Food Distribution Research Society

Journal of Food Distribution Research
Volume 56, Issue 3, pp. 21–41

Identifying Local Food Customer Segments Using Cluster Analysis

Alicia Rihn[a]Ⓘ, Hannah Williams[b], Ricky Chen[c], Karen DeLong[d], and Kim Jensen[e]

[a]*Assistant Professor, Department of Agricultural and Resource Economics,*
2621 Morgan Circle, University of Tennesseee,
Knoxville, TN 37996, USA

[b]*Former MS Student, Department of Agricultural and Resource Economics,*
2621 Morgan Circle, University of Tennesseee,
Knoxville, TN 37996, USA

[c]*Former Assistant Professor, Department of Agricultural and Resource Economics,*
2621 Morgan Circle, University of Tennesseee,
Knoxville, TN 37996, USA

[d]*Professor, Department of Agricultural and Resource Economics,*
2621 Morgan Circle, University of Tennesseee,
Knoxville, TN 37996, USA

[e]*Former Professor, Department of Agricultural and Resource Economics,*
2621 Morgan Circle, University of Tennesseee,
Knoxville, TN 37996, USA

Abstract

Customers have different motivations for purchasing local foods. A survey of 1,147 Tennesseans identified three customer segments and the motives behind their local food preferences. The three customer segments were: "Local Indifferent" (30.5% of the sample), "Economy Driven" (40.0%), and "Local Enthusiast" (29.5%). Local Enthusiasts agreed more with wanting to purchase local, feeling social pressure to purchase local, and considering Tennessee (TN) products as higher quality, better for the environment, and benefiting the local economy. Ordered probit regressions indicated purchasing frequency, retailer type, and demographics were correlated with the Local Indifferent and Local Enthusiast segments.

Keywords: cluster analysis; factor analysis; *k*-means local; ordered probit model; quality perceptions

Ⓘ Corresponding author: Tel: (865) 974-7472
Email: arihn@utk.edu

Introduction

Consumer interest and demand for local foods have been increasing due to their perceived benefits (Kumar et al., 2021; Stone et al., 2021). Between 2019 and 2020, U.S. farms saw a 35% increase in direct-to-consumer sales, which reached $10.7 billion (USDA ERS, 2021). During that time, farmers' market sales increased by 11%, sales to restaurants increased by 13%, and sales via farm stores, community supported agriculture (CSAs), and other direct-to-consumer channels increased by 79% (USDA ERS, 2021). Key motivators for local food purchases include higher perceived quality (Costello and Fairhurst, 2002), perceptions of sustainable or environmentally friendly production (Weber and Matthews, 2008; Jia, 2021), supporting the local economy (Robinson and LaMore, 2010; Filipek, 2018), and knowing the farmer or food source (Jia, 2021). Consequently, local origins generate premiums often ranging from 40.4% to 52.5% for growers (Printezis, Grebitus, and Hirsch, 2019), which can offset additional costs associated with local direct-to-consumer sales (Wang and Sun, 2003; Yue and Tong, 2009; Rihn et al., 2016; Printezis, Grebitus, and Hirsch, 2019; He et al., 2020; Liu et al., 2020; Jia, 2021). Although some of the perceived benefits of local foods are uncertain or vary by production contexts (e.g., food security, environmental benefits; see review by Stein and Santini, 2021), customer perceptions of products being locally grown can improve their preferences for local foods, increase quality perceptions, and generate value for the customer (Nie and Zepeda, 2011; Aprile, Caputo, and Nayga, 2016; Kumar and Smith, 2018; Fan, Gómez, and Coles, 2019).

Local product purchasing motivations are not equal across all consumers, as indicated in a review by Jia (2021), who found that different customer segments may have stronger ties to different motivations. Understanding the prevalent motivations of different customer segments in the market has the potential to aid in marketing efforts for local foods (Nie and Zepeda, 2011; Aprile, Caputo, and Nayga, 2016; Kumar and Smith, 2018). Target marketing, where marketing content is tailored to specific groups, could be used to improve marketing effectiveness and efficiency while reducing marketing expenditures (Dibb et al., 2019). Therefore, the goal of this research is to identify customer segments that explain varying consumer preferences for local products. To accomplish this goal, we conduct a study of Tennesseans to determine their attitudes, views, and frequency of purchasing local products. We conduct factor analysis, *k*-means cluster analysis, and estimate an ordered probit regression to isolate customer segments and find purchasing habits, attitudes, and demographics that correlate with varying local food preferences.

Tennessee consumer preferences were studied because the Tennessee Department of Agriculture (TDA) has a Pick TN Products (PTP) program aimed at helping promote sales of local agricultural products (TDA, 2023). State agricultural marketing improvement programs are prevalent in most states and are used to identify products produced or processed in-state and leverage state identity, brand equity, and promotional materials to encourage sales of those items (Onken and Bernard, 2010; Moreno and Malone, 2021). In Tennessee, the Pick TN Products program has low consumer awareness in-state and across the southeast United States (Fife, Secor, and Campbell, 2025). Low brand (e.g., PTP program) awareness negatively impacts product selection and sales (Yasin, Nasser Noor, and Mohamad, 2007; Huang and Sarigöllü, 2012). Currently, there are approximately 2,600 farmers or farm-direct businesses participating in the PTP program who could potentially

benefit from greater brand awareness (TDA, 2023). Aligning target marketing content with customer perceptions increases brand awareness and ultimately could lead to additional sales. Consequently, the PTP program could benefit from targeted marketing messages that focus on benefits that align with customer perceptions.

Tennessee is an interesting state to evaluate because in 2020, Tennessee had 1,418 farming operations selling products locally, which generated $31.8 million in sales, with value-added products adding an additional $25.4 million in sales (USDA NASS, 2022). Between 2012 and 2022, Tennessee's population grew 9.2% to over 7 million people (USA Facts, 2025a). Similarly, the U.S. population grew 6.2% during that time (USA Facts, 2025a). Tourism is a very large industry in Tennessee. The state experienced a 14% annual increase from 2021 to 2022, and accounts for 5.8% of Tennessee's GDP ($27.5 billion) (TN Department of Tourist Development, 2023; USA Facts, 2025b). For comparison, the U.S. travel and tourism industry accounted for approximately 3% of the nation's GDP in 2022 (Arcand and Kern, 2024). It is likely that results of this study will be representative of other states because Tennessee's population growth, and the relative size of the Tennessee tourism industry, is similar to national averages.

