Are All Organic Labels Treated Equally? The Influence of Retail Outlet on Consumer Perceptions of and Willingness to Pay for Organic Tomatoes

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Abstract:

The primary objective of this paper was to determine the effect of retail outlet (supercenter, supermarket, farmers market, fresh format store) on consumer perceptions of and willingness-to-pay for organic grape tomatoes. Additionally, we examine whether information on the proposed Food Safety Modernization Act (FSMA) regulations alters perceptions and willingness-to-pay values differently across retail outlets. To address these questions, we conducted field experiments with 219 participants in two U.S. states in the fall of 2014. Results of the study show consumers' perceptions of organic grape tomatoes vary significantly depending on which retail outlet the product is sold in, with farmers markets and fresh format stores receiving the most favorable evaluations and supercenters receiving the least favorable evaluations. However, when consumers are confronted with information on the proposed FSMA guidelines, safety perceptions of (and willingness to pay for, to a lesser extent) organic grape tomatoes sold in the most (least) favored retail outlets *decrease* (*increase*). This is likely explained by participants' preferences for food safety – specifically an aversion to organic grape tomatoes grown by FSMA-exempt farmers, which participants believe to be most prevalent at farmers markets.

Key Words: organic, consumer perceptions, willingness to pay, retail outlet, Food Safety Modernization Act

Background/Motivation

The organic food industry has grown tremendously in the past decade, both in terms of size and product scope (ERS, 2014). Given the increasingly popularity of organic foods with consumers, many retailers have responded by broadening their product offerings to include more organic alternatives – a list which includes major retailers such as Walmart, Target, and Aldi (Wohl, 2014; Tuttle, 2013; Ewoldt, 2013). These moves have intensified competition for traditional organic retailers such as Whole Foods and Natural Grocers as well as more localized farmers markets, food co-ops, and CSAs. For consumers, the increased competition should mean lower prices for organic foods; however, it remains to be seen whether consumers perceive organic products to be comparable across these different retail outlets. Worstall (2014) contends that, for some consumers, organic foods may function as a Veblen good such that the organic good's higher price is a clear signal of the good's higher quality. Thus, by low-cost retailers moving organics more toward mainstream, these goods could be losing the very "signaling power" which helped differentiate the greater organic brand in the first place.

At the same time the organic market has been growing, so, too, has been interest in food safety. According to the Centers for Disease Control and Prevention (CDC) estimates, one in six Americans (approximately 48 million people) get sick every year from foodborne illnesses, with 128,000 hospitalizations and 3,000 deaths (CDC, 2014). Further, since 2010, there has been an average of 11.6 multistate foodborne outbreak investigations per year. The majority of these investigations are for fruits and vegetables, meats, and dairy products (CDC, 2015).

In response to food safety concerns, President Obama signed the Food Safety Modernization Act (FSMA) into law in 2011; the act represents the first reform to food safety laws in over 70 years. Per the U.S. Food and Drug Administration (FDA) website, FSMA "*aims to ensure the U.S. food supply is safe by shifting the focus from responding to contamination to preventing it*" (FDAa, 2015). Under FSMA, there are seven proposed rules related to various aspects of food safety, including preventive controls for human and animal food, sanitary transportation, foreign supplier verification programs, food safety audits, intentional adulteration, and produce safety. Final rules are expected to be released on a staggered timeline, beginning in August, 2015, and ending in May, 2016 (Schultz, 2014).

While the FSMA rules will impact organic and conventional producers, processors, and manufacturers alike, the organic industry has taken a special interest in the proposed rule for

produce safety (not surprisingly, as produce is the largest product segment in this industry). One point of concern has been regulations on the application of manure. In the original proposed rule, the minimum time interval between manure application and crop harvest was set to be nine months; however, this is in conflict with the regulations set by the National Organic Program (NOP), which stipulates the minimum time interval between application and harvest is 120 days (four months). After an initial comment period, the FDA released a revision to the original proposed rule which removes the required nine-month time interval in an effort not to contradict the NOP's pre-existing standards (Zuraw, 2014; FDAb, 2015).

