Title: A Qualitative Study of Southern U.S. Consumers' Top of the Mind Beliefs about the Safety of Local Beef

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Revised Manuscript APPETITE-D-15-00994R1

“WANTED: SAFE BEEF, Bacteria-tainted ground beef remains a major source of serious illness in the U.S.” declared the cover of the October 2015 Consumer Reports. Prepared by the Food Safety and Sustainability Center, the “Beef Report” contends that to fully prevent foodborne disease and reduce the risk of illness it is necessary to address animal production and processing practices. The “Beef Report” goes on to assert that a majority of U.S. consumers are demanding sustainable beef products. Indeed, according to industry reports on the future of beef in North America, there is growing consumer interest and demand for alternative production systems such as organic, forage-fed (Galyean, Ponce, & Schutz, 2011; Gwin, Thibournery, & Stillman, 2013) and “local” (Gwin et al., 2013; Johnson, Marti, & Gwin, 2012; Martinez et al., 2010; Troop, 2015). Yet, the extent to which consumers’ beef safety concerns drive demand for alternative beef production is unknown.

In terms of general beef production, concerns about beef safety have been shown to influence consumer attitudes toward meat (Verbeke & Vackier, 2004) as well as intent to purchase and/or consume beef (da Fonseca & Salay, 2008; Henson & Northen, 2000; Loureiro & Umberger, 2007). Much of this evidence comes from European studies. For example, a study conducted in the capital cities of Germany, Spain, France, and the United Kingdom found that focus group participants perceived beef from their own country to be safer than beef from other countries (Van Wezemael, Verbeke, Kugler, de Barcellos, & Grunert, 2010). This finding was related to consumers’ knowledge and trust in the beef safety regulations of their own country (Van Wezemael et al., 2010). Studies from the E.U. have also found that consumers relate production practices to beef safety (Van Wezemael et al., 2010; Verbeke, Perez-Cueto, de Barcellos, Krystallis, & Grunert, 2010). For some consumers, organic certification signals safety because they associate organic with natural production where animals are treated and fed in “decent, healthy, and animal friendly ways” (Van Wezemael et al., 2010, p. 841). Animal welfare standards at the production stage are also seen as an indicator of beef safety; in particular, the conditions in which the animals are born, raised and killed (Verbeke, Van

Wezemaël, et al., 2010). E.U. consumers also perceive different actors along the supply chain as possessing varying levels of trust with upstream actors (production and processing) trusted least and those in distribution and retail trusted most (Van Wezemaël et al., 2010).

Research examining U.S. consumers' beef safety beliefs is limited. One study found that U.S. consumers value certification of USDA food safety inspection for beef products more than country-of-origin labeling, traceability, or tenderness (Loureiro & Umberger, 2007). Other research has found that consumer trust in the U.S. food system more broadly, is heavily influenced by beliefs that food system actors behave with fiduciary responsibility (Sapp et al., 2009). This work provides some insight into U.S. consumers food safety beliefs, including preferences for beef safety certification. However, there is little research investigating the beef safety beliefs that underlie these preferences, whether the products are classified as "sustainable" or otherwise. An essential step to understanding the rise in U.S. demand for sustainable and local beef production, is to examine beef safety beliefs that inform U.S. consumers' behavior. This is the theme of the present research.

Beef safety is a credence attribute and the level of safety is generally not observable nor easily experienced (Grunert, 2005). This makes it difficult for consumers to accurately assess beef safety (Van Wezemaël et al., 2010). Instead, consumer beef safety perceptions are subjective and an individual's "perception filter" acts as a mirror that reflects, deflects, or distorts information (Verbeke, Frewer, Scholderer, & De Brabander, 2007, p. 4). Additionally, consumers' perceptions of food, in general, are not only based on sensory factors, but also on an individual's attitudes and beliefs (Costell, Tárrega, & Bayarri, 2010). Studies of alternative foods more generally have also found attitudes and beliefs to be especially important in consumer choice and behavior (Connor, Armitage, & Conner, 2002; Costell et al., 2010; Roininen & Tuorila, 1999).

A theoretical model that is useful for examining consumer's attitudes and beliefs about beef safety is the *theory of planned behavior* (TPB). The TPB is a framework that has been successfully used to examine beliefs underlying behavioral decision-making in a variety of domains including food (Arvola et al., 2008; Claret et al., 2014; Connor et al., 2002; Dean et al., 2006; Sheats & Middlestadt, 2013). Developed as an extension of the theory of reasoned action (TRA), the TPB is a belief-based social cognitive theory (Ajzen, 1985) that posits that individual's expectations and values about engaging in a behavior form their behavioral,

normative and control beliefs (Fishbein & Ajzen, 2010). These beliefs are theorized as the underlying factors which influence three latent constructs: attitude, subjective norm, and perceived behavioral control. Most often, the TPB is used to predict which of these latent constructs influence behavior and is the aim of a larger study from which the data for this paper originated. The focus of this paper, therefore, is to examine the beef safety beliefs that underlie consumers' intention to purchase local beef, a first step in modeling consumers' behavior and intention.

Beliefs represent an individual's perception and are defined as the subjective probability that an object possesses certain attributes and reflect the likelihood that performing a behavior will lead to a specific outcome (Fishbein & Ajzen, 2010). Beliefs can originate from a variety of sources (e.g. personal experiences, media, interaction with family and friends) and do not have to be factually accurate to influence behavior (Fishbein & Ajzen, 2010). The TPB recognizes that individuals can form many different beliefs about an object but it assumes that only salient or top-of-mind beliefs (i.e., beliefs that come readily to mind without much cognitive effort) serve as the prevailing determinants of behavior toward an object and are therefore the best predictors of the consumer's behavior (Ajzen & Fishbein, 1980). Furthermore, salient beliefs are likely to vary because not all people share the same thoughts and feelings about particular behaviors (e.g. purchasing local beef and beef safety).