Previous research has been conducted that evaluated consumer preferences for local foods in Tennessee. For example, Costello and Fairhurse (2002) identified quality as the main driver of purchasing TN products among tourists. Existing literature has found that Tennesseans are willing to pay premiums for local products (Dobbs et al., 2016; Everett et al., 2017; Everett et al., 2018; Merritt et al., 2018; McKay et al., 2019; Jensen et al., 2021). However, no known research has evaluated Tennessee customer segments for local foods. Therefore, this research extends existing literature by identifying unique Tennessee consumer clusters based on their perceptions of local products. It is expected that results of this research would also be beneficial for other states, especially those with similar demographics, that are interested in the characteristics of customer segments that have varying perceptions of local foods.

Methodology

Survey

An online survey was conducted in May 2022 to elicit Tennessee consumer perceptions of in-state products. Prior to data collection, all experimental procedures and protocols were approved by the institutional review board (IRB-21-06725-XM). Qualtrics software was used to implement the survey, and Qualtrics was hired to recruit the participants to complete the approximately 15-minute survey. To qualify for the survey, participants needed to be 18 years old or older, Tennessee residents, and have grocery shopping responsibilities in their households. The survey consisted of several sections, which addressed purchasing behavior (e.g., frequency, retail location, budget), a discrete choice experiment, perceptions of and motivations to purchase local and PTP items, and demographics. In this analysis, the purchasing behavior, perceptions, motivations, and demographic data were used. A total of 1,957 Tennesseans passed the screening questions and participated in the study. However, due to incomplete responses, a total of 1,147 complete

questionnaires (58.6% of the sample) were used in this study's econometric analysis. Stata 17 was used to analyze the data.

Factor Analysis

A factor analysis was used to identify the salient constructs defining Tennesseans' preferences for TN products. The factor analysis included 29 statements from the survey instrument that were related to participants' perceptions and motivations for local and PTP purchases (see Table 2 for a list of the 29 statements). Broadly, there were five statements addressing local perceptions, four statements covering social pressures or norms related to buying local, nine Tennessee produce quality perception statements, four perceived environmental benefits of buying TN products statements, and seven perceived economic benefits of buying TN products statements. All constructs included the same 7-point Likert rating scale (level of agreement), where 1 equaled strongly disagree and 7 equaled strongly agree, and were randomized within the question where they were presented. The statements were divided into seven questions and randomized within each question to reduce order bias.

A principal-factor analysis was used to isolate the constructs. The factor analysis reduced the number of unobserved variables (factors) by grouping together variables with a shared variance (Yong and Pearce, 2013). In order to use factor analysis, a minimum sample size of 300 participants is recommended (Comrey and Lee, 1992). Cronbach's alpha was used to test scale reliability and internal consistency, with 0.70 being the minimum acceptable alpha value (Trochim and Donnelly, 2006). The Kaiser criterion identified the number of factors per construct with an Eigenvalue equal to or greater than 1, indicating the presence of a new factor (Braken and van Assen, 2017). Based on these criteria, a total of five factors were identified from the 29 statements (discussed in detail in the results section).

Cluster Analysis

Following the factor analysis, the factors were used in a *k*-means cluster analysis to identify unique customer segments based on Tennesseans' perceptions and motivations for buying TN products. In turn, this information can be used to tailor marketing strategies to engage clusters that may be more likely to purchase those items. Cluster analysis groups individuals of a population into homogenous groups based on similar perceptions, demographics, or other variables (Dibb et al., 2019). This process is advantageous in that these individuals tend to respond similarly to marketing stimuli, which facilitates target marketing, where marketing communications target a specific customer segment. These communications are tailored to that segment to encourage a better response (e.g., engagement, product/brand/advertisement recall, brand loyalty, purchasing behavior) from those customers. Target marketing provides firms with the benefit of more effectively reaching their customers with content that better resonates. This benefit can result in financial and labor resources being more efficiently used when designing marketing communications.

Econometric Analysis

Given that the cluster membership has an observed natural ordering, an ordered probit model was used to address the relationship among the factors, demographics, and cluster membership (Greene and Hensher, 2009). Ultimately, each model estimates how the different factors impact cluster membership to better understand the key drivers of each cluster.

In an ordered probit model, the latent continuous variable y^* underlies the observed ordinal responses (i.e., cluster membership). y^* is a linear combination of observable variables X (i.e., purchasing behavior, demographic variables) with an ε disturbance terms with a normal distribution. Specifically for X variables, the purchasing behavior variables included frequency of TN product purchases (termed "FreqTNpurchase"), percent of grocery budget spent on TN products ("Per_Tngrocery"), if they perceive PTP products local ("PTP_local"), importance of local production ("Local_impt"), distance travelled to purchase PTP products ("distancetraveled_PTP"), and purchase likelihood from retailers (i.e., grocery—"PL_grocery," big box stores—"PL_bigbox," limited assortment stores—"PL_limited assortment," wholesale stores—"PL_wholesale," specialty stores—"PL_specialty," and farm direct sources—"PL_farmdirect). The demographic variables included the participant's age, number of adults in the household, number of children (< 18 years) in the household, gender, education, household income, and area of residency information (i.e., urban, suburban, rural).

For the ordered probit model, let $i = 1,2, \dots, n$ represent the cluster index with three ordered outcomes ($y_i \in [0,1,2]$). Specifically,

$$y_i^* = X_i\beta + \varepsilon_i \tag{1}$$

where y_i^* is the unobserved latent variable and y_i is the observed ordinal variable.

$$y_i = 0 \ \ if \ y_i^* \leq 0 \tag{2}$$

$$y_i = 1 \ \ if \ 0 < y_i^* \leq \mu_1$$

$$y_i = 2 \ \ if \ \mu_1 < y_i^*$$

and μ_1 and β represent parameters to be estimated. Multinomial probit models were also estimated, and the model fit was assessed using the Bayesian Information Criterion (BIC). The ordinal probit models had lower BIC values than the multinomial probit models, indicating better model fit (ordered probit = 1765.085 versus multinomial probit = 1821.045; Mohammed, Naugler, and Far, 2015). Collinearity was tested between the variables in the model using the coldiag2 command in Stata (based on Belsley, Kuh, and Welsch, 1980) with a value of 21.22, where 30 is an acceptable cut-off value (Kim, 2019). Additionally, the mean variance inflation factor (VIF) was estimated at 1.62, indicating low collinearity issues (i.e., < 10 value; Stata, 2024).

