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Editor: Linda Chalker-Scott

Fontenot, K.¹, Chen, Y.², Cater, M.³, Kirk-Ballard, H.⁴

¹Southwest Regional Director, Louisiana State University AgCenter, Rayne, Louisiana, 70578

²Professor, Louisiana State University AgCenter, Baton Rouge, Louisiana 70803

³Northeast Regional Director, Louisiana State University AgCenter, Winnsboro, Louisiana 71295

⁴Assistant Professor, Louisiana State University AgCenter, Baton Rouge, Louisiana, 70803

Is There a Market for Louisiana Produced Tea (*Camellia sinensis*)? A Survey to Determine the Potential for a Niche Market

Abstract

Tea (*Camellia sinensis*) is the second most consumed beverage in the world with a strong following as a sweet beverage in the southern United States. Specialty crop producers face many challenges regarding development of a local tea industry. A survey was developed and distributed to 5,537 Louisiana residents to determine specific interest in tea production practices and tea products. When asked to rank in importance the reasons why respondents purchase tea, domestically grown and locally grown tea were identified as important factors by 30.0% and 24.8% of respondents, respectively (Domestic $n = 853$, Local $n = 706$). Respondents also ranked certified organic tea ($n = 785$, 27.6%) and sustainably produced, but not certified organic, tea ($n = 1,288$, 45.5%) as important factors when considering purchasing tea.

Keywords: beverage, caffeine, consumer, marketing, specialty crop, survey

Introduction

Tea (*Camellia sinensis*) is a popular beverage in Louisiana and throughout the United States; most of the purchased and consumed tea is not produced domestically. Should local United States farmers start growing tea to fill a void in domestically available product? Many factors should be considered when growing a new specialty crop such as is the climate suitable for production, and can the crop be processed locally. Tea is currently commercially produced at several farmers in south Louisiana and one farm in Mississippi. Researchers at the Louisiana State University Agricultural Center (LSU AgCenter) are working on research projects to identify the best methods for producing tea at younger and more mature stages of growth by focusing on sun and shade structures (Chen et al., 2022a). A full-scale tea production trial is ongoing at the Hammond Research Station in Hammond Louisiana to address environmental challenges of growing local tea. There is no dedicated processing facility for tea in Louisiana as of 2024. However, the few existing local tea producers do prefer to process their own tea as they use the recipe to market their tea products. Concurrently, LSU AgCenter researchers wanted to gauge if a potential market for locally grown tea exists while conducting plant management and production research.

Determining if a local demand exists is an important step in determining if specialty crop growers should include tea as a potential crop on their Louisiana farms. There is a reason to believe tea may become a profitable crop for Louisiana producers. Tea is currently the most consumed beverage in the world only after water, and the fastest growing beverage in the US with a market value of \$13.12 billion in 2020 (Tea Association of the USA 2021). This value represents a 32% increase from 2014, and 3.6% increase since the beginning of the Covid pandemic (Tea Association of the USA, 2020). Specialty tea (aka loose-leaf tea) is the most profitable market category for US growers with a \$3.2 billion market value in 2020 and continues to grow faster than other tea beverage categories (supermarket, ready-to-drink, and food service). Tea currently sold in the US consists primarily of blended imported products. Domestically grown tea represents a negligible share of the US market, grown by approximately 60 commercial tea growers in 15 states (Alabama, California, Florida, Georgia, Hawai'i, Louisiana,

Maryland, Michigan, Mississippi, North Carolina, New York, Oregon, South Carolina, Texas, and Washington) (Chen et al., 2022b). The US League of Tea Growers (USLTG) via personal communication with Y. Chen (2020) stated “US tea growers are selling their products with a profit despite high labor costs in the US, and they sell out each year, unable to keep up with the demand.”

To successfully promote and market US grown tea, there must be an understanding of the current attitudes and usage of the wide spectrum of tea offerings, including identifying motivations and barriers to use of each type of tea. Louisiana restaurants and gas stations all offer two types of iced tea, sweet and unsweet. Tea is already heavily consumed; this study aims to determine if consumers prefer locally grown or other criteria in the tea they chose to purchase. A survey was designed to understand criteria Louisiana consumers use when purchasing tea and tea products. Previous research has shown that US consumer preferences for green teas grown in other countries are different from consumer preferences in other parts of the world (Lee et. al., 2010). This is the first time that consumer acceptability of US grown tea is being evaluated with US consumers.

