

CHARACTERISTICS OF FRESH VEGETABLE CONSUMERS¹

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Abstract. Data from the 1977-78 Nationwide Food Consumption Survey were used to determine the relationship of demographic characteristics of consumers and purchase of green peppers, tomatoes, green cabbage, celery, sweet corn and strawberries. The analysis was performed using the contingency table, chi-square framework. The results indicated that the purchase of these vegetables were not independent of income, geographic region, household size, head of household education, head of household occupation, head of household age, or presence and age of children. The only demographic characteristic tested which we concluded to be independent of vegetable purchases was population density.

Fresh vegetables have become a more important part of the diet of U.S. consumers. Per capita consumption of fresh vegetables has increased 10.57% in the past 10 yr. By comparison, consumption of processed vegetables has decreased 3.72% (1). USDA statistics reported that in 1982, consumers reached a 30-yr high for consumption of fresh vegetables at 109.4 lb. per person. This increase in demand for fresh vegetables has been generally attributed to recent shifts in preferences and dietary concerns of consumers.

Producer organizations for several fresh vegetables have begun marketing campaigns in recent years aimed at increasing the demand for fresh produce. These campaigns have utilized target advertising and promotion, i.e., advertising to specific market segments, in several market areas. An example of these target promotional programs is the advertising used by the California Canners and Growers Cooperative (CGC). The programs are tailored to the products being promoted and the areas in which the products are being sold. CGC's objectives are to maintain an advertising program consistent with market conditions and consumer preferences. Another example is the Michigan Celery Promotion Cooperative (MCPC) which allocates about 70% of their promotional budget to advertising and direct mail campaigns. MCPC has learned that promotions aimed at specific market segments can be used to increase the demand for their fresh products.

The purpose of this study was to identify targetable market segments such as those used by MCPC. The primary objective was to evaluate the relationships between 8 demographic characteristics and the purchase of 6 fresh vegetables. (McCabe (2) did a similar study on the characteristics of fresh citrus consumers.) The demographic characteristics were chosen to allow potential market segments to be identified where promotional programs would be most beneficial. The intent of this study was to provide a base source of useful information for fresh vegetable producers and producer associations, distributors, and market researchers.

Materials and Methods

The data used for the analysis come from the USDA 1977-78 Nationwide Food Consumption Survey (3). The study used a cross-section of data from 4,069 households

interviewed in the months of January, February and March, 1978. The 8 demographic characteristics defined in the study were: income; geographic region; population density; household size; head of household education, occupation and age and; age of children. The fresh vegetables analyzed were green peppers, tomatoes, green cabbage, celery, white and yellow sweet corn, and strawberries. Data only for the fresh form of each vegetable were used.

Actual data analysis was done in the contingency table, chi-square framework. Each demographic characteristic was divided into distinct categories defined as market segments. The analysis determined if differences existed in consumption of the vegetables by demographic characteristic category. A chi-square statistic was derived for each demographic characteristic to test the hypothesis of independence of fresh vegetable purchases and demographic characteristics. Significant chi-square statistics were used to conclude that fresh vegetable purchases and demographic characteristics were not independent. Correlations between some variables were also tested, although no attempt was made to identify all possible characteristic-commodity relationships.

The following market segments were defined for the demographic characteristics studied. Income was divided into 7 categories with ranges of \$5,000 in each category. The geographic regions of the United States included the Northeast, North Central, South and West. Three levels of population density were studied including central city, suburban metro, and non-metro. Education levels were divided into 7 categories: no school or not completing elementary level, completing the elementary level, some high school, completing high school, some college, completing college, and post graduate school. Occupation levels of household heads were classified as professional-technical, manager-officer, farmer, clerical-sales, craftsman-foreman, operative, and service. Head of household age was divided into 6 categories with 10-yr ranges. The age groups for children included infants under 1 yr of age, preschool children aged 1 to 5, school children aged 6 to 12, and adolescents aged 13 to 19. An additional missing category was used for each characteristic to represent the households that did not answer the question associated with that characteristic.