Results

Descriptive Statistics

Table 1 summarizes the sample's demographic and purchasing behavior variables. Participants averaged approximately 45 years old and had two adults per household and one child per household. Slightly more than 66% of the sample were female, and 32% had obtained a bachelor's degree or higher at the time of the study. Approximately 27% of the sample lived in urban areas, 31% lived in suburban areas, and 41% lived in rural areas. Their 2021 household income was $63,348. Compared to the Tennessee population, our sample is slightly older and overrepresents females (U.S. Census Bureau, 2021). These inconsistencies are likely attributed to the screening questions at the beginning of the study, where participants less than 18 years old are excluded (census data include children less than 18 years old) and primary grocery shoppers are targeted. Typically, females are the primary grocery shoppers within the household (Van Hove, 2022). Overall, 70% of participants perceived PTP as local and indicated they spend 25.3% of their total grocery dollars (equivalent to $86.30 per month) on Tennessee grocery products. On average, they were willing to drive 14 miles to buy TN products. Their purchase likelihood for TN products was highest in grocery stores, followed by big box stores, limited assortment, wholesale, and specialty stores.

Table 1. Summary Statistics of the Sample

		Total (n = 1,147)		TN Population 2021[1]
	Definition	**Mean**	**SD**	**Mean**
Demographic variables				
Age	Age in years	45.480	15.335	38.8 years
Adult	# of adults in household	2.219	1.093	2.52 people per household
Child	# of children < 18 years in household	0.865	1.228	---
Female	1 = female; 0 = otherwise	0.664	0.472	50.9%
Bachelor's degree +	1 ≥ 4-year bachelor's degree; 0 = otherwise	0.321	0.467	29.0%
Income	Household income in 2021	$63,348	54.253	$58,516
Urban	1 = urban resident; 0 = otherwise	0.266	0.442	
Suburban	1 = suburban resident; 0 = otherwise	0.312	0.464	
Rural	1 = rural resident; 0 = otherwise	0.413	0.493	
Purchase variables				
FreqTNpurchase	Frequency of purchasing TN products; 1 = never; 5 = all of the time.	3.397	0.950	
Per_Tngrocery	Percent of grocery budget spent on TN products, 0%–100%	25.349	22.446	
PTP_local	1 = consider Pick TN Product local; 0 = otherwise	0.709	0.455	

Table 1 (cont.)

		Total (n = 1,147)		TN Population 2021[1]
	Definition	**Mean**	**SD**	**Mean**
Local_impt	Importance of local production; 1 = very unimportant; 7 = very important	5.238	1.574	
PL_grocery	Purchase likelihood of Pick TN Products from grocery store[a]	5.473	1.462	
PL_bigbox	Purchase likelihood of Pick TN Products from big box store[a]	5.402	1.490	
PL_limitedassortment	Purchase likelihood of Pick TN Products from limited assortment store[a]	4.831	1.638	
PL_wholesale	Purchase likelihood of Pick TN Products from wholesale store[a]	4.825	1.640	
PL_specialty	Purchase likelihood of Pick TN Products from specialty store[a]	4.677	1.630	
PL_farmdirect	Purchase likelihood of Pick TN Products from farm direct source[a]	5.369	1.548	
Distancetraveled_PTP	Distance traveled (miles) to purchase Pick TN Products goods	14.199	9.373	

Notes: [1]Source: U.S. Census Bureau (2021). [a]1 = very unlikely, 7 = very likely.

Factor Analysis

From 29 perception statements, a total of five factors were generated. Table 2 summarizes the constructs, mean ratings, factors, factor loadings, and Cronbach's alphas for the factors. Factor 1 had a Cronbach's alpha of 0.867 and consisted of five constructs addressing participants' agreement with different local product purchase-related perception statements and is termed "Local Perceptions" (see Table 2). Generally, participants rated, "It is important to be able to purchase my favorite local foods all year long," the highest (mean rating of 5.42), followed by preferring to purchase TN products (mean = 5.28); Pick TN Products having a Tennessee farm connection (mean = 5.25); Tennesseans should buy TN products (mean = 4.81); and frequently seeking TN products (mean = 4.63).

Factor 2 consisted of four statements addressing social pressure to buy local goods and is termed the "Social Pressure" factor (Cronbach's alpha = 0.938). Generally, participants had the highest level of agreement with the statement, "People who are important to me think I should buy locally produced foods" (mean = 4.44), followed by, "People who influence my consumer behavior think that I should buy locally produced foods" (mean = 4.424); "My friends think that I should buy locally produced foods" (mean = 4.424); and "My family thinks that I should be buying locally produced foods" (mean = 4.391) (see Table 2).

Factor 3 addressed perceptions of TN products compared to those from other states and is termed "TN Quality" (Cronbach's alpha = 0.934). The factor included nine statements, with the highest ratings for agreeing that TN products are fresher (mean = 5.621); higher quality (mean = 5.305);

healthier (mean = 5.092); safer (mean = 4.994); exciting (mean = 4.986); more options (mean = 4.979); more available (mean = 4.951); greater shelf life (mean = 4.933); and less expensive (mean = 4.526) when compared to products from other states (see Table 2).

Factor 4 addressed consumer perceptions of TN products compared to products from other states with regard to environmental benefits (termed "TN Environmental"; Cronbach's alpha = 0.918). The factor included four statements, with the greatest level of agreement with TN products are "better for the environment" (mean = 5.293); "more sustainable" (mean = 5.221); "have a lower carbon footprint" (mean = 5.160); and "have lower greenhouse gas emissions" (mean = 5.064) relative to products from out of state (see Table 2).

Lastly, Factor 5 consisted of seven statements related to how TN products could impact the local economy and is termed "TN Economy" (Cronbach's alpha = 0.914). Participants agreed the most with "Compared to products from other states, TN products support local farmers" (mean = 6.15); "Compared to products from other states, TN products help the local economy" (mean = 6.052); "It is important to support our local farmers and our local business community" (mean = 6.006); "Buying TN products is important because it creates more jobs in the local community" (mean = 5.675); "I worry that local farms are going out of business because most food purchased in supermarkets is grown on larger farms across the country" (mean = 5.621); "Buying TN products is important because more of the money stays in the local community" (mean = 5.609); and, "I am willing to pay more for TN products because it helps the local economy" (mean = 5.067) (see Table 2).

