

# **CONSUMER PREFERENCE FOR GRADED MAPLE SYRUP**

**by Paul E. Sendak**



**FOREST SERVICE RESEARCH PAPER NE-402  
1978**

**FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE  
NORTHEASTERN FOREST EXPERIMENT STATION  
370 REED ROAD, BROOMALL, PA. 19008**

---

### **The Author**

PAUL E. SENDAK received his B.S. degree in forestry from Rutgers University in 1965. He received his M.S. degree in forestry in 1968 and his Ph.D. in forestry economics in 1972 from the University of Massachusetts. He joined the Northeastern Forest Experiment Station in 1969, and is now working at the station's Sugar Maple Laboratory in South Burlington, Vermont.

---

MANUSCRIPT RECEIVED FOR PUBLICATION 27 DECEMBER 1977

---

### **Abstract**

The three grades of maple syrup and a commercial table syrup containing artificial flavor and 3 percent pure maple syrup were evaluated by 1,018 women in four cities. The results indicate that differences in preference for flavor are related to how close the respondents are to a maple syrup-production region. Differences in preference among grades of pure maple syrup were slight and in reverse order of the quality implied by the Federal grading standard. Outside of the region of maple syrup production, differences in preference between pure maple syrup and the commercial table syrup were marked, and favored the commercial syrup.

---

## INTRODUCTION

**D**O USERS prefer pure maple syrup to a national brand of artificially flavored table syrup? Does syrup preference depend on whether a person has used pure maple syrup? This study was designed to measure consumer preferences among the three grades of maple table syrup and a national brand of artificially flavored table syrup. The study used paired products testing. Data were gathered on the participants' evaluations of the syrups before and after use, on their pattern of syrup use, and on their age, household size, and income.

## METHODS

There are three Federal maple table syrup grades.<sup>1</sup> They are based on the relationship between syrup color and flavor. U.S. Grade AA syrups are light amber and have a delicate bouquet with a detectable base maple flavor. U.S. Grade A syrups are medium amber and have the base maple flavor. U.S. Grade B syrups are dark amber and have a caramel flavor. The national brand of table syrup used in this study was Log Cabin (LC).<sup>2</sup> This syrup contains cane and corn syrups, artificial flavoring, coloring, preservatives, and 3 percent maple sugar syrup.

About 100 gallons of each of the three grades of maple syrup were thoroughly mixed, filtered, and then hotpacked (180°F) in clear glass pint bottles. The table syrup was also hotpacked in the same type of bottle. Each bottle was identified by a three-digit code on a white label.

Study participants were selected from four metropolitan areas. Two of the areas—Lansing, Mich., and Manchester, N.H.—are within the maple syrup-producing region; the other two areas—Colorado Springs, Colo., and Raleigh, N.C.—are outside of it. Participants were located by a telephone survey. Some 432 telephone

numbers were systematically selected from the 1974 telephone directory for each of the metropolitan areas. Six randomly selected digits between 1 and 20 added to each of the selected numbers gave a list of 2,592 numbers in each area. The numbers on the list were dialed, and if there was an answer and it was not a business phone, the respondent was asked if the woman of the house would be willing to participate in a table syrup preference study.

In a total of 4,152 households reached, 13 percent of the respondents refused to be interviewed. There were no women in 7 percent of the households, and at 11 percent of the homes, the woman of the house was not available for interviewing. Twenty-two percent of the households had not used table syrup in the 3 months preceding the interview so were not eligible to participate in the study. This left 1,944 potential participants of whom 1,635 said they were willing to take part in the evaluation. Some of the 1,635 moved away or dropped out of the study for other reasons before it was started, leaving 1,509 potential participants.

For paired products testing, each study participant uses two brands, say A and B. There are three possible outcomes: the participant may respond (1) I prefer A to B, (2) I prefer B to A, or (3) I have no preference. For this study, each participant received one syrup at a time, and the order in which the syrups were sent was random. The syrups were referred to as "table syrup" in the cover letter and questionnaires, so the participant did not know the identity of the syrups.

