.

European Consumer Preferences for U.S. and Domestic Beef: Value of Source Verification and Beef Produced Without Use of Synthetic Hormones or GMO Feed Grains

by Glynn T. Tonsor and Ted C. Schroeder Agricultural Economics Kansas State University

May 15, 2003

PREPARED BY:

Glynn T. Tonsor gtonsor@agecon.ksu.edu USDA National Needs Fellow Agricultural Economics

Ted C. Schroeder tcs@ksu.edu Professor Agricultural Economics

Waters Hall Kansas State University Manhattan, KS 66506

Phone: (785) 532-4488 Fax: (785) 532-6925

We acknowledge partial funding from the Cattlemen's Beef Board and Assistance from the National Cattlemen's Beef Association in completion of this project. Special thanks are given to Alex Pegon, Isabell Goldberg, Arlo Biere, Jayson Lusk, and John Fox for their assistance in data collection and experimental design.

1	_	_	_	_	_	_	_	_	_	_	_	_	_	

TABLE OF CONTENTS

Authors	ii
Executive Summary	1
Section 1: Introduction	3
Section 2: Objectives	4
Section 3: Experimental Design	5
Section 4: Survey Responses	7
Section 5: Choice Experiment Results	23
Section 6: Conclusion	34
References	35
Appendix A	36
Appendix B	42
Appendix C	46
Appendix D	50

EXECUTIVE SUMMARY

Issue

Since the European Union (EU) implemented a ban on production and importation of meat derived from animals treated with growth-promoting hormones much debate and research has been conducted to obtain information necessary to make an objective decision on the appropriateness of the ban. Relatively little of this research has considered how EU consumers have been affected or how they feel about the ban. As on-going meat trade policy debates with Europe continue, information regarding EU consumer preferences is important for both policy negotiations and the meat production, processing, and merchandising industry.

Purpose

The purpose of this research is to determine beef product preferences of EU consumers and to elicit how much, if anything, these consumers are willing to pay for particular beef product attributes. More specifically, this study evaluates how EU consumers value beef steaks from animals produced using growth hormones, fed Genetically Modified Organisms (GMO) feeds, and from U.S. origin relative to typical and source-verified domestically produced EU steaks. A survey was used to obtain demographic information about our EU participants as well as to determine how consumers felt about various purchasing and safety issues related to meat consumption. Furthermore, a choice experiment using real money and binding shopping scenarios was used to evaluate how much, if anything, EU participants were willing to pay to obtain their preferred steak attributes. The resulting estimates are more likely to reveal true EU consumer preferences than simple surveys that do not involve real products and real money exchanging hands.

Results

Results reveal that consumers in London, England, Frankfurt, Germany, and Paris, France are, on average, willing to pay a premium (\$8.75/lb, \$3.25/lb, and \$0.98/lb, respectively) for a *USDA Choice No Hormones or GMOs* steak as opposed to their *Domestic Typical* steak. A particularly interesting result is that London and Frankfurt consumers indicated overall that they preferred a *USDA Choice No Hormones or GMOs* steak over their own domestic steak (even if the domestic steak was source verified). Paris consumers preferred a *Domestic Source Verified* steak, but their second ranked steak was the *USDA Choice No Hormones or GMOs* steak, ranked above their *Typical Domestic* steak. EU consumers also indicated a willingness to pay a premium for both U.S. produced hormone-free beef (\$0.86/lb in London, \$1.93/lb in Frankfurt, and \$0.30/lb in Paris) and for U.S. produced beef not fed genetically modified organisms (\$8.88/lb in London, \$2.55/ lb in Frankfurt, and \$2.79/lb in Paris) relative to *USDA Choice* beef produced using traditional production practices that include use of growth implants and GMO feed.

11					1.0			- 11 - 11 - 11 - 11 - 11 - 11 - 11 - 1		
	 	 	-	_		-	-	 _	-	 100

Implications

EU consumers indicated a willingness to pay to obtain U.S. Choice beef, but only if it was produced without the use of synthetic hormones or GMO feeds. This research is one of a few recent studies finding this same result. To gain market share in the EU, if U.S. beef was allowed, it appears that a product labeled as produced without the use of GMO feed and synthetic growth hormones would have the most potential for gaining market share. In fact, our results suggest such a product has potential for substantial market share in all three countries and could even be the dominant product in London and Frankfurt. In order for traditional U.S. beef produced using growth hormones and GMO feeds to gain acceptance by EU consumers, it appears considerable consumer educational effort would be necessary.

Lingering Questions

Further cost-benefit research should be conducted to compare the premiums such labels may attract with the additional costs associated with producing such products. Whether in the long run additional education efforts of EU consumers could help alleviate their concerns about the use of GMO feeds and synthetic growth hormones is a question not addressed in this research, but our results indicate that this would be an important consideration.

SECTION 1: INTRODUCTION

On January 1, 1989, the European Union (EU) enacted a ban on the production and importation of meat derived from animals treated with growth-promoting hormones. Since the implementation of this ban, much debate and research has been conducted on the issue. Growth-promoting hormones are widely used in several meat-producing countries for beef production as they increase efficiency and produce a leaner carcass, leading to more bottom-line profit for the producer. The EU hormone ban is based on the premise that there could be adverse health effects on humans who consume beef produced utilizing growth hormones. Numerous scientific studies that have been conducted find no adverse human health effects resulting from consumption of beef raised with growth hormones. In fact, hormone levels (in estradiol equivalents) in beef are much less than those found in eggs (U.S. Mission to EU 1999). The current EU ban is inconsistent with the Uruguay Round Agreement on Health and Safety Measures used to restrict imports as ruled by the World Trade Organization's (WTO) dispute settlement panels.

The vast majority of slaughter cattle in the United States are administered growthpromoting hormones; and as a result U.S. beef producers have effectively been shut out of the potential European beef market. More recently, the EU also has raised concerns about U.S. feeding of Genetically Modified Organisms (GMO) feed grains. Again, no scientific basis for concern exists for GMO feed grains. Nonetheless, this has provided another source of contention in EU-U.S. meat trade negotiations. The European Union, with a population of more than 375 million, gross domestic product of over \$7.5 trillion, and a possible expansion from the current 15 to 27 countries over the next decade, represents a vast economic market in which American beef producers are currently excluded. Estimates range from \$100 to over \$200 million dollars in lost U.S. exports as a result of the current EU ban (Ahearn 2002).

Many have questioned the motivations behind the EU ban. Hanrahan (2000) contends that by 1985 beef surpluses within the European Union were so extensive that policy makers were supportive of just about any policy, which would limit beef imports that were "interfering" with the operation of the Common Agricultural Policy. European beef producers have staunchly supported the ban as it limits their competition and strengthens the EU's ability to maintain domestic beef prices, which are in excess of prevailing world prices. Few studies however have been done to determine how European consumers feel about the ban or about beef produced using synthetic growth hormones or GMO feeds. Consumers may be adversely affected by the EU ban since it results in an absence of choice between hormone-free or GMO-free beef and cheaper beef products (Bureau, Marette, and Schiavina 1998).

SECTION 2: OBJECTIVES

A better understanding of EU consumer preferences regarding meat products is important for policy makers negotiating trade relations, associations developing global markets for beef, and meat producers affected by the EU ban. The objective of this report is to determine beef product preferences of consumers within the EU using a research methodology designed to illicit how much consumers are willing to pay to avoid certain meat attributes or to obtain other particular product characteristics. More specifically, this study evaluates how EU consumers value beef steaks from animals administered growth hormones, fed genetically modified feeds, and from different countries of origin relative to their typical, domestically produced steak products. In particular, questions addressed in this study include: How much is it worth to European consumers to have a beef product that is assured to be free of growth-promoting hormones or not fed genetically modified organisms feed grains? Is a United States country of origin designation deemed to be valuable to European consumers in their demand for U.S. beef? This latter question is particularly relevant given EU problems with BSE in their beef supply in recent years.

SECTION 3: EXPERIMENTAL DESIGN

To determine EU consumer beef preferences we used a combination of a survey and a choice experiment (see Appendices A, B, and C). The survey was designed to obtain demographic information about the EU participants and to acquire a sense for how the participant felt about various purchasing and safety issues related to meat consumption. The choice experiment was chosen to estimate what, if anything, European consumers are willing to pay to avoid having growth hormones and or genetically modified organisms used in the production of their beef. The choice experiment method has been found to be accurate in eliciting such willingness to pay estimates, and it is considered a closer simulation to real-life purchasing situations than traditional survey methods (Lusk et al. 1999). In the choice experiment consumers were presented with a set of 16 different purchasing scenarios for five different steaks (see Appendix C). Table 1 provides descriptions of the five steaks. The five types chosen for this study were 1) USDA Choice steak, 2) USDA Choice No Hormones steak, 3) USDA Choice No Hormones or GMO steak, 4) Domestic Typical steak, and 5) Domestic Source Verified steak. Consumers were informed that one of the shopping scenarios would be randomly selected as binding and real steak and actual money would be exchanged (i.e., the participant would pay the price listed in the scenario for the steak they selected and they would receive that steak), so they were told that it was important they answer each shopping scenario with the idea that it could be binding.

The data were collected from August 5, 2002, to August 15, 2002, in the London, England; Frankfurt, Germany; and Paris, France, areas. Overall, 248 people participated in the study across the three countries. Given the intensive one-on-one data collection process used in this study, relative to a simple mail out survey, this is actually a large number of participants. Data were collected from the London area from August 6-8 with 121 individuals participating. On August 6-7 participants from Bromley South, England, near a Sainsbury's grocery store were solicited and on August 8 experiments at another Sainsbury's store in Faversham, England, were conducted. Data were collected from Frankfurt August 10-12 in a large shopping area similar to an American farmer's market. In Frankfurt, 65 individuals participated in our experiment. Finally, the experiment was conducted in Paris August 14-15 in the business district of the city where 62 people participated.

When soliciting participants, as individuals passed they were asked if they would be interested in participating in our survey and choice experiment study. They were told they would be paid 10 pounds (approximately \$16 US) in England or 20 euro dollars (approximately \$20 US) in Germany and France for the 20 to 30 minutes of their time that we estimated it would take to complete the study. It was explained to participants that we were interested in studying his or her meat consumption preferences and overall thoughts and feelings toward meat products. Each tentative participant then read our instruction sheets (copy is provided in appendix A) and decided if they still wished to participate.