Table 2. Perception Statement Means and Factor Loadings Used in a Factor Analysis (n = 1147)

	Total Sample		**Factor Loadings**
	Mean	**Std. Dev.**	**Local Perceptions**
Factor 1. Local perceptions (1 = strongly disagree; 7 = strongly agree)			
It is important to be able to purchase my favorite local foods all year long.	5.442	1.476	0.679
I prefer to purchase products that are produced in Tennessee.	5.275	1.537	0.842
All Pick TN products have a Tennessee farm connection.	5.250	1.474	0.662
Tennesseans should always buy TN products instead of products produced out of state.	4.811	1.712	0.754
I frequently seek out TN products.	4.628	1.791	0.774
Cronbach's alpha			0.867
Factor 2. Social pressure (1 = strongly disagree; 7 = strongly agree)			
People who are important to me think that I should buy locally produced foods.	4.444	1.802	0.922

Table 2. (cont.)

	Total Sample		Factor Loadings
	Mean	**Std. Dev.**	**Local Perceptions**
My friends think that I should buy locally produced foods.	4.419	1.762	0.897
People who influence my consumer behavior think that I should buy locally produced foods.	4.424	1.809	0.821
My family thinks that I should be buying locally produced foods.	4.391	1.856	0.884
Cronbach's alpha			0.938
Factor 3. TN quality (1 = strongly disagree; 7 = strongly agree)			
Fresher	5.621	1.370	0.736
Higher quality	5.305	1.427	0.839
Healthier	5.092	1.457	0.840
Safer	4.994	1.449	0.851
Exciting	4.986	1.492	0.763
More options	4.979	1.429	0.786
More available	4.951	1.549	0.738
Greater shelf life	4.933	1.475	0.784
Less expensive	4.526	1.651	0.705
Cronbach's alpha			0.9343
Factor 4. TN environmental TN products compared to products from other states (1 = strongly disagree; 7 = strongly agree)			
Are better for the environment	5.293	1.428	0.838
Are more sustainable	5.221	1.415	0.819
Have lower carbon footprints	5.160	1.469	0.867
Have lower greenhouse gas emissions	5.064	1.447	0.865
Cronbach's alpha			2.875
Factor 5. TN economy (1 = strongly disagree; 7 = strongly agree)			
Compared to products from other states, TN products support local farmers in the state.	6.146	1.172	0.741
Compared to products from other states, TN products help the local economy.	6.052	1.243	0.760
It is important to support our local farmers and our local business community.	6.006	1.250	0.841
Buying TN products is important because it creates more jobs in the local community.	5.675	1.359	0.865

Table 2 (cont.)

	Total Sample		Factor Loadings
	Mean	**Std. Dev.**	**Local Perceptions**
I worry that local farms are going out of business because most food purchased in supermarkets is grown on larger farms across the country.	5.621	1.447	0.691
Buying TN products is important because more of the money stays in the local community.	5.609	1.423	0.872
I am willing to pay more for TN products because it helps the local economy.	5.067	1.710	0.687
Cronbach's alpha			4.290

Cluster Analysis

The five factors (i.e., local perceptions, social pressure, TN quality, TN environmental, TN economy) were used in a *k*-means cluster analysis. The optimal number of clusters was determined using the Duda-Hart Je(2)/Je(1) values and Calinski and Harabasz pseudo-F index (Stata, 2024). Based on these metrics, three distinct clusters were identified. Cluster 1 included 30.5% of the sample, Cluster 2 had 40.0% of the sample, and Cluster 3 had 29.5% of the sample. Differences in means between clusters were determined using ANOVA and Tukey's honest significance test in Stata (v.17) and are presented in Table 3.

When considering the factors, Cluster 1 rated the five factors the lowest, whereas Cluster 3 rated the five factors the highest, and Cluster 2 was at an intermediate level between the other two clusters (see Table 3). We named the clusters based on their levels of agreement with the different factors. Cluster 1 was named "Local Indifferent" due to their low level of agreement with the different factor constructs of local perceptions, social pressure, TN quality, TN environmental, and TN economy. Cluster 2 was named "Economy Driven" due to their higher level of agreement with the TN Economy factor relative to the remaining factors. Lastly, Cluster 3 was named "Local Enthusiast," given their high agreement with all of the perceived local or TN-specific benefits.

Table 3. Cluster Summary Statistics and Factor Loadings (n = 1147)

	Cluster 1—Local Indifferent (n = 350)[1,2]			**Cluster 2—Economy Driven (n = 459)**[1,2]			**Cluster 3—Local Enthusiast (n = 338)**[1,2]		
	Mean	**SD**		**Mean**	**SD**		**Mean**	**SD**	
Demographic variables									
Age	46.446	15.931	a	49.026	15.049	b	39.663	13.306	c
Adult	1.977	0.939	a	2.087	0.947	a	2.648	1.290	b
Child	0.591	0.970	a	0.660	1.081	a	1.426	1.454	b
Female	0.751	0.433	a	0.784	0.412	a	0.411	0.493	b
Bachelor's degree +	0.309	0.463	a	0.281	0.450	a	0.388	0.488	b
Income	48.693	40.650	a	54.624	38.918	a	90.370	71.976	b
Urban	0.197	0.398	a	0.133	0.340	a	0.518	0.500	b

Table 3 (cont.)