The questionnaire was developed from a discussion that took place during a focus session with eight Vermont housewives, who identified seven characteristics of the test syrups. The questionnaire sent with the first bottle of syrup asked the participant's age, income, size of household, and past use of table syrup. The syrup evaluation section gave directions on how to rate the characteristics of the syrup both before and after use. The participants were asked to comment on their satisfaction with the syrup. The participant received a questionnaire with the second syrup which also included an evaluation section, and the final question asked for a preference rating between the two syrups.

Paired syrup samples were sent through United Parcel Service to 1,509 households and 1,018

---

<sup>1</sup> U.S. Food and Drug Commission. 1974. Standards of identity for maple syrup. 29 CFR 30.2, 39 FR 20882 and U.S. Dep. Agric., Agric. Mark. Serv. 1967. U.S. standards for maple syrup. 7 CFR, Part 52, Sec. 52.5961-52.5968.

<sup>2</sup> The use of trade names in this publication is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the U.S. Department of Agriculture or the Forest Service of any product or service to the exclusion of others that may be suitable.

questionnaires were returned. Two hundred names were randomly selected from the list of nonrespondents, and 188 of these households were reached by telephone. A short form of the questionnaire was used to interview 96 of the nonrespondents.

The nonrespondents differed considerably from the respondents in age and geographical distribution, so the data were weighted for location and age. The weighted nonrespondent and the unweighted respondent syrup preference rates were compared. Two of the paired syrup tests were based on too few observations to be analyzed statistically; the other four pairs were analyzed by chi-square tests of homogeneity.

None of the four chi-square tests showed statistical significance. There is no statistical evidence that the two sets of paired syrup test data are different. The data from the respondents should give unbiased estimates of the population parameters. The data from the nonrespondent questionnaires are not included in the data summaries in this paper.

## RESULTS

### Age, household size, and income

The modal age class of the housewives interviewed in Lansing, Manchester, and Colorado Springs was 25 to 34 years and in Raleigh 35 to 44 years. The number of people in the households averaged 3.38 in Lansing, 3.86 in Manchester, 3.66 in Colorado Springs, and 3.39 in Raleigh. The modal income class of the households was \$15,000 to \$24,999 for all four cities. However, there were more respondents in the \$15,000 and over range in Lansing and Raleigh (46 percent) than there were in Manchester and Colorado Springs (29 percent). More detailed information on respondents can be found in Tables 11 through 13.

It is difficult to generalize about the differences between the survey respondents and the general population. The census unit closest to the areas sampled in our survey is the Urbanized Area, which consists of a central city (or cities) and closely settled surrounding territory.<sup>3</sup> In all cases, differences are small, and are probably the result

of differences between the target population of our survey and that of the census.

### Analysis of paired syrup preference rates

The preference tests were designed to estimate regional differences in syrup preferences and differences related to past use of syrup.

Table 1 gives the preference rates for each pair of syrups compared. The data suggest that the preference rates depend on whether the person is a pure maple syrup user and whether the person lives inside the syrup-producing region where it is easy to obtain pure maple syrup. The differences between preference rates are small when maple syrups are compared with each other, especially within the maple syrup-producing region. The largest differences are for maple syrups compared to Log Cabin table syrup.

In a paired product test, a "no preference" response may be due to one of the following reasons:

- (1) An individual's perception is not sharp enough to detect the difference between products.
- (2) The products do not differ in the quality judged.

The smaller the no-preference rate, the sharper the average perception and/or the larger the difference between the products. On the other hand, if the two preference rates and no-preference rate are all close to one-third, it is likely that there is no difference between products. Thus, the outcomes of the tests are random. There are two trends in the no-preference rates in Table 1. The no-preference rates are the highest (and close to one-third) for the U.S. Grade AA to U.S. Grade A test, and lowest for the U.S. Grade B to Log Cabin test.

Preference rates were compared by using chi-square tests of homogeneity to analyze the equality of rates in parallel samples, and tests of goodness-of-fit to analyze whether the outcome of each paired test was due to chance.

*Analysis of the preference rates within paired tests.* In paired products experiments, it is possible that the preference rates—say  $\pi_A$  and  $\pi_B$ —are equal, or, if the experiments allow ties, that the preference rates equal the rate of ties. The chi-square test of homogeneity ( $\chi_h^2$ ) was used to test the hypothesis

$$\pi_A = \pi_B.$$

The chi-square test of goodness-of-fit ( $\chi_g^2$ ) was used to test the hypothesis

$$\pi_A = \pi_B = 1/3.$$

The results of the two chi-square tests are given

<sup>3</sup> U.S. Bureau of the Census, Census of Population: 1970, Vol. 1, Characteristics of the population; Part 7, Colorado; Part 24, Michigan; Part 31, New Hampshire; Part 35, North Carolina; U.S. Gov. Print. Off., Washington, D. C., 1973.