They were informed that if they participated they would pay the price for the shopping scenario that was randomly selected and they would receive the respective steak that they selected in that scenario. To practice and further demonstrate to the participants

ш.	L	<u>а</u>	 L	ц —	 ш. —	ш.	L	L	<u> </u>	<u>ـ</u>	L	Ш
_					-		-					

that we were serious, first each person participated in a short shopping scenario using candy bars. One of the scenarios was binding and the participant paid the price and received the candy bar that he or she selected. Those that elected to participate read the steak information sheet and then completed a survey and the choice experiment. While participants completed the surveys and choice experiments, we were available to answer or clarify questions as necessary. After the surveys and choice experiments were completed, it was explained to the participants that although our instructions indicated that they would have to purchase a steak from us, we were unable to actually sell them one. This is because it is illegal to have U.S. beef in the European Union as a result of the current beef ban. It was extremely important to maintain the guise with each participant that the steak was actually going to be purchased in order to obtain the most reliable results. Finally, the participant was paid the participation fee and thanked for their time.

Steak Name	Description
USDA Choice	Steak produced in the U.S. under typical U.S. production practices. <i>USDA Choice</i> label denotes that the United States Department of Agriculture (USDA) has inspected this steak and given its second highest quality grade.
USDA Choice No Hormones	Steak produced in the U.S. under typical U.S. production practices, but is guaranteed to not have been injected with any growth hormones or antibiotics during production.
USDA Choice No Hormones or GMOs	Steak produced in the U.S. without added hormones, was not fed antibiotics, and was not fed genetically modified crops.
Domestic Source Verified	Steak produced under typical production conditions and regulations within the country being studied (e.g. England, Germany, or France). Beyond the fact that the steak has been inspected, no other guarantees about the meat quality are provided.
Domestic Typical	Steak produced within the country being studied. Production practices and the actual names of the farmer/feeder who raised the animal are provided. Besides the government inspection, no other quality guarantees are provided.

Table #1. Description of Steaks Used in Choice Experiment*

* All steaks were described as being equal in weight (0.35kg or 12 oz.), packaging, and freshness.

SECTION 4: SURVEY RESPONSES

In total, 248 consumers participated in this study. Given the way this study was conducted (i.e., randomly selecting people as they walked by in shopping malls and grocery stores) it is not a random stratified sample of EU consumers overall. Such studies are quite difficult to conduct with a complete random and/or stratified sample of the population. However, we had a representative sample of consumers on their food shopping trip in the respective cities and stores. So, although results need to be interpreted with this in mind, given how similar our results are to other recent studies, our findings add further important information to understanding EU consumer preferences.

A summary of the demographics of the participants is provided in Table 2. Survey participants were about equally split between males and females overall with some variation across different countries. The average age was 36 years and most participants had some college education, lived in households of two or three people, and had an annual household income equivalent of \$30,000 to \$50,000. Nearly three-fourths of those surveyed did not currently have children under the age of 12 living at home.

Table 3 provides a summary of the consumption patterns obtained from the survey. Twenty-six percent of the participants consumed minced beef one or two times per month and 64% consumed minced beef three or more times per month. Thirty-four percent ate beef steak one or two times per month and 50% percent consumed beef steak three or more times per month. Over 25% of Paris participants indicated that they consumed beef steak more than six times per month. Poultry was clearly the primary meat product consumed with more than 44% of those surveyed consuming poultry (chicken or turkey) in excess of six times per month. About 30% ate fish more than six times per month.

In Table 4 results of survey questions eliciting consumer knowledge of several meat consumption issues are summarized. On a scale of 1 to 5 (1 being "No Knowledge" and 5 being "Very Knowledgeable") consumers were asked how knowledgeable they felt they were on "Cattle production practices," the "U.S. Beef Quality Grading System," "Beef Slaughter practices," the "Use of Growth Hormones in animals," and the "Use of Genetically Modified Feeds." More than 35% percent claimed "No Knowledge" to all five of these issues. Over 70% of the participants in all three cities claimed "No Knowledge" of the "U.S. Beef Quality Grading System" Moreover, 42% percent indicated "No Knowledge" of the "Use of Growth Hormones in animals" with more than 55% in London having no knowledge of growth hormones. Nearly 40% claimed "No Knowledge" of the "Use of genetically modified feeds." Not surprisingly, a strong relationship was present (correlation of 0.802) between the consumer's knowledge of growth hormone use and the use of genetically modified feeds. Based upon results from these survey respondents, EU consumers, not surprisingly, do not have much familiarity with typical U.S. beef production practices.

Table 5 summarizes how important consumers considered various steak attributes when purchasing beef steak. Many consumers claimed that country of origin was important with 52% responding with a 4 or 5 (very important) and only 22% responding with a 1 or 2 (not important). Large numbers of respondents indicated concern over use

		1.1		1.1		1.0	114	1.1	1.1			
1	-		_	_	 _	1	-	 _		_	_	

Table 2. Demographic Variables and Summary Statistics of European Consumer Participants									
Biographical Data	London	Frankfurt	Paris	Overall					
Number of Participants									
1= Male	53	41	33	127					
2 = Female	68	24	29	121					
Total Participants	121	65	62	248					
Gender of participant									
1 = Male	43.80%	63.08%	53.23%	51.21%					
2 = Female	56.20%	36.92%	46.77%	48.79%					
Age of participant									
1 =Under 25	30.58%	30.77%	23.81%	28.94%					
2 = 25-34	23.97%	26.15%	41.27%	28.87%					
3 = 35-44	14.05%	27.69%	14.29%	17.68%					
4 = 45-54	8.26%	7.69%	12.70%	9.22%					
5 = 55-64	10.74%	3.08%	4.76%	7.24%					
6 = Over 64 years	12.40%	4.62%	3.17%	8.05%					
Average age (years)	38.43	33.43	33.43	35.87					
Average # of individuals in household									
1 = 1	22.31%	27.69%	25.40%	24.49%					
2 = 2	24.79%	27.69%	28.57%	26.50%					
3 = 3	19.83%	18.46%	12.70%	17.69%					
4 = 4	21.49%	16.92%	15.87%	18.89%					
5 = 5 or more	11.57%	9.23%	17.46%	12.43%					
Average (number)	2.88	2.91	2.81	2.87					
Children in household under age 12									
1 = Yes	32.50%	15.63%	23.81%	25.90%					
2 = No	67.50%	84.38%	76.19%	74.10%					
Average (number)	1.68	1.84	1.76	1.74					

able 2.	Demographic	Variables and	Summary	Statistics	of European	Consumer	Participant

ш.	1	1		1		1	1		1

5 1		I N	,	
Biographical Data	London	Frankfurt	Paris	Overall
Educational Background				
1 = High School Diploma	22.31%	36.92%	19.05%	25.33%
2 = Some College	29.75%	4.62%	7.94%	17.71%
3 = Technical School Diploma	5.79%	3.08%	7.94%	5.61%
4 = Associate's Degree	2.48%	6.15%	7.94%	4.81%
5 = Bachelor's Degree	19.83%	6.15%	6.35%	12.88%
6 = Master's Degree	3.31%	18.46%	39.68%	16.37%
7 = Juris Doctorate	0.00%	9.23%	4.76%	3.61%
8 = Doctorate	2.48%	15.38%	6.35%	6.83%
9 = Other	14.05%	0.00%	0.00%	6.85%
Household Income Level				
1 = Less than \$10,000	15.83%	23.08%	11.11%	16.55%
2 = \$10,000 to \$29,999	28.33%	18.46%	39.68%	28.58%
3 = \$30,000 to \$49,999	25.83%	18.46%	22.22%	23.00%
4 = \$50,000 to \$69,999	10.83%	16.92%	17.46%	14.09%
5 = \$70,000 to \$99,999	10.83%	7.69%	4.76%	8.49%
6 = \$100,000 to \$119,999	5.00%	6.15%	3.17%	4.85%
8 = \$140,000 to \$159,999	0.00%	1.54%	1.59%	0.80%
9 = \$160,000 to \$179,999	2.50%	1.54%	0.00%	1.62%
10 = More than \$180,000	0.83%	4.62%	0.00%	1.62%
Average (level selected)	3.08	3.42	2.83	3.11

 Table 2. Demographic Variables of EU Consumer Participants (continued)

	Ш.		<u> </u>	1		1	_	1		1		<u> </u>	1		
--	----	--	----------	---	--	---	---	---	--	---	--	----------	---	--	--

	London	Frankfurt	Paris	Overall
Times minced beef is consumed per month				
1 = None	12.04%	5.66%	8.93%	9.59%
2 = 1 or 2 times	32.41%	24.53%	17.86%	26.70%
3 = 3 or 4 times	34.26%	34.26%	34.26%	34.26%
4 = 5 or 6 times	7.41%	7.55%	23.21%	11.40%
5 = Over 6 times	13.89%	20.75%	25.00%	18.47%
Average (times per month)	3.70	4.09	5.25	4.19
Times beef steak is consumed per month				
1 = None	16.04%	21.95%	1.69%	14.00%
2 = 1 or 2 times	36.79%	36.59%	28.81%	34.74%
3 = 3 or 4 times	25.47%	21.95%	35.59%	27.08%
4 = 5 or 6 times	8.49%	12.20%	8.47%	9.46%
5 = Over 6 times	13.21%	7.32%	25.42%	14.72%
Average (times per month)	3.46	2.85	5.12	3.72
Times poultry (chicken & turkey) is consume	ed per month			
1 = None	1.67%	0.00%	0.00%	0.81%
2 = 1 or 2 times	10.00%	11.48%	9.68%	10.31%
3 = 3 or 4 times	20.00%	24.59%	29.03%	23.46%
4 = 5 or 6 times	19.17%	18.03%	27.42%	20.93%
5 = Over 6 times	49.17%	45.90%	33.87%	44.49%
Average (times per month)	7.81	7.25	6.76	7.40
Times pork is consumed per month				
1 = None	15.60%	11.11%	23.08%	16.29%
2 = 1 or 2 times	41.28%	22.22%	40.38%	36.06%
3 = 3 or 4 times	16.51%	29.63%	19.23%	20.63%
4 = 5 or 6 times	9.17%	7.41%	11.54%	9.30%
5 = Over 6 times	17.43%	29.63%	5.77%	17.71%
Average (times per month)	3.57	5.26	2.39	3.72

	Table 3.	Food Purchasin	g, Consumption, an	d Perception	Variables and	Summary Statistics
--	----------	----------------	--------------------	--------------	---------------	--------------------