One reason beliefs about the safety of local beef may differ is food involvement which is the level of perceived personal importance of food in a person's life. This can include the extent to which individuals enjoy talking about food, engage in food-related activities, and entertain thoughts about food during the day (Chen, 2007). The level of involvement may influence the extent to which consumers rely on price, marketing efforts, and labeling in their decision-making (Verbeke & Vackier, 2004). Studies have also shown that the context in which agrifood products are purchased shapes the meanings which are attributed to said product (Holloway & Kneafsey, 2000). For instance, products acquired from farmers' markets can be imbued with particular symbolic meaning related to nostalgia for rural areas such as authenticity, quality, and naturalness. There is mixed evidence regarding how race, income, and education may shape the likelihood that consumers support local foods (Byker, Shanks, Misyak, & Serrano, 2012; Chambers, Lobb, Butler, Harvey, & Bruce Traill, 2007; Onianwa, Wheelock, & Mojica, 2005; Zepeda & Li, 2006; Zepeda & Nie, 2012) and it is possible that individuals from different socio-

economic backgrounds vary in their beef safety beliefs. Some studies (e.g., Davidson, Schröder, & Bower, 2003; Roininen, Arvola, & Lahteenmaki, 2006) find that beliefs about local foods, in general, vary across consumers who live in rural areas versus those who live in urban areas, but other research has not found this variation (Chang et al., 2013).

Given the contextual variability of beliefs, it is important to identify the beef safety beliefs of the population of interest. According to the TPB, elicitation studies are recommended when the researcher's goal is to understand beliefs underlying context specific behaviors (Fishbein, 1995; Fishbein & Ajzen, 1975; Middlestadt, Bhattacharyya, Rosenbaum, Fishbein, & Shepherd, 1996). Specifically, Fishbein and Ajzen (2010) recommend that researchers 1) conduct interviews with members of the target group using open-ended questions eliciting top-of-mind beliefs about the behavior in question, 2) complete a content analysis to rank-order the elicited beliefs, and 3) determine the most salient beliefs based on the content analysis.

The findings from this analysis can help guide further research on motivations, attitudes, and behavior regarding local foods, which is of increasing interest to members of the U.S. beef industry (Graves, 2016; Onozaka, Nurse, & McFadden, 2010). It is also of interest to U.S. national and subnational governments as they continue to fund and to endorse relocation efforts by promoting sustainable, local meat supply chains. Furthermore, non-governmental organizations promoting sustainable beef (e.g., Consumers Reports) will benefit from a deeper understanding of beliefs that may influence consumers' local beef and beef safety behaviors.

Given these gaps in knowledge and previous research of how beliefs about food risks are shaped by socio-cultural factors, this study sought to explore the food safety beliefs of southern, U.S. consumers because this population has been underrepresented in investigations of beef safety perceptions and in local food studies more generally. Furthermore, the present study focused on two types of consumers: farmers' market and grocery store. The decision to target these two consumer groups was based on an overall lack of available data regarding consumer awareness of local beef products. The former was chosen as these individuals are most likely to be familiar with local food products. This group, which is well represented in the literature (Byker et al., 2012) also tends to be white, urban, affluent, and well-educated (Rice, 2015). Much less is known about the beliefs of other consumer types (e.g., grocery store, minority, rural, low-income, low-education). Therefore, rural grocery stores located in a region that has a larger percent of individuals who have low incomes, low levels of education, and identify as minority

were chosen as a comparison group. Although there is no data available regarding rural consumer familiarity with local foods, the research team hypothesized that rural grocery store consumers would hold qualitatively different beliefs about the safety of local beef than consumers from urban farmers' markets.

The specific objectives of this research are: (1) to assess the degree to which beef safety, in general, is a top-of-mind concern for U.S. rural grocery store and urban farmers' market consumers; (2) to explore U.S. rural grocery store and urban farmers' market consumers' top-of-mind beliefs about the safety of local beef; (3) to compare U.S. rural grocery store and urban farmers' market consumers' beliefs about the safety of local beef and (4) to compare beliefs about the safety of local beef across sociodemographic factors, residential location, and reported level of beef consumption. These type of data are lacking in the U.S., yet they are fundamental to understanding the ways in which consumers will shape ideas about the "sustainability" of beef and influence their beef buying behavior.

Methods

Eligibility, setting and recruitment

A purposive sampling strategy was designed to reflect the aims of the study. Thus, data were collected in two settings. The first setting included grocery stores in 18 predominately rural counties in Alabama with greater percentages on non-white residents and median incomes lower than the national average. In many areas this store was the only retail food market in the county. The beef products available for purchase in these settings came from a national food distributor. The face-to-face intercept surveys were conducted inside the store near the meat cooler. Trained interviewers contacted customers in the process of making a beef purchase selection after they completed an interview, according to a standardized protocol, irrespective of any personal characteristic.

Data were also collected at farmers' markets in seven mid- to large-sized cities across the state of Alabama. The beef products at farmers' markets were produced and processed within the state. Data were collected from markets during their primary operation period, typically on a Saturday morning. At these markets, interviewers set up a tent or booth similar to other market vendors and displayed a sign requesting participation and the interviews took place at this site.

To be eligible for the study, regardless of setting, customers had to be at least 19 years of age and purchase beef at least one time per month. Participants were informed that it was a study of beef buying behavior; the words “local beef” and “beef safety” were not mentioned. A \$10 blank check was offered as an incentive. Interviewers took notes and with the respondent’s permission, audio recorded the interview. In instances in which audio recording did not take place, notes were taken verbatim by an experienced interviewer.

All data collection occurred from 12 April to 29 August of 2014. The size of the sample was determined by saturation. Study protocols were approved by the university Institution Review Board.

