and identically distributed extreme value (Carlsson et al., 2003 and Tonser et al., 2005).

This model allows us to estimate the relationship between the product attributes and respondents' socio-demographic and psychographic characteristics on beef product choices. In the empirical estimation, alternative specific constants are included for the Australian and U.S. country of origin alternatives, with the Korean alternative omitted to avoid multicollinearity.

The coefficients from the model are then used to calculate premium values for each beef product attributes and to determine consumers' relative value for beef from different countries. Respondents' value or willingness to pay for a given meat attribute, relative to the domestic product is given by the negative ratio of the beef product attribute to the price coefficient (Tonser et al., 2005).

Consumer characteristics and Summary of Responses to Survey Questions

Of the 300 Korean consumers who completed surveys online, the majority of respondents were female (89%), married (61%) and had completed at least some university education (62%). The average age of consumers was 45 years and the average household income was approximately $60,000 per year (5 million KRW/month). The average household size was 3.7 and 48% of respondents had dependent children living at home. Consumers participating in this study indicated that they most preferred to purchase pork and beef for meals purchased and eaten both at home (47% and 31%, respectively) and outside of the home (47% and 38%, respectively). Only 9% and 4% of respondents preferred to purchase chicken for consumption at home and outside of the home, respectively. Compared to U.S. consumers, Korean consumers purchase relatively less beef for meals prepared and eaten at home with only about 27% of respondents indicating they consumed beef once or more per week. Consumption of beef outside the household is also relatively low; the majority of respondents, 63%, consume beef outside of their household less than one time per month (Umberger et al. 2002).

The largest percent of consumers typically purchase beef in sizes of >500 grams to 1 kilogram (45% of consumers) or between 100 grams and 500 grams (40% of consumers). Very few consumers purchase beef in quantities over 1 kilogram (14%) or less than 100 grams (2%). The majority of beef purchases are made at a discount store (62%) or a local butcher shop (31%).

The most commonly purchased cut of beef appears to be bulgogi, top blade, brisket, ribeye and strip steak. The cuts of beef used for soup (Knuckle Soup and Ox Tail) had the highest number of people indicating they never purchased.

A set of questions were asking to assess consumers' attitudes and behavior. These questions involved consumers rating how strongly they agreed or disagreed with 14 different statements. Two statements involving the importance of price – a belief that the price of beef in Korea is too high, and that price is the most important factor when purchasing beef received relatively high mean ratings of strong agreement. In addition to price, the mean of the statement regarding Hanwoo beef being better in quality than imported beef was relatively high. The mean level of agreement for statements involving media credibility and trust in labeling information and advertisements were relatively lower than other factors. The fact that many consumers do not appear to trust the media reports about beef and the large concern about price tend to suggest the potential for U.S. beef to gain market share if it is priced competitively.

Respondents were asked to rate a series of factors which might influence where they purchase their food (i.e. choice of retail outlet). The factors of *Superior products (taste, quality etc), Sanitary condition/ Cleanliness of store/market, Competitive prices,* and *Convenient location* were all ranked relatively high with mean ratings higher than "very influential". *Supporting local producers and community* and *store/ market reputation* received relatively lower ratings.

Korean Consumers Willingness to Purchase U.S. Beef

A large majority (83%) of consumers indicated that they had previously purchased and consumed imported beef. Consumers' responses when asked about their willingness to purchase beef imported from the United States when it became available again provide a somewhat mixed

signal for U.S. beef exporters– roughly one-third (32%) responded with a "yes", 29% were not sure, and 39% indicated 'no" they would not purchase U.S. beef. Promotional material highlighting the U.S. beef industry's ability to meet the "unsure" category of Korean consumers' highly desired attributes, could persuade these consumers to choose U.S. beef – thus allowing the U.S. beef industry to regain a large share of the Korean beef market.