**Table 1.—Percentage of respondents who preferred one syrup in paired syrup tests, or who had no preference**

Syrup pair	Sample size	Respondent's preference				Neither
		U.S. Grade AA	U.S. Grade A	U.S. Grade B	Log Cabin	
NONUSERS WITHIN THE SYRUP-PRODUCING REGION						
AA - A	60	40	33			27
AA - B	69	38		45		17
AA - LC	66	23			53	24
A - B	56		29	45		26
A - LC	68		40		43	17
B - LC	66			32	47	21
NONUSERS OUTSIDE THE SYRUP-PRODUCING REGION						
AA - A	82	25	40			35
AA - B	80	39		44		17
AA - LC	68	16			59	25
A - B	73		27	49		24
A - LC	71		15		72	13
B - LC	83			24	66	10
USERS WITHIN THE SYRUP-PRODUCING REGION						
AA - A	24	21	54			25
AA - B	16	38		44		18
AA - LC	27	37			44	19
A - B	26		31	50		19
A - LC	15		33		47	20
B - LC	23			57	30	13
USERS OUTSIDE THE SYRUP-PRODUCING REGION						
AA - A	3	67	33			0
AA - B	3	33		67		0
AA - LC	3	67			33	0
A - B	4		25	75		0
A - LC	7		29		71	0
B - LC	3			0	100	0

**Table 2.—Percentage of respondents who preferred one syrup, or who had no preference, within paired syrup tests by chi-square analysis**

Syrup pair	Respondent's preference			$\chi^2_a$	$\chi^2_g$
	First syrup	Second syrup	None		
----- Percent -----					
NONUSERS WITHIN THE SYRUP-PRODUCING REGION					
AA - A	40	33	27	0.36	1.60
AA - B	38	45	17	0.44	8.43 *
AA - LC	23	53	24	8.00 **	11.55 **
A - B	29	45	26	1.98	3.25
A - LC	40	43	17	0.07	7.62 *
B - LC	32	47	21	1.92	6.64 *
NONUSERS OUTSIDE THE SYRUP-PRODUCING REGION					
AA - A	25	40	35	3.19	3.25
AA - B	39	44	17	0.26	9.32 **
AA - LC	16	59	25	16.49 **	20.68 **
A - B	27	49	24	4.57 *	8.58 *
A - LC	15	72	13	25.81 **	47.43 **
B - LC	24	66	10	16.33 **	43.10 **
USERS WITHIN THE SYRUP-PRODUCING REGION					
AA - A	21	54	25	3.56	4.76
AA - B	38	44	18	0.08	1.62
AA - LC	37	44	19	0.18	2.89
A - B	31	50	19	1.19	3.78
A - LC	33	47	20	0.33	1.60
B - LC	57	30	13	1.80	6.61 *

<sup>a</sup> Homogeneity, given that one of the two syrups is preferred.

<sup>b</sup> Goodness-of-fit, assuming that the preference probabilities are one-third.

\*Significant at 5 percent level.

\*\*Significant at 1 percent level.

in Table 2. For any pair of products, if  $\chi_h^2$  and  $\chi_g^2$  are both not statistically significant (at the 0.05 level), accept the hypothesis  $\pi_A = \pi_B = 1/3$ . If  $\chi_h^2$  is not statistically significant and  $\chi_g^2$  is, accept the hypothesis that  $\pi_A = \pi_B$  and reject the hypothesis that  $\pi_A = \pi_B = 1/3$ . The response rates are equal but they are not 1/3. If  $\chi_h^2$  and  $\chi_g^2$  are both statistically significant, accept the alternative hypothesis  $\pi_A \neq \pi_B$ .

How do nonusers of maple syrup perceive the different grades of pure maple syrup? In the syrup-producing region, the data suggest there is no difference in preference for the different grades. Outside of the region, there was no difference in preference between the Grade AA to Grade A and Grade AA to Grade B comparisons. But, Grade B was preferred over Grade A, 49 to 27 percent (Table 2).