	Cluster 1—Local Indifferent (n = 350)[1,2]			Cluster 2—Economy Driven (n = 459)[1,2]			Cluster 3—Local Enthusiast (n = 338)[1,2]		
	Mean	SD		Mean	SD		Mean	SD	
Suburban	0.351	0.478	a	0.355	0.479	a	0.213	0.410	b
Rural	0.429	0.496	a	0.510	0.500	b	0.266	0.443	c
Purchase variables									
FreqTNpurchase	2.851	0.840	a	3.242	0.721	b	4.172	0.830	c
Per_Tngrocery	15.700	16.276	a	21.013	17.630	b	41.228	25.324	c
PTP_local	0.431	0.496	a	0.739	0.440	b	0.956	0.206	c
Local_impt	4.134	1.263	a	5.139	1.362	b	6.515	1.156	c
PL_grocery	4.934	1.467	a	5.959	1.166	b	5.373	1.600	c
PL_bigbox	4.866	1.535	a	5.821	1.248	b	5.388	1.566	c
PL_limitedassortment	4.237	1.603	a	5.144	1.572	b	5.021	1.600	b
PL_wholesale	4.160	1.594	a	5.211	1.535	b	4.988	1.621	b
PL_specialty	4.049	1.572	a	4.937	1.583	b	4.976	1.575	b
PL_farmdirect	4.631	1.562	a	5.828	1.390	b	5.509	1.456	c
Distancetraveled_PTP	10.037	9.175	a	14.336	8.851	b	18.324	8.368	c
Perception factors									
Local purchase	-0.706	0.635	a	0.110	0.581	b	1.287	0.448	c
Social pressure	-0.608	0.745	a	0.013	0.613	b	1.278	0.680	c
TN quality	-0.724	0.597	a	-0.055	0.565	b	1.508	0.498	c
TN environmental	-0.725	0.574	a	-0.008	0.678	b	1.325	0.463	c
TN economy	-0.953	0.732	a	0.326	0.573	b	1.041	0.265	c
% of Sample	30.5%			40.0%			29.5%		

Notes: [1]Significance between clusters was tested using ANOVA and Tukey's honest significance test. Significance is indicated by different letters at the 5% level.
[2]*k*-means cluster analysis was used to form the clusters.

The "Local Indifferent" cluster consists of 30.5% of the sample (n = 350) and had the lowest level of agreement for all five factors (i.e., local purchase, social pressure, TN quality, TN environmental, TN economy), indicating general disagreement with these factors relative to the Economy Driven and Local Enthusiast clusters (see Table 3). Local Indifferent cluster members averaged 46 years old, and 43% lived in rural areas (both age and rural living were intermediate levels between the other two clusters). Household size, gender, education, income, urban residency, and suburban residency were comparable to Economy Driven cluster members, who had two adults and 0.6 children; were 75% female; had a B.S. degree or higher (31%); had an annual household income of $48,693; and lived in urban areas (20%) and suburban areas (35%). Regarding TN product purchasing behavior, the Local Indifferent members exhibited the lowest ratings (relative to the other clusters) in terms of frequency of purchasing TN products, percent of grocery budget spent on TN products, perceiving PTP-logoed products as local, viewing local as important, and having improved purchase likelihood for PTP products at any of the retail outlets. They were also willing to travel the shortest distance to purchase PTP products at 10 miles.

The second cluster ("Economy Driven") consists of 40% of the sample (n = 459), who rated all of the factors (i.e., local purchase, social pressure, TN quality, TN environmental, TN economy) intermediately between the Local Indifferent (lowest ratings) and Local Enthusiast clusters (highest ratings; see Table 3). Members of the Economy Driven cluster indicated agreement with the local purchase factor and TN economy factor. They indicated slight agreement with the social pressure factor and slight disagreement with the TN quality factor and TN environmental factors. Economy Driven cluster members were the oldest participants at 49 years old and had the highest portion of rural residents (51%). Their other demographic variables were comparable to the Local Indifferent cluster. When considering their purchasing variables, they were intermediate between the other two clusters for frequency of purchasing TN products, percent of grocery budget spent on TN products, perceiving PTP as local, the importance of local origins, and the distance they are willing to travel for PTP products (14.3 miles). They were comparable to Local Enthusiasts for their purchase likelihood ratings of PTP products at specialty stores, wholesalers, and limited assortment stores. The Economy Driven cluster had the highest purchase likelihood ratings out of all three clusters for grocery, big box, and farm direct retail outlets, which may indicate an emphasis on availability and convenience for this cluster.

The last cluster ("Local Enthusiasts") consisted of nearly 30% of the sample (n = 338; see Table 3). They agreed with all of the factors (i.e., local purchase, social pressure, TN quality, TN environmental, TN economy) significantly more than the Local Indifferent or Economy Driven clusters. In turn, this cluster was named the "Local Enthusiast" cluster due to this greater agreement. They were the youngest cluster at 39.7 years old and had the lowest portion of members residing in rural communities (26.6%). They also spent the largest portion of their grocery budget on TN grocery products at 41%, or approximately $140 per month. They had slightly larger households than the Local Indifferent or Economy Driven clusters with 2.6 adults and 1.3 children. They also had a lower portion of female respondents at 46% and the highest household income at $83,809. They exhibited the highest ratings for frequency of purchasing TN products, the importance of buying local, willingness to travel for PTP products (18.3 miles), and 96% of the sample perceived PTP as local. Relative to the other two clusters, they had intermediate ratings for their likelihood of purchasing PTP from grocery, big box, and farm direct outlets.

Cluster Membership

Table 4 summarizes ordered probit model estimates and marginal effects to assess the relationship between different purchase and demographic variables with cluster membership as the dependent variable. The results demonstrate that several purchase behavior variables impacted cluster membership. For instance, participants with a higher frequency of purchasing TN products are 7.4% more likely to be in the Local Enthusiasts cluster. As the percentage of the monthly grocery budget spent on TN products increases, the probability of being in the Local Enthusiasts cluster increases by 0.1%. Individuals who perceive PTP-logoed items as local are 13.4% more likely to be in this cluster. There is also a positive relationship between perceiving local production as important and Local Enthusiast membership, at 6.8%. Membership in the Local Enthusiast cluster increases for each purchase likelihood rating increased by 1.1% for specialty stores and 1.4% for the farm direct retail outlets. These findings align with research demonstrating that local food purchasing behavior and attitudes influence food-related cluster membership (Aprile, Caputo, and Nayga, 2016; Kumar and Smith, 2018). Furthermore, local foods are often purchased directly from

producers, which can impact local food access and purchasing behavior (Aprile, Caputo, and Nayga, 2016).