Survey instrument

Data used for this analysis were collected as part of a larger study using a quantitative and qualitative survey instrument designed by an interdisciplinary team of rural sociologists and meat scientists following the principles of TPB (Fishbein & Ajzen, 2010). In particular, the present study was designed to identify valid indicators and measures (i.e., salient beliefs) for key domains in the TPB, specifically beef safety behavioral beliefs.

Closed- and open-ended items were based on a review of the literature addressing local foods, beef consumption, beef safety, and consumer perceptions, as well as a pre-test with the targeted population. The survey included questions about beef purchase behavior, beef safety, familiarity with the term “local beef,” food safety beliefs about local beef, and demographics. Because a primary goal of the study was to assess the extent to which beef safety was a top-of-mind concern, sequencing of items was important to limit order-effect bias (Perreault, 1975). The questions and their ordering are outlined in Table 1.

Table 1 Ordering of questions used in intercept survey				
Order in Survey	Measurement Objective	Question	Question Type	Data Analysis
Section 1	Beef Purchase Behavior	How often do you purchase beef for your household?	Closed-ended with options: less than once a week, 1 time per week, 2-3 times per month, once a month, less than once a month, I buy in bulk; 1 or 2 times a year, never	Frequency counts, chi-square test statistics
		How often is beef eaten in your household?		
Section 2	Top-of-mind Beef Safety Elicitation	What circumstances would cause you to change your beef purchase behavior?	Open-ended	Content analysis, frequency counts of major categories
		Which, if any, of the items on this list would cause you to change your beef purchase behavior?	Closed-ended with options: health concerns, animal welfare, price, food safety, environmental factors, quality and freshness, new information, peer group influences, family reason, and changes in economic circumstances	Frequency counts, chi-square test statistics
		Of the items you mentioned on your own, and from the list, which would you say is the most important factor that would cause you to change your beef purchase behavior?	Open-ended	Content analysis, frequency counts of major categories
Section 3	Local Beef Familiarity	Is the term local beef familiar to you?	Open-ended	Content analysis, frequency counts, chi-square test statistics
		Where is the best place to purchase local beef?	Open-ended	Content analysis, frequency counts of major categories
Section 4	Top-of-mind Beliefs about the Safety of Local Beef	Do you associate local beef with improved food safety? ^a	Open-ended	Content analysis, frequency counts of major categories
		Why do you associate local beef with improved food safety? ^a		
Section 5	Demographic Questions	Age, sex, race, income, education, place of residence, and # of children <6 years old in household	Closed-ended ^b	Frequency counts, chi-square test statistics

^a Only the participants that indicated familiarity with local beef (n=168) were asked the questions about the safety of local beef.

^b Refer to Table 2 for answer choice categories.

Analysis

Verbatim text from audio recordings and written notes were digitized. Following the TPB methods described in the literature (Fishbein & Ajzen, 2010; Middlestadt, 2012), a content analysis of verbatim text was conducted by a four-person interdisciplinary team with experience coding data using the qualitative software tool NVivo10[®]. Content analysis is a qualitative descriptive method used to identify, analyze, and quantify ideas within the data. It is the approach most appropriate for studies seeking to identify and retain the point of view of the participant (Krippendorff, 2012).

The analysis was conducted in three phases. During the first phase of analysis, verbatim text of the transcribed audio recorded open-ended question was carefully read and re-read and researchers independently developed categories of the major response types. To ensure reliability across response categories and control for researcher bias, the team met and similarities and differences observed across response categories were systematically discussed. This part included reevaluation of the data until consensus was reached. Per Fishbein and Ajzen (2010), items were treated as distinct when participants mentioned similar, but not identical items, however low-frequency items were combined into more general categories. The retained categories were organized in a coding manual. During the second phase of coding, researchers used the coding manual as a guide and scored each response with a one for open-ended responses that fell into the category and a zero if it did not. Responses could be coded for more than one category.

During the third phase of analysis, frequencies, percentages and chi-square test statistics were used to describe and compare the demographic characteristics of the study population and the different types of beef safety beliefs identified. Food safety belief categories are described with percentages to illustrate the relative importance of each belief type.

Results

Sample and household characteristics

In total, 275 participants were interviewed including 174 grocery store consumers and 101 farmers' market consumers. As expected, the consumer groups varied significantly across key sociodemographic characteristics (Table 2). Chi-square analysis also found significant

variation in the familiarity of the term “local beef” across the consumer groups and a significant variation in the types of some beef safety beliefs across consumer groups. Therefore, the decision was made to present the data by consumer group.

In comparison to U.S. Census data and the farmers’ market sample, the grocery store sample had more minorities and rural residents, as well as lower median income and level of educational attainment. Females and individuals over the age of 45 were overrepresented in the overall sample.

A majority of participants (84.4%) from both consumer groups reported that beef is consumed in their household at least one time per week. The frequency with which beef is purchased varied significantly across consumer groups (Pearson’s chi-square = 12.8707, $p = 0.025$); grocery store consumers were most likely to purchase beef more than one time a week (44.4%) and farmers’ market consumers were most likely to purchase beef either 1 time per week or 2-3 times per month (60.0%).