In the syrup-producing region the only significant difference was in the Grade AA to Log Cabin comparison. Over one-half (53 percent) of the participants preferred Log Cabin and less than one-fourth (23 percent) preferred Grade AA syrup. Outside the maple region, Log Cabin was preferred to each of the grades of pure maple syrup, on the average of 66 to 19 percent.

All of the chi-square tests of homogeneity of the preference rate for maple syrup users within the maple syrup-producing region are not statistically significant. The power of the chi-square test was too low to detect significant differences from a sample of this size. The sample size for maple syrup users outside the region is too small for valid

chi-square tests, so these data are not included in Tables 2 through 5.

*Analysis of preference rates across paired tests.* Does the preference rate for a particular syrup depend on the syrups to which it is compared? To answer this question, the homogeneity of the preference rates in each column of Table 1 was tested by chi-square analysis. The results are given in Table 3.

Within the maple syrup-producing region, the preference rates for a given syrup by nonusers are homogeneous; outside of the region, this preference rate depends on the syrups to which it is compared. The power of the chi-square test was too low to detect significant differences among the maple syrup users estimated from a sample of this size.

*Analysis of regional differences in syrup preference rates.* The best data for comparing regional differences in preference rates is the comparison between nonusers within and outside the maple syrup-producing region. None of the pairs of preference rates among the paired pure maple syrup tests is significant (Table 4). The preference rates between regions for Grade AA to Log Cabin are not significantly different. On the other hand, outside of the region, 72 percent of the participants preferred Log Cabin to Grade A and 66 percent preferred Log Cabin to Grade B compared to 43 and 47 percent within the region.

There is a considerable difference between the respondents who have used pure maple syrup in the year preceding the study. Within the syrup-

**Table 3.—Percentage of respondents who preferred one syrup in across paired tests by chi-square analysis of homogeneity**

Response	Preference			$\chi_h^2$
	First syrup	Second syrup	Third syrup	
----- Percent -----				
NONUSERS WITHIN THE SYRUP-PRODUCING REGION				
Prefers AA to A,B,LC	40	38	23	5.13
Prefers A to AA,B,LC	33	29	40	1.72
Prefers B to AA,A,LC	45	45	32	3.03
Prefers LC to AA,A,B	53	43	47	1.45
NONUSERS OUTSIDE THE SYRUP-PRODUCING REGION				
Prefers AA to A,B,LC	25	39	16	9.63 **
Prefers A to AA,B,LC	40	27	15	11.53 **
Prefers B to AA,A,LC	44	49	24	11.80 **
Prefers LC to AA,A,B	59	72	66	15.36 **
USERS WITHIN THE SYRUP-PRODUCING REGION				
Prefers AA to A,B,LC	21	38	37	1.93
Prefers A to AA,B,LC	54	31	33	3.20
Prefers B to AA,A,LC	44	50	57	0.62
Prefers LC to AA,A,B	44	47	30	1.38

\*\* Significant at 1 percent level.

**Table 4.—Percentage of nonusers of maple syrup within and outside the syrup-producing region who preferred one syrup by chi-square analysis of homogeneity**

Preference	Within the region	Outside the region	$\chi^2_{df}$
	----- Percent -----		
AA to A	40	25	3.32
A to AA	33	40	0.71
AA to B	38	39	0.02
B to AA	45	44	0.02
AA to LC	23	16	0.92
LC to AA	53	59	0.46
A to B	29	27	0.02
B to A	45	49	0.28
A to LC	40	15	10.25 **
LC to A	43	72	12.11 **
B to LC	32	24	1.10
LC to B	47	66	5.61 *

\* Significant at 5 percent level.

\*\* Significant at 1 percent level.

**Table 5.—Percentage of maple syrup users and nonusers within the syrup-producing region who preferred one syrup by chi-square analysis of homogeneity**

Preference	Users	Nonusers	$\chi^2_{df}$
	----- Percent -----		
AA to A	21	40	2.78
A to AA	54	33	3.12
AA to B	38	38	0.00
B to A	44	45	0.01
AA to LC	37	23	2.00
LC to AA	44	53	0.56
A to B	31	29	0.04
B to A	50	45	0.20
A to LC	33	40	0.21
LC to A	47	43	0.08
B to LC	57	32	4.41 *
LC to B	30	47	1.91

\* Significant at 5 percent level.

producing region, 25 percent of the respondents were users compared to only 5 percent outside of the region.