A second issue relates to which operations will be subject to the new FSMA regulations. For small and medium-sized operations, there have been concerns over the potential cost of implementation (Satran, 2012), yet the FDA has provided a number of exemptions to ensure the guidelines can be implemented by farms regardless of size (Satran, 2013; FDAb, 2015). Per the FDA website (FDA, 2013), key exemptions under the produce rule would apply to:

1. Certain specified produce commodities that are rarely consumed raw.
2. Produce that is used for personal or on-farm consumption.
3. Produce that receives commercial processing that adequately reduces the presence of microorganisms as long as certain documentation is kept.
4. Farms that have an average annual value of food[1] sold during the previous three-year period of $25,000 or less.
5. Farms that have food sales averaging less than $500,000 per year during the last three years and the farm's sales to qualified end-users (final consumer or restaurant/retail food establishment that is located in the same state as the farm or less than 275 miles away) must exceed sales to others.[2]

For consumers concerned about food safety, the key takeaway is that the majority of produce sold in the U.S. will be subject to the new FSMA regulations, which should ideally reduce the number of foodborne illnesses. However, the exemptions provided by the FDA indicate that smaller farms or farms which primarily sell to end consumers (perhaps through farmers markets, CSAs, etc.) will not be subject to the more stringent requirements. Depending

[1] Under the revised rule, the FDA now proposes that the value of *produce* (not food broadly) sold during the previous three-year period must be $25,000 or less in order to be exempt (FDAb, 2015).
[2] Farms which meet these two requirements would be eligible for a qualified exemption and would be subject to modified requirements (FDA, 2013).

on consumers' knowledge and preferences for food safety, these exemptions could shift purchases away from these smaller operations and toward larger retailers (who likely source their produce from larger operations which can meet their volume demands and are subject to the FSMA regulations). Unfortunately, little is currently known in regard to consumers' knowledge of the proposed FSMA rules and how this knowledge may shape perceptions and purchasing behavior within and across retail outlets; this research aims to provide insight on this current gap in the literature.

In this paper, we seek to provide insight on two key issues: (1) whether and how consumer perceptions of and willingness to pay for organic grape tomatoes vary across retail outlets; and (2) how information on the proposed FSMA regulations impacts safety perceptions and willingness to pay values for organic grape tomatoes within and across retail outlets. We chose to use organic grape tomatoes as our product of interest for a number of reasons. First, organic grape tomatoes were widely available (and in season) across various retail outlets in both locations over the course of the experiment. Secondly, grape tomatoes are a product many consumers are familiar with and purchase, allowing for a broader population from which to sample. Finally, tomatoes are known to be a source of several foodborne illnesses (primarily *Salmonella* outbreaks) in the past, so this is a product where information on the proposed FSMA rules may be more relevant in the minds of consumers.

Data and Methods

Participants and Recruitment

Individuals were recruited in two U.S. states (one Midwest, one Northeast) between August and October, 2014 to participate in brief (10 minutes or less) field experiment sessions on organic grape tomatoes. Both sites used convenience sampling at a variety of locations, including local parks, supermarkets, farmers markets, and college campuses. The only eligibility criteria were that participants had to be at least 18 years of age and a consumer of tomatoes. In total, 219 individuals participated in the study, with about half from each location (112 participants from Midwest, 107 participants from the Northeast). Individuals received $5.00 for their participation in the study.

Experimental Design/Procedure

Upon consenting to participate in the study, each session began with a Becker-DeGroot-Marschak (BDM) auction (Becker, DeGroot, and Marschak, 1964) for a pint of organic grape tomatoes from four different retail locations (supercenter, supermarket, fresh format, and farmers market). These four locations (outlets) were selected because they represent a broad spectrum of retail outlets where consumers may shop for organic produce, particularly grape tomatoes. Throughout the study, we referred to each retail outlet in its broadest sense (supermarket, supercenter, etc.) and then provided location-specific examples of each type of retail store in parentheses. With the exception of the farmers market location, at least two store examples were provided to participants for each retail outlet which should encourage participants to make judgments at the store class level rather than on an individual store's reputation.

The BDM auction mechanism (Becker, DeGroot, and Marschak, 1964) was used because it is designed to be incentive compatible (in other words, it encourages individuals to bid truthfully; Lusk, Feldkamp, and Schroeder, 2004). In a BDM auction, participants are asked to place a bid on a given product – in our case, four products – that reflects how much they would be willing to pay for the product. The researchers explained that even though participants were placing bids on multiple products, only one product would actually be sold and this would be drawn at random along with the binding price. Because the binding price is drawn at random, participants are advised that it is in their best interest to submit a bid equal to the price they are willing to pay for the product.[3] The researchers restricted bids to fall between \$0 and \$5 to ensure participants' incentives could cover any purchase costs; pricing research was conducted in both locations to determine the appropriate price range.