Korean Consumers' Perceptions of U.S. versus Domestic and Australian Beef

Consumers were asked to compare U.S. beef versus domestic and Australian in order to determine if the U.S. beef industry would have any comparative advantages relative to its primary competitors in the Korean beef market. U.S. beef appears to have a strong price advantage relative to Korean beef, with 84% of consumers rating U.S. beef as better than Korean beef in terms of price (Table 1). The only other perceived comparative advantage of U.S. beef to domestic appears to be in tenderness, with roughly 16% of consumers indicating U.S. beef was better than Korean. A substantial number (>25%) of consumers perceive U.S. beef to be comparable to domestic beef marbling, muscle color, health/nutritional value, cleanliness, fat color, credibility of the government and environmental friendliness. Promotional campaigns emphasizing the high quality of U.S. beef will be important for competing against the domestic beef, however, for the price advantage may be enough for budget-conscious consumers.

In June 2007, when this study was conducted, the largest share of imported beef sold in Korean supermarkets was from Australia; this situation is converse to the market position prior to the 2003 discovery of BSE in the United States. Thus, to regain market share, U.S. beef exporters will have to establish a competitive advantage relative to the Australian beef companies. To determine perceptions of Australian beef relative to domestic beef, consumers were again asked to rate the same characteristics comparing Australian to domestic. Similar to

the U.S. versus domestic comparison, Australian beef was viewed to be better in terms of price. However, in terms of nearly all other characteristics, more consumers rated "Australian better than domestic" than rated "U.S. better than domestic". Koreans appear to have a higher positive perception of Australian beef than of U.S. beef, particularly in the area of environmentally friendly, cleanliness, standards and credibility (Table 2). This may be due to Australia's positive promotional campaigns focusing on these attributes.

To further investigate Korean's current perceptions of Australian versus U.S. beef, consumers were asked to compare beef on various characteristics similar to the Korean-U.S. beef comparison discussed above. Surprisingly, the largest number of consumers rated U.S. beef better or equal to Australia on price than any other characteristic (Table 3). Prior to U.S. beef being banned from Korea, it was priced higher than Australian beef. Furthermore, at least one retailer and one wholesaler interviewed in June 2007 indicated that they expected U.S. beef to be again priced higher than Australian. It is difficult to know whether consumers mean absolute price, or value/ quality for price. Therefore, exporters and retailers will have to pay special attention to how they price U.S. beef versus Australian.

Korean Consumers Concerns About BSE

As the focus group participants discussed, they were very concerned about the safety of beef because of their concerns and uncertainty regarding Mad Cow Disease. In particular, consumers associated beef from the U.S. with Mad Cow Disease. Several focus group participants indicated an unwillingness to purchase or consume any beef from the United States due to Mad Cow Disease concerns. To determine a quantitative measure of concern regarding BSE, consumers were asked to indicate their level of concern about the disease. Consumers expressed a high level of concern about Mad Cow Disease, with 90% of consumers indicating

they were either very or extremely concerned. As we will discuss in the next section, this high level of concern was also indicated when consumers were asked to rate marketing claims – the claim *Tested to be free of Mad Cow Disease* received the highest mean rating relative to other claims in a list of 14. The majority of consumers indicated that they had changed their beef purchasing behavior due to Mad Cow Disease. The largest number indicated they shifted their consumption of beef to other meats such as pork, poultry and fish and away from beef. This change and several others (S*topped consuming beef completely, Decreased consumption of beef, Stopped purchasing any imported beef*) suggest that Korean media reports on BSE *not only* harmed Korean's confidence in U.S. beef, but it also had a potential long-term negative affect on total demand for beef in Korea.