Demographic characteristics also impacted cluster membership (see Table 4). Females are 4.7% less likely to be in the Local Enthusiasts cluster. Having a 4-year bachelor's degree or higher decreases Local Enthusiast cluster membership probability by 5.4% and increases the probability of being in the Local Indifferent cluster by 5.6%. For each additional adult and child within the household, the probability of being in the Local Enthusiasts cluster increases by 2.1% and 2.3%, respectively. Compared to rural residents, living in an urban area increases Local Enthusiast cluster membership by 7.5%. As income increases, so does Local Enthusiast cluster membership at 0.1%. Age and suburban residency does not significantly impact cluster membership. Similar to our results, Nie and Zepeda (2011) surveyed U.S. consumers and determined that the number of adults and being female increased local food interest. While counter to our findings, Aprile, Caputo and Nayga (2016) surveyed Italian consumers and found that older, female consumers with lower education levels and intermediate incomes were more likely to be in the Strict Localist cluster. Overall, many studies agree that demographics impact consumers' purchasing behavior for local foods and cluster membership (Nie and Zepeda, 2011; Aprile, Caputo, and Nayga 2016; Kumar and Smith, 2018), but the effect varies across studies, likely highlighting the importance of gaining insights from different locations.

Table 4. Ordered Probit Model and Marginal Effect Estimates Assessing Consumer Characteristics and Perceptions Impacting Cluster Membership

	Ordered Probit Model		Marginal Effects					
			Cluster 1—Local Indifferent (30.5% of Sample)		Cluster 2—Economy Driven (40.0% of Sample)		Cluster 3—Local Enthusiast (40.0% of Sample)	
	Coef.	Robust SE	dy/dx	Delta-method SE	dy/dx	Delta-method SE	dy/dx	Delta-method SE
Purchase variables								
FreqTNpurchase	0.370	0.063***	-0.077	0.013***	0.003	0.002	0.074	0.012***
Per_Tngrocery	0.007	0.002**	-0.001	0.001**	0.000	0.000	0.001	0.000**
PTP_local	0.670	0.095***	-0.140	0.020***	0.006	0.004	0.134	0.020***
Local_impt	0.339	0.037***	-0.071	0.007***	0.003	0.002	0.068	0.006***
PL_grocery	0.071	0.039	-0.015	0.008	0.001	0.001	0.014	0.008
PL_bigbox	0.068	0.037	-0.014	0.008	0.001	0.001	0.014	0.007
PL_limitedassortment	0.056	0.031	-0.012	0.006	0.000	0.000	0.011	0.006
PL_wholesale	-0.028	0.031	0.006	0.006	0.000	0.000	-0.006	0.006
PL_specialty	0.056	0.028*	-0.012	0.006	0.000	0.000	0.011	0.006*
PL_farmdirect	0.071	0.032*	-0.015	0.007	0.001	0.000	0.014	0.006*
Distancetraveled_PTP	0.009	0.005	-0.002	0.001	0.000	0.000	0.002	0.001
Demographic variables								
Age	0.003	0.003	-0.001	0.001	0.000	0.000	0.001	0.001
Adult	0.105	0.040**	-0.022	0.008**	0.001	0.001	0.021	0.008**
Child	0.116	0.038**	-0.024	0.008**	0.001	0.001	0.023	0.007**
Female	-0.236	0.088**	0.049	0.018**	-0.002	0.002	-0.047	0.017**
Bachelor's degree +	-0.269	0.087**	0.056	0.018**	-0.002	0.002	-0.054	0.017**
Income	0.002	0.001**	0.000	0.000**	0.000	0.000	0.000	0.000**
Urban	0.374	0.115***	-0.078	0.024***	0.003	0.003	0.075	0.023***
Suburban	0.012	0.094	-0.002	0.019	0.000	0.001	0.002	0.019

Table 4 (cont.)

	Ordered Probit Model		Marginal Effects					
			Cluster 1—Local Indifferent (30.5% of Sample)		Cluster 2—Economy Driven (40.0% of Sample)		Cluster 3—Local Enthusiast (40.0% of Sample)	
	Coef.	Robust SE	dy/dx	Delta-method SE	dy/dx	Delta-method SE	dy/dx	Delta-method SE
Threshold parameters								
1	4.924	0.400						
2	6.724	0.441						
No. of obs.	1,147							
Log pseudolikelihood	-808.571							
Wald Chi2	530.9							
Prob > Chi2	< 0.0001							
Pseudo R2	0.3525							

Note: Single, double, and triple asterisks (***, **, *) indicate significance at the < 0.1%, 1%, and 5% levels.

Discussion and Conclusions

Consumers are interested in and willing to pay premiums for local goods (Printezis, Grebitus, and Hirsch, 2019), which can overcome additional production costs (Liu et al., 2020; Jia, 2021) and aid rural communities (Stein and Santini; 2022). Consumer preferences for local foods have been studied in various states (Yue and Tong, 2009; Rihn et al., 2016). Evidence shows Tennesseans will pay a premium for local or in-state products (Dobbs et al., 2016; Everett et al., 2017; Everett et al., 2018; Merritt et al., 2018; McKay et al., 2019; Jensen et al., 2021). However, no known study has isolated customer segments for those with varying preferences for local foods in Tennessee. Therefore, this study used an online survey to elicit Tennesseans' motivations for purchasing TN products and clustered participants based upon these motivations. Results are likely relevant for other states with similar demographics to Tennessee.

Through factor analysis, key motivations for buying local products included positive perceptions of local products, social pressure to buy local products, and the perception that local products were of superior quality, better for the environment, and helped improve the local economy. Overall, helping the local economy, supporting local farmers and businesses, and creating jobs in the local community (these were the top four statements out of 29 total statements). The next highest rated motivation was the belief that local products were better for the environment, followed by positive perceptions of local products, superior quality, and social pressures. These results align with the literature showing that supporting the local economy motivates local purchases in Michigan (Robinson and LaMore, 2010) and that sustainability and environmental considerations heighten interest in local products (Weber and Matthews, 2008). The local economy focus may also relate to knowing the local farmer or knowing the farm story behind the purchase, which has contributed to consumer interest in local products (see review by Jia, 2021).

Three clusters were identified to explain different customer segment preferences for local: Local Indifferent, Economy Driven, and Local Enthusiasts. Key differences were observed across the three clusters in terms of demographics, purchasing behavior, and the perception factors. The cluster analysis demonstrates that both the Economy Driven and Local Enthusiast clusters exhibited heightened interest in local Tennessee goods and may be actionable targets for focused marketing efforts. Leveraging the PTP-local connection would be of particular interest to the Local Enthusiast cluster. Often, brands are easier to identify and associate easily with key marketing concepts, which is also observed in state marketing programs where states leverage brands to build positive associations and equity (Onken and Bernard, 2010; Moreno and Malone, 2021). Furthermore, frequently purchasing TN products and allocating a larger portion of the grocery budget to TN products are indicative of the Local Enthusiast cluster. Specialty store availability and farm direct options can attract this cluster, especially if they are in close proximity to urban areas (e.g., farmers' markets). Also, showing promotions that encompass consumers who are similar to their own household demographics may be a means of heightening their awareness and engagement (e.g., self-congruity; Liu et al., 2012). Conversely, if one wishes to target the Economy Driven cluster, marketing promotions should focus on the local community benefits, which could heighten consumer interest. Additionally, product availability with retailers that are accessible to rural community members would align with this cluster's needs.