After the first round of bidding, participants were asked to complete a brief survey regarding their perceptions of the four pints of organic grape tomatoes. For each retail outlet, participants rated the perceived safety, health, and taste of the organic grape tomatoes using 7-point Likert scale responses. Participants also rated their confidence that the grape tomatoes labeled as organic were truly organic for each retail outlet (also with a 7-point Likert scale). Finally, participants indicated their level of knowledge (where 1=no knowledge and 7=very

[3] Subjects in a BDM auction have no incentive to understate their true willingness to pay because the binding price is determined by a random draw, not the subject's bid. If a subject bids higher than her true value, she could end up paying a price higher than the true value. Conversely, if a subject bids lower than her true value, she could miss out on a profitable purchase. For more on the BDM auction mechanism, refer to Becker, DeGroot, and Marschak,1964; Corrigan and Rousu, 2008; Thrasher et al., 2011).

knowledgeable) on four topics: Food Safety Modernization Act (FSMA), Organic, Tomato Safety, and Salmonella.

In the next portion of the study, participants were randomly assigned to one of two information treatments. Both information treatments gave some basic facts about the proposed FSMA regulations, including the objective of FSMA, basic requirements for food facilities, and two exemption rules related to farm size (exemption numbers 4 and 5 as described previously). Additionally, in the second information treatment, participants also received information specifically related to tomato safety. This consisted of a quote from the FDA about the number of multistate outbreaks contributed to the contamination of raw tomatoes and the resulting number of illnesses and deaths. A sample information treatment is provided in figure 1.[4]

Upon reading the fact sheet, participants were given the opportunity to ask any questions about the information provided. Then, participants were asked to bid again on the four pints of organic grape tomatoes. The researchers again reminded participants of the nature of the BDM auction mechanism and encouraged participants to submit a bid equal to their true value of the product. Once the second round of bidding was complete, the researchers randomly drew which auction round/retail outlet combination (out of eight possible combinations) would be binding along with the binding price. The binding price was randomly drawn from a uniform distribution which ranged from $0.25 to $5.00 in increments of $0.25. If the participant bid more than the price drawn, he/she paid the binding price and received the appropriate pint of organic grape tomatoes.

Once the auction process was complete, participants were asked to fill out a second brief questionnaire, which consisted of two distinct sections. In the first section, participants were asked to state their level of agreement/disagreement (using a 5-point Likert scale) with several statements related to attitudes toward food safety and FSMA. Participants were also asked to rate the perceived safety of the organic grape tomatoes sold in each of the retail outlets for a second time – to determine whether the information provided altered safety perceptions. In addition, participants rated the likelihood (on a 7-point Likert scale) that each of the retail outlets was selling organic grape tomatoes that would be exempt from FSMA. The second section of the questionnaire asked about socio-demographic characteristics, including gender, age, income,

[4] It should be noted that in the second information treatment (FSMA + Tomato Safety information), the researchers did randomize the order of information across participants (e.g., some received FSMA information first then tomato safety quote, others vice versa); however, there no differences were detected between the two groups.

education, presence of children in the home, frequency of organic produce purchases, and frequency of purchasing produce at each of the four types of retail outlets.

Data Analysis

The first objective of this study was to provide insight on whether and how consumers' perceptions of and willingness to pay for organic grape tomatoes vary across retail outlets. We analyzed ratings of perceived safety, heath, and taste as well as round 1 auction bids (pre-information) using analysis of variance (ANOVA) and then Fisher's least significant difference (LSD) procedure.[5]

The second objective of the study was to determine how information on the proposed FSMA regulations affects safety perceptions of and willingness to pay for organic grape tomatoes within and across retail outlets. We perform this analysis using matched pairs t-tests for the mean pre- and post-information perceived safety ratings and willingness to pay bids.