Important Beef Characteristics, Attributes and Marketing Claims

Consumers were asked to indicate the five most important characteristics to them when searching for "high quality beef" at the supermarket. Their responses to these questions are shown in Table 4 and can be used by exporters to develop products with characteristics which better meet Korean consumers' demands and give them a competitive edge in the market. Interestingly, when summing the total number of people who ranked a characteristic as important (gave it any score of 1-5), *cut of meat* overwhelmingly had the highest percent (83%) of consumers ranking it as important and *country-of-origin* ranked sixth, suggesting *country-of-origin* is not a primary issue for all Koreans. The attributes of *chilled (not frozen)* (67%), *grade* (65%), *price* (60%), *color* (57%), *country-of-origin* or *region* (57%), and *marbling* (56%) were also viewed to be very important characteristics by the majority of consumers. Less than one-quarter of the consumers indicated that they considered *leanness* (21%), *brand* (15%), *frozen*

(8%), *grass-fed beef* (7%), *grain-fed beef* (1%) and *other* (1%) to be one the top five most important characteristics when purchasing beef.

In addition to the beef product characteristics ranked by consumers and discussed above, consumers were asked to use a Likert scale (where 1 = not at all important and 5 = extremely important) to rate the importance and desirability of a list of 14 marketing claims which exporters potentially could use to differentiate their products from the competition. The list of marketing claims and summary statistics for each claim are included in Table 5. *Tested to be free of Mad Cow Disease (BSE)* had the highest mean ranking. This result is not surprising given the large amount of time that Mad Cow Disease was discussed in Korean media, as indicated by the June 2007 focus group participants. On average, the marketing claims *Tenderness Guaranteed, Hormone-free Beef, Antibiotic-free Beef, Hanwoo beef, Environmentally-friendly production methods,* and *Korean Beef* were also perceived to be very important marketing claims, receiving mean ratings above very important (mean greater than 4). *Grain-fed beef* and *U.S. beef* received the lowest average mean ratings.

Consumers were also asked to use a five-point Likert scale to rate the desirability of a list of 15 general quality attributes when purchasing beef. These results are somewhat similar to those found when consumers were asked to "rank" attributes. *Freshness* (not frozen) appears to be very desirable with the highest mean rating of any attribute. Although it may be expensive, the importance of freshness may indicate the need for U.S. beef exporters to further explore transportation and shipping methods which allow more U.S. beef to arrive and to be sold as chilled (not frozen) meat in the Korean supermarket. Focus group comments from the 2007 participants indicated that one comparative advantage of Australian beef was that it was believed to be "fresher" than other imported beef. Other attributes receiving high ratings (>4) include:

Expiration Date, Food Safety Inspected, Tenderness Assurance, High Quality Grade, Bright Red Color, and *Highly Marbled*. It is interesting to point out that price, nutritional value and fat content were only moderately important relative to other attributes, and that branding, package size and preparation time are relatively less important.

Econometric Results

Preliminary results of the basic RPL estimation with no interactions or socio-demographic variables suggest that price, country-of-origin, environmentally friendly and marbling all significantly impact Korean consumers' choices of beef products (Table 6). Label information allowing consumers the opportunity to trace the product back to the farm-of-origin did not significantly influence the probability they would choose a given beef product option. Not surprisingly, price had a negative effect on product choices; higher prices decreased consumers' utility for beef products. Higher levels of marbling increased the probability a consumer would choose a specific product. If a beef product originated from the U.S. or Australia it was also significantly less likely to be chosen. The coefficients provided in Table 6 were used to estimate the marginal WTP for these product attributes.

The marginal WTP values provided in the first column of Table 7 can be interpreted as the premium for a product with the attribute relative to a domestic (Korean) beef product. For example, these results suggest that Korean consumers would be willing to pay $2.44 and $4.87 less per 100 grams than for domestic beef. Interestingly, the discount for U.S. beef was almost exactly double that of Australian beef. If beef products were labelled as environmentally friendly or were highly marbled, consumers would be willing to pay premiums of $1.66 and $1.14 more per 100 grams than for domestic beef.