Methods

A tea consumer survey was developed in 2018 with a focus on engaging consumers’ willingness and interest in consuming and purchasing locally grown tea. The target audience included Louisiana residents and Louisiana State University (LSU) college students. All survey participants were 18 years of age or older. Prior to survey distribution, the survey and protocols were submitted to Louisiana State University’s Internal Review Board (Project IRB# E10915). Surveys were distributed in 2018-2019 at various gatherings including local garden club meetings, Master Gardener events, and garden shows throughout Louisiana. On-campus surveys were administered to LSU students enrolled in the Agronomy 1001 *Plants and People* course. This course was selected for student engagement due to its high enrollment (>100 students per semester) and diversity of students as it is a general education course. Compensation

was not provided to survey participants, except for Agronomy 1001 students who were encouraged to share the survey with neighbors, friends, and relatives for bonus points on a mid-term exam. All surveys were verified through signatures on the consent form with duplicate surveys eliminated from the final data set.

Each respondent signed a consent acknowledging the purpose of the survey and that no known risks with participating in the survey focused on their individual consumption and purchasing habits related to tea or tea products. The first two survey questions had a broad focus, asking respondents to check boxes next to the various types of caffeinated beverages typically consumed. Respondents also answered within the past six months if any non-beverage products containing tea purchased. For the first two questions, respondents could select all options that applied to them. If tea was selected on question number 1, the respondent was then asked to fill out questions 3-13. If the respondent indicated that they did not currently consume tea, they were asked to advance to question number 14. Questions 3-13 specifically focused on methods of purchasing, and consuming tea as well as marketing preferences. For non-tea consumers and tea consumers alike, question 14 was specific to the price point at which the respondent was willing to purchase tea. Questions 15 through 20 were optional for all respondents and specifically addressed personal identification information such as age, gender identity, marital status, number of people living in the household, employment status, and household annual gross income.

Specific tea preference questions were asked between questions 3-13. Questions 3 and 4 focused on where respondents purchase tea and in what form they purchase tea. Both questions 3 and 4 could be answered with multiple options. Questions 5-8 focused on individual responses to what form, how frequent, the length of time (years) they have been drinking tea and if they expect their consumption patterns to increase or decrease in the next year. Questions 9-13 pertained more to consumer preference in how the tea is grown and for what purpose the consumer is drinking it. Respondents were asked to rank preferences on location of the tea farm, health benefits, taste, cost, availability, and certifications such as sustainably grown or organic tea. A full copy of the survey is included in Table 1.

Table 1. Louisiana tea consumer survey - purchasing habits and preference for US-grown tea distributed to Louisiana consumers in 2018 and 2019.

| Question | Question | Potential Answers the Survey Respondent Could Select From |
|----------|--|---|
| 1 | What CAFFEINATED beverages do you consume? <i>(Select All That Apply)</i> | <input type="checkbox"/> Soda <input type="checkbox"/> Coffee <input type="checkbox"/> Tea (Hot or Iced, including bottled, ready-to-drink, or blended beverages) <input type="checkbox"/> Other (please specify): _____ |
| 2 | In the past 6 months, have you purchased any of the following non-beverage products CONTAINING TEA? <i>(Select All That Apply)</i> | <input type="checkbox"/> Candy or Lozenges <input type="checkbox"/> Ice cream, frozen desserts, cookies, or other confections <input type="checkbox"/> Personal grooming products (skin cleanser, shampoo, lotion, etc.) <input type="checkbox"/> Supplements or weight loss products <input type="checkbox"/> Other (please specify): _____ |
| 3 | Where do you usually buy tea or prepared tea beverages? <i>(Select All That Apply)</i> | <input type="checkbox"/> Retail store / Supermarket <input type="checkbox"/> Convenience store <input type="checkbox"/> Farmers' market / Roadside market <input type="checkbox"/> Specialty tea and coffee shop <input type="checkbox"/> Online <input type="checkbox"/> Restaurant <input type="checkbox"/> Other (please specify): _____ |
| 4 | In what form do you usually buy tea? <i>(Select All That Apply)</i> | <input type="checkbox"/> Loose leaf tea <input type="checkbox"/> Tea bags <input type="checkbox"/> Ready to drink, including blended tea drinks <input type="checkbox"/> Instant <input type="checkbox"/> Other (please specify): _____ |