Ш.	LL	<u> </u>	1	Ш.	1	1			1	L	

	London	Frankfurt	Paris	Overall
Times lamb is consumed per month				
1 = None	17.31%	34.21%	19.61%	22.31%
2 = 1 or 2 times	38.46%	28.95%	37.25%	35.67%
3 = 3 or 4 times	25.96%	10.53%	23.53%	21.31%
4 = 5 or 6 times	5.77%	7.89%	11.76%	7.83%
5 = Over 6 times	12.50%	18.42%	7.84%	12.89%
Average (times per month)	3.12	3.21	2.65	3.02
Times fish is consumed per month				
1 = None	9.32%	8.33%	3.28%	7.55%
2 = 1 or 2 times	18.64%	18.33%	27.87%	20.87%
3 = 3 or 4 times	23.73%	36.67%	14.75%	24.88%
4 = 5 or 6 times	13.56%	15.00%	24.59%	16.69%
5 = Over 6 times	34.75%	21.67%	29.51%	30.01%
Average (times per month)	6.10	4.55	5.07	5.44

fable 3. Food Purcha	ising, Consum	ption, and Pero	ception Variab	les (continued)
----------------------	---------------	-----------------	----------------	-----------------

,

ш.	L		1			L	<u> </u>	L	

	London	Frankfurt	Paris	Overall
Knowledge of cattle production practices				
1 = No Knowledge	48.31%	25.86%	30.16%	37.89%
2 =	27.97%	22.41%	26.98%	26.27%
3 =	16.95%	16.95%	16.95%	16.95%
4 =	5.08%	17.24%	17.46%	11.36%
5 = Very Knowledgeable	1.69%	1.72%	4.76%	2.47%
Knowledge of U.S. beef quality grading system	n			
1 = No Knowledge	71.19%	73.85%	72.13%	72.12%
2 =	16.95%	16.92%	18.03%	17.21%
3 =	9.32%	9.23%	3.28%	7.79%
4 =	1.69%	0.00%	6.56%	2.47%
5 = Very Knowledgeable	0.85%	0.00%	0.00%	0.41%
Knowledge of beef slaughter practices				
1 = No Knowledge	41.53%	27.69%	35.48%	36.39%
2 =	28.81%	41.54%	30.65%	32.61%
3 =	21.19%	21.54%	20.97%	21.22%
4 =	6.78%	7.69%	8.06%	7.34%
5 = Very Knowledgeable	1.69%	1.54%	4.84%	2.44%
Knowledge of growth hormone use in animals	5			
1 = No Knowledge	55.56%	31.25%	30.16%	42.84%
2 =	21.37%	37.50%	19.05%	25.02%
3 =	15.38%	25.00%	26.98%	20.80%
4 =	5.98%	3.13%	22.22%	9.29%
5 = Very Knowledgeable	1.71%	3.13%	1.59%	2.05%
Knowledge of use of genetically modified feed	ls			
1 = No Knowledge	47.46%	38.46%	26.98%	39.98%
2 =	26.27%	36.92%	22.22%	28.05%
3 =	13.56%	16.92%	12.70%	14.23%
4 =	8.47%	4.62%	30.16%	12.88%
5 = Very Knowledgeable	4.24%	3.08%	7.94%	4.86%

Table 4. Knowledge of Meat Issues and Summary Statistics

-

1		1		1					
		100	 -		-			-	 100

	^	London	Frankfurt	Paris	Overall
Price					
	1 = Not Important	12.93%	9.23%	3.17%	9.52%
	2 =	10.34%	13.85%	19.05%	13.44%
	3 =	33.62%	33.62%	33.62%	33.62%
	4 =	17.24%	24.62%	23.81%	20.82%
	5 = Very Important	25.86%	20.00%	23.81%	23.81%
Color					
	1 = Not Important	2.54%	1.54%	1.59%	2.04%
	2 =	9.32%	10.77%	3.17%	8.16%
	3 =	19.49%	27.69%	20.63%	21.93%
	4 =	31.36%	30.77%	38.10%	32.89%
	5 = Very Important	37.29%	29.23%	36.51%	34.98%
Externa	l Fat				
	1 = Not Important	7.69%	4.69%	6.45%	6.59%
	2 =	5.98%	3.13%	11.29%	6.56%
	3 =	7.69%	25.00%	16.13%	14.34%
	4 =	33.33%	29.69%	30.65%	31.71%
	5 = Very Important	45.30%	37.50%	35.48%	40.80%
Internal	Fat (Marbling)				
	1 = Not Important	8.62%	3.08%	8.06%	7.03%
	2 =	6.90%	4.62%	16.13%	8.61%
	3 =	17.24%	27.69%	20.97%	20.91%
	4 =	34.48%	40.00%	25.81%	33.76%
	5 = Very Important	32.76%	24.62%	29.03%	29.69%
Brand (Label)				
	1 = Not Important	20.51%	7.81%	12.90%	15.28%
	2 =	16.24%	18.75%	9.68%	15.26%
	3 =	24.79%	28.13%	14.52%	23.09%
	4 =	11.11%	25.00%	41.94%	22.46%
	5 = Very Important	27.35%	20.31%	20.97%	23.91%

Table 5.	Steak Attributes and	Importance in	Purchasing Steak	and Summary	Statistics
		por united in			

1	11	11	 11	 1	11	11	11	11	11	 11	11
			 		100			-			

I	8	(/	
	London	Frankfurt	Paris	Overall
Country of origin				
1 = Not Important	17.09%	6.25%	7.94%	11.96%
2 =	13.68%	6.25%	11.11%	11.09%
3 =	28.21%	23.44%	17.46%	24.27%
4 =	15.38%	26.56%	20.63%	19.63%
5 = Very Important	25.64%	37.50%	42.86%	33.05%
USDA quality grade				
1 = Not Important	27.59%	19.35%	40.32%	28.61%
2 =	14.66%	14.52%	22.58%	16.60%
3 =	21.55%	17.74%	12.90%	18.39%
4 =	18.10%	30.65%	14.52%	20.49%
5 = Very Important	18.10%	17.74%	9.68%	15.90%
Use of growth hormones				
1 = Not Important	17.09%	7.81%	4.76%	11.58%
2 =	11.97%	9.38%	9.52%	10.68%
3 =	21.37%	14.06%	17.46%	18.48%
4 =	13.68%	20.31%	25.40%	18.35%
5 = Very Important	35.90%	48.44%	42.86%	40.92%
Feeding genetically modified grain				
1 = Not Important	22.22%	7.69%	4.76%	14.05%
2 =	7.69%	9.23%	12.70%	9.35%
3 =	20.51%	15.38%	12.70%	17.22%
4 =	15.38%	16.92%	25.40%	18.29%
5 = Very Important	34.19%	50.77%	44.44%	41.10%

 Table 5. Steak attributes and Importance in Purchasing Steak (continued)

ш	L	<u> </u>	L	Ш. — — — — — — — — — — — — — — — — — — —	L	1	Ш. —	L	L	<u> </u>	1	L	ш

of growth hormones and genetically modified feed with nearly 60% ranking these with a 4 or 5 (very important). Nearly 30% claimed the USDA Quality Grade was "Not Important" in making steak purchasing decisions which is not surprising given that many European consumers are not familiar with U.S. beef. Color, external fat, and internal fat also appear to be important to consumers when they are choosing their steaks, but less so than growth hormones or genetically modified feed usage.

Table 6 summarizes how those surveyed responded to various issues affecting meat consumption patterns. Approximately 60% stated that Foot-and-Mouth Disease and Bovine Spongiform Encephalopathy (BSE) have had a "Major Affect" on their meat consumption patterns. Only 31% and 38%, respectively, of the participants indicated that use of genetically modified crops as feed ingredients for beef production and the use of growth hormones have had a "Major Affect" on their meat consumption patterns. Based on these responses, it appears that our participants were more concerned with BSE and Foot-and-Mouth Disease than with the use of genetically modified feed grains and growth hormones in beef production. This is one dimension that could bode well for U.S. beef in Europe if the U.S. can maintain absence of both of these problems in their beef herd.

Table 7 provides a breakdown of how participants felt about a series of beef attributes. Collectively, more than 65% "agree" or "very much agree" with the statements "Beef is generally nutritious/wholesome" and "Beef is generally easy to prepare". When asked if they consider "Beef (to be) generally safe," consumers yielded a wide array of responses. On a scale of 1 to 5 (1 being "Totally Disagree" and 5 being "Very Much Agree"), 26% of the participants noted a 1 or 2, with 35% of Frankfurt participants indicating a 1 or 2, while 35% provided a 4 or 5. Only 16% strongly agreed with the statement "Beef is generally consistent." On the same scale of 1 to 5, nearly 35% noted a 3 on this question. Tables 8 and 9 show how survey participants rank the meat species according to their relative attribute performance. The overall most superior valued product tended to be poultry (44% of respondents) and beef had a much smaller frequency of superior rating with only 11% indicating it offered the superior attributes (Table 8). In contrast, 29% indicated that beef had the most inferior overall value (Table 9). When compared to pork, poultry, fish, and lamb, beef was viewed as having relatively superior consistency, tenderness, and juiciness (Table 8). Furthermore, 49% felt that beef was inferior in terms of "safety" and 27% indicated beef to be the least "healthy" of the five meats (Table 9). A large percentage of participants indicated fish was superior to the other species with regards to health (68% ranked fish first), safety (55% ranked fish first) and nutrition (47% ranked fish first) – Table 8. In contrast, fish was the meat most often noted to be most difficult to prepare (Table 9).

1	1	<u> </u>	1		1	1	1		Ш.	1	1	1		Ш
---	---	----------	---	--	---	---	---	--	----	---	---	---	--	---

	London	Frankfurt	Paris	Overall
Genetically modified crops as feed ingredie	ents for beef pr	oduction		
1 = Not Important	22.88%	9.38%	6.35%	15.21%
2 =	10.17%	12.50%	19.05%	13.00%
3 =	27.12%	27.12%	27.12%	27.12%
4 =	13.56%	20.31%	25.40%	18.29%
5 = Very Important	26.27%	40.63%	31.75%	31.40%
Growth hormone use in beef production				
1 = Not Important	20.34%	4.69%	6.35%	12.74%
2 =	11.86%	6.25%	12.70%	10.60%
3 =	23.73%	15.63%	17.46%	20.04%
4 =	10.17%	28.13%	23.81%	18.29%
5 = Very Important	33.90%	45.31%	39.68%	38.34%
Bovine Spongiform Encephalopathy (BSE)				
1 = Not Important	16.24%	3.13%	9.52%	11.12%
2 =	7.69%	7.81%	3.17%	6.59%
3 =	12.82%	6.25%	7.94%	9.88%
4 =	8.55%	14.06%	19.05%	12.62%
5 = Very Important	54.70%	68.75%	60.32%	59.79%
Foot-and-Mouth Disease				
1 = Not Important	11.76%	7.81%	7.94%	9.77%
2 =	6.72%	3.13%	7.94%	6.08%
3 =	11.76%	7.81%	6.35%	9.37%
4 =	11.76%	18.75%	20.63%	15.81%
5 = Very Important	57.98%	62.50%	57.14%	58.96%