Results and Discussion

A summary of the data used in this study is presented in Table 1. This table shows that 2,724 of the 4,069 sample households purchased at least 1 of the 6 vegetables studied, and that 59% of those purchasing households bought tomatoes, while 42% purchased celery, 37% purchased cabbage, 23% purchased peppers, 4% purchased strawberries and 3% purchased sweet corn.

The contingency tables for the demographic characteristics are reported in Tables 2 through 8. Each table contains a purchasing distribution, a purchasing index, and the average number of pounds purchased per sample household for each of the vegetables studied.

The purchasing distribution for a vegetable gives the percent of total households purchasing the vegetable for each demographic characteristic category. It is calculated by dividing the total purchasing households for the vegetable in each category, by the total households purchasing the vegetable in all categories, and multiplying this product by 100. (The purchasing distribution is the row percent for the contingency table.)

The purchasing index for a vegetable gives the percent of households in a demographic category which purchased

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Table 1. The number and percent of households purchasing one or more selected fresh vegetables.

Vegetable	Total households purchasing vegetable	Total purchasing households (%) ^z	Total sample households (%) ^z
Tomatoes	1,612	59.18	39.62
Celery	1,152	42.29	28.31
Cabbage	1,012	37.15	24.87
Peppers	629	23.09	15.46
Sweet corn	96	3.52	2.36
Strawberries	78	2.86	1.92
Total households purchasing one or more vegetables	2,724	100.00	—
Total sample households	4,069	—	100.00

^zPercentages do not sum to 100 since some households purchased more than one kind of fresh vegetables.

that vegetable. The index is computed by dividing the number of purchasing households in each category by the total sample households in that category and multiplying this product by 100. (The purchasing index is the column percent for the contingency table.) The index may be used as a proportion to determine the positive or negative relationship between the purchase of the vegetable and the characteristic.

Table 2. Distribution of fresh vegetable purchases and amount purchased by income.

	Under \$5000	\$5000-9999	\$1000-1499	\$15000-1999	\$20000-24999	\$25000-29999	\$30000 or more	Missing data	Total
Peppers									
Purch dist. (%)	4.9	11.4	4.0	13.2	9.2	5.6	8.7	32.9	100.0
Purch index (%)	6.2	12.2	15.3	17.4	17.5	20.7	25.3	—	
Avg lb. purchased	0.75	0.66	0.64	0.59	0.79	0.75	0.66	0.78	0.71
Tomatoes									
Purch dist. (%)	8.9	13.5	15.1	11.8	8.9	5.0	6.8	30.0	100.0
Purch index (%)	28.6	36.8	42.3	40.0	43.4	47.3	50.2	—	
Avg lb. purchased	1.26	1.38	1.37	1.22	1.40	1.48	1.31	1.29	1.32
Cabbage									
Purch dist. (%)	12.9	14.1	14.8	10.9	8.0	3.4	4.8	31.0	100.0
Purch index (%)	26.0	24.3	26.1	23.0	24.4	20.1	22.6	—	
Avg lb. purchased	2.67	2.85	2.53	3.31	2.37	2.64	2.81	3.03	2.84
Celery									
Purch dist. (%)	6.0	12.3	13.6	11.1	9.7	5.9	8.6	32.7	100.0
Purch index (%)	13.7	24.1	27.4	26.8	33.7	40.2	45.6	—	
Avg lb. purchased	0.64	0.77	0.76	0.69	0.77	0.92	0.82	0.77	0.77
Sweet corn									
Purch dist. (%)	7.3	18.8	13.5	6.3	8.3	6.3	3.1	36.5	100.00
Purch index (%)	1.4	3.1	2.3	1.3	2.4	3.6	1.4	—	
Avg lb. purchased	1.44	1.48	2.07	3.15	1.08	2.24	1.10	1.82	1.79
Strawberries									
Purch dist. (%)	2.6	6.4	12.8	12.8	11.5	6.4	6.4	41.0	100.0
Purch index (%)	0.4	0.8	1.7	2.1	2.7	3.0	2.3	—	
Avg lb. purchased	1.50	1.35	1.65	1.23	1.61	0.95	2.70	1.73	1.62
Purchasing Total									
Households (n)	384	597	661	528	412	228	320	1449	4579
Purch dist. (%)	8.4	13.0	14.4	11.5	9.0	5.0	7.0	31.6	100.0
Purch index (%)	76.3	101.4	115.2	110.5	124.1	134.9	147.5	112.53	
Sample Total									
Households (n)	503	589	574	478	332	169	217	1207	4069
Samp. dist. (%)	12.4	14.5	14.1	11.7	8.2	4.2	5.3	29.7	100.0