*Analysis of preference rates for pure maple syrup users and nonusers.* Within the syrup-producing region, preference rates can be compared with past use of syrup (Table 5). The chi-square test indicates that the only significant difference was maple syrup users preferred Grade B syrup to Log Cabin at a preference rate of 57 percent compared to 32 percent for nonusers.

### **Product perception index**

When pure maple syrup is packed in clear glass bottles, the difference in color between the grades of syrup is noticeable. Commercial table syrups are usually dark amber, like Grade B syrup. The lighter colored grades of maple syrup may look thin or diluted to consumers unfamiliar with pure maple syrup. This may be a barrier to sales of the lighter grades outside the syrup-producing region.

An attempt was made to measure the difference between expectation and experience. Expectation,

measured before use, was based on the syrup's appearance in the bottle. Seven bipolar word pairs that described table syrup were rated on a 5-point scale by respondents before and after syrup use. The scale was arranged so that the more desirable property was number 1 and the least desirable, number 5. For example, under flavor, it is desirable for a maple-flavored table syrup to have a maplelike flavor, therefore, "maplelike" was number 1 and "not maplelike" was number 5.

An index of product perception is the average of the perception scores. "No opinion" responses for as many as two of the seven items were accepted and the index calculated on the items scaled. The seven items were: consistency (1) heavy to light; flavor (2) full-bodied to delicate, (3) very sweet to not sweet, (4) not honeylike to honeylike, (5) maplelike to not maplelike; aroma (6) strong to weak; and texture (7) smooth to grainy. The closer the calculated index was to 1, the higher the syrup was rated.

The index was calculated by syrup, before and after use. Mean indexes and simple correlation coefficients were calculated between the before-use and after-use indexes (Table 6). The correlations are positive and highly significant.

The differences between the means are statistically significant for all of the pure maple syrups but not for the Log Cabin syrup. For all the pure maple syrups, the change in the perception index was upward, indicating a less favorable impression of the syrup after using it.

There is a trend in syrup rankings. Based on the perception index before syrup use, Grade B ranked highest, followed by Log Cabin, Grade A, and Grade AA. Based on the index after syrup use, which is the most important index, Grade B and Log Cabin ranked equally high, followed by Grade A and Grade AA.

Profiles of the mean perception scores before and after syrup use are shown in Figure 1. The items that had the largest between-to-within variance ratios were pouring consistency; two items under flavor—full-bodied to delicate, maplelike to not maplelike; and aroma.

Respondents were also given the opportunity to evaluate the color of the syrups. Table 7 shows the percentage of respondents, by syrups and regions, who disliked the syrup color. The only consensus among those few who disliked a color was that Grade AA was too light. For the other syrups, the respondents were about equally divided as to whether the product was too light or too dark.

### **Other syrup characteristics**

Pure maple syrup cannot be modified by adding different kinds of syrup, coloring agents, and flavor enhancers to offset changes in ingredient prices or consumer preferences. However, information about desirable and undesirable characteristics of pure maple syrup can be used in marketing the different grades.

Respondents also evaluated pouring consistency, aroma, flavor, and aftertaste. Table 8 shows the percentage of respondents who expressed dislike for one or more of these syrup characteristics.

Dissatisfaction with pouring consistency decreases with darker syrups and correlates with actual density of the syrups tested. Although all pure maple syrups, in theory, have the same density, variation inevitably occurs between batches. The densities of the syrups in this study were Grade AA, 65.4 percent solids; Grade A, 66.0 percent; and Grade B, 67.6 percent. Log Cabin syrup, which is about the same density as pure maple, appears thicker because it contains corn syrup which is more viscous. Although these differences seem minor, they may have been perceptible to the respondents. More than 90 percent of the respondents who disliked the consistency indicated that the syrup was too thin.

The respondents' dissatisfaction with aroma is relatively constant among syrups and between regions (Table 8). Pure maple syrup has a faint aroma when heated. More than two thirds of the respondents complained that the aroma was weak or not present at all.