Table 6. Issues and Their Effects on Meat Consumption

11	10	11		111	11		11	10	11	11	111		11	11
-	-	1000	-		-	-		1000	-	-	-	-		-

		London	Frankfurt	Paris	Overall
Consistent					
1 = Totall	y Disagree	6.72%	18.75%	4.84%	9.40%
2 =		17.65%	15.63%	6.45%	14.32%
3 =		44.54%	44.54%	44.54%	44.54%
4 =		18.49%	18.75%	27.42%	20.79%
5 = Very	Much Agree	12.61%	6.25%	33.87%	16.26%
Tender					
1 = Totall	y Disagree	1.69%	1.56%	1.64%	1.65%
2 =		15.25%	7.81%	6.56%	11.13%
3 =		38.14%	32.81%	27.87%	34.17%
4 =		27.12%	29.69%	26.23%	27.57%
5 = Very	Much Agree	17.80%	28.13%	37.70%	25.48%
Safe					
1 = Totall	y Disagree	5.93%	14.06%	13.11%	9.86%
2 =		11.02%	25.00%	11.48%	14.80%
3 =		28.81%	25.00%	24.59%	26.76%
4 =		26.27%	6.25%	34.43%	23.06%
5 = Very	Much Agree	27.97%	29.69%	16.39%	25.52%
Nutritious/Wholes	rome				
1 = Totall	y Disagree	2.59%	1.61%	1.61%	2.09%
2 =		5.17%	6.45%	8.06%	6.23%
3 =		26.72%	16.13%	14.52%	20.90%
4 =		38.79%	48.39%	33.87%	40.08%
5 = Very	Much Agree	26.72%	27.42%	41.94%	30.71%
Juicy					
1 = Totall	y Disagree	3.39%	1.59%	1.61%	2.47%
2 =		6.78%	6.35%	11.29%	7.79%
3 =		33.90%	30.16%	43.55%	35.33%
4 =		33.05%	38.10%	32.26%	34.17%
5 = Very	Much Agree	22.88%	23.81%	11.29%	20.23%

 Table 7. Beef Attribute Perceptions and Summary Statistics

-	 -	 	 _	 1000	 	-	 -	1.1

	London	Frankfurt	Paris	Overall
Easy to prepare				
1 = Totally Disagree	2.56%	7.81%	0.00%	3.30%
2 =	2.56%	6.25%	4.92%	4.12%
3 =	25.64%	26.56%	21.31%	24.80%
4 =	35.04%	29.69%	27.87%	31.85%
5 = Very Much Agree	34.19%	29.69%	45.90%	35.94%
Healthy				
1 = Totally Disagree	4.20%	1.56%	0.00%	2.46%
2 =	9.24%	10.94%	9.68%	9.80%
3 =	28.57%	42.19%	27.42%	31.85%
4 =	24.37%	17.19%	33.87%	24.86%
5 = Very Much Agree	33.61%	28.13%	29.03%	31.03%

 Table 7. Beef Attribute Perceptions and Summary Statistics (continued)

	U U	L L	ш.	L L		п п				
--	-----	-----	----	-----	--	-----	--	--	--	--

Table 8. Meat Attributes Selected Superior by Participants											
Product Attribute	London	Frankfurt	Paris	Overall							
Overall Price Value											
1 = Beef	18.26%	6.25%	3.28%	11.37%							
2 = Pork	16.52%	29.17%	40.98%	25.95%							
3 = Poultry	44.35%	44.35%	44.35%	44.35%							
4 = Fish	13.91%	0.00%	4.92%	8.02%							
5 = Lamb	6.96%	14.58%	3.28%	8.04%							
Consistent											
1 = Beef	18.58%	51.72%	55.00%	36.37%							
2 = Pork	9.73%	10.34%	13.33%	10.79%							
3 = Poultry	42.48%	17.24%	15.00%	28.99%							
4 = Fish	21.24%	0.00%	8.33%	12.45%							
5 = Lamb	7.96%	20.69%	8.33%	11.39%							
Tender											
1 = Beef	38.26%	18.97%	32.79%	31.84%							
2 = Pork	4.35%	8.62%	3.28%	5.20%							
3 = Poultry	19.13%	32.76%	8.20%	19.97%							
4 = Fish	16.52%	27.59%	37.70%	24.72%							
5 = Lamb	21.74%	12.07%	18.03%	18.28%							
Safe											
1 = Beef	17.92%	3.70%	9.84%	12.18%							
2 = Pork	4.72%	11.11%	1.64%	5.62%							
3 = Poultry	19.81%	22.22%	13.11%	18.77%							
4 = Fish	50.00%	48.15%	72.13%	55.05%							
5 = Lamb	7.55%	14.81%	3.28%	8.38%							
Nutritious/Wholesome											
1 = Beef	17.43%	18.18%	49.18%	25.57%							
2 = Pork	1.83%	10.91%	4.92%	4.98%							
3 = Poultry	21.10%	23.64%	6.56%	18.13%							
4 = Fish	51.38%	47.27%	37.70%	46.88%							
5 = Lamb	8.26%	0.00%	1.64%	4.44%							

Table 8 Meat Attributes Selected Superior by Participants

11	11	11	 11	11	 11	 11	11	11	 11	11
			 100		 10.0		110		 100	

Product Attribute	London	Frankfurt	Paris	Overall
Juicy				
1 = Beef	50.89%	33.33%	59.32%	48.40%
2 = Pork	10.71%	29.82%	1.69%	13.47%
3 = Poultry	12.50%	17.54%	5.08%	11.97%
4 = Fish	6.25%	5.26%	11.86%	7.39%
5 = Lamb	19.64%	14.04%	22.03%	18.77%
Easy to prepare				
1 = Beef	21.93%	20.69%	32.79%	24.32%
2 = Pork	5.26%	18.97%	9.84%	10.00%
3 = Poultry	33.33%	43.10%	39.34%	37.40%
4 = Fish	33.33%	17.24%	16.39%	24.88%
5 = Lamb	6.14%	0.00%	1.64%	3.41%
Healthy				
1 = Beef	5.31%	3.77%	16.39%	7.68%
2 = Pork	3.54%	1.89%	0.00%	2.22%
3 = Poultry	20.35%	18.87%	3.28%	15.70%
4 = Fish	65.49%	67.92%	73.77%	68.20%
5 = Lamb	5.31%	7.55%	6.56%	6.21%

 Table 8. Meat Attributes Selected Superior by Participants (continued)

A CONTRACTOR OF A DESCRIPTION OF A DESCRIPANCO OF A DESCRIPTION OF A DESCRIPTION OF A DESCRIPTION OF A DESCR

Ш.	1			1	1		1	_	 1

Product Attribute	London	Frankfurt	Paris	Overall
Overall Price Value				
1 = Beef	32.76%	19.05%	32.79%	29.17%
2 = Pork	15.52%	11.90%	8.20%	12.74%
3 = Poultry	7.76%	7.76%	7.76%	7.76%
4 = Fish	10.34%	19.05%	26.23%	16.60%
5 = Lamb	33.62%	33.33%	24.59%	31.29%
Consistent				
1 = Beef	24.56%	9.68%	8.33%	16.60%
2 = Pork	26.32%	16.13%	18.33%	21.65%
3 = Poultry	20.18%	8.06%	10.00%	14.46%
4 = Fish	11.40%	58.06%	53.33%	34.12%
5 = Lamb	17.54%	8.06%	10.00%	13.17%
Tender				
1 = Beef	27.35%	34.43%	16.39%	26.47%
2 = Pork	39.32%	22.95%	62.30%	40.77%
3 = Poultry	6.84%	0.00%	9.84%	5.80%
4 = Fish	8.55%	4.92%	1.64%	5.87%
5 = Lamb	17.95%	37.70%	9.84%	21.10%
Safe				
1 = Beef	50.00%	55.36%	41.67%	49.32%
2 = Pork	14.91%	10.71%	35.00%	18.83%
3 = Poultry	15.79%	21.43%	13.33%	16.65%
4 = Fish	12.28%	7.14%	3.33%	8.70%
5 = Lamb	7.02%	5.36%	6.67%	6.49%
Nutritious/Wholesome				
1 = Beef	17.39%	18.64%	6.78%	15.07%
2 = Pork	39.13%	44.07%	35.59%	39.54%
3 = Poultry	13.91%	8.47%	8.47%	11.13%
4 = Fish	12.17%	18.64%	37.29%	20.15%
5 = Lamb	17.39%	10.17%	11.86%	14.12%

Ш.	1	1		1	_	1	1		 1

Product Attribute	London	Frankfurt	Paris	Overall
Juicy				
1 = Beef	16.24%	25.81%	6.56%	16.33%
2 = Pork	31.62%	16.13%	50.82%	32.36%
3 = Poultry	16.24%	32.26%	22.95%	22.12%
4 = Fish	23.08%	3.23%	16.39%	16.20%
5 = Lamb	12.82%	22.58%	3.28%	12.99%
Easy to prepare				
1 = Beef	16.38%	13.79%	13.11%	14.89%
2 = Pork	16.38%	8.62%	9.84%	12.71%
3 = Poultry	17.24%	12.07%	8.20%	13.62%
4 = Fish	25.00%	34.48%	40.98%	31.48%
5 = Lamb	25.00%	31.03%	27.87%	27.30%
Healthy				
1 = Beef	30.77%	32.20%	16.67%	27.62%
2 = Pork	30.77%	42.37%	45.00%	37.37%
3 = Poultry	10.26%	10.17%	11.67%	10.59%
4 = Fish	15.38%	11.86%	18.33%	15.20%
5 = Lamb	12.82%	3.39%	8.33%	9.23%

 Table 9. Meat Attributes Selected Inferior by Participants (continued)

A COLUMN A CARD OF A RANGE OF A R

SECTION 6: CHOICE EXPERIMENT RESULTS

We utilized a choice experiment to evaluate consumer willingness to pay for, or to avoid certain steak attributes. In the choice experiment consumers were presented with a set of 16 different purchasing scenarios for five different steaks. The five steak types were 1) *USDA Choice* steak, 2) *USDA Choice No Hormones* steak, 3) *USDA Choice No Hormone* or GMOs steak, 4) *Domestic Typical* steak, and 5) *Domestic Source Verified* steak. Consumers were informed that one of 16 shopping scenarios would be randomly selected as binding and that actual steak and money would be exchanged, so they were aware of the importance in answering each scenario with the idea that it could be binding.