Demographic characteristic		State of Alabama	Grocery Store (n=174)	Farmers' Market (n = 101)	Groups Combined (n=275)	
		Percentage	Percentage (count)	Percentage (count)	Test of Difference by consumer group	Percentage (count)
Sex	Male	48.5%	30.5% (53)	48.5% (48)	p=0.002	37.0% (101)
	Female	51.5%	69.5% (121)	51.2% (51)		63.0% (172)
Highest degree of education attainment ^a	< High School	16.3%	7.7% (13)	0%	p=0.000	4.8% (13)
	High School	31.1%	40.0% (68)	5.0% (5)		27.0% (73)
	Some college	29.6%	28.8% (49)	21.0% (21)		25.5% (70)
	Bachelor's degree or more	23.1%	23.5% (40)	74.0% (74)		42% (114)
Race	Caucasian/White	69.7%	40.1% (69)	79.0% (79)	p=0.000	54.4% (148)
	African American/Black	26.7%	51.7% (89)	10.0% (10)		36.4% (99)
	Other	3.6%	8.1% (14)	11.0% (11)		9.2% (25)
Income	< \$9,999	8.7%	18.0% (29)	8.0% (8)	p=0.000	13.5% (37)
	\$10,000 - 19,999	17.5%	11.8% (19)	9.0% (9)		10.2% (28)
	\$20,000 - \$29,999	14.0%	12.4% (20)	2.0% (2)		8.0% (22)
	\$30,000 - \$39,999	11.7%	16.8% (27)	14.0% (14)		14.9% (41)
	\$40,000 - \$49,999	9.5%	8.1% (13)	8.00 (8)		7.6% (21)
	\$50,000 - \$59,999	8.0%	11.8% (19)	4.0% (4)		8.4% (23)
	>\$60,000	30.7%	19.3% (31)	50.0% (50)		29.5% (81)
Children under 6 years of age in household ^b	Yes	6.4%	26.9% (46)	17.8% (18)	p=0.088	23.5% (64)
	No	--	73.1% (125)	82.2% (83)		76.5% (208)
Age ^c	>19 and < 25	6.9%	4.1% (7)	16.8% (17)	p=0.021	8.9% (24)
	25-44	29.0%	35.5% (60)	32.7% (33)		34.4% (93)
	45-64	22.8%	44.4% (75)	38.6% (39)		42.2% (114)
	65+	13.0%	33.7% (57)	32.7% (33)		33.3% (90)
Place of residence ^d	Rural	3.0%	40.7% (70)	10.0% (10)	p=0.000	29.4% (80)
	Small city/town	21.4	44.8% (77)	39.0% (39)		42.7% (116)
	Medium size city		9.3% (16)	33.0% (33)		18.0% (49)

	Suburban	75.5%	1.7% (3)	8.0% (8)		4.0% (11)
	Urban		0.6% (1)	7.0% (7)		2.9% (8)
	Other	--	2.9% (5)	3.0% (3)		2.9% (8)

^a State data from 2010-2014 American Community Survey and US Census Report. ^b State data reflects U.S. Census data which reports children under age of 5 in household whereas our survey measured children under age of 6 in household. ^c State data reflects U.S. Census age categories 20-24, whereas our survey included individuals age 19, the legal age of consent in Alabama. ^d State data based on the USDA's county-level Rural-Urban Continuum Codes.

Degree of beef safety concern

Results from the top-of-mind beef safety elicitation indicated that food safety was not a salient concern for a majority of participants (Table 3). When asked what circumstances would cause them to change the amount of beef purchased there was significant variation in the frequency of response types across consumer groups. Combined, food safety was the fourth most common response type following price, nothing, and personal health.

TABLE 3

Participants' top-of mind beef safety beliefs from general elicitation.

<i>What would cause you to change the amount of beef you purchase?</i>	Grocery Store n=132	Farmers' Market n=93	Groups Combined n=225
	% ^a (No.)	% ^a (No.)	% ^a (No.)
Price***	12.9% (17)	28.7% (29)	20.4% (46)
Nothing*	25.0% (33)	12.9% (13)	20.4% (46)
Personal Health*	11.4% (15)	21.5% (20)	15.6% (35)
Food Safety	9.1% (12)	10.8% (10)	9.8% (22)
Availability***	0	20.4% (19)	20.4% (19)
Lifestyle (diet, recipe, holiday) *	9.1% (12)	2.2% (2)	6.2% (14)
Information	5.3% (7)	4.3% (4)	4.9% (11)

Chi-square test shows the variable is different across consumer types, ***p<0.001, **p<0.01, *p<0.05.

^a Percentages do not sum to 100 because participants identified more than one response type.

When participants were presented with a list of items and asked to identify the most important factor that could cause their beef purchase behavior to change (Table 4), personal health ranked highest, followed by food safety, quality and freshness, and price. Notably, both groups of responses reflect individualized factors shaping purchase behaviors with the exception

of those identifying animal welfare. Neither consumer group identified environmental reasons or peer group influences as important factors in shaping their beef purchase behavior although they were included on the list of items.

Table 4

Percent of respondents who identify each characteristic presented as most the important factor influencing beef purchase behavior.

<i>What is the most important factor that would cause you to change the amount of beef you purchase?</i>	Grocery Store n=128	Farmers' Market n=93	Groups Combined n=221
	(%) ^a No.	(%) ^a No.	(%) ^a No.
Personal health	19.5% (25)	19.4% (18)	19.5% (43)
Food Safety *	11.7% (15)	21.5% (20)	15.8% (35)
Quality/Freshness	12.5% (16)	12.9% (12)	12.7% (28)
Price**	7.0% (9)	18.3% (17)	11.8% (26)
Animal Welfare	3.1% (4)	5.4% (5)	4.1% (9)
Change in economic circumstances**	0.8% (1)	7.5% (7)	3.6% (8)
Family reasons	0	3.2% (3)	1.4% (3)
New information/knowledge about product	0	2.15% (2)	0.90% (2)

Chi-square test shows the variable is different across consumer types, *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

^a Percentages do not sum to 100 because participants identified more than one response type.

Familiarity with local beef

Familiarity of the term “local beef” varied statistically across consumer type (Pearson’s chi-square = 33.779, $p = 0.000$). Approximately 80% of farmers’ market consumers were familiar with the term “local beef” compared to 44% of grocery store consumers. Familiarity with the term also significantly increased with level of education (Pearson’s chi-square = 23.327, $p = 0.000$) but not with other sociodemographic factors. When asked where the best place to purchase local beef, farmers’ market consumers were most likely to identify a farmers’ market, farm, or farmer (40.5%) while grocery store consumers were most likely to cite grocery stores (45.5%).

