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health factors” and that they want to support the “local economy,” make sure that farmers receive “their fair share of economic returns,” and maintain “local farmland” (Onozaka et al. 2010).

Despite the existence of volumes of work on preferences among consumers for locally grown produce in general and broccoli in particular, there has been little focus on buyers for large intermediaries. Without their support for local foods, the final consumer will not be able to purchase locally grown products unless they visit farmer’s markets. Larger organizations tend to eschew smaller vendors, which generally include local producers, because of the costs involved (Hughes et al. 2014). Often there are regulations guiding purchasing decisions of institutional purchasers that prohibit focusing on anything other than costs (Becot et al. 2014), whereas others produce buyers were more interested in other attributes such as quality and availability than when produce is sourced from (Rimal and Onyango 2013). Although some buyers were found to be interested in buying local, they were only willing to do so with the same price and equivalent quality, but there were concerns about whether the experimental method affected respondent’s answers (Coles et al. 2019). This study attempts to fill the gaps on what we know about buyer behavior and settle whether respondents in our original study might have been influenced by having too much information.

Methods and Materials

We designed and implemented an economic experiment with produce industry professionals as respondents. They were shown broccoli samples at the Dec 2019 New York Produce Show. We provided two broccoli varieties, one from California and another sourced from the East Coast. The California variety was purchased at a grocery store in Allentown, PA, USA, and brought to New York City in a cooler packed with ice. The East Coast broccoli was transported from South Carolina in a cooler packed with ice.

Produce buyers considered the two samples of broccoli placed in Styrofoam containers on ice, which was replaced as needed. The California broccoli was labeled as “A,” and the East Coast broccoli was labeled “B.” A total of 54 respondents participated in the survey. Of that, 28 received the survey without information and 26 were given the survey with information. Versions of the survey were alternatively supplied to participants as they arrived at our booth at the New York Produce Show. The versions were identical except one only identified the broccoli as either A or B, non-information, and the other identified the broccoli as A California and B East Coast, information.

Respondents were asked to judge the overall quality of each of the samples as “exceptional,” “acceptable,” or “unacceptable” and to rate characteristics such as color, bead size and uniformity on a scale of 1 (poor) through 9 (outstanding). The surveys also collected demographic information including

Table 1. Descriptions of variables used in dataset.

Variable	Description and definition in model
Dependent variable	0 if West Coast, 1 if East Coast
Purchase choice	
Independent variables	
Information	0 = no information, 1 = information
Quality	1 = exceptional, 2 = acceptable, 3 = unacceptable
Color	1–9 rated poor to outstanding
Bead size	1–9 rated poor to outstanding
Uniformity	1–9 rated poor to outstanding
Demographic questions	
Company	1 if wholesaler, 2 if retailer, 3 if restaurant, 4 if other
Years in industry	No. of years
Sell produce	1 if yes, 2 if no
Buy produce	1 if yes, 2 if no
Company purchases for greater New York City	1 if yes, 2 if no
Company purchases for East Coast market	1 if yes, 2 if no

company type, number of years in the industry, whether they are buyers or sellers and what region they buy and sell for. They were asked which choice, broccoli A, B, or neither, they would purchase.

We collected 98 observations from 54 respondents. Table 1 describes the variables included in the data set from the information gathered from the survey. Each of the questions was asked for both broccoli varieties with 26 of the respondents answering the questions with information about the source and 28 answered each of the questions about both varieties without sourcing information. Not all respondents answered all questions related to one and/or both strains.

We ran regressions for each attribute (overall quality, color, bead size, and uniformity), in which the dependent variable was the variety selected (West Coast or East Coast) for buyer j as a function of years in the industry and as a function of whether information was provided about the product origin (information).

$$\text{VarietyChosen}_j = \alpha_0 + \alpha_1 \text{Years.in.industry}_j + \alpha_2 \text{Information}_j + \beta_i \text{Value.Attribute}_i + \varepsilon_j$$

In the preceding model, ε_j is the error term, α_1 and α_2 are vectors of parameter estimates corresponding to each respondent, and β_i is the vector of parameter estimates corresponding to each value of the attribute.

Results

In this section, we use ordinary least squares and logit regression analysis to determine the attributes important to buyer broccoli selection, whether East Coast sourcing (local) is a factor and, if so, whether it affects quality perceptions or is a standalone attribute. Table 2 shows the preference for East and West coast broccoli based on whether the buyer had information about its origin. There appears to be a preference for West Coast broccoli when buyers did not know its source, but the preference is decidedly the opposite when buyers knew the source of each variety. A chi-square test yielded a P value of 0.0556,

demonstrating this as significantly different at just above the 5% level.

We regressed several attributes and the ones that affected the decision on broccoli varieties chosen were: years in the industry, whether the buyer had sourcing information and several quality attributes. Regressions in Table 3 indicate a correlation between buyer selection and whether the buyer had information about broccoli. This relationship became stronger when controlling for the years spent in the industry, indicating buyers who were newer to the produce industry were influenced more by information on the source of the broccoli. After controlling for years in industry it changed from just over three times greater probability of selecting East Coast broccoli than West Coast when the source was known to 4.22 times greater probability, indicating a higher interest in sourcing locally grown broccoli from those newer to the industry. None of the other buyer attributes affected variety selection choice as shown in Table 3.