Results of the choice experiment are presented in Table 10. The percentage of participants who chose each steak in each shopping scenario is provided. It is noteworthy that the most popular steak selected by Paris participants was *Domestic Source Verified* steak over the other four steaks in all 16 shopping scenarios. In fact, only in scenarios # 4 and #10 did less than 50% of Paris participants choose the *Domestic Source Verified* steak. Furthermore, a higher percentage of London participants chose *USDA Choice* and *USDA Choice No Hormones or GMOs* steaks in all 16 scenarios than did their Frankfurt and Paris counterparts.

Scenario #11 was designed with all five steaks having the same price (see Appendix D). For this scenario, the USDA Choice No Hormone or GMOs steak was the most popular among London and Frankfurt participants. This indicates that if all five steaks were offered for the same price, London and Frankfurt customers actually prefer U.S. origin beef relative to beef produced in their own countries if the U.S. product is produced without use of synthetic hormones or GMO feed grains. Paris participants maintained their notable preference for the *Domestic Source Verified* steak. It also is worth mentioning that when presented with equivalent prices for all five steaks, less than 14% of participants in each country chose the *Domestic Typical* steak. This is somewhat surprising, but it suggests that U.S. produced beef without the use of growth hormones or GMO grains has appeal to European consumers. Perhaps EU consumers concern over BSE in EU beef production has reduced their confidence in the domestic product.

To determine how much consumers were willing to pay for the various steaks relative to each other we estimated a multinomial logit model. The data for each country was scaled prior to estimating this model to allow for heterogeneity of preferences by consumers in each country¹. This procedure simply enables us to determine, from the consumer choice experiment results, how consumers rank the steaks in overall preference and how much money they were willing to pay for the different steaks. Results of this model estimation are provided in Table 11. As expected, the parameter estimates indicate a negative relationship between the price of a given steak and the utility the consumer obtains from consuming that steak. From our price parameter estimate we can also see that the London consumers are the least concerned with price, followed by the

¹ London data was used as a reference group so it was scaled by 1.0, while Frankfurt and Paris data were scaled by 1.06 and 1.41, respectively.

1	_		_		_	_			_

	London	Frankfurt	Paris	Overall
Shopping Scenario #1				
$1 = USDA \ Choice$	11.86%	4.92%	1.64%	7.49%
2 = USDA Choice No Hormones	8.47%	9.84%	3.28%	7.53%
3 = USDA Choice No Hormones or GMOs	43.22%	39.34%	27.87%	38.37%
4 = Domestic Typical	9.32%	9.84%	8.20%	9.18%
5 = Domestic Source Verified	27.12%	36.07%	59.02%	37.44%
Shopping Scenario #2				
$1 = USDA \ Choice$	9.24%	6.67%	1.67%	6.67%
2 = USDA Choice No Hormones	9.24%	10.00%	6.67%	8.80%
3 = USDA Choice No Hormones or GMOs	35.29%	16.67%	11.67%	24.51%
4 = Domestic Typical	15.13%	18.33%	13.33%	15.52%
5 = Domestic Source Verified	31.09%	48.33%	66.67%	44.50%
Shopping Scenario #3				
$1 = USDA \ Choice$	9.32%	6.67%	3.39%	7.14%
2 = USDA Choice No Hormones	18.64%	38.33%	11.86%	22.11%
3 = USDA Choice No Hormones or GMOs	33.05%	18.33%	10.17%	23.47%
4 = Domestic Typical	14.41%	8.33%	5.08%	10.48%
5 = Domestic Source Verified	24.58%	28.33%	69.49%	36.79%
Shopping Scenario #4				
$1 = USDA \ Choice$	8.47%	6.56%	0.00%	5.85%
2 = USDA Choice No Hormones	22.03%	24.59%	3.33%	18.03%
3 = USDA Choice No Hormones or GMOs	36.44%	34.43%	23.33%	32.64%
4 = Domestic Typical	18.64%	16.39%	26.67%	20.06%
5 = Domestic Source Verified	14.41%	18.03%	46.67%	23.42%
Shopping Scenario #5				
$1 = USDA \ Choice$	9.24%	6.56%	5.00%	7.48%
2 = USDA Choice No Hormones	10.92%	9.84%	1.67%	8.32%
3 = USDA Choice No Hormones or GMOs	37.82%	37.70%	16.67%	32.50%
4 = Domestic Typical	13.45%	8.20%	11.67%	11.63%
5 = Domestic Source Verified	28.57%	37.70%	65.00%	40.07%

Table 10. Choice Experiment Results for Each Shopping Scenario by Country

-	_	 -	 -	_			-	_			-	1
					and the second se	and the second se	and the second se		and the second se	and the second se		_

	London	Frankfurt	Paris	Overall
Shopping Scenario #6				
$1 = USDA \ Choice$	11.86%	5.00%	3.33%	7.93%
2 = USDA Choice No Hormones	14.41%	21.67%	5.00%	13.96%
3 = USDA Choice No Hormones or GMOs	31.36%	16.67%	10.00%	22.17%
4 = Domestic Typical	19.49%	26.67%	23.33%	22.33%
5 = Domestic Source Verified	22.88%	30.00%	58.33%	33.61%
Shopping Scenario #7				
$1 = USDA \ Choice$	8.47%	5.00%	1.67%	5.86%
2 = USDA Choice No Hormones	21.19%	38.33%	8.33%	22.47%
3 = USDA Choice No Hormones or GMOs	43.22%	26.67%	23.33%	33.91%
4 = Domestic Typical	10.17%	8.33%	6.67%	8.81%
5 = Domestic Source Verified	16.95%	21.67%	60.00%	28.95%
Shopping Scenario #8				
$1 = USDA \ Choice$	10.08%	5.00%	0.00%	6.23%
2 = USDA Choice No Hormones	10.08%	18.33%	0.00%	9.73%
3 = USDA Choice No Hormones or GMOs	47.90%	38.33%	31.67%	41.33%
4 = Domestic Typical	14.29%	20.00%	18.33%	16.80%
5 = Domestic Source Verified	17.65%	18.33%	50.00%	25.92%
Shopping Scenario #9				
$1 = USDA \ Choice$	11.76%	10.00%	3.33%	9.19%
2 = USDA Choice No Hormones	10.92%	5.00%	1.67%	7.06%
3 = USDA Choice No Hormones or GMOs	36.97%	35.00%	13.33%	30.55%
4 = Domestic Typical	20.17%	31.67%	28.33%	25.22%
5 = Domestic Source Verified	20.17%	18.33%	53.33%	27.98%
Shopping Scenario #10				
$1 = USDA \ Choice$	10.08%	8.33%	5.00%	8.35%
2 = USDA Choice No Hormones	10.92%	11.67%	3.33%	9.22%
3 = USDA Choice No Hormones or GMOs	52.10%	50.00%	31.67%	46.44%
4 = Domestic Typical	14.29%	13.33%	20.00%	15.46%
5 = Domestic Source Verified	12.61%	16.67%	40.00%	20.52%

Table 10.	Choice Ex	periment	Results for	· Each	Shoppi	ing S	cenario	by	Country	(continued	1)
						—		· · ·		(· /

	1000	100	1000	and the second se			1000	

	London	Frankfurt	Paris	Overall
Shopping Scenario #11				
$1 = USDA \ Choice$	8.55%	1.67%	1.67%	5.02%
2 = USDA Choice No Hormones	11.11%	15.00%	3.33%	10.19%
3 = USDA Choice No Hormones or GMOs	41.03%	46.67%	21.67%	37.66%
4 = Domestic Typical	13.68%	11.67%	5.00%	10.98%
5 = Domestic Source Verified	25.64%	25.00%	68.33%	36.15%
Shopping Scenario #12				
$1 = USDA \ Choice$	5.93%	5.00%	3.33%	5.04%
2 = USDA Choice No Hormones	22.03%	26.67%	6.67%	19.41%
3 = USDA Choice No Hormones or GMOs	32.20%	16.67%	8.33%	22.16%
4 = Domestic Typical	10.17%	13.33%	11.67%	11.37%
5 = Domestic Source Verified	29.66%	38.33%	70.00%	42.02%
Shopping Scenario #13				
$1 = USDA \ Choice$	16.10%	13.33%	6.67%	13.02%
2 = USDA Choice No Hormones	7.63%	10.00%	1.67%	6.76%
3 = USDA Choice No Hormones or GMOs	36.44%	35.00%	13.33%	30.29%
4 = Domestic Typical	20.34%	25.00%	28.33%	23.56%
5 = Domestic Source Verified	19.49%	16.67%	50.00%	26.38%
Shopping Scenario #14				
$1 = USDA \ Choice$	14.41%	14.75%	6.67%	12.56%
2 = USDA Choice No Hormones	8.47%	11.48%	5.00%	8.39%
3 = USDA Choice No Hormones or GMOs	43.22%	45.90%	28.33%	40.20%
4 = Domestic Typical	10.17%	6.56%	5.00%	7.93%
5 = Domestic Source Verified	23.73%	21.31%	55.00%	30.91%
Shopping Scenario #15				
$1 = USDA \ Choice$	10.26%	5.00%	0.00%	6.31%
2 = USDA Choice No Hormones	11.11%	15.00%	3.33%	10.19%
3 = USDA Choice No Hormones or GMOs	40.17%	43.33%	21.67%	36.37%
4 = Domestic Typical	11.11%	6.67%	8.33%	9.25%
5 = Domestic Source Verified	27.35%	30.00%	66.67%	37.87%

Table 10. Choice Experiment Results for Each Shopping Scenario by Country (continued)

	London	Frankfurt	Paris	Overall
Shopping Scenario #16				
$1 = USDA \ Choice$	13.56%	6.56%	1.69%	8.76%
2 = USDA Choice No Hormones	20.34%	34.43%	8.47%	21.07%
3 = USDA Choice No Hormones or GMOs	31.36%	18.03%	11.86%	22.99%
4 = Domestic Typical	10.17%	11.48%	6.78%	9.66%
5 = Domestic Source Verified	24.58%	29.51%	71.19%	37.52%

 Table 10. Choice Experiment Results for Each Shopping Scenario by Country (continued)

					 			1	
-	 and the second	1000	 -	-	 1000	-	 1000	1000	 100

	Parameter	Standard	Chi-	Pr >	Hazard
	Estimate		Square	Chisq	Kauo
Results over all 248 respondents (19,840	observation	(S^2)			
USDA Choice	-0.058	0.02253	6.6706	0.0098	0.943
USDA Choice No Hormones	-0.044	0.02255	3.8446	0.0499	0.957
USDA Choice No Hormones or GMOs	0.0839	0.0228	13.5293	0.0002	1.087
Domestic Typical	-0.042	0.02256	3.4864	0.0619	0.959
Domestic Source Verified	0			•	
PRICE	-0.015	0.00572	6.8724	0.0088	0.985
Results over 121 London respondents (9,	680 observa	tions)			
USDA Choice	-0.119	0.03263	13.2346	0.0003	0.888
USDA Choice No Hormones	-0.091	0.0327	7.6946	0.0055	0.913
USDA Choice No Hormones or GMOs	0.1982	0.03377	34.4674	<.0001	1.219
Domestic Typical	-0.087	0.03271	7.0297	0.008	0.917
Domestic Source Verified	0				
PRICE	-0.033	0.00835	15.2051	<.0001	0.968
Results over 65 Frankfurt respondents (5	5,200 observe	ations)			
USDA Choice	-0.178	0.04435	16.0314	<.0001	0.837
USDA Choice No Hormones	-0.071	0.04478	2.5451	0.1106	0.931
USDA Choice No Hormones or GMOs	0.0693	0.04548	2.3226	0.1275	1.072
Domestic Typical	-0.11	0.04448	6.0447	0.0139	0.896
Domestic Source Verified	0				
PRICE	-0.055	0.01135	23.5906	<.0001	0.946

Table 11. Parameter Estimates from Multinomial Logit Model^A

^A Data was scaled to allow for preference heterogeneity prior to estimating the model (scaled 1.0, 1.06, and 1.41 for London, Frankfurt, and Paris, respectively).