Belief that local beef is safer¹

Of the total number of participants familiar with the term “local beef” (n = 168, 61%), a majority (n = 105, 63%) associated local beef with improved food safety, approximately 27% (n = 46) said that local beef was not safer, and 2% didn’t know (n = 5). A subset of participants was indefinite (n = 12, 7%). They explained that “I kind of do, but at the same time I also know it doesn’t necessarily have to be that way” (male, 39, farmers’ market). Some of these participants believed that “it’s the handling and processing that makes it safe” (female, 44, grocery store). Therefore, food safety “depends on who was doing the work,” and that beef is “no safer than who handles it” (male, 65, grocery store). Others stipulated that food safety “depends on the farm,” or “the organization doing the beef” (female, 60, farmers’ market).

The belief that local beef is safer did not significantly vary across consumer type (grocery store, 61%; farmers’ market, 64%) or general sociodemographics--age, income, education, race, sex.

Predominant food safety beliefs about local beef

Six main categories about the safety of local beef were identified (Table 5) via content analysis. Chi-square analysis did not find any variation across the belief categories and major sociodemographic characteristics, residential location, or frequency with which consumers bought and ate beef. However, there was significant variation by consumer type across two of the six major categories. Analysis of the categories suggest two overarching themes into which the categories can be further grouped: a knowledge derived group and a technology derived group. The knowledge group includes beliefs that local beef inherently provides greater access to knowledge about the production and processing aspects of beef and that overall, consumers inherently possess greater knowledge about beef products that are local. In contrast, the beliefs in the technology group providing participants with safety assurances included references to shorter shipping distances, less fluctuation in refrigeration time and temperatures, particular processing practices, and adherence to relevant regulations. These themes, including instances of variation, are discussed and illustrated with quotations from the study participants.

TABLE 5

Salient Food Safety Beliefs about Local Beef				
Overarching Theme	Thematic Category	Grocery Store n=37	Farmers' Market n=52	Groups Combined n=89 ^a
		(%) ^b No.	(%) ^b No.	(%) ^b No.
Knowledge Derived Group	Knowledge	51.4% (19)	36.5% (19)	42.7% (38)
	How produced	8.1% (3)	11.5% (6)	10.1% (9)
	Where produced	13.5% (5)	3.8% (2)	7.9% (7)
	Who produced	5.4% (2)	7.7% (4)	6.7% (6)
	What fed	8.1% (3)	3.8% (2)	5.6% (5)
	Slaughter/Processed	10.8% (4)	9.6% (5)	10.1% (9)
	Other	5.4% (2)	7.7% (4)	6.7% (6)
	Smaller Scale**	5.4% (2)	23.1% (12)	15.7% (14)
Technology Derived Group	Relationships	13.5% (5)	11.5% (6)	12.4% (11)
	Shipping, geographic considerations	18.9% (7)	15.4% (8)	16.9% (15)
	Processing	13.5% (5)	7.7% (4)	10.1% (9)
	U.S. Regulatory Standards*	18.9% (7)	1.9% (1)	9.0% (8)

Chi-square test shows the variable is different across consumer types, ***p<0.001, **p<0.01, *p<0.05.

^a Although 105 individuals stated that local beef was safer, only 89 provided responses regarding why they believed local beef was safer.

^b Percentages do not sum to 100 because participants identified more than one response type.

Knowledge was the most common theme identified by consumers in the study and is one of three categories in the knowledge derived group. When asked why they associated local beef with improved food safety, participants in both consumer groups most frequently alluded to having more knowledge about various aspects of cattle production and beef processing. Beliefs in this category were often premised on the idea that an inherent attribute of local beef is access to greater amounts of knowledge, as participants explained: “it’s the amount of information that is accessible to you” (male, 37, farmers’ market), and “you know so much more than going to the store and picking up a package” (female, 20, farmers’ market). Related to this idea was the notion that “with locally grown, it’s so much easier to figure out where they were raised, what the

cut of beef is, exactly where in the state they came from. And you know what they were fed” (female, 20, farmers’ market).

Types of knowledge identified by participants included knowing how the beef was produced or raised; knowing who produced it; knowing what it was fed; and knowing about the origin stated as simply as: “you know where your products are coming from” (male, no age given, grocery store) to more nuanced explanations such as “because it's coming from the southern states and you know how southern farmers’ raise beef” (female, 48 grocery store). Knowledge about cattle feed was separated from the general production knowledge sub-theme because it was often identified as a distinct element that ensured the safety of the beef. For instance, participants stated that “it was fed good feed” (female, 48, grocery store), and “you know what they were fed and how that affects the cow’s health” (male, 37, farmers’ market). A small percentage also felt that local beef provided greater access to knowledge about relevant food safety concerns, with participants explaining: “[I] think you probably have more control over knowing about disease and stuff than if the beef is coming from far away...I think you hear about or know more stuff that happens to beef in your area than if the beef ships in from far away” (female, 46, farmers’ market) and “if there's an issue with something, everyone knows about it, it's not something the media can sweep under the rug” (male, 55, farmers’ market).

The relationship category was also included in the knowledge derived theme. In this case, relationships included personal contact with the producers, butchers, owners, processors, “people that run the slaughterhouse” (female, 35, grocery store) and “friends that raise their beef” (male, 30, grocery store). Personal relationships facilitated interactions between the consumer and other supply chain actors and fostered a sense of trust. As one participant said: “I would be able to talk to someone directly, who if they're not the person who raises the beef, they actually have a relationship with the person who raises the beef, and I’ve built up a relationship of trust with that person” (male, 37, farmers’ market). Similarly, interactions contributed to food safety beliefs by engendering a sense of accountability: “you've got a little more accountability because there's probably more interaction with a local farmer and butcher” (male, 37, farmers’ market). and “the producer “is directly responsible for the product he sells” (male, 43, farmers’ market). Relationships also meant that the consumer had developed a history of satisfaction in terms of food safety with certain producers and stores. Relationships also established and maintained reputations for producers, which also contributed to food safety beliefs. Participants believed that

local producers “would try to offer the best possible beef for their customers to hopefully stay in business here because people will go somewhere else to shop” (female, 62, grocery store) and because “if something went wrong, that's their entire business, they can't send it somewhere else” (female, 28, farmers’ market).