Results

Sample Characteristics

Table 1 provides the demographic profile for the participants in this study. As can be seen from the table, our sample was 68.5% female and relatively well educated (almost 70% with a bachelor's degree or higher). The average age was 38.4 years with an average annual household income of $70,400. As mentioned previously, we had a fairly even split of participants in each of the geographical regions. In terms of purchasing behaviors, table 1 shows that a majority of our respondents (57.7%) buy organic produce "Sometimes", with supermarkets and farmers markets being the most common venues for buying produce.

Consumer Perceptions and Willingness to Pay across Retail Outlets

Table 2 presents the average ratings for perceived safety, health, taste, and confidence in the organic label as well as the average willingness to pay values *before* food safety information was provided. For each of the five measures, the joint F-test was rejected, revealing there were

[5] The Fisher's Least Significance Difference (LSD) procedure was only utilized in instances where the initial ANOVA analysis revealed significant differences across the four retail outlets.

significant differences across the four retail outlets; thus, the Fisher's Least Significance Difference (LSD) procedure was used for pairwise comparisons.

From the table, we can see that respondents do *not* view a pint of organic grape tomatoes uniformly across retail outlets. Rather, there seems to be three distinct tiers of tomatoes. Organic tomatoes in the top tier are sold in fresh format stores or at farmers markets. With the exception of perceived taste, there were no significant differences between ratings or willingness to pay values for these two retail outlets. Participants expected organic grape tomatoes from these two outlets to be safer to consume, healthier, better tasting, and more likely to truly be organic as labelled. Additionally, respondents were willing to pay over $1.00 more for tomatoes sold at these outlets versus tomatoes sold at supermarkets or supercenters.

The second tier of organic grape tomatoes are those sold in supermarkets. According to respondents' ratings, these tomatoes are just slightly above average (average ratings range from 4.42 to 5.20 on a 7-point scale). These tomatoes are clearly not perceived to be as high of quality as tomatoes in fresh format stores or at farmers markets; however, they are evaluated more favorably than organic tomatoes sold in supercenters, which represent the third tier. Participants were only willing to pay $2.33 for a pint of organic grape tomatoes from supercenters, on average, and participants were most skeptical that the organic grape tomatoes at supercenters would actually be organic.

Effect of Food Safety Information on Safety Perceptions, Willingness to Pay, and Attitudes

In the last section, we discussed consumers' perceptions of and willingness to pay for organic grape tomatoes before they received food safety information. Here, we compare participants' pre- and post-information willingness to pay values and perceived safety ratings across the four retail outlets.

Figure 2 presents the differences between willingness to pay values pre- and post-information. As can be seen in the figure, there was very little change in respondents' willingness to pay for the organic grape tomatoes after they reviewed the food safety information. The biggest changes were for organic tomatoes sold at farmers markets (willingness to pay decreased by $0.09, on average; $p=0.03$) and fresh format stores (willingness to pay decreased by $0.07, on average; $p=0.109$). We observed a slight increase in respondents'

willingness to pay for organic grape tomatoes sold in supercenters; however, this increase was not statistically significant.

While the food safety information did not impact willingness to pay values much, figure 3 shows participants' safety perceptions were significantly altered for three of the four retail outlets. First, we notice the average perceived safety rating for organic grape tomatoes sold at supercenters significantly increased (pre-information rating=4.46; post-information rating 4.69; $p=0.005$). Next, we see the perceived safety ratings for tomatoes sold at fresh format stores and farmers markets significantly decreased (average decreases were 0.35 and 0.53 for fresh format stores and farmers markets, respectively; both $p<0.001$). Looking at the results broadly, we can see the provision of safety information helped to close the gap in average safety ratings across the retail outlets (pre-information range of safety ratings=1.45; post-information range of safety ratings=0.87).

After the food safety information was provided, we also asked participants to answer some questions on their attitudes toward food safety and the proposed FSMA regulations. Respondents were asked to state their level of agreement (or disagreement) with five statements using a 5-point Likert scale. Table 3 provides the average level of agreement with each of these statements. From the table, it is clear that participants agree all farms should be FSMA compliant and that tomato safety is an important concern to address (average levels of agreement were 4.10 and 4.29 for these statements, respectively); however, expectations were more tempered on FSMA's ability to prevent food illnesses. Additionally, respondents seem to be opposed to organic farms being exempt from FSMA (average level of agreement=1.84). This is less surprising given the strong agreement to the statement that all farms should be compliant. Interestingly, participants did not seem to associate food safety capabilities with farm size, as the average level of agreement landed right near the midpoint of the 5-point scale.