The purchasing index can be used as a gauge of target market segments for commodity promotions. The index is useful in designing advertising campaigns to attain 2 different objectives: 1) increase the market share of the current total consumption of households which already purchase vegetables, and 2) increase general consumption of certain vegetables above current levels of consumption. To increase the market share of current purchasing households, commodity industry groups should advertise toward the market segments with high purchasing indices. A vegetable group can increase its market share by differentiating its product and educating the households which already purchase that vegetable about the value of their product. Increasing the general consumption of a vegetable can be achieved by advertising toward market segments that have a low purchasing index. Educating nonpurchasing households about the uses and nutritional values of a vegetable may convince them to begin purchasing that vegetable.

The bottoms of Tables 2 through 8 also contain 2 sections of totals, purchasing total and sample total. The purchasing total section gives the total number of household commodity purchases in each category. For example, a household purchasing only one item will be counted once, while another household purchasing all 6 of the vegetables would be counted 6 times. The total of the household purchases in all categories equals 4579. The purchasing total section also includes an overall purchasing index and distribution of the purchasing households. In many cases the

purchasing index will be greater than 100%. For example, household purchases of vegetables for incomes greater than \$30,000 equaled 320, while only 217 of the sample households were in this income class (Table 2). The purchasing index of 147.5 (320/217*100) indicates that some of the households in this income class purchased more than one of the vegetables studied. The purchasing total distribution was the fresh vegetable purchases variable used in the chi-square analysis to test independence of fresh vegetable purchases and the demographic characteristic.

The second total section gives the actual number of sample households in each category of the demographic characteristic. The total of the sample households in all categories equals the winter sample size, 4069. The sampling distribution for each category is given in the last line of each table.

Income. The contingency table for fresh vegetable purchases and income is contained in Table 2. The chi-square statistic of 73.06 indicates a significant level of 0.005 that vegetable purchases and income class were not independent.

The purchasing index indicates that purchases of most vegetables studied were positively related to household income. Peppers, tomatoes, celery and strawberries had high purchasing indices for households in the \$30,000 or more income category. This implies that out of all the sample households, a higher proportion of the households in the highest income category purchased these vegetables than households in any other income category.

Purchases of corn and cabbage did not show a positive relationship. Corn purchases were about steady with each income level except for a peak at the \$25,000-29,999 level. Purchases of cabbage tended to decrease with increasing income. This implies that lower income households tend to purchase cabbage more often than higher income households.

The sample total distribution shows that 53% of the households had an income of less than \$20,000. The greatest proportion of sample households were in the \$5,000 to \$9,999 range. The purchasing total distribution indicates that the greatest proportion of households purchasing vegetables were in the \$10,000 to \$14,999 range category. As income increases above this range, the proportion of purchasing households decreases. But, although proportions decrease, the purchasing total index indicates that these higher income households purchase a greater variety of vegetables. This is also seen when comparing the purchasing total and sample total distributions. The proportions of purchasing households with \$20,000 or more income were greater than the sample proportions.

Geographic region and urbanization. The contingency table for regional location and purchase of fresh vegetables (Table 3) derived a chi-square statistic of 56.71 (Table 3) indicating a significance of 0.005 that vegetable purchases and regional location were not independent. The chi-square analysis to test the relationship between fresh vegetable purchases and population density were not significant. Therefore, no results for population density are reported.

The purchasing total index for the western region was higher than the index for the other regions. The commodities purchasing indices show that a higher proportion of households in the west purchased tomatoes, celery and strawberries than in any other region. The purchasing index for cabbage and corn was highest for the southern region while the purchasing index for peppers was highest in the northeast.