Issues pertaining to scale were also included in the knowledge derived group and were the third most popular food safety belief overall and was identified primarily by farmers’ market consumers ($n = 12$, 85.7%; Pearson’s chi-square = 6.091, $p = 0.014$). In general, participants equated local beef with smaller operations which resulted in safer products. Interestingly, this was because of the relational implications of smaller scale operations rather than the industrial nature of operations. For example, participants explained that “smaller outfits are more conscientious of what’s going on” (male, 34, grocery store), “they put more time into it” (male, 27, farmers’ market), and they “have a tendency to be more adherent to the food standards, the laws” (female, 56, farmers’ market). Many contrasted local beef to “mass food lots (female, 46, farmers’ market)” and “mass produced operations” (female, 63, farmers’ market) where “things slip through the cracks” (male, 39, farmers’ market), “[in contrast] with local, [where] they’re really looking at it” (female, 37, farmers’ market). As one participant stated, “the bigger chains would probably be more apt to push the product out [by] whatever means regardless of the safety or condition of the animal” (female, 42, grocery store).

Shipping and geographic considerations was the second most popular food safety belief response across both consumer types and was one of three categories in the technology derived group. Pertaining to shorter shipping distances and supply chains, this belief was generally tied to the understanding that food safety risks decrease as the travel time and distance decrease because the “less handling and less travel time [means] less room for error” (male, 40, grocery store) and “if you're transporting something much further, the more elements there are in the chain, the more one of them can get broken down” (male, 37, farmers’ market). Some participants also believed that non-local beef was more likely “be out a month, a month and a half in the freezer” (male, 74, grocery store) or “sitting in a warehouse waiting to be shipped across the country” (male, 39, farmers’ market). It was common for participants to equate increased shipping distance and time with “refrigeration” which was also perceived as a risk factor. For instance, a respondent stated that “any safety concern would be from slaughter to purchase, you know, refrigeration, and all that” (male, 55, farmers’ market). Others noted that

greater transportation meant that when “refrigeration” was required, the beef is “gonna be frozen” (male, 38, farmers’ market), and “less fluctuation in temperature. . . saves the meat [from going bad]” (female, 34, farmers’ market).

Processing was also included in the technology derived theme. Processing was given as an explanation for why participants believed local beef was safer. These consumers felt that “any safety concern would be from the slaughter to the purchase, you know, refrigeration, cleanliness of the facility” (male, 55, farmers’ market). Local beef afforded the opportunity to “actually visit the processing facility” (male, 55, farmers’ market) and “when you can see what’s happening that makes a difference” (female, 65, farmers’ market), or you can “get to know him [the processor]” (male, 42, farmers’ market). Others believed that for local beef “the work environment tends to be less anxious and [so they] would be processing it right” (male, 57, grocery store). Two participants specifically identified local as safer because they weren’t stuffing it full hormones and antibiotics during processing” (male 42, female 65, farmers’ market). Local beef was also perceived to be “humanely processed” (male, 56, farmers’ market) which contributes to beef safety.

There was also a small group of participants that believe local beef is safer based on trust in the U.S. regulatory system, and this perspective was more prevalent among grocery store participants (n=7, 23.3%; Pearson’s chi-square = 4.923, p = 0.026). This group was split between those that appear to have a high level of trust in formal standards because “U.S. inspection, it’s got to be top, you know everything has to be clean and good” (female, 56, grocery store) and “in the U.S. it has to be certified before it’s even shipped out” (female, 24, grocery store). The other half appeared simply to trust the U.S. more than foreign products providing explanations such as: “I don’t trust out of country beef, I’m trying to be politically correct, I just don’t trust Canadian or Mexican processing” (female, 52, grocery store), and “because like I said, you don’t know what they do over yonder” (female, 24, grocery store).

Discussion and conclusion

Overall, the variation in sociodemographic characteristics in the two consumer groups matched expectations and our sampling strategy. The variation in frequency of beef purchases

across consumer groups could occur for multiple reasons. USDA research has found as income increases beef consumption decreases and black household consumption of beef is higher than white household consumption (Davis & Lin, 2005); our sample of grocery store consumers contained more blacks and more individuals with lower-incomes than the farmers' market sample. Furthermore, the variation could be a result of availability, as farmers' markets are often open only one day a week. The fact that women are over-represented most likely reflects the fact that women are the primary grocery shoppers for a household (Roy Dholakia, 1999).

Is beef safety a top-of-mind concern?

The findings indicate that for a majority of participants, the safety of beef in general, was not a top-of-mind concern. This finding is consistent with European studies (Brunsø, Fjord, & Grunert, 2002; Verbeke et al., 2007) and could reflect an overall high level of confidence in the safety of the U.S. food supply (IFIC, 2014). However, the relative shift in the food safety ranking from fourth in the top-of-mind elicitation to second position when respondents were provided a list supports previous research by Loureiro and Umberger (2007) who found consumers highly value USDA safety certification. One explanation for the shift could be that in making decisions about beef products, safety is not the primary framework for decision making because it competes with and includes other decision making frameworks (Green, Draper, & Dowler, 2003) such as price, health, quality, and freshness.

Neither beef production and processing reasons nor environmental factors were top-of-mind issues for consumers suggesting a disconnect between perceptions held by consumers and those held by consumer advocacy organizations (e.g. Food Safety and Sustainability Center, as noted above).