Although maple flavor is unique, it varies with grade. In the syrup-producing region, the percentage of respondents who disliked the flavor of pure maple syrup is about 14 percent for all three grades (Table 8). Outside of the region, the percentage of those who disliked the flavor is about 22 percent. Considerably fewer respondents (7 percent) disliked the flavor of Log Cabin syrup. This may be the result of Log Cabin's widespread use and the consumer acceptance testing that is done before changing it.

Table 9 gives the percentage of respondents who gave certain reasons for disliking the flavor of each syrup. Regional responses were combined because the differences were small. "Too weak" was the most frequently given reason for disliking the flavor of a syrup, especially for Grade AA.

About 22 percent of the respondents disliked the aftertaste of Grade A and B syrups. Their rea-



**Table 6.—Perception index for syrups before and after use**

Syrup	Perception index <sup>a</sup>		Correlation coefficient Before & after use (r)	Sample size
	Before use	After use		
U.S. Grade AA maple syrup	2.71 (.03) <sup>b</sup>	2.84* (.03)	0.48	348
U.S. Grade A maple syrup	2.57 (.03)	2.71* (.03)	0.49	323
U.S. Grade B maple syrup	2.33 (.03)	2.41* (.03)	0.44	369
Log Cabin table syrup	2.44 (.03)	2.44 (.03)	0.50	353

<sup>a</sup> Average of perception scores.

<sup>b</sup> Standard error.

\* Difference between before and after use significant at the 5 percent level.

**Table 7.—Percentage of respondents who disliked syrup color, and total number of respondents**

Syrup	Respondents			
	Within the region		Outside the region	
	%	N	%	N
U.S. Grade AA	5.4	276	3.0	234
U.S. Grade A	1.5	262	3.4	233
U.S. Grade B	1.9	269	2.0	250
Log Cabin	2.2	273	0.4	239

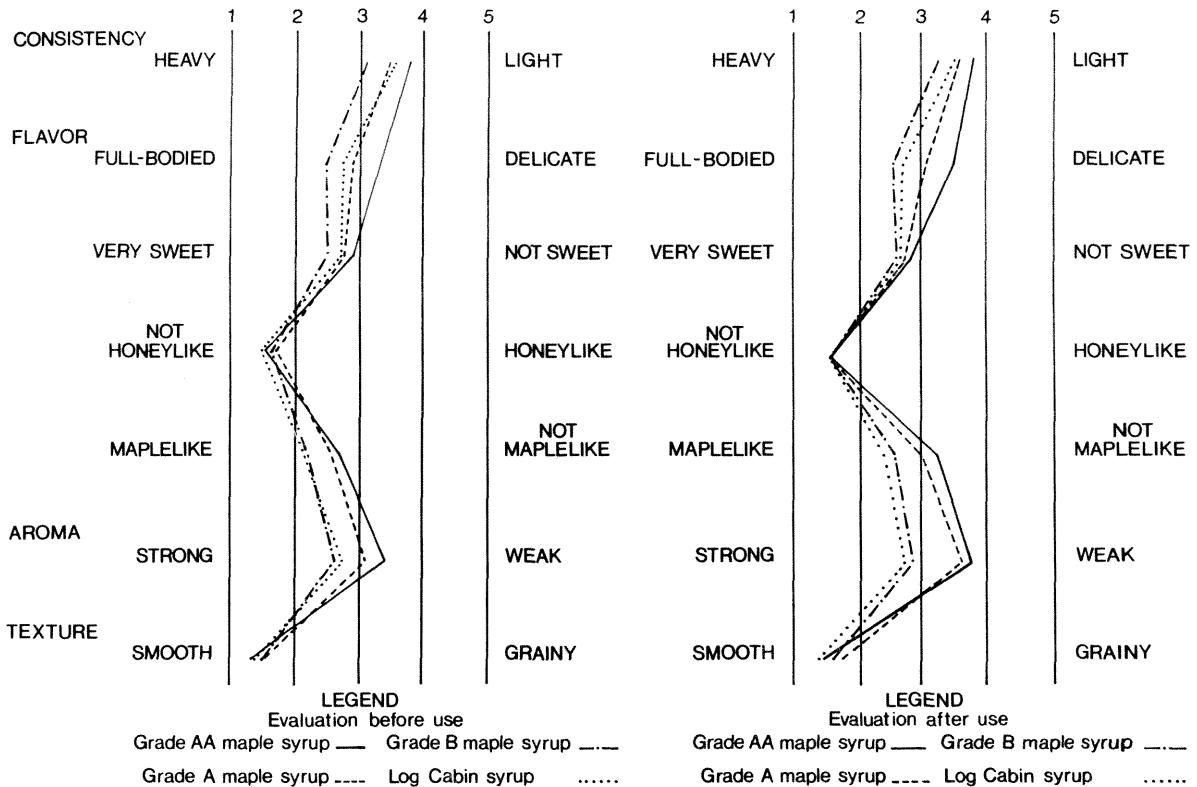
**Table 8.—Percentage of respondents who disliked syrup characteristics (and total number of respondents) within and outside the maple syrup-producing region**