To attempt to identify sources of heterogeneity a second model was also estimated, using interactions of socio-demographic information with country-of-origin (Australian and U.S.). Interactions between *ADVERTISE*, *EXPEND*, *MADCOW*, *ENVIRONMENT* and *AUSTRALIA*, and interactions between *MARBLING*, *ENVIRONMENT*, and *KIDS* and *US* were all significant and positive. The variable representing interactions between *AGE* and *US* was significant and negative. Consumers who agreed or strongly agreed with the statement "advertisements help me decide what meat products to buy," (*ADVERTISE*) were more likely to choose the Australian beef product. Additionally, consumers who spend relatively higher amounts of money on beef (*EXPEND*), had changed their beef purchasing behavior because of Mad Cow Disease (*MADCOW*) and those who rated the attribute environmentally-friendly production methods as extremely important (*ENVIRONMENT*) were more likely to choose Australian beef.

Consumers who were more likely to choose U.S. beef were consumers who rated high marbled (marbling/distribution of fat in the muscle) as the most important characteristic when searching for "high quality" beef at the supermarket, those rated environmentally-friendly production methods as extremely important and consumers, and consumers with a higher number of dependent children present in the household. Interestingly older consumers were less likely to prefer U.S. beef. This is a result that is similar to the focus group outcomes.

Again the coefficients were used to calculate marginal willingness-to-pay for attributes (Table 7). The discounts for Australian and U.S. beef relative to domestic beef were much smaller than those estimated using the model with no interactions: $1.14 per 100 grams and $3.11 per 100 grams, respectively. However, the discount for U.S. beef is now much larger relative to the discount for Australian beef. Marginal willingness-to-pay for environmentally

friendly beef and higher marbled beef are not substantially different than those estimated previously.

Summary and Implications

In June 2007, 300 Korean consumers participated in an online survey as part of a study designed to assess Korean's meat purchasing behavior, changes in meat consumption and purchasing behavior due to Mad Cow Disease, preferences for beef quality attributes, and relative perceptions of domestic versus Australian and U.S. beef. Consumers also completed a choice experiment to determine whether their beef choices were influenced by four attributes: country-of-origin, traceability, marbling and environmentally-friendly production methods, as well as various socio-demographic variables. In light of BSE and consumer concerns, and to regain consumer confidence and market share, the U.S. beef industry must consider ways to differentiate themselves from their competition and to take into account the needs of their Korean consumers.

Tested to be free of Mad Cow Disease (BSE) had the highest mean rating, on average. The marketing claims *Tenderness Guaranteed*, *Hormone-free Beef*, *Antibiotic-free Beef* and *Environmentally-friendly* production methods were rated as very important. Niche markets likely exist for beef that is guaranteed tender, hormone-free, antibiotic-free, and produced in an environmentally-friendly manner. Interestingly, consumers did not seem to have much interest in organic products or branded products. This may change if new distributors stick to a sole supplier and partner with a specific firm for a steady supply of product which meets Korean's high quality standards.

It is important to note that all of these econometric results are *preliminary* and should not yet be used to predict consumers who are more or less likely to purchase Australian or U.S. beef.

The econometric analysis is ongoing to assure appropriate model specifications are used. Initial results suggest that Korean consumers discount both U.S. and Australian beef relative to domestic beef, however, the discount for U.S. beef was estimated to be double that of Australian beef. Consumers were willing to pay positive premiums for beef products with environmentally-friendly certification and higher levels of marbling.

Both focus group and survey results suggest that Australia has established a competitive advantage over the U.S. in the Korean market. Consumers participating in this study indicated higher positive perceptions of Australian beef than of U.S. beef, particularly in the area of environmentally friendly, cleanliness, standards and credibility; and thus Korean consumers discount Australian beef less than U.S. beef relative to their domestic beef. The U.S. industry could improve perceptions and their country-image by providing Korean consumers with promotional material pointing out that U.S. beef production systems are comparable to competitors' (e.g. Australia) in terms of "environmental-friendliness".

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Table 1. Consumers' relative ratings of how U.S. beef and beef production systems compare to domestic (KOREAN) beef on various attributes.