Almost all fresh produce marketed in the U.S. in the sample period (January to March) is produced in Florida, Texas, California and Mexico. Florida and Texas are located in the southern region and are the largest shippers

Table 3. Percent distribution of vegetable purchases, average amount purchased and average price by geographic region.

	Northeast	North Central	South	West	Total & weighted avg
Peppers					
Purch dist. (%)	31.6	18.3	29.6	20.5	100.0
Purch index	19.9	11.9	12.9	19.6	—
Avg lb. purchased	0.87	0.61	0.67	0.62	0.71
Avg price (\$/lb.)	0.65	0.87	0.81	0.72	0.75
Tomatoes					
Purch dist. (%)	27.7	16.4	32.8	23.1	100.0
Purch index	44.6	27.3	36.7	56.5	—
Avg lb. purchased	1.25	1.09	1.51	1.32	1.32
Avg price (\$/lb.)	0.61	0.58	0.54	0.51	0.56
Cabbage					
Purch dist. (%)	18.0	19.2	48.5	14.3	100.00
Purch index	18.2	20.0	34.1	22.0	—
Avg lb. purchased	3.08	2.54	2.92	2.67	2.84
Avg price (\$/lb.)	0.22	0.21	0.19	0.18	0.20
Celery					
Purch dist. (%)	25.2	27.7	26.9	20.2	100.0
Purch index	28.9	32.9	21.5	35.4	—
Avg lb. purchased	0.76	0.77	0.74	0.80	0.77
Avg price (\$/lb.)	0.55	0.48	0.46	0.39	0.47
Sweet corn					
Purch dist. (%)	16.7	14.6	49.0	19.8	100.0
Purch index	1.6	1.4	3.3	2.9	—
Avg lb. purchased	1.39	1.43	2.12	1.56	1.79
Avg price (\$/lb.)	0.51	0.55	0.44	0.50	0.48
Strawberries					
Purch dist. (%)	19.2	21.8	37.2	21.8	100.0
Purch index	1.5	1.8	2.0	2.6	—
Avg lb. purchased	1.23	1.88	1.90	1.24	1.62
Avg price (\$/lb.)	1.03	0.82	0.71	0.74	0.80
Purchasing Total					
Households	1149	924	1591	905	4579
Purch dist. (%)	25.1	20.2	34.7	20.0	100.0
Purch index	114.67	95.26	110.56	139.06	—
Sample Total					
Households	1002	970	1439	658	4069
Samp. dist. (%)	24.6	23.8	35.4	16.2	100.0

of cabbage, while Florida ships almost all of the sweet corn in this period. This production pattern probably contributes heavily to the southern region having the highest purchasing index for cabbage and sweet corn, i.e., these products are most available in the south and generally cost less. Average price per pound for each commodity is also contained in Table 3. The prices did show sweet corn to cost the least in the south, and cabbage price in the south to be second only to the west for least cost.

Mexico is the leading shipper for tomatoes, strawberries and peppers in the sample period. In addition, California is a large shipper of strawberries, and the major shipper of celery in this period. These shipping patterns would contribute to the result that the west has the largest purchasing index for tomatoes, celery and strawberries, and a high index for peppers.

It could be argued that shipping region, or rather, the availability, has more to do with the purchasing index in each region than other regional characteristics. An exception to this argument is the high purchasing indices for consumption of peppers and tomatoes in the northeast. It would appear that significant regional differences in prefer-

ences exist for the northeast compared to the other regions for these 2 commodities. The northeast displays a high purchasing index for each commodity even though it produces none of the commodities in the January to March period.

This regional analysis also included testing some correlations between commodity purchases by region and the average price per pound. Correlations were only significant for peppers and corn. In each case, the North Central region had the highest average prices and the lowest percent of purchasing households. The South, with the lowest average sweet corn price, had the highest rate of purchase and also the highest amount purchased per household compared to the other regions. Similar results were found for peppers purchases.