| | | | | | | | | | |
|---|--|---|------------|-------------------------|---------------|--------------------|--------------------|----------------|----------------------|
| 5 | In what form do you consume tea the most? (<i>Select ONLY One</i>) | <input type="checkbox"/> Hot tea (Winter Only); <input type="checkbox"/> Hot tea (Winter and Other Seasons); <input type="checkbox"/> Iced tea (Summer Only); <input type="checkbox"/> Iced tea (Summer and Other Seasons); <input type="checkbox"/> Ready to drink beverages, including blended tea drinks | | | | | | | |
| 6 | How many years have you consumed tea? | I don't drink hot tea, I've been drinking iced tea for ___ years; I don't drink iced tea, I've been drinking hot tea for ___ years; I drink both hot (for ___ years) and iced tea (for ___ years). | | | | | | | |
| 7 | How often do you consume tea? | | Season | Less than once per week | Once per week | 2-3 times per week | 4-5 times per week | Once every day | More than once a day |
| | | Hot tea | Year-round | | | | | | |
| | | | Summer | | | | | | |
| | | | Winter | | | | | | |
| | | Iced tea | Year-round | | | | | | |
| | | | Summer | | | | | | |
| | | | Winter | | | | | | |
| 8 | Compared to your current consumption level, do you expect your tea consumption next year to: | <input type="checkbox"/> Decrease <input type="checkbox"/> Remain the same <input type="checkbox"/> Increase | | | | | | | |
| 9 | Where do you prefer your tea leaves to be grown? (<i>Select ONLY One</i>) | <input type="checkbox"/> Local (Tea grown within your own state or region) <input type="checkbox"/> Domestic (Tea grown within the United States) <input type="checkbox"/> Imported (Tea grown outside the United States) <input type="checkbox"/> Origin does not influence my purchase | | | | | | | |

| | | |
|----|---|--|
| 10 | Please rank from 1 to 4 the following motivations to drink tea, where 1 = Most Important, and 4 = Least Important: | <input type="checkbox"/> Health Benefits <input type="checkbox"/> Tastes Good <input type="checkbox"/> Caffeine Source <input type="checkbox"/> Relaxation |
| 11 | Please rank from 1 to 7 the following factors that may influence your choice while shopping for tea, where 1 is the Most Important and 7 the Least Important: | <input type="checkbox"/> Cost <input type="checkbox"/> Availability <input type="checkbox"/> Quality (flavor, etc.) <input type="checkbox"/> Locally-Grown <input type="checkbox"/> Grown in the United States <input type="checkbox"/> Certified Organic <input type="checkbox"/> Not organic, but produced using <u>Sustainable Production</u> practices |
| 12 | How likely are you to purchase certified organic tea? (<i>Select ONLY One</i>) | <input type="checkbox"/> Very Likely <input type="checkbox"/> Likely <input type="checkbox"/> Neutral <input type="checkbox"/> Unlikely <input type="checkbox"/> Very Unlikely |
| 13 | How likely are you to purchase tea that is not certified | <input type="checkbox"/> Very Likely <input type="checkbox"/> Likely <input type="checkbox"/> Neutral <input type="checkbox"/> Unlikely <input type="checkbox"/> Very Unlikely |

| | | |
|----|--|---|
| | organic but that was sustainably produced? (<i>Select ONLY One</i>) | |
| 14 | Assuming imported tea are priced at \$10/oz for 20 servings at local stores, how much of a premium price, if any, would you be willing to pay for same amount and quality of tea made from tea leaves grown in the US? (<i>Select ONLY One</i>) | \$10/oz; \$11/oz; \$12/oz; \$13/oz; \$14/oz; \$15/oz; \$20/oz |
| 15 | What is your age (optional) | _____ years |
| 16 | Please specify your gender identity: (optional) | Male, Female, Other / Prefer not to answer |
| 17 | Are you married? (optional) | Yes, No, Other/ Prefer not to answer |