In addition, we see the quality attributes color and bead size influence buyers’ decisions, but not overall quality nor head uniformity as seen from Table 3. As shown in Table 4, there were no effects on quality perception based on whether they knew the product was locally procured. Having sourcing information did not change any of the respective broccoli attribute ratings, indicating that East Coast procurement was a desirable standalone attribute, but it did not influence the buyer’s perception of any of the broccoli quality attributes.

Discussion

Studies have shown great interest by consumers in local foods, and locally grown produce in particular, including locally grown

Table 2. Differing preferences to purchase locally grown broccoli when buyer is provided with this information.

	No information	%	Information	%
West Coast	16	59.3	7	31.8
East Coast	11	40.7	15	68.2
Total	27		22	

Table 3. Preference for East Coast grown broccoli over West Coast grown when buyer is provided with sourcing information and quality attributes, adjusted for years of experience in the produce industry.

Independent variable	Dependent variable: purchase East Coast broccoli							
	Logit model				Odds ratio			
Information	1.440*** (0.484)	1.465*** (0.493)	1.402*** (0.490)	1.448*** (0.485)	4.220*** (2.041)	4.328*** (2.132)	4.062*** (1.990)	4.257*** (2.063)
Years industry	-0.040** (0.016)	-0.047*** (0.017)	-0.049*** (0.017)	-0.042*** (0.016)	0.961** (0.015)	0.954*** (0.0162)	0.953*** (0.016)	0.959*** (0.016)
Quality	-0.130 (0.429)				0.878 (0.377)			
Color		0.333* (0.188)				1.396* (0.263)		
Beadsize			0.296* (0.177)				1.344* (0.237)	
Uniformity				0.060 (0.137)				1.061 (0.146)

*, **, *** denote estimates statistically significant at the 0.10, 0.05, and 0.01 level, respectively.

broccoli. Despite this, the few studies that have investigated the interest and attitudes of produce buyers toward local produce have shown little interest on their part. This includes our 2019 study where we suspected there was an interest (Coles et al. 2019) that the experimental design did not reveal. Hence, we readdress the issue with a different experimental design and do find a preference for East Coast broccoli in this study.

We hypothesize the difference between our two studies is because buyers are in constant negotiations with salespeople and do not want to tip their hands. Asymmetrical information is an advantage that buyers did not want to surrender during negotiations. We suspect this may contribute to how buyers approach not only negotiations, but also other things such as surveys related to how they feel about a particular product in which they have interest. In other words, they are engaging with the survey with the same mindset they do when negotiating with salespeople, as adversaries. When confronted with the original survey, they expressed how they felt about the quality of the broccoli. Then they were asked whether they had a different opinion of the broccoli based on new information that it was grown locally, as defined by being grown in the state where they sold their product. This required them to do the equivalent of tipping their hands by revealing that they may prefer locally grown broccoli and may also be more willing to accept reduced quality if it was grown locally—information they would not want to share with those from whom they are purchasing fresh produce.

By eliminating the second step and only asking each respondent to evaluate West Coast (nonlocal) and East Coast (local) grown broccoli when they knew from where it was sourced, or only A and B broccoli, but not the source of either, they were not put into a position to be tempted to tip their hands. Thus, we found that buyers in this study did prefer locally grown. From a policy standpoint, concerns that consumers will only be able to procure locally grown broccoli from small distributors such as farmer's markets because buyers at larger supply chains are unwilling to purchase locally procured broccoli for their employers is unfounded. Our hypothesis that buyers would prefer locally procured broccoli is confirmed.

In addition, our study showed that years in the industry had a pronounced effect on preference for East Coast broccoli, our proxy for locally grown broccoli. Buyers who are new to the industry were more receptive to the East Coast broccoli than more seasoned veteran buyers, indicating experienced buyers understand consumer preferences better than less experienced buyer or changing attitudes that indicate the possibility of increasing preferences for locally grown going forward. In addition, we were concerned about specific attributes: color, bead size, and uniformity, as these were the most difficult attributes of California grown broccoli for plant breeders to replicate in varieties bred for the East Coast climate. We found that color and bead size were involved in the selection process but could not find an indication that overall quality and uniformity were driving the selection process. We hypothesized that buyers found both

broccoli varieties to be reasonably acceptable because only two of the attributes proved to influence selection, and, of the two that did, the effects were small and the significance low. This is also hinted at by the close to 50/50 split in preferences when there was no information on sourcing provided to the respondents.

We found variation in preferences for locally procured broccoli among buyers, specifically a greater preference among those with fewer years in the industry. Future research should focus on those differences and where they are, such as organic sellers as opposed to discount marketers, where there is a better opportunity for East Coast producers to sell their produce and get a foothold in markets. A greater understanding of the differences in buyer preferences could also assist in convincing those currently with no preferences that they should give local producers a chance and determine how well they can sell this category.

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Table 4. Four separate ordinary least squares regressions with the broccoli attributes as the dependent variables based on information adjusted for the purchase choice and years in the industry.

Independent variables	Dependent variables			
	Quality	Color	Bead size	Uniformity
Years in industry	-0.000 (0.004)	0.023** (0.010)	0.028*** (0.010)	0.033*** (0.012)
information	0.012 (0.122)	0.02423 (0.308)	0.109 (0.308)	-0.154 (0.388)
Purchase choice	-0.040 (0.129)	0.577* (0.316)	0.542* (0.317)	0.172741 (0.399)

*, **, *** denote estimates statistically significant at the 0.10, 0.05, and 0.01 level, respectively.

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