^B Number of observations (248 respondents x 16 shopping scenarios x 5 steaks each).

11	11	11		110	1		10	111	11	10	11		1.1	11
-	-	-	1000		-	-	-	1000	_	-		-		-

	Parameter Estimate	Standard Error	Chi- Square	Pr > ChiSq	Hazard Ratio
Results over 62 Paris respondents (4,960	ns)				
USDA Choice	-0.739	0.04826	234.6623	<.0001	0.477
USDA Choice No Hormones	-0.726	0.04839	225.3595	<.0001	0.484
USDA Choice No Hormones or GMOs	-0.606	0.04949	149.8665	<.0001	0.546
Domestic Typical	-0.648	0.04906	174.6388	<.0001	0.523
Domestic Source Verified	0				
PRICE	-0.043	0.01175	13.5241	0.0002	0.958

Table 11. Parameter Estimates from Multinomial Logit Model (continued)

11							1.1			
_	 -	 -	-	 	and the second se	-	-	-	 -	- Mar

Paris participants, and finally Frankfurt consumers appear to be the most concerned with price. Our parameter estimates allow us to rank the five available steaks in order of overall preference for each of the three surveyed groups (see Table 12). London participants rank the steaks (from highest to lowest) as follows: 1) USDA Choice No Hormones or GMOs steak, 2) Domestic Source Verified steak, 3) Domestic Typical steak, 4) USDA Choice No Hormones or GMOs steak, 2) Domestic No Hormones or GMOs steak, 2) Domestic Source Verified steak, 3) Domestic Source Verified steak, 3) USDA Choice No Hormones or GMOs steak, 2) Domestic Source Verified steak, 3) USDA Choice No Hormones steak, 4) Domestic Typical steak, and 5) USDA Choice steak. Finally, Paris participants rank the steaks: 1) Domestic Source Verified steak, 2) USDA Choice No Hormones or GMOs steak, 3) USDA Choice No Hormones or GMOs steak, 4) Domes

From our parameter estimates, we were able to estimate the value that our surveyed consumers place on the various steak attributes. To develop these estimates, we calculate the price increase that must occur to an observed, preferable steak in order to make it equally desirable to the originally less-preferred steak. Or described differently, we adjust the price of one steak until the utility of consuming both steaks is equal. Once this price adjustment is derived, we can interpret the price difference as the average consumer's willingness to pay to avoid/obtain the steak attribute being tested.

These calculations were made to develop willingness to pay estimates on all three consumer groups for the various steaks. Table 13 presents a summary of these estimations. Results were highly varied across the three countries surveyed. Paris participants were willing to pay on average \$0.30/lb premium for a hormone-free steak, while the Frankfurt estimate was \$1.93/lb, and the London estimate was \$0.86/lb. Lusk, Roosen, and Fox (2003) surveyed consumers by mail and estimated the premiums for hormone-free steak to be \$9.94/lb, \$7.29/lb, and \$7.39/lb for France, Germany, and the United Kingdom respectively. Alfnes and Rickertsen (2003) used second-price auctions in a study conducted among Norwegian consumers and estimated consumer willingness to pay for hormone-free steak to be \$1.39/lb. We should note that one possible explanation for the higher premium estimates made by Lusk, Roosen, and Fox is that they used a "hypothetical" research approach without any binding attributes while this study and Alfnes and Rickertsen incorporated "non-hypothetical" techniques in which the consumer believed there would be actual exchange of money for goods.

The partic ipants' willingness to pay for GMO-free steak in our study was relatively higher than their willingness to pay for hormone-free steak. Paris participants indicated an average willingness to pay of \$2.79/lb, Frankfurt participants provided a premium estimate of \$2.55/lb, and London consumers indicated a surprisingly large premium of \$8.88/lb. Lusk, Roosen, and Fox found premiums for GMO-free steak to be \$9.32/lb, \$7.67/lb, and \$6.31/lb for consumers in France, Germany, and the United Kingdom respectively.

Table 12.	Steak	Preference	Rankings	for	Each	City
-----------	-------	------------	----------	-----	------	------

Preference Rankings	London
Most Preferred	USDA Choice No Hormones or GMOs
2nd Most Preferred	Domestic Source Verified
3rd Most Preferred	Domestic Typical
4th Most Preferred	USDA Choice No Hormones
Least Preferred	USDA Choice
Preference Rankings	Frankfurt
Most Preferred	USDA Choice No Hormones or GMOs
2nd Most Preferred	Domestic Source Verified
3rd Most Preferred	USDA Choice No Hormones
4th Most Preferred	Domestic Typical
Least Preferred	USDA Choice
Preference Rankings	Paris
Most Preferred	Domestic Source Verified
2nd Most Preferred	USDA Choice No Hormones or GMOs
3rd Most Preferred	Domestic Typical
4th Most Preferred	USDA Choice No Hormones
Least Preferred	USDA Choice

_	_		_	 	 -	-	_	 -	 _

Steak Attribute	tribute Willingness										
	London	Frankfurt	Paris	Overall							
Hormone-free	\$0.86	\$1.93	\$0.30	\$0.93							
GMO-free	\$8.88	\$2.55	\$2.79	\$8.53							
Domestic Typical steak rather than USDA Choice No Hormones or GMOs steak	-\$8.75	-\$3.25	-\$0.98	-\$8.39							
Domestic Typical steak rather than USDA Choice	\$0.98	\$1.23	\$2.11	\$1.07							
Domestic Source Verified steak rather than Domestic Typical steak	\$2.66	\$1.99	\$15.00	\$2.81							
<i>Domestic Source Verified</i> steak rather than <i>USDA Choice</i> steak	\$3.65	\$3.22	\$17.11	\$3.88							
Domestic Source Verified steak rather than USDA Choice No Hormones or GMOs steak	-\$6.09	-\$1.26	\$14.02	-\$5.59							

 Table 13. Average Willingness to Pay Estimates for Various Beef Steak Attributes

All surveyed groups in our study discounted the *Domestic Typical* steak as compared to the *USDA Choice No Hormones or GMOs* steak. In other words, the consumers were willing to pay a premium (\$8.75/lb, \$3.25/lb., and \$0.98/lb for London, Frankfurt, and Paris respectively) for the *USDA Choice No Hormones or GMOs* steak instead of purchasing the *Domestic Typical* steak. This is consistent with the summary of steak preference rankings in Table 12 where the U.S. steaks produced free of hormones and without the use of GMO grains had consumer appeal. Again, this demonstrated EU consumer preference for U.S. beef.

All three consumer groups were willing to pay a considerable premium for the *Domestic Source Verified* steak instead of purchasing the *Domestic Typical Steak* or the *USDA Choice* steak. On average, London consumers were willing to pay \$2.66/lb for the *Domestic Source Verified* steak over the *Typical Domestic* steak, Frankfurt consumers indicated a premium of \$1.99/lb, and Paris participants showed a willingness to pay a \$15.00/lb premium. Furthermore, London consumers indicated a willingness to pay of \$3.65/lb for the *Domestic Source Verified* steak as opposed to the *USDA Choice* steak. Frankfurt participants provided a premium estimate of \$3.22/lb and Paris consumers showed a premium of \$17.11/lb. Source verification appears important to EU consumers and may suggest another strategy for U.S. beef to gain market share if it were allowed access.

Each of the consumer groups indicated a willingness to pay for the *Domestic Typical* steak relative to the *USDA Choice* steak produced with use of hormones and GMO feeds. These premiums for London, Frankfurt, and Paris were \$0.98/lb, \$1.23/lb, and \$2.11/lb respectively. Finally we observed that the premiums associated with purchasing the *Domestic Source Verified* steak rather than purchasing the *USDA Choice No Hormones or GMOs* steak varied a great deal over the three countries. London and Frankfurt consumers indicated a willingness to pay \$6.09/lb. and \$1.26/lb, respectively, for the ability to purchase the *USDA Choice No Hormones or GMOs* steak. Conversely, Paris participants demonstrated a willingness to pay a premium of \$14.02/lb. for the *Domestic Source Verified* steak.

Precise willingness to pay dollar estimates reported in this study need to interpreted with care. Because real mone y was being used, the estimated dollar amounts reveal the level or strength of consumer preferences for one product or another. As such results are best used for relative ranking of preferences. It is important to keep in mind that any estimated "premium" for product A relative to product B is likewise the estimated "discount" the consumer is willing to pay for product B relative to A.

SECTION 7: CONCLUSION

The European Union enacted a ban in 1989 on beef produced from animals treated with growth-hormones, despite the fact that no scientific evidence supports the claim that adverse human health results from consumption of such beef. Little research has been done to evaluate European consumers' feelings about this ban nor how they may react given the opportunity to purchase potentially cheaper beef from the United States. This study evaluated EU consumer preferences and the willingness of consumers to pay for various beef steaks.

The findings of this study suggest that American cattle producers may be well served to take measures which increase the knowledge possessed by the average European consumer of the U.S. beef quality grading system, the use of growth hormones in meat production, and how genetically modified feeds are utilized in producing beef. As the consumer gains familiarity with why and how these issues affect meat, which is potentially, but not currently available to them, they may begin to demand the right to choose imported, less expensive products over their current, relatively limited set of domestic choices. Additionally, consideration should be given to increasing awareness of the fact that the U.S. has never had a case of BSE detected and has been free of the Footand-Mouth disease since 1929 (Mathews and Buzby 2001). EU consumers revealed preferences for U.S. relative to domestic steak which could be related to their concern about BSE in their domestic supply.