| | | |
|----|---|---|
| 18 | How many people are, including you, residing in your household on a regular basis? | Insert a number |
| 19 | Which of the following best describes your current employment status? (optional) | <input type="checkbox"/> Unemployed <input type="checkbox"/> Formal Part-Time Job(s) <input type="checkbox"/> Formal Full-Time Job <input type="checkbox"/> Retired |
| 20 | Please select the range of your household's yearly gross income: (optional) | <input type="checkbox"/> Less than US\$24,999 <input type="checkbox"/> US\$25,000-US\$34,999 <input type="checkbox"/> US\$35,000-US\$49,999 <input type="checkbox"/> US\$50,000-US\$74,999 <input type="checkbox"/> US\$75,000-US\$99,999 <input type="checkbox"/> US\$100,000-US\$149,999 <input type="checkbox"/> US\$150,000-US\$199,999 <input type="checkbox"/> US\$200,000 or more |

All responses (5,485 valid responses) were entered into Qualtrics (Qualtrics, Provo, UT, USA) survey instrument for statistical analysis. The objective of this survey was to determine if Louisiana residents are interested in purchasing and drinking locally grown tea and if so, do specific production practices or availability of value-added tea products play a role in the consumers' willingness and price point at which they will purchase this product.

Results and Discussion

The purpose of this survey was to describe the potential market in Louisiana for locally grown and processed tea. Survey data were collected from 5,537 residents of a southeastern US state. Fifty-two responses were removed from the data set because those participants indicated they were less than 18 years old, leaving 5,485 valid responses.

Demographic results

There was an almost equal number of male ($n = 2,481$, 49.2%) and female ($n = 2,522$, 50.0%) respondents. A very small percentage of respondents indicated their gender as other or preferred not to answer ($n = 40$, 0.8%) with 442 people choosing not to respond. Participants ranged in age from 18 to 94 years with an average age of 27.43 ($n = 4,703$, $SD = 14.73$). The number of participants who did not respond to this question was 782. The majority of respondents were not married ($n = 3,972$, 79.0%), and 19.7% indicated they were married ($n = 992$). Sixty-two (1.2%) respondents reported their marital status as other or prefer not to answer, and 459 respondents did not provide an answer.

Participants' household size ranged from 1 to 10 people with an average of 3.36 3.27 ($n = 5,076$, $SD = 1.45$). Twenty-one outliers ($Z > 3.00$) were identified and excluded; 388 survey participants did not answer this question. The largest number of survey participants were unemployed ($n = 1,787$, 37.7%), and the next largest group had at least one part-time job ($n = 1,493$, 31.5%). Nearly a quarter of respondents had a full-

time job ($n = 1,165$, 24.6%). The smallest number of respondents were retired ($n = 291$, 6.1%), and 749 did not respond.

Almost one third of respondents reported their yearly income as \$24,999 or less ($n = 1,099$, 30.1%). The second highest number of respondents indicated a yearly income between \$100,000 and \$149,999 ($n = 505$, 13.8%), followed by a group of 455 (12.4%) respondents with a yearly income between \$75,000 and \$99,999. There were missing data for 1,829 respondents.

Tea consumption results

Almost two thirds of respondents reported consuming caffeinated coffee ($n = 3,619$, 66.0%), and almost as many reported consuming caffeinated soda ($n = 3,577$, 65.2%). Caffeinated tea was consumed by about half of respondents ($n = 2,852$, 52.0%). Five percent drank other caffeinated beverages ($n = 274$).

About half of participants reported they had bought ice cream, frozen desserts, cookies, or other confections containing tea in the last six months ($n = 2,533$, 46.2%). Similarly, 2,530 (46.1%) participants bought personal grooming products containing tea. About one third of respondents bought candy or lozenges that contained tea ($n = 1,909$, 34.8%), and 917 (16.7%) participants indicated they bought supplements or weight loss products containing tea in the last six months. A very small percentage bought other non-beverage products containing tea ($n = 40$, 0.7%).