Syrup	Characteristics							
	Pouring consistency		Aroma		Flavor		Aftertaste	
	Within region	Outside region	Within region	Outside region	Within region	Outside region	Within region	Outside region
U.S. Grade AA	18(276)	19(234)	12(276)	13(234)	16(276)	17(234)	15(276)	16(234)
U.S. Grade A	12(262)	16(233)	8(262)	12(233)	13(262)	27(233)	17(262)	23(233)
U.S. Grade B	8(269)	10(250)	7(269)	10(250)	14(269)	24(250)	21(269)	25(250)
Log Cabin	10(273)	6(239)	6(273)	3(239)	8(273)	6(239)	11(273)	8(239)

**Table 9.—Percentage of respondents who gave reasons for disliking the flavor of the syrups, and total number of respondents**

Syrup	Flavor					
	Too strong	Too weak	Too sweet	Not maplelike	Other	N
U.S. Grade AA	6	63	14	5	11	98
U.S. Grade A	9	48	22	10	10	98
U.S. Grade B	18	34	24	15	8	91
Log Cabin	7	34	31	15	13	61

**Figure 1.—Evaluation of syrups before and after use.**



sons are given in Table 10. "Too bitter" was the most frequent reason for Grade A and B syrups. The most frequent description of the aftertaste of Grade AA and Log Cabin syrups was "too sweet."

## DISCUSSION

This study shows that there are differences in taste preferences for pure maple syrup and Log Cabin syrup between respondents living in two cities in the syrup-producing region and those in two cities far from this region. Although there are many regional differences that could account for this, it seems likely that the greater chance for use of pure maple syrup in the syrup-producing region is a major factor. This supports the hypothesis that habit plays a key role in food preference.<sup>4</sup> Pure maple syrup is more of a staple in the region of maple syrup production.

Preference rates for pure maple syrup versus Log Cabin syrup were about the same for maple

syrup users and nonusers in the syrup region. Preference rates for different grades of maple syrup appear to be at variance with the grading standards. The standards place a premium on lightness of color and delicacy of flavor, but the survey participants either did not recognize the difference among grades or preferred a darker color and more robust flavor.

The largest difference in syrup preference was in the cities outside the syrup-producing region, where the preference for Log Cabin syrup averaged 66 percent. Habit is a likely explanation of this. Log Cabin syrup is the most widely used table syrup in the four cities, and especially in Colorado Springs and Raleigh (Tables 14 and 15).

The inability to distinguish the flavors of different grades of pure maple syrup may be caused by the number of flavors the average consumer encounters in the table syrups generally used. In this survey, and in an earlier investigation of pure maple syrup users, several different brands and types of table syrup were in the participant's home at the time of the study. The participants in this survey who lived outside the region judged the difference between grades of pure maple syrup to be

<sup>4</sup> Todhunter, E. N. 1973. Food habits, food faddism and nutrition. *World Rev. Nutr. Diet.* 16:286-317.

**Table 10.—Percentage of respondents who gave reasons for disliking aftertaste of the syrups, and total number of respondents**

Syrup	Aftertaste				N
	Too bitter	Too sweet	Disagreeable	Other	
U.S. Grade AA	32	38	20	11	56
U.S. Grade A	40	23	15	22	81
U.S. Grade B	39	22	20	20	82
Log Cabin	25	30	20	25	40

much less than the difference between pure maple syrup and Log Cabin syrup.