	% of Consumers Rating Country as Better or Same			
Attribute	**Domestic (Korean) Better**	**U.S. Better**	**Both the Same**	**U.S. ≥ Domestic***
Price	11.33%	84.00%	4.67%	88.67%
Tenderness	58.67%	15.67%	25.67%	41.33%
Marbling	67.00%	9.33%	23.67%	33.00%
Muscle color	69.67%	5.67%	24.67%	30.33%
Health/nutritional value	70.00%	0.67%	29.33%	30.00%
Cleanliness	70.33%	2.67%	27.00%	29.67%
Fat Color	71.33%	3.33%	25.33%	28.67%
Trustworthiness / credibility of government	72.67%	0.33%	27.00%	27.33%
Environmentally friendly	72.67%	3.00%	24.33%	27.33%
Credibility of producers	77.00%	0.33%	22.67%	23.00%
Food Safety Standards	77.67%	4.00%	18.33%	22.33%
Flavor	82.33%	3.33%	14.33%	17.67%
Overall Quality	85.00%	1.67%	13.33%	15.00%

*This column is simply the sum of the "U.S. Better" and the "Both the Same" Columns

Table 2. Consumers' relative ratings of how AUSTRALIAN beef and beef production systems compare to domestic (KOREAN) beef on various attributes.

	% of Consumers Rating Country as Better or Same			
	Domestic Better	**Australian Better**	**Both the Same**	**Australian ≥ Domestic***
Price	12.33%	82.00%	5.67%	87.67%
Cleanliness	44.67%	23.33%	32.00%	55.33%
Environmentally friendly	45.00%	23.00%	32.00%	55.00%
Tenderness	48.67%	17.00%	34.33%	51.33%
Food Safety Standards	49.67%	15.67%	34.67%	50.33%
Marbling	54.67%	14.00%	31.33%	45.33%
Credibility of producers	55.00%	9.67%	35.33%	45.00%
Trustworthiness and credibility of government	55.33%	9.33%	35.33%	44.67%
Health/nutritional value	58.67%	3.33%	38.00%	41.33%
Fat Color	59.67%	10.00%	30.33%	40.33%
Muscle color	60.67%	10.00%	29.33%	39.33%
Overall Quality	71.00%	5.67%	23.33%	29.00%
Flavor	73.00%	5.33%	21.67%	27.00%

*This column is simply the sum of the "Australian" and the "Both the Same" Columns

Table 3. Consumers' relative ratings of how U.S. beef and beef production systems compare to AUSTRALIAN beef systems on various attributes.

	% of Consumers Rating Country as Better or Same			
	U.S. Better	**Australian Better**	**Both the Same**	**U.S. ≥ Australian***
Price	41.00%	26.00%	33.00%	74.00%
Tenderness	17.00%	41.67%	41.33%	58.33%
Health/nutritional value	3.67%	43.33%	53.00%	56.67%
Marbling	10.33%	48.33%	41.33%	51.67%
Muscle color	10.67%	49.33%	40.00%	50.67%
Flavor	13.00%	52.33%	34.67%	47.67%
Fat Color	8.67%	53.33%	38.00%	46.67%
Trustworthiness and credibility of government	2.67%	54.33%	43.00%	45.67%
Credibility of producers	2.00%	55.67%	42.33%	44.33%
Food Safety Standards	3.00%	56.67%	40.33%	43.33%
Overall Quality	7.00%	56.67%	36.33%	43.33%
Environmentally friendly	1.67%	62.00%	36.33%	38.00%
Cleanliness	1.67%	64.67%	33.67%	35.33%

*Column is the sum of the "U.S. Better" and the "Both the Same" Columns

Table 4. Percent of consumers ranking attributes as one of the 5 *characteristics that are most important* when searching for "high quality beef" at the supermarket (1 = most important, 2 = second most important, … 5 = fifth most important).