Locations to purchase tea results

Almost half of respondents usually bought tea from retail stores or supermarkets ($n = 2,492$, 45.4%). Participants also bought tea from restaurants ($n = 1,550$, 28.3%) and convenience stores ($n = 1,195$, 21.8%). Some participants purchased tea from specialty tea and coffee shops ($n = 832$, 15.2%), and 469 (8.6%) respondents indicated they usually bought tea from farmers' markets or roadside markets. A small percentage of participants bought tea online ($n = 380$, 6.9%). Very few purchased tea from other places ($n = 22$, 0.4%).

Tea preference results

The largest number of survey participants bought tea in bag form ($n = 2,077$, 37.9%), followed closely by ready-to-drink tea ($n = 1,945$, 35.5%). Some respondents indicated they usually bought loose leaf tea ($n = 734$, 13.4%), and 627 (11.4%) participants bought instant tea. A very small percentage bought tea in a different form ($n = 21$, 0.4%).

The majority of respondents consumed iced tea most often in summer and other seasons ($n = 1,347$, 47.2%). Others reported consuming hot tea the most in winter and other seasons ($n = 592$, 20.7%). Another group of participants reported consuming ready-to-drink beverages the most ($n = 375$, 13.1%). Some participants consumed iced tea the most in summer only ($n = 297$, 10.4%), and a small percentage consumed hot tea the most in winter only ($n = 245$, 8.6%). Almost half of respondents did not provide an answer ($n = 2,629$).

More than half of survey participants drank hot and iced tea ($n = 1,556$, 55.6%). A little over a third of participants drank only iced tea ($n = 955$, 34.1%), and a small percentage of respondents drank only hot tea ($n = 288$, 10.3%). Nearly half of the survey participants did not answer this question ($n = 2,686$). Table 2 shows the mean, standard deviation, minimum value, and maximum value for each type of tea drinker.

Table 2. Mean, standard deviation, minimum value, and maximum value for years of tea consumption by type of tea.

| How many years have you consumed tea? | Mean | Standard Deviation | Minimum | Maximum |
|--|-------|--------------------|---------|---------|
| Both hot and iced tea | 17.24 | 15.95 | 1 | 90 |
| Iced tea only | 16.16 | 14.53 | 1 | 79 |
| Hot tea only | 11.80 | 11.51 | 0 | 60 |

The largest percentage of survey respondents reported consuming hot tea less than once per week year-round ($n = 945$, 46.9%), in the summer ($n = 646$, 58.7%), and in the winter ($n = 538$, 38.2%). Almost two thirds of respondents had missing data for their year-round hot tea consumption ($n = 3,470$). Most participants did not provide an

answer for their summertime hot tea consumption ($n = 4,385$), and 4,078 responses were missing data for wintertime hot tea consumption. Over a quarter of participants consumed iced tea two to three times per week year-round ($n = 738$, 28.6%). Over half did not provide an answer ($n = 2,902$). In the summer, 396 (28.9%) participants consumed iced tea two to three times per week. The number of responses for drinking iced tea in the summer that were missing was 4,115. In the winter, about one third consume iced tea less than once per week ($n = 399$, 34.2%). Most participants did not provide an answer to this question ($n = 4,320$). More than three fourths of respondents expected their tea consumption level to remain the same next year ($n = 2,482$, 78.5%). Some expected it to increase ($n = 465$, 14.7%), and a smaller percentage of survey respondents expected their tea consumption level to decrease ($n = 214$, 6.8%). Almost half of respondents did not respond to this question ($n = 2,324$).

Locality of tea results

A large group of participants said that the origin of the tea did not influence their tea purchase ($n = 1,901$, 60.9%). Some preferred their tea leaves to be grown locally ($n = 475$, 15.2%). Others prefer their tea leaves to be grown domestically ($n = 448$, 14.3%), while the smallest group of survey participants preferred imported tea leaves ($n = 298$, 9.5%). The number of survey participants who did not respond was 2,363.