The popularity of the category "nothing" likely reflects the nature of an open-ended question and could suggest different levels of consumer involvement or personal satisfaction. For instance, given the extra effort often necessary to shop at farmers' markets (e.g., less convenient location, limited hours) it is plausible that farmers' market consumers are primed to talk about food purchases relative to grocery store consumers as they are actively seeking alternative food products. Thus it is not surprising that "nothing" would be a less common response among farmers' market consumers than rural grocery store consumers. The higher ranking of price and

availability by farmers' market consumers similarly reflect different purchasing contexts between consumer groups. For instance, grocery store consumers are unlikely to face a lack of available beef products at the grocery store whereas it is not uncommon for vendors at farmers' markets to run out of product before the end of the market. Furthermore, it is not uncommon for consumers to perceive products at farmers' markets as more expensive (Chambers et al., 2007). The relative position of personal health for both consumer groups is consistent with European research that has shown consumers' decisions to eat meat have been shifting towards nutrition and health considerations (da Fonseca & Salay, 2008; Verbeke et al., 2007), thus providing new evidence that U.S. consumers align with E.U. consumers in this regard.

What beef safety beliefs do consumers hold for local beef?

Consumers in this study believe local beef is safer because they know more about the product and have greater access to information. This finding supports and provides additional evidence to other research that has found that consumers tend to have higher knowledge in their own country or region and thus believe domestic beef is safer than non-domestic beef (Green et al., 2003; Grunert, 2005; Van Wezemael et al., 2010). For instance, similar to British and French participants in Wezemael et al.'s (2010) study, a subset of participants (primarily grocery store) in our study tied beef safety directly to beliefs about superior domestic beef safety regulations. Additionally, our findings go beyond other beef safety research by providing insight into the types of knowledge consumers infer from beef deemed "local" and shed light on how these inferences contribute to perceptions of beef safety. For instance, participants did not stipulate that the cow be fed a certain type of feed, that it be produced in a definite geography, or processed a specific way in their explanations, items previously identified as indicators of beef safety. Rather they stipulated that local beef was safer because they "knew" about these aspects of production and processing. This finding is important because it suggests that participants possess, or believe they possess, a great deal of knowledge about the production and supply chain and this knowledge is the primary reason they believe local beef is safer than non-local beef products. One possible interpretation of this finding seems especially relevant.

Individuals lacking knowledge about potential risk factors generally rely on information from experts or social trust as a means of reducing the complexity they face (Frewer, Scholderer,

& Bredahl, 2003; Siegrist & Cvetkovich, 2000) and social trust is often based on an assessment of those who are responsible for managing the risk (Siegrist & Cvetkovich, 2000). Yet, when self-knowledge is perceived as adequate to assess the risk and benefits, individuals make their own judgements (Siegrist & Cvetkovich, 2000). The findings from this study reflect both a reliance on self-knowledge and social trust in consumer beef safety judgements.

In addition to grounding their perceptions of beef safety in perceived self-knowledge about local beef, participants also derived assurances from personal relationships. Specifically, actors along the supply chain reinforced consumer trust through personal interactions, a sense of accountability, and a history of satisfaction which in turn fostered a sense of shared values and social trust (Earle & Cvetkovich, 1995; Sapp et al., 2009). This process also reflects an ‘embodied trust’ in which consumers consider themselves part of a reciprocal network with agrifood actors who are known over time (Green et al., 2003). This is an important finding because beef safety is a credence attribute and as such consumers’ tend to rely on external cues to assess beef safety (Grunert, 2005; Van Wezemael et al., 2010). A common way this occurs is through the transformation of credence attributes into search attributes, but without trust in the actors and information providers behind the search criteria, the transformation will fail (Van Wezemael et al., 2010). This finding is also congruent with an earlier analysis of participants’ definitions of local beef and their perceptions of quality (citation to be included after peer-review). In this work it was found that the term “local beef” conveyed feelings of familiarity and trust to consumers because of perceptions of geographic proximity, as well as real and perceived personal relationships and social ties to producers, places, and production practices which acted to reinforce consumer perceptions of confidence and reliability of the product (citation to be included after peer-review).

“Scale” was included in this group of beef safety beliefs because, as mentioned earlier, many of these beliefs alluded to the underlying relational qualities that smaller-scale operations afforded. These beliefs suggest participants derive trust about the safety of local beef because they associate care and competence with smaller scale operations, which are two dimensions of trust that can influence consumer confidence in food safety (de Jonge, Van Trijp, van der Lans, Renes, & Frewer, 2008). The prevalence of scale as an indicator of beef safety reflects the ideology of “Buy Local” food campaigns that criticize globalized corporate concentration of the

food system (Allen & Hinrichs, 2007; McMichael, 2000), which may explain why it was more commonly cited among farmers' market consumers.

The other group of beliefs, the technology derived group included references to shipping distances, refrigeration, processing practices, and regulations. These findings are consistent with beliefs consumers hold for local foods in general and are attributes that consumers associate with beef safety (Van Wezemael et al., 2010). Specifically, because local foods are often defined geographically, it is common to associate them with shorter transportation distances (McFadden, 2015; Ostrom, 2006), and therefore, also with freshness (Chambers et al., 2007; Roininen et al., 2006; Zepeda & Li, 2006), better taste (Roininen et al., 2006) and better quality (McFadden, 2015; Ostrom, 2006). The connection to refrigeration as a risk factor is interesting because beef, regardless of being local, will require refrigeration between processing and the point of sale, and generally, local beef products sold at farmers' markets in the U.S. are frozen and often transported in the back of a truck with generator. That participants derive beef safety assurance from the belief that they can visit the processing facilities is also noteworthy. On one hand, it illustrates that a sense of openness and transparency about processing fosters consumer trust and thus could be an indication that similar to participants in Van Wezemael et al.'s (2010) study, consumers especially distrust this part of the supply chain. On the other hand, the actual ability of the individual to visit the processing plant is uncertain given the small number of facilities in Alabama and adjacent states, as well as the strict visitation policies that many have. Regulatory standards were also included in this group because they represent a type of social, or regulatory technology that provides consumers in this study with beef safety assurance. Yet, generally speaking, the content of the standards governing red meat, the ways in which they are implemented, and the implications of such are "unknowns" for consumers.