This study provides insights on underlying motivations and drivers that impact preferences for local products among three distinct customer segments. However, several limitations need to be acknowledged. First, this study uses self-reported stated preference data, and real-world behavior may not align with what participants self-report. Similarly, the data were collected using an online survey, meaning hypothetical bias may have occurred. Both of these limitations could be addressed in future work by incorporating scanner data and retail data or intercept methods to test the robustness of the results in a real-world setting.

Finally, another limitation of this study is that it only surveyed Tennessee consumers. However, Tennessee is similar to the national average in terms of tourism as a percentage of GDP and population growth statistics. Therefore, Tennessee customer segments for local products could be similar to those for the rest of the nation, and particularly similar to states with comparable demographics to Tennessee. Nonetheless, future research could use factor and cluster analysis to identify distinct customer segments for local food preferences nationally.

References

Aprile, M.C., V. Caputo, and R.M. Nayga Jr. 2016. "Consumers' Preferences and Attitudes toward Local Food Products." *Journal of Food Products Marketing* 22(1):19–42.

Arcand, H., and P. Kern. 2024. "U.S. Travel and Tourism Satellite Account for 2018-2022." *The Journal of the U.S. Bureau of Economic Analysis*. Available online: https://apps.bea.gov/scb/issues/2024/04-april/0424-travel-tourism-satellite-account.htm#:~:text=As%20the%20industry%20continued%20to,fully%20recovered%20from%20the%20pandemic.

Belsley, D., E. Kuh, and R. Welsch. 1980. *Regression Diagnostics.* Hoboken, NJ: Wiley.

Braeken, J., and M.A.L.M. van Assen. 2017. "An Empirical Kaiser Criterion." *Psychological Methods* 22(3):450-466.

Comrey, L.A., and H.B. Lee. 1992. *A First Course in Factor Analysis*, 2nd ed. Hillside, NJ: Lawrence Erlbaum Associates.

Costello, C.A., and A. Fairhurst. 2002. "Purchasing Behavior of Tourists towards Tennessee-made Products." *International Journal of Hospitality and Tourism Administration* 3(3):7–17.

Dibb, S., L. Simkin, W.M. Pride, and O.C. Ferrell. 2019. "Part 2: Understanding and Targeting Customers." In *Marketing Concepts and Strategies*, 8th ed. Boston, MA: Cengage, pp. 139-240.

Dobbs, L.M., K.L. Jensen, M.B. Leffew, B.C. English, D.M. Lambert, and C.D. Clark. 2016. "Consumer Willingness to Pay for Tennessee Beef." *Journal of Food Distribution Research* 47(2):38–61.

Everett, C., K. Jensen, C. Boyer, and D. Hughes. 2018. "Consumers' Willingness to Pay for Local Muscadine Wine." *International Journal of Wine Business Research* 30(1):58–73.

Everett, C., K. Jensen, D. Hughes, and C. Boyer. 2017. "Consumer Willingness to Pay for Local Wines and Shopping Outlet Preferences." *Journal of Food Distribution Research* 48(3):31–50.

Fan, X., M. Gómez, and P. Coles. 2019. "Willingness to Pay, Quality Perception, and local Foods: The Case of Broccoli." *Agricultural and Resource Economics Review* 48(3):414–432.

Fife, K., W. Secor, and B. Campbell. 2025. "State Labeling's Impact on Geographic Boundaries of Local." *Agribusiness: An International Journal* 41(2):481–504.

Filipek, M. 2018. *Another Reason to Shop Small® on Small Business Saturday®: Approximately 67 Cents of Every Dollar Spent At a Small Business Remains in the local Community*. New York, NY: American Express. Available online: https://about.americanexpress.com/newsroom/press-releases/news-details/2018/Another-Reason-to-Shop-Small-on-Small-Business-Saturday-Approximately-67-Cents-of-Every-Dollar-Spent-at-a-Small-Business-Remains-in-the-Local-Community-11-13-2018/default.aspx [Accessed September 7, 2023].

Greene, W.H., and D.A. Hensher. 2009. *Modeling Ordered Choices.* New York, NY: New York University.

He, C., L. Shi, Z. Gao, and L. House. 2020. "The Impact of Customer Ratings on Consumer Choice of Fresh Produced: A Stated Preference Experiment Approach." *Canadian Journal of Agricultural Economics* 68:359–373.

Huang, R., and E. Sarigöllü. 2012. "How Brand Awareness Relates to Market Outcome, Brand Equity, and the Marketing Mix." *Journal of Business Research* 65(1):92–99.

Jensen, K.L., K.L. DeLong, M.B. Gill, and D.W. Hughes. 2021. "Consumer Willingness to Pay for Locally Produced Hard Cider in the USA." *International Journal of Wine Business Research* 33(3):411–431.

Jia, S. 2021. "Local Food Campaign in a Globalization Context: A Systematic Review." *Sustainability* 13(13):7487.

Kim, J.H. 2019. "Multicollinearity and Misleading Statistical Results." *Korean Journal of Anesthesiology* 72(6):558–569.

Kumar, S., S. Talwar, M. Murphy, P. Kaur, and A. Dhir. 2021. "A Behavioural Reasoning Perspective on the Consumption of Local Food. A Study on REKO, a Social Media-Based Local Food Distribution System." *Food Quality and Preference* 93:104264.

Kumar, A., and S. Smith. 2018. "Understanding Local Food Consumers: Theory of Planned Behavior and Segmentation Approach." *Journal of Food Products Marketing* 24(2):196–215.

Liu, F., J. Li, D. Mizerski, and H. Soh. 2012. "Self-congruity, Brand Attitude, and Brand Loyalty: A Study on Luxury Brands." *European Journal of Marketing* 46(7/8):922–937.