Purpose for drinking tea results

When survey respondents were asked to rank the most important factors motivating them to drink tea, a little over one fourth of respondents ranked health benefits as their most important motivator drink tea ($n = 795$, 27.9%). Over half of participants chose taste as the most important motivation to drink tea ($n = 1,674$, 57.5%). More than one third of respondents reported caffeine source as their least important reason for drinking tea ($n = 1,080$, 38.7%). Relaxation also received a low rank as a motivation to drink tea ($n = 834$, 29.6%).

Factors influencing the consumer's willingness to purchase tea results

When asked to rank the most important factors influencing their tea buying choices, quality was selected as the most important factor by 1,239 (42.7%) respondents, with cost identified as a close second factor ($n = 977$, 33.8%). Availability also received a high ranking ($n = 856$, 29.7%) Domestically grown and locally grown tea were identified as the most important factor by 30.0% and 24.8% of respondents, respectively (Domestic $n = 853$, Local $n = 706$). Certified organic tea ($n = 785$, 27.6%) and sustainably produced, but not certified organic, tea ($n = 1,288$, 45.5%) received the lowest rankings.

When asked how likely respondents were to purchase certified organic tea, the largest percentage of respondents indicated they were likely or very likely to purchase it ($n = 1,339$, 42.4%). Almost as many respondents ($n = 1,320$, 41.9%) held a neutral opinion, and a small percentage of respondents reported that they were unlikely or very unlikely to purchase certified organic tea ($n = 495$, 15.7%). The number of missing responses for this question was 2,331.

Sustainably produced, but not certified organic, tea garnered the most responses in the neutral category on their likeliness to purchase it ($n = 1,543$, 49.3%). Another group of participants were either likely or very likely to purchase sustainably produced, but not certified organic, tea ($n = 1,178$, 37.6%). A small percentage of survey participants were unlikely or very unlikely to purchase this type of tea ($n = 410$, 13.1%). Data were missing for 2,354 responses.

Price point results

The highest number of participants were willing to pay \$10 per ounce for tea grown in the US that was the same amount and quality as imported tea ($n = 2,379$, 46.9%), followed by \$12 per ounce ($n = 1,035$, 20.4%) and \$11 per ounce ($n = 703$, 13.9%). A small number of participants did not provide an answer ($n = 417$).

Objective two was to develop a model to explain consumer-expected level of tea consumption for the next year. The dependent variable was consumer-expected level of tea consumption for the next year. Independent variables included where the tea was

grown; health benefits, good taste, caffeine, and relaxation as motivating factors to drink tea; cost, quality, US grown, certified organic, or not organic as influential factors while shopping for tea; and likelihood of purchasing certified organic or not certified organic but sustainably produced tea. Mediating variables included availability and locally-grown as influential factors while shopping for tea. All factors had statistically significant impacts on consumer-expected level of tea consumption for the next year (Figure 1).