Similarly, the subset of participants that were indefinite about beef safety point to processing and handling as focal points of their discernment. Although verbatim text was analyzed, it was not always clear what participants were referring to when they used the term "handling" or which actors in the supply chain they were referencing. This a topic for further exploration.

These findings also provide evidence that consumers are making some connections between sustainable production practices and beef safety particularly in regards to scale and shipping. However, many of the beef safety beliefs participants associate with local beef do not

directly point to animal production practices (e.g. pasture raised, all organic, grass-based diets) or environmental factors as implicated in Consumer Report's "Beef Report." In some ways, this finding is not surprising. As Cleveland, Carruth, and Mazaroli (2015) found, local food products are perceived by many individuals as a sustainable food choice because they serve as indicators or a means for achieving a wide range of goals from supporting local economies, reducing greenhouse gases, and increasing community ties, to conserving farms. Similarly, local beef products were not understood simply in terms of their on-farm production systems. Thus, beef safety was seen, predominantly, as derived from a variety of places and practices along the food supply chain beyond the farm gate.

While some participants were concerned about animal feed, the lack of other production related beef safety beliefs also suggest low levels of knowledge about on-farm production practices and the ways in which these practices relate to food safety outcomes. This could be a function of media framing of food safety issues in the U.S. which tends to link foodborne threats as food poisoning or contamination caused by processors, food producers, or retailers rather than as foodborne risks associated with farming practices as they do in Europe and Britain (Lockie, 2006). Future research is needed to more fully examine the types of knowledge U.S. consumers have regarding beef production and processing practices, as well as the veracity of such knowledge. In this study, several belief statements indicated low levels of understanding of beef production and processing aspects (e.g., "stuffing it full of hormones and antibiotics during processing") suggesting that the knowledge that provides beef safety assurance isn't always accurate. It could also be that consumer trust is derived from perceived transparency that "know[ing] so much more" affords rather than the content of the knowledge they possess.

How do beef safety beliefs differ across consumer type and sociodemographic characteristics of consumers?

In addition to identifying the salient beef safety beliefs that consumers have about local beef, an aim of the paper was to explore the extent to which local beef safety beliefs varied across consumer types. Only two belief categories, "scale" and "U.S. regulatory standards," varied significantly in occurrence across consumer groups and reflect one way that beef safety is socially and culturally located (Green et al., 2003). Especially for grocery store consumers, ideas of beef safety were tied to U.S. regulatory standards with some participants clearly stating

opposition to products from other countries. In contrast, farmers' market consumers were more likely to identify issues pertaining to scale as reasons that local beef is safer. These findings suggest that whereas farmers' market consumers understand that "smaller" scaled operations, at least in theory, allow relationships with supply chain actors, grocery store consumers generally place their trust in governmental bodies when it comes to food safety, which could stand in for their inability to establish personal relationships with these actors.

More striking were the similarities among beef safety beliefs across consumer types and other sociodemographic factors. One explanation for a lack of difference among beef safety beliefs is that the grocery store consumers believed the products at their stores to be local. This helps explain why consumers at grocery stores and farmers' markets have similar beef safety beliefs. However, we know the beef products are fundamentally different. The grocery stores in this study sourced their products from national distributors. In contrast, the beef products available at farmers' markets were sourced from within the state. Respondents' perception of "local" could matter over time. Unlike many areas across the E.U., and some regions of the U.S., the "local foods movement" is a relatively new phenomenon in Alabama, where it is centered predominately in urban areas and adjacent small towns. Thus, as rural grocery store consumers become more sophisticated in their knowledge about food sourcing (e.g., the origin of beef products available at their grocery stores), their beliefs toward safety may change.

Limitations

Future research in this area should address the following limitations of this study. First, a key finding of this study is that consumer's perceptions of beef safety are largely related to the amount of the knowledge individuals possess (or believe they possess) across many aspects of the local beef supply chain. However, because this study sought to identify top-of-mind responses (i.e. perceptions) regarding beef safety we did not probe participants in a way that verified their knowledge claims. A further limitation of this study is its lack of generalizability. While the results may not be generalizable beyond the southeastern U.S., they provide a starting point for future research. The study also did not measure participant's level of food involvement, a factor that may have provided additional insight into interpretation of beef safety beliefs. Finally, because of the exploratory nature of this work, future studies are recommended to quantify the relative importance of categorically distinct beef safety beliefs.

Conclusion

This study contributes to the literature on beef safety and local foods by providing insight into the beliefs of previously unstudied populations including rural, low-income, non-white consumers from the southern U.S... Participants from two different shopping contexts, grocery stores and farmers' markets, indicated local beef was safer than non-local beef and this was based on the beliefs that individuals possess greater knowledge about the product; that less shipping was involved; that locally processed meat is derived from small scale operations, and thus more likely to meet U.S. regulatory standards and to be safer; and, both relationships and proximity allow for more consumer oversight. Interestingly, farmers' market and grocery store consumers' both held similar beliefs about the safety of beef, yet the types of products available to them varied, as did their understandings of what is "local". The results of this study should play an important role guiding future research quantifying motivations, attitudes, and behavior regarding beliefs about local beef.

Acknowledgments

Supported by the Agriculture and Food Research Initiative competitive grant (number to be included after peer review) of the USDA NIFA.

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