The implications for marketing are clear. To increase the use of pure maple syrup, a promotion campaign will be required to acquaint consumers with maple syrup characteristics, particularly taste. The disparity between grade and price and consumer preference should be resolved. The sale of a product is not helped by a Grade B designation. The implication to the consumer, who knows nothing about the product, is that it must be inferior to Grade A.

It would seem appropriate to change from grades to a more descriptive evaluation, such as light, medium, and dark amber. The identifying standard allows the use of such descriptive terms

along with the grade designations. However, the use of the descriptive terms within one level of product quality would seem to be a preferred approach.<sup>5</sup> The survey results indicate that two descriptive classes of maple syrup, such as light and dark, might be even more appropriate.

Before marketing strategies can be recommended, the effects of syrup price and identification must be assessed. This survey shows that more people preferred the taste of pure maple syrup than are using it. However, sales of maple syrup are determined in the market, where the consumer can choose among brands of table syrups and pure maple syrup.

<sup>5</sup> Such a proposal is before the industry now [Proposed: (7 CFR Part 52) Fed. Reg. Vol. 42, No. 82, 28 Apr. 77].

## APPENDIX

**Table 11.—Percentage of participating housewives in each age class in the four cities**

Age class (years)	City			
	Lansing	Manchester	Colorado Springs	Raleigh
Less than 20	1.5	2.3	4.0	—
20-24	8.8	8.7	9.9	8.2
25-34	25.4	29.2	25.8	20.5
35-44	19.6	19.7	21.8	22.8
45-54	20.8	20.5	19.0	22.8
55-64	13.8	11.7	11.1	16.4
More than 64	10.0	8.0	8.3	9.1
Total number of respondents	260	264	252	219

**Table 12.—Distribution of household size in the four cities (in percent)**

Number in household	City			
	Lansing	Manchester	Colorado Springs	Raleigh
1	6.9	4.5	6.0	5.1
2	29.0	22.4	26.0	28.1
3	20.5	19.0	15.6	22.6
4	20.5	22.8	28.4	22.1
5	14.7	15.3	14.0	14.8
6	5.0	8.6	5.6	5.1
7 or more	3.5	7.5	4.4	2.3
Total number of respondents	259	268	250	217

**Table 13.—Distribution of households in the four cities by family income class (in percent)**

Income class	City			
	Lansing	Manchester	Colorado Springs	Raleigh
Under \$5,000	7.9	7.4	6.6	8.0
\$ 5,000-\$ 7,999	9.1	15.3	13.6	7.5
\$ 8,000-\$ 9,999	10.3	8.7	13.2	7.5
\$10,000-\$11,999	14.3	21.5	14.5	11.9
\$12,000-\$14,999	17.1	21.5	20.7	13.4
\$15,000-\$24,999	31.3	22.3	26.0	37.3
\$25,000 & over	9.9	3.3	5.4	14.4
Total number of respondents	252	242	242	201

**Table 14.—Table syrups in households at the time of survey and purchased more than once in the 12 months preceding survey within the maple syrup-producing region (in percent)**

Syrup	In household	Purchased more than once
Log Cabin	23.0	28.0
Vermont Maid	16.6	21.6
Pure Maple	11.2	6.4
Aunt Jemima	9.8	11.4
Mrs. Butterworth's	9.1	10.5
Karo Light	8.3	4.5
Karo Dark	3.2	1.2
Food Club	3.1	2.4
Staley	2.6	2.9
Smuckers Blueberry	1.1	1.0
All others	12.0	10.2
<b>Total mentions</b>	<b>1,936</b>	<b>842</b>

**Table 15.—Table syrups in households at the time of survey and purchased more than once in the 12 months preceding survey outside the maple syrup-producing region (in percent)**

Syrup	In household	Purchased more than once
Log Cabin	27.5	35.1
Karo Light	15.3	14.2
Mrs. Butterworth's	7.7	7.0
Staley	5.7	5.2
Karo Dark	5.4	3.9
Aunt Jemima	4.5	3.9
Golden Griddle	4.2	3.7
Ann Page	2.6	1.9
Bar-None	2.3	3.1
Country Kitchen	1.9	1.7
Pure Maple	1.9	1.2
All others	22.0	19.2
<b>Total mentions</b>	<b>1,910</b>	<b>970</b>