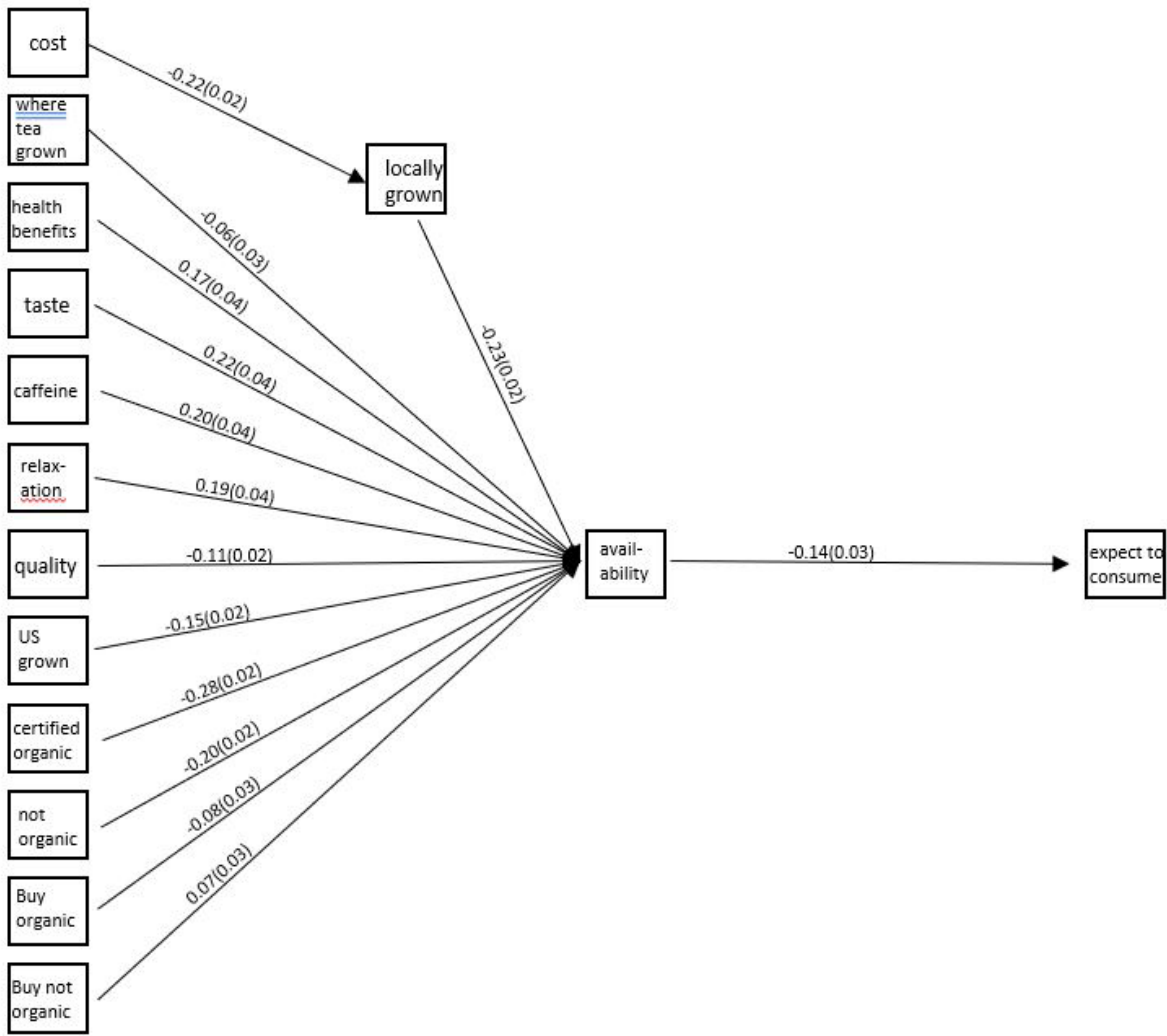


Figure 1. SEM model of factors contributing to consumer-expected consumption of tea. Values are B estimates with standard errors in parentheses.

Availability of tea while shopping had a direct effect on the expected level of tea consumption. An increase of 1.00 standard deviation in availability resulted in a person being 0.87 times more likely to increase expected level of tea consumption (95% CI

[0.83, 0.92]). The effects of health benefits, good taste, caffeine, and relaxation as motivating factors to drink tea; cost, quality, US grown, certified organic, or not organic as influential factors while shopping for tea; and likelihood of purchasing certified organic or not certified organic but sustainably produced tea were fully mediated by availability while shopping. Additionally, the influence of locally-grown tea as a choice while shopping was moderated by cost.

Conclusions

The majority of surveys were distributed on LSU's campus which ultimately meant the majority of our respondents were young (average age of the survey respondents was 27 years). While many of the survey participants were young, they would soon be entering the workforce and hopefully have disposable income to spend on luxury beverage items such as tea. Therefore, this demographic was suitable as consumers first need money to purchase the tea we are trying to determine if there is a market for. We were pleased to have almost equal representation from male (49.2%) and female (50%) answer the survey. Demographic data was not a significant factor in this survey regarding purchasing or not purchasing tea.

Availability of tea had a direct effect on expected level of tea consumption. Since domestically produced tea is desired, it must be available to shoppers. Local tea producers must first start growing the product and making it available in local markets before concerning themselves with other marketing influences, such as how the tea was produced. However, if locally grown tea is too costly to produce and greatly exceeds the costs of foreign tea, the results from this survey indicate the consumer will be less likely to purchase it. Future studies should focus on costs related to production, marketing, and supply chain associated with the local tea industry. Tea growers do not need to target specific populations when advertising their locally grown tea.

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