Discussion

This study contributes to the current literature by examining two key issues: (1) whether and how the retail setting impacts perceptions of and willingness to pay for organic products (specifically, organic grape tomatoes), and (2) how food safety information on the Food Safety Modernization Act (FSMA) impacts consumer perceptions and willingness to pay within and across retail outlets.

Results of our study show that the retail setting has a very real impact on consumers' perceptions of and willingness to pay for organic grape tomatoes. Participants in this study rated tomatoes sold in fresh format stores and at farmers markets most favorably, while tomatoes sold in supercenters received the lowest evaluations. These results are particularly interesting in light of the movement of organic to the mainstream. Even though a USDA Organic seal should mean the same thing on a pint of grape tomatoes regardless of where it is sold, our study indicates consumers do not perceive the attributes (taste, health, safety, authenticity) to be equal across retail outlets. For the National Organic Program (NOP), this suggests more educational efforts may be needed to increase consumer understanding of organic standards. Alternatively, organic producers may want to be more strategic when choosing a retail outlet, as this choice will likely have impacts on downstream evaluations of their products.

While consumers were especially critical of organic grape tomatoes sold in supercenters (which have become a major supplier of organic produce across the U.S.), our study found that the provision of information on the proposed FSMA regulations actually *improved* consumers' perceived safety ratings of tomatoes sold in supercenters. Conversely, this same information resulted in a decrease of perceived safety ratings and willingness to pay for organic grape tomatoes sold in fresh format stores and at farmers markets. One explanation for this may be respondents' aversion to organic tomatoes grown by FSMA-exempt farmers, which respondents believe to be most prevalent at farmers markets and fresh format stores. It is important to note, however, that while perceived safety ratings were changed by food safety information, this did not translate into substantial changes in consumers' willingness to pay within or across retail outlets, so changes in purchasing behavior may be unlikely.

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Fact Sheet:

Food Safety Modernization Act (FSMA) Basics:

Objective: Keep the US food system safe from contamination by preventing it, rather than responding to outbreaks.

Food facilities are required to:

- Evaluate hazards
- Implement and monitor effective measures preventing contamination
- Have pre-made plan for corrective actions that must be taken

Exemption/Exclusion Rules:

- Farms with an average of less than $25,000 in annual food sales
- Farms with an average of less than $500,000 in annual food sales and the majority of food is sold directly to the final consumer or restaurant/retail food establishment located in the same state as the farm or less than 275 miles away

Tomato Safety Quote:

"From 1973 to 2010, there were 15 multistate outbreaks of illnesses attributed to *Salmonella* contamination of raw tomatoes, with 12 of these outbreaks taking place since 2000. They resulted in almost 2,000 confirmed illnesses and three deaths, with states in the eastern U.S. hardest hit."

--U. S. Food and Drug Administration

Figure 1. Sample Information Treatment
(NOTE: Information treatment 1 only received the FSMA basics section while information treatment 2 received the tomato safety quote in addition to the FSMA basics.)