Attribute	Most Important	2nd Most Important	3rd Most Important	4th Most Important	5th Most Important	Total*
Cut of meat	23.33%	21.67%	17.00%	12.67%	8.33%	83.00%
Chilled (not frozen)	15.00%	17.67%	11.67%	13.33%	9.67%	67.33%
Grade	10.33%	14.67%	16.33%	15.33%	8.67%	65.33%
Price	3.33%	10.67%	9.33%	13.33%	23.00%	59.67%
Color	6.67%	11.00%	14.33%	13.33%	12.00%	57.33%
Country of origin	30.00%	7.33%	8.33%	6.67%	4.67%	57.00%
Marbling	8.67%	10.67%	12.33%	11.67%	13.00%	56.33%
Leanness (Less fat)	0.33%	3.00%	2.67%	6.00%	9.33%	21.33%
Brand	1.33%	0.67%	4.67%	3.33%	5.33%	15.33%
Frozen	0.00%	1.00%	2.00%	1.67%	3.00%	7.67%
Grass-fed beef	0.67%	1.67%	1.00%	1.67%	2.33%	7.33%
Grain-fed beef	0.00%	0.00%	0.00%	1.00%	0.33%	1.33%
Other	0.33%	0.00%	0.33%	0.00%	0.33%	1.00%

*Total is the total number of consumers who indicated that the attribute was one of the important.

Table 5. Mean Importance Ratings of Various Beef Marketing Claims (1 = Not at all Important and 5 = Extremely Important).

Marketing Claim	Mean	Standard Deviation	Minimum	Maximum	N
Tested to be free of Mad Cow Disease (BSE)	4.53	0.63	2	5	300
Tenderness Guaranteed	4.34	0.73	1	5	300
Hormone-free Beef	4.25	0.78	1	5	300
Antibiotic-free Beef	4.21	0.72	2	5	300
Hanwoo beef	4.21	0.80	2	5	300
Environmentally-friendly production methods	4.18	0.75	1	5	300
Korean Beef	4.13	0.79	2	5	300
Humane Production Methods	3.98	0.88	1	5	300
Organic	3.96	0.83	1	5	300
Grass-fed Beef	3.81	0.78	2	5	300
Traceable to the Farm	3.65	0.89	1	5	300
Australian Beef	3.42	0.69	1	5	300
Grain-fed Beef	3.41	0.76	1	5	300
U.S. Beef	3.16	1.02	1	5	300

Table 6. Parameter Estimates from RPL Models With and Without Interactions.

	RPL Model, No Interactions		RPL Model, With Interactions	
	Coefficient	**P-value**	**Coefficient**	**P-value**
OZ	-1.6429	0.0000	-0.7970	0.0976
US	-3.2838	0.0000	-2.1717	0.0001
TRACE	-0.1437	0.2068	-0.1384	0.2337
PRICE	-0.0007	0.0000	-0.0007	0.0000
ENVI	1.1233	0.0000	1.1745	0.0000
MARBLE	0.7706	0.0000	0.8021	0.0000
Australian Interaction Variables				
Beef Expend			0.0015	0.0012
Marbling1			-0.1668	0.6032
Advertise			0.3937	0.0616
Mad Cow			0.8230	0.0004
Age			-0.0529	0.4852
Education			0.0705	0.3974
Income			-0.0326	0.5054
# Kids			-0.0555	0.5760
Environment			0.4894	0.0104
U.S. Interaction Variables				
Beef Expend			0.0000	0.2407
Marbling1			0.6546	0.0388
Advertise			0.1192	0.6057
Mad Cow			-0.0011	0.9964
Age			-0.1555	0.0610
Education			0.0948	0.2953
Income			-0.0084	0.8737
# Kids			0.2200	0.0391
Environment			0.4255	0.0380

Table 7. Marginal Willingness-to-Pay ($US/100g)Estimates from RPL Models

Attribute	RPL Model, No Interactions	RPL Model, With Interactions
OZ	-$2.44	-$1.14
US	-$4.87	-$3.11
TRACE	-$0.21	-$0.20
ENVI	$1.66	$1.68
MARBLE	$1.14	$1.15