Consumers in London, Frankfurt, and Paris are, on average, willing to pay a premium (\$8.75/lb, \$3.25/lb, and \$0.98/lb respectively) for a *USDA Choice No Hormones or GMOs* steak as opposed to their *Domestic Typical* steak. These consumers also indicated a willingness to pay a premium for both U.S. hormone-free beef (\$0.86/lb in London, \$1.93/lb in Frankfurt, and \$0.30/lb in Paris) and for U.S. beef not produced using genetically modified organisms (\$8.88/lb in London, \$2.55/lb in Frankfurt, and \$2.79/lb in Paris) relative to U.S. Choice beef. Based on these estimates it appears that London consumers are the most concerned with use of growth hormones. Additionally we observe that our Paris participants have stronger preferences for their domestic beef than their counterparts in London or Frankfurt.

REFERENCES:

- Adamowicz, W., R. Boxall, M. Williams, and J. Louviere. "Stated Preference Approaches for Measuring Passive Use Values: Choice Experiments and Contingent Valuation." *American Journal of Agricultural Economics*. 80(February 1998): 64-75.
- Ahearn, Raymond. "U.S.-European Union Trade Relations: Issues and Policy Challenges." Congressional Research Service Issue Brief for Congress. Order Code IB10087. 4 March 2002.
- Alfnes, Frode and K. Rickertsen. "European Consumers' Willingness to Pay for U.S. Beef in Experimental Auction Markets." American Journal of Agricultural Economics 85(2003): 396-405.
- Bureau, J., S. Marette, and A. Schiavina. "Non-Tariff Trade Barriers and Consumers' Information: The Case of the EU-US Trade Dispute Over Beef." *European Review of Agricultural Economics*. 25(1998):437-462.
- Hanrahan, Charles. "The European Union's Ban on Hormone-Treated Meat." Congressional Research Service Issue Brief for Congress. Order Code RS20142. December 2000.
- Lusk, J., J. Fox, T. Schroeder, J. Mintert, and M. Koohmaraie. "Will Consumers Pay for Guaranteed Tender Steak?" *Research Bulletin 3-99*, Research Institute on Livestock Pricing Agricultural and Applied Economics, Virginia Tech., Blacksburg, VA. 1999.
- Lusk, J., J. Roosen, and J. Fox. "Demand for Beef from Cattle Administered Growth Hormones or Fed Genetically Modified Corn: A Comparison of Consumers in France, Germany, the United Kingdom, and the United States." *American Journal of Agricultural Economics* 85(2003): 16-29.
- Mathews Jr., K. and J. Buzby. "Dissecting the Challenges of Mad Cow and Foot-and-Mouth Disease." Economic Research Service. *Agricultural Outlook*. August 2001.
- Umberger, W., D. Feuz, C. Calkins, and K. Killinger. "U.S. Consumer Preference for Domestic Corn-fed versus International Grass-fed Beef." Paper presented at the International Agricultural Research Consortium Trade in Livestock Products Conference, Auckland, New Zealand, 18-19 April 2001.
- United States Mission to the European Union. *A Primer On Beef Hormones*. Available at http://www.useu.be/issues/BeefPrimer022699.html, accessed 9 January 2003.

Experimental Instructions

Thank you for agreeing to participate in today's session. You have been given a packet with an assigned ID number, which is located on the upper right hand corner of the packet. You will use this ID number to identify yourself during this research session. We use numbers to ensure confidentiality.

Before we begin, I want to emphasize that your participation in this session is completely voluntary. If you do not wish to participate in the experiment, please say so at any time. Non-participants will not be penalized in any way. I want to assure you that the information you provide will be kept strictly confidential and used only for the purposes of this research.

In today's session, we are ultimately interested in your preference of beef products. First, I would like you all to open your packets and take out the "consumer survey." Please take a few minutes to complete the survey.

I will now begin going through a set of instructions with you and will read from this script so that I am able to clearly convey the procedures. Importantly, from this point forward, I ask that there be no talking among participants. Failure to comply with these instructions will result in disqualification from the experiment.

Are there any questions before we begin?

Information Sheet

In today's session, we are interested in your preference of beef products. Specifically, we will be conducting some choice experiments. First, we will illustrate the mechanics of these choice experiments through an example utilizing candy bars. Secondly, we will conduct another choice experiment, but this time beef products will be used.

Candy Bar Choice Experiment

We have three candy bars: Snickers, Nestle Crunch, and Milky Way. We are interested in your preferences for each of these candy bars. In a moment, you will be asked to indicate which candy bar, you prefer in four different shopping scenarios. However, before you do so, please listen to the following instructions.

Instructions for Simulated Retail Shopping Scenarios - Choice Experiments

In a moment, we will give you the opportunity to purchase <u>one</u> of these candy bars. Other than differences in the labeled characteristics, the candy bars are the same size, weight, packaging, etc.

In a moment, you will be asked to indicate which candy bar, you prefer in 3 different shopping scenarios. However, before you do so, please listen to the following instructions.

- Each scenario has 3 candy bars priced at various levels. For each scenario, you
 will indicate which candy bar you would prefer. For example, scenario 1 has a
 Snickers priced at £0.30, a Nestle Crunch priced at £0.45, and a Milky Way
 priced at £0.40. Given these prices, which candy bar do you choose to purchase?
- 2) After you have completed this task for all scenarios, we will draw a number, 1 through 3 to determine which scenario is binding. For example, if we draw the number 2, we will only focus on your choice in scenario 2 and will ignore all other scenarios. Importantly, all scenarios have an equally likely chance of being binding.
- 3) After the binding scenario has been determined, each participant will come to the front of the room and purchase the candy bar they indicated in the binding scenario.

Important Points

- ? You will only have the opportunity to purchase <u>one</u> candy bar. Because we randomly draw a binding scenario, you <u>cannot</u> purchase more than one candy bar. That is, under no circumstances will you take home more than one candy bar from this experiment.
- ? You *will actually pay money* to purchase the candy bar you indicated. This procedure is **not** hypothetical.
- ? It is acceptable to indicate the "none of these" option for any candy bar in any scenario. If you mark "none of these" in a binding scenario, you **will not** purchase a candy bar. That is, you will pay nothing and will leave without a candy bar.

Are there any questions?

Steak Choice Experiment

We have five steaks labeled: USDA Choice, USDA Choice – No Hormones, USDA Choice – No Hormones or GMOs, Domestic Typical and Domestic Source Verified. We are interested in your preferences for each of these steaks. In a moment, you will be asked to indicate which steak you prefer in 16 different shopping scenarios. However, before you do so, please listen to the following instructions.

Instructions for Simulated Retail Shopping Scenarios – Choice Experiments

In a moment, we will give you the opportunity to purchase <u>one</u> of these steaks. Again, other than differences in the labeled characteristics, the steaks are the same size, weight, packaging, etc. Now please remove the sheet labeled "Steak Information Sheet" from your packet. You will notice that this sheet provides more detailed information on each of these steaks. Please follow your sheet while I read it aloud to you.

<< now read the Steak Info. Sheet>>

In a moment, you will be asked to indicate which steak, you prefer in _____ different shopping scenarios. However, before you do so, please listen to the following instructions.

- Each scenario has 5 steaks priced at various levels. For each scenario, you will indicate which steak you would prefer. For example, scenario 1 has a USDA Choice priced at £14.64, a USDA Choice No Hormones steak priced at £14.64, a USDA Choice No Hormones or GMOs steak priced at £9.41, a Domestic Typical steak priced at £14.64, and a Domestic Source Verified steak priced at £11.15. Given these prices, which steak do you choose to purchase?
- 2) After you have completed this task for all scenarios, we will draw a number, 1 through 16 to determine which scenario is binding. For example, if we draw the number 2, we will focus on your choice in scenario 2 and will ignore other scenarios. All scenarios have an equally likely chance of being binding.
- 3) After the binding scenario has been determined, each participant will come to the front of the room and purchase the steak they indicated in the binding scenario.

Important Points

- ? You will only have the opportunity to purchase <u>one</u> steak. Because we randomly draw a binding scenario, you <u>cannot</u> purchase more than one steak. That is, under no circumstances will you take home more than one steak from this experiment.
- ? You *will actually pay money* to purchase the steak you prefer. This procedure is **not** hypothetical.

Are there any questions?

Steak Information Sheet

In today's session, we are interested in your preferences for several different types of beef steaks. Specifically, we have five different types of beef ribeye steaks that you will be asked to evaluate. The steaks are all the same size, weight (0.35 kg, 12 oz., 0.75lbs.), packaging, and freshness, and differ only by characteristics identified by labels on the products. The first steak is labeled as a <u>USDA Choice</u>. The second steak has a label identifying it as <u>USDA Choice - No Hormones</u>. The third steak has a label identifying it as <u>USDA Choice - No Hormones</u>. The fourth steak is labeled as <u>Domestic</u> <u>Typical</u>. The fifth steak is labeled as <u>Domestic Source Verified</u>. We realize that you may be unaware of some of these types of labels. To assist you in your evaluation, we have provided the following steak descriptions.

USDA Choice

This steak was produced in the United States under typical U.S. production practices. This includes the probable use of growth hormones, antibiotics, and genetically modified feed. The label *USDA Choice* denotes that this steak was inspected by the United States Department of Agriculture and was given its second highest (Choice) quality grade.

USDA Choice - No Hormones

This steak was produced in the U.S. using typical production practices, but was NOT injected with any growth hormones or antibiotics during production.

USDA Choice - No Hormones or GMOs

It is estimated that approximately 95% of all fed cattle in the U.S. are administered added growth hormones during production. Animals that are administered growth hormones generally grow at faster rates and reach higher weights compared to animals which have not been administered growth hormones. Secondly, cattle are routinely administered antibiotics during feeding to reduce the chance of illness. Moreover, most cattle raised in the U.S. are fed genetically modified corn, as it is the most prevalent grain available to livestock feeders. This steak is from an animal that was raised in the U.S. with NO added hormones, was NOT fed antibiotics, and was NOT fed genetically modified crops.

Domestic Typical

This steak was produced under typical production conditions and regulations within this country. Beyond the fact that the steak has been inspected, no other guarantees are given regarding the quality of the meat.

Domestic Source Verified

This steak is a typical steak that is produced in this country. The label identifies the production practices utilized in producing the product and names the actual farmer/feeder who raised the animal. Beyond the fact that the steak has passed government inspections, no other guarantees are given regarding the quality of the meat.

Appendix B. Survey Completed by Participants

Beef Preferences Study

Section I: Biographical Data

In this part of the survey, we would like some background information about you, as it is a critical part of our analysis. This is an anonymous survey and your name is in no way linked to the responses. In addition, all of this information will be treated as confidential. Results of the survey will only be used in aggregate form and only for research purposes.