Liu, Y., X. Chen, A.N. Rabinowitz, and B. Campbell. 2020. "Demand, Challenges, and Marketing Strategies in the Retail Promotion of Local Brand Milk." *Agricultural Economics* 51(5):655–668.

McKay, L., K.L. DeLong, K.L. Jensen, A.P. Griffith, C.N. Boyer, and D.M. Lambert. 2019. "Restaurant Willingness to Pay for Local Beef." *Agribusiness: An International Journal* 35(4):610–624.

Merritt, M.G., K.L. Delong, A.P. Griffith, and K.L. Jensen. 2018. "Consumer Willingness to Pay for Tennessee Certified Beef." *Journal of Agricultural and Applied Economics* 50(2):233–254.

Mohammed, E.A., C. Naugler, and B.H. Far. 2015. "Emerging Business Intelligence Framework for a Clinical Laboratory through Big Data Analytics." In Q. Nam Tran and H. Arabnia, eds. *Emerging Trends in Computational Biology, Bioinformatics, and Systems Biology*. Amsterdam, Netherlands: Elsevier, pp. 577–602.

Moreno, F., and T. Malone. 2021. "The Role of Collective Food Identify on Local Food Demand." *Agricultural and Resource Economics Review* 50(1):22–42.

Tennessee Department of Tourist Development. 2023. *Tennessee Celebrates Record $27.5 Billion in Travel Spending in 2022*. Nashville, TN: Tennessee Department of Tourist Development. Available online: at https://www.tn.gov/tourism/news/2023/5/9/tn-celebrates-record--27-5-billion-in-travel-spending-in-2022.html#:~:text=BY%20THE%20NUMBERS%3A,record%20of%2014%20in%202020.

Nie, C., and L. Zepeda. 2011. "Lifestyle Segmentation of US Food Shoppers to Examine Organic and Local Food Consumption." *Appetite* 57(1):28–37.

Onken, K.A., and J.C. Bernard. 2010. "Catching the "Local" Bug: A Look At State Agricultural Marketing Programs." *Choices* 25(1):1–7.

Printezis, I., C. Grebitus, and S. Hirsch. 2019. "The Price Is Right!? A Meta-Regression Analysis on Willingness to Pay for Local Food." *PloS One* 14(5):1–23.

Rihn, A., H. Khachatryan, B. Campbell, C. Hall, and B. Behe. 2016. "Consumer Preferences for Organic Production Methods and Origin Promotions on Ornamental Plants: Evidence from Eye Tracking Experiments." *Agricultural Economics* 47(6):599–608.

Robinson, N., and R.L. LaMore. 2010. "Why Buy Local? An Assessment of the Economic Advantages of Shopping At Locally Owned Businesses." Lansing, MI: Michigan State University Center for Community and Economic Development. Available online: https://ced.msu.edu/upload/reports/why%20buy%20local.pdf.

Stata. 2024. "Regression with Stata Chapter 2—Regression Diagnostics." Available online: https://stats.oarc.ucla.edu/stata/webbooks/reg/chapter2/stata-webbooksregressionwith-statachapter-2-regression-diagnostics/ [Accessed July 18, 2024].

Stein, A.J., and F. Santini. 2022. "The Sustainability of "Local" Food: A Review for Policy-makers." *Review of Agricultural, Food and Environmental Studies* 103:77–89.

Stone, T.F., J.R. Thompson, K.A. Rosentrater, and A. Nair. 2021. "A Life Cycle Assessment Approach for Vegetables in Large-, Mid-, and Small-scale Food Systems in the Midwest US." *Sustainability* 13(20):11368.

Tennessee Department of Agriculture. 2023. "Pick Tennessee Products." Nashville, TN: TDA. Available online at https://www.tn.gov/agriculture/department/business-development-division/farm-direct/picktn-products.html.

Trochim, W.M., and J.P. Donnelly. 2006. *The Research Methods Knowledge Base*, 3rd ed. Cincinnati, OH: Atomic Dog.

U.S. Census Bureau. 2021. "QuickFacts Tennessee." Washington, DC: U.S. Census Bureau. Available online: https://www.census.gov/quickfacts/fact/table/TN/PST045222 [Accessed October 23, 2023].

USA Facts. 2025a. "Our Changing Population: Tennessee." Available online: https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/state/tennessee/ [Accessed September 7, 2025].

USA Facts. 2025b. "Gross Domestic Product (GDP) State—Tennessee (dollars)." Available online: https://usafacts.org/metrics/gross-domestic-product-gdp-by-state-tennessee/ [Accessed May 17, 2025].

U.S. Department of Agriculture. 2021. *Direct-to-Consumer Farm Sales Reach $10.7 Billion in 2020, 35-percent Increase from 2019*. Washington, DC: U.S. Department of Agriculture, Economic Research Service. Available online: https://www.ers.usda.gov/data-products/chart-gallery/gallery/chart-detail/?chartId=104408.

U.S. Department of Agriculture. 2022. *Census of Agriculture. 2020 Local Food Marketing Practices Survey*. Washington, DC: U.S. Department of Agriculture, National Agricultural Statistics Service. Available online: https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/Local_Food/index.php.

Van Hove, L. 2022. "Consumer Characteristics And E-Grocery Services: The Primacy of the Primary Shopper." *Electronic Commerce Research* 22(2):241–266.

Wang, Q., and J. Sun. 2003. "Consumer Preference and Demand for Organic Food: Evidence from a Vermont Survey." Paper presented at the annual meeting of the AAEA annual meeting, Montreal, Canada, July 27–30.

Weber, C.L., and H.S. Matthews. 2008. "Food-miles and the Relative Climate Impacts of Food Choices in the United States." *Environmental Science and Technology* 42(10):3508–3513.

Yasin, M.N., M. Nasser Noor, and O. Mohamad. 2007. "Does Image of Country-of-Origin Matter to Brand Equity?" *Journal of Product and Brand Management* 16(1):38–48.

Yong, A.G., and S. Pearce. 2013. "A Beginner's Guide to Factor Analysis: Focusing on Exploratory Factor Analysis." *Tutorials in Quantitative Methods for Psychology* 9(2):79–94.

Yue, C., and C. Tong. 2009. "Organic or Local? Investigating Consumer Preference For Fresh Produce Using a Choice Experiment with Real Economic Incentives." *HortScience* 44(2):366–371.