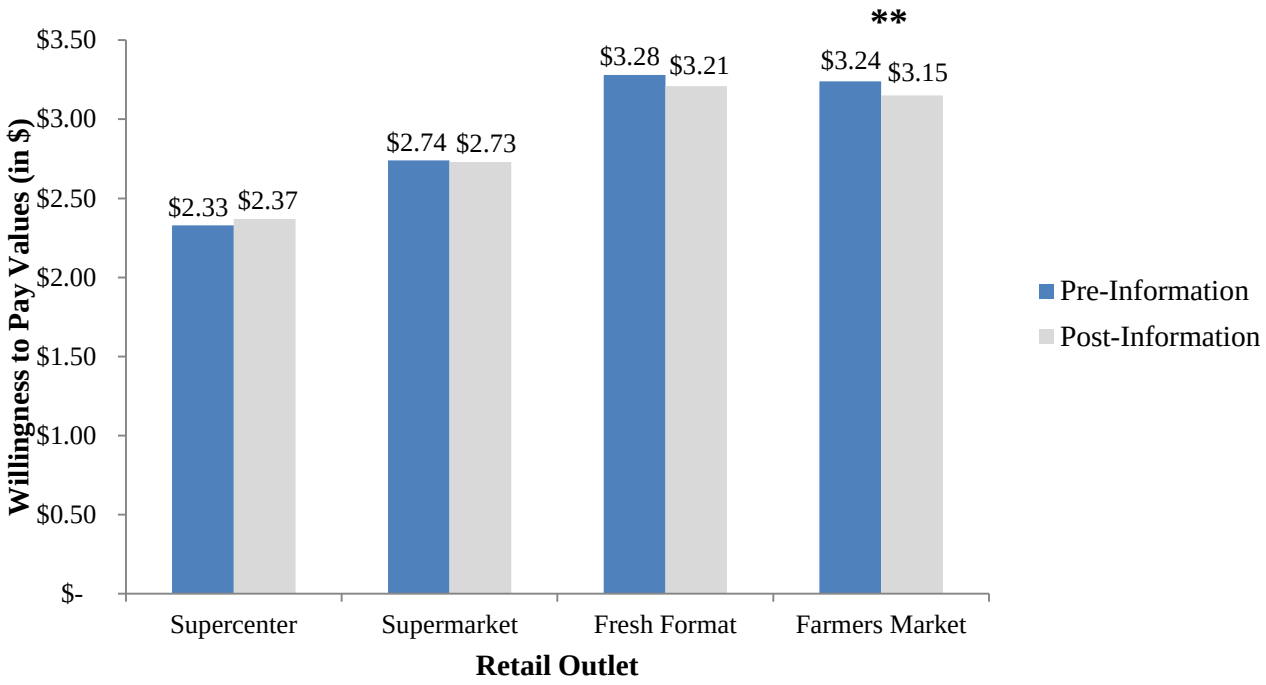

Figure 2. Pre- and Post-Information Willingness to Pay Values by Retail Outlet

**Denotes a significant difference in means at the 5% level.

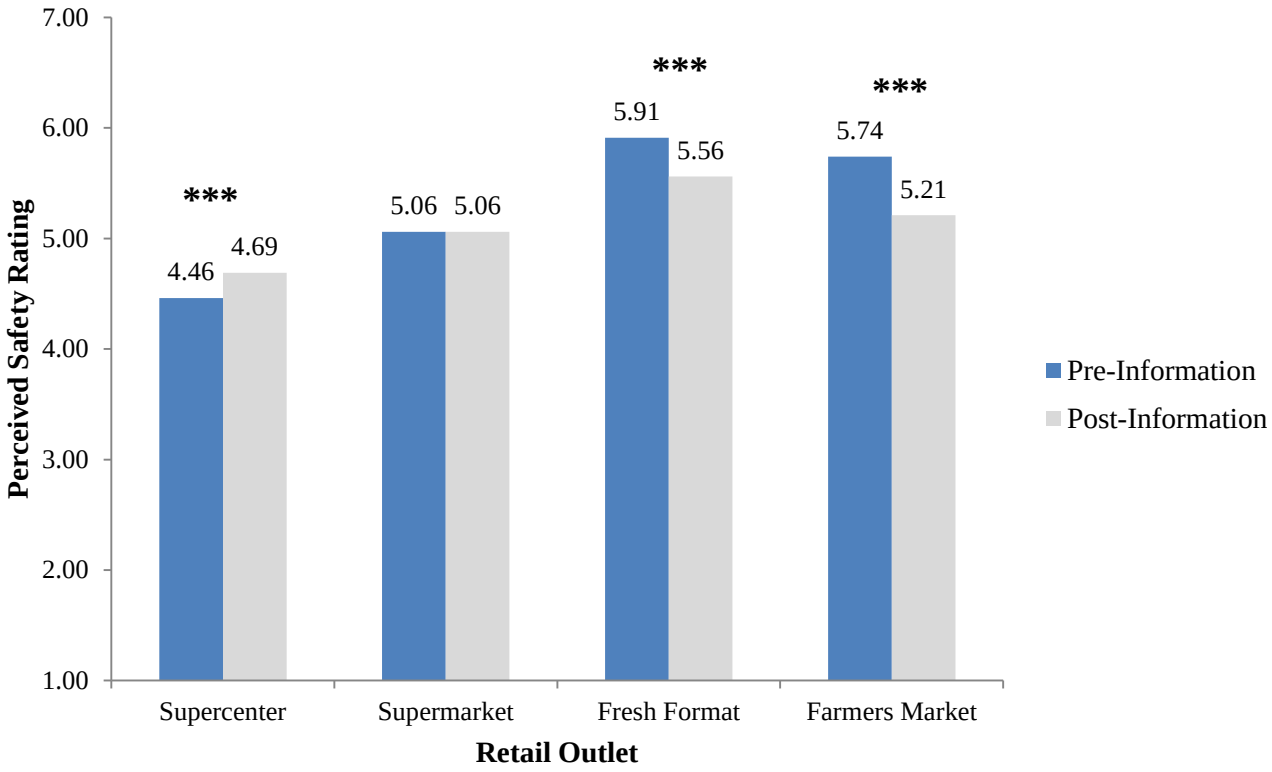

Figure 3. Pre- and Post-Information Perceived Safety Ratings by Retail Outlet

(Note: Ratings on a 7-point scale where 1=Very Unsafe and 7=Very Safe)

***Denotes a significant difference in means at the 1% level.

Table 1. Characteristics of Study Participants and Definition of Variables (*N*=219)

Variable	Definition	Sample Mean or Proportion
Gender	Female	68.5%
	Male	31.5%
Education	High School Diploma/GED	30.4%
	Bachelor's Degree	29.0%
	Graduate or Professional Degree	40.6%
Age	Average age in years	38.6
Income	Average Annual household income in $1000s	70.4
Geographic Location	Resides in Northeastern region of U.S.	48.9%
	Resides in Midwestern region of U.S.	51.1%
Children in Home	Yes, children under 18 in household	19.2%
	No children under 18 in household	80.8%
Organic Buyer	Purchases organic produce always or often	32.6%
	Purchases organic produce sometimes	57.7%
	Purchases organic produce never	9.8%
Produce Shopping Location	Purchases produce at supermarkets always or often	76.8%
	Purchases produce at supermarkets sometimes	18.1%
	Purchases produce at supermarkets never	5.1%
	Purchases produce at supercenters always or often	39.2%
	Purchases produce at supercenters sometimes	27.1%
	Purchases produce at supercenters never	33.6%
	Purchases produce at farmers markets always or often	57.0%
	Purchases produce at farmers markets sometimes	29.0%
	Purchases produce at farmers markets never	14.0%