- 1. Indicate your gender. ? Male ? Female
- 2. What is your present age? _____years
- 3. How many individuals live in your household, including yourself?
- 4. Are there children under the age of 12 in the household? (circle one) YES NO
- 5. What is your educational background? (*Mark the box next to the highest level of education you have completed.*)

? High School Diploma	?	Master's Degree
? Some college	?	Juris Doctorate
? Technical School Diploma	?	Doctorate
? Associate's Degree	?	Other:

- ? Bachelor's Degree
- 6. Please indicate your approximate annual household income before taxes: (*Mark one box*)

? less than \$10,000	? \$100,000 to \$119,999
? \$10,000 to \$29,999	? \$120,000 to \$139,999
? \$30,000 to \$49,999	? \$140,000 to \$159,999
? \$50,000 to \$69,999	? \$160,000 to \$179,999
? \$70,000 to \$99,999	? more than \$180,000

Appendix B. Survey Completed by Participants (continued)

Section II: Food Purchasing, Consumption, and Perceptions

7. How may times per month on average do you eat the following (including at home and away from home)?
minced beef
minced beef
times per month
beef steak (i.e. ribeye, etc.)
times per month
poultry (chicken & turkey)
times per month
pork
times per month
lamb
times per month
fish

8. How knowledgeable do you consider yourself about the following issues?

	No				Very		
Issue	Knowled	lge	Knowledgeable				
Cattle production practices	1	2	3	4	5		
U.S. Beef Quality Grading System	n 1	2	3	4	5		
Beef slaughter practices	1	2	3	4	5		
Use of Growth Hormone in anima	ls 1	2	3	4	5		
Use of Genetically Modified feeds	s 1	2	3	4	5		

(1 = no knowledge and 5 = very knowledgeable)

9. Several attributes may be important to you when you purchase beef steak. Please indicate how important each of the following attributes are to you when you purchase beef steak. (1 = not important and 5 = very important.)

	Not		Very				
Attribute	Important	t	Important				
Price	1	2	3	4	5		
Color	1	2	3	4	5		
External Fat	1	2	3	4	5		
Internal Fat (marbling)	1	2	3	4	5		
Brand (Label)	1	2	3	4	5		
Country of Origin	1	2	3	4	5		
USDA Quality Grade	1	2	3	4	5		
Use of Growth Hormones	1	2	3	4	5		
Feeding Genetically modified gr	ain 1	2	3	4	5		

					-				-	
1	_		_	1	_	1	_			_

ippendin bi bulie, compreted by i di depunto (commutati	Appendix B.	Survey	Complete	l by P	Participants	(continued)
---	-------------	--------	----------	--------	---------------------	-------------

10.	Please indicate how the	w the following issues affect your meat consumption patterns.								
	(1 = no affect and 5 = 1)	major affect)								
		No			Major					
	Issue	Affect	Affect Affect							
	Genetically modified crops as feed ingredients for beef production									
		1	2	3	4	5				
	Growth hormone use in	beef production								
		1	2	3	4	5				
	Bovine Spongiform En	cephalopathy (BSE)								
		1	2	3	4	5				
	Foot-and-Mouth Diseas	se								
		1	2	3	4	5				

11. Please indicate how you feel about each of the following beef attributes. Beef is generally (1 = totally disagree and 5 = very much agree)

Attributes	Totally Disagree			Very Much Agree			
Consistent	1	2	3	4	5		
Tender	1	2	3	4	5		
Safe	1	2	3	4	5		
Nutritious/Wholesome	1	2	3	4	5		
Juicy	1	2	3	4	5		
Easy to prepare	1	2	3	4	5		
Healthy	1	2	3	4	5		

1	1	<u> </u>		Ш.	_	L .	Ш.	L .	Ш	L	L	Ш

Appendix B. Survey Completed by Participants (continued)

12. Please circle the meat that you feel possesses the **SUPERIOR** attribute listed.

Attribute	Meat Choices						
Overall Price Value	Beef	Pork	Poultry	Fish	Lamb		
Consistent	Beef	Pork	Poultry	Fish	Lamb		
Tender	Beef	Pork	Poultry	Fish	Lamb		
Safe	Beef	Pork	Poultry	Fish	Lamb		
Nutritious/Wholesome	Beef	Pork	Poultry	Fish	Lamb		
Juicy	Beef	Pork	Poultry	Fish	Lamb		
Easy to prepare	Beef	Pork	Poultry	Fish	Lamb		
Healthy	Beef	Pork	Poultry	Fish	Lamb		

13. Please circle the meat that you feel possesses the **INFERIOR** attribute listed.

Attribute	Meat Choices					
Overall Price Value	Beef	Pork	Poultry	Fish	Lamb	
Consistent	Beef	Pork	Poultry	Fish	Lamb	
Tender	Beef	Pork	Poultry	Fish	Lamb	
Safe	Beef	Pork	Poultry	Fish	Lamb	
Nutritious/Wholesome	Beef	Pork	Poultry	Fish	Lamb	
Juicy	Beef	Pork	Poultry	Fish	Lamb	
Easy to prepare	Beef	Pork	Poultry	Fish	Lamb	
Healthy	Beef	Pork	Poultry	Fish	Lamb	

Appendix C. Choice Experiment Completed by Participants

Choice Experiment: Shopping Scenarios Steak Choices (prices are in U.S. Dollars/lb.)

Scenario # 1	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$10.50	\$10.50	\$6.75	\$10.50	\$8.00
I choose					

Steak Choices (prices are in U.S. Dollars/lb.)

Scenario # 2	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$10.50	\$9.25	\$9.25	\$8.00	\$6.75
I choose					

Steak Choices (prices are in U.S. Dollars/lb.)

Scenario # 3	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$10.50	\$8.00	\$10.50	\$9.25	\$9.25
I choose					

Scenario # 4	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$10.50	\$6.75	\$8.00	\$6.75	\$10.50
I choose					

	Steak Choices (prices are in U.S. Dollars/lb.)							
Scenario # 5	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified			
Prices	\$9.25	\$10.50	\$8.00	\$9.25	\$6.75			
I choose								
Steak Choices (prices are in U.S. Dollars/Ib.)								
Scenario # 6	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified			
Prices	\$9.25	\$9.25	\$10.50	\$6.75	\$8.00			

Appendix C. Choice Experiment Completed By Participants (continued)

Steak Choices (prices are in U.S. Dollars/Ib.)

Scenario # 7	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$9.25	\$8.00	\$9.25	\$10.50	\$10.50
I choose					

Scenario # 8 USDA Choice		USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified	
Prices	\$9.25	\$6.75	\$6.75	\$8.00	\$9.25	
I choose						

Appendix C. Choice Experiment Completed by Participants (continued)								
Steak Choices (prices are in U.S. Dollars/Ib.)								
Scenario # 9	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified			
Prices I choose…	\$8.00	\$10.50	\$9.25	\$6.75	\$9.25			

Appendix C. Choice Experiment Completed by Participants (continued)

Steak Choices (prices are in U.S. Dollars/lb.)

Scenario # 10	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices I choose…	\$8.00	\$9.25	\$6.75	\$9.25	\$10.50

Steak Choices (prices are in U.S. Dollars/lb.)

Scenario # 11	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$8.00	\$8.00	\$8.00	\$8.00	\$8.00
I choose					

Scenario # 12 USDA Choice		USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified	
Prices	\$8.00	\$6.75	\$10.50	\$10.50	\$6.75	
I choose						

ippendix of choice Experiment completed by fullepunds (continued)	Appendix C.	Choice Experiment	Completed by	Participants	(continued)
---	-------------	--------------------------	--------------	---------------------	-------------

	Steak Choices (prices are in U.S. Dollars/Ib.)							
Scenario # 13	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified			
Prices	\$6.75	\$10.50	\$10.50	\$8.00	\$10.50			
I choose								

Steak Choices (prices are in U.S. Dollars/lb.)

Scenario # 14	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$6.75	\$9.25	\$8.00	\$10.50	\$9.25
I choose					

Steak Choices (prices are in U.S. Dollars/lb.)

Scenario # 15	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$6.75	\$8.00	\$6.75	\$6.75	\$6.75
I choose					

Scenario # 16	USDA Choice	USDA Choice No Hormones	USDA Choice No Hormones or GMOs	Domestic Typical	Domestic Source Verified
Prices	\$6.75	\$6.75	\$9.25	\$9.25	\$8.00
I choose					

		100		100		 		

Shopping Scenario Number	Price of USDA Choice	Price of USDA Choice No Hormones	Price of USDA Choice No Hormones or GMOs	Price of Domestic Typical	Price of Domestic Source Verified
Shopping Scenario #1	\$10.50	\$10.50	\$6.75	\$10.50	\$8.00
Shopping Scenario #2	\$10.50	\$9.25	\$9.25	\$8.00	\$6.75
Shopping Scenario #3	\$10.50	\$8.00	\$10.50	\$9.25	\$9.25
Shopping Scenario #4	\$10.50	\$6.75	\$8.00	\$6.75	\$10.50
Shopping Scenario #5	\$9.25	\$10.50	\$8.00	\$9.25	\$6.75
Shopping Scenario #6	\$9.25	\$9.25	\$10.50	\$6.75	\$8.00
Shopping Scenario #7	\$9.25	\$8.00	\$9.25	\$10.50	\$10.50
Shopping Scenario #8	\$9.25	\$6.75	\$6.75	\$8.00	\$9.25
Shopping Scenario #9	\$8.00	\$10.50	\$9.25	\$6.75	\$9.25
Shopping Scenario #10	\$8.00	\$9.25	\$6.75	\$9.25	\$10.50
Shopping Scenario #11	\$8.00	\$8.00	\$8.00	\$8.00	\$8.00
Shopping Scenario #12	\$8.00	\$6.75	\$10.50	\$10.50	\$6.75
Shopping Scenario #13	\$6.75	\$10.50	\$10.50	\$8.00	\$10.50
Shopping Scenario #14	\$6.75	\$9.25	\$8.00	\$10.50	\$9.25
Shopping Scenario #15	\$6.75	\$8.00	\$6.75	\$6.75	\$6.75
Shopping Scenario #16	\$6.75	\$6.75	\$9.25	\$9.25	\$8.00

Appendix D. Choice Experiment Shopping Scenarios	Appendix D.	Choice	Experiment	: Shop	ping	Scena	rios
--	-------------	--------	------------	--------	------	-------	------

* Prices are U.S. Dollar equivalent for steaks with the same weight (12 oz.,0.35kg), packaging, and freshness.