	Purchases produce at fresh format stores always or often	34.1%
	Purchases produce at fresh format stores sometimes	30.4%
	Purchases produce at fresh format stores never	35.5%

Table 2. Consumer Perceptions of and Willingness to Pay (WTP) for Organic Grape Tomatoes by Retail Outlet

Retail Outlet	*Average Safety Rating*[*] (*Pre-Info*)	*Average Health Rating*[*]	*Average Taste Rating*[*]	*Average Confidence Rating*[†*]	*Average WTP* (*Round 1; Pre-Info*)
Fresh Format	5.91[a]	6.16[a]	6.13[b]	5.81[a]	$3.28[a]
Farmers Market	5.74[a]	6.18[a]	6.37[a]	5.76[a]	$3.24[a]
Supermarket	5.06[b]	5.20[b]	4.81[c]	4.42[b]	$2.74[b]
Supercenter	4.46[c]	4.83[c]	4.42[d]	4.04[c]	$2.33[c]
F-Statistic	57.83	70.82	146.26	77.78	36.18

NOTE: Averages with the same letter in a column are not significantly different at the 5% significance level.

*All ratings were measured on a 7-point Likert scale where 1=Very Unsafe (Very Unhealthy, Tastes Very Bad, No Confidence) and 7=Very Safe (Very Healthy, Tastes Very Good, Complete Confidence).

†Confidence rating refers to how confident participants were that the grape tomatoes labeled as organic are truly organic.

Table 3. Consumer Attitudes Toward Food Safety

Statement	*Average Level of Agreement*[*]
All farms should comply with FSMA regulations.	4.10
Small farms are better at food safety than large ones.	2.95
Tomato safety is an important concern to address	4.29
Organic farms should be exempt from FSMA.	1.84
The FSMA will be effective at preventing food illnesses.	3.53

*Level of agreement/disagreement was measured on a 5-point scale where 1=Strongly Disagree and 5=Strongly Agree.