Household size. Table 4 contains the contingency table for household size and fresh vegetable purchases. A chi-square statistic of 79.69 indicated a significance of 0.005 that household size and fresh vegetable purchases were not independent.

Purchases of cabbage and strawberries had a low index at the single member household size and a peak high index at the 6 or more size. This means that a higher proportion of the larger families tended to purchase cabbage and strawberries than the smaller families. The smaller 3 member size households purchased peppers and sweet corn most often, while the purchasing index for celery was highest at the 2 member size.

The purchasing total and sample total distributions

showed that the greatest proportion of households was at the 2 member size. Comparison of the 2 total distributions showed consistent results. The purchasing total distribution was greater than the sample total distribution for households with 2 or more members. This indicates a general positive relationship between household size and purchase of vegetables. Households tended to purchase more vegetables as member size increased. The amount of each commodity purchased also increased as household size increased, as expected.

Head of household education. The contingency table for head of household education and fresh vegetable purchases is shown in Table 5. A chi-square statistic of 30.87 indicated a significance level of 0.005 that head of household education and fresh vegetable purchases were not independent.

The purchasing index shows that there was a positive relationship between increasing levels of education and the frequency of purchase of most vegetables studied. This means that households with well educated heads purchased vegetables more often than households with less educated heads. The opposite was true only for cabbage. Well educated household heads tended to have the lowest purchasing index for cabbage. This result, combined with the result in Table 3 that high income households also had the lowest rate of purchase for cabbage indicates that the lower income households with less educated heads purchased cabbage most frequently.

Households with less educated heads did not purchase

Table 4. Distribution of fresh vegetable purchases by size of household.

	One	Two	Three	Four	Five	Six or more	Total
Peppers							
Purch dist. (%)	10.7	28.8	24.5	18.8	10.0	7.3	100.0
Purch index (%)	8.7	14.6	21.3	17.0	17.2	16.4	—
Avg lb. purchased	0.58	0.62	0.71	0.82	0.78	0.90	0.71
Tomatoes							
Purch dist. (%)	14.8	29.3	19.2	19.6	9.4	7.6	100.0
Purch index (%)	31.1	38.2	42.9	45.4	41.5	43.8	—
Avg lb. purchased	1.00	1.22	1.43	1.40	1.43	1.76	1.32
Cabbage							
Purch dist. (%)	13.5	31.3	16.8	19.0	10.8	8.6	100.0
Purch index (%)	17.8	25.6	23.5	27.6	29.8	31.0	—
Avg lb. purchased	1.78	2.27	2.94	3.08	3.49	5.02	2.84
Celery							
Purch dist. (%)	12.5	34.8	19.2	17.3	9.5	6.7	100.0
Purch index (%)	18.8	32.4	30.6	28.6	30.1	27.4	—
Avg lb. purchased	0.57	0.72	0.76	0.90	0.80	0.96	0.77
Sweet corn							
Purch dist. (%)	13.5	31.3	21.9	18.8	6.3	8.3	100.0
Purch index (%)	1.7	2.4	2.9	2.6	1.6	2.8	—
Avg lb. purchased	1.16	1.41	1.81	2.16	1.87	3.29	1.79
Strawberries							
Purch dist. (%)	5.1	35.9	15.4	19.2	9.0	15.4	100.0
Purch index (%)	0.5	2.3	1.7	2.2	1.9	4.3	—
Avg lb. purchased	1.31	1.48	1.60	1.04	2.82	2.11	1.62
Purchasing Total							
Households (n)	604	1429	888	858	447	353	4579
Purch dist. (%)	13.2	31.2	19.4	18.7	9.8	7.7	100.0
Purch index (%)	78.6	115.6	123.0	123.3	122.1	125.6	—
Sample Total							
Households (n)	768	1236	722	696	366	281	4069
Samp. dist. (%)	18.9	30.4	17.7	17.1	9.0	6.9	100.0

Table 5. Distribution of fresh vegetable purchases by head of household education.

	No elementary	Elementary	Some high school	High school	Some college	College	Post graduate	Total
Peppers								
Purch dist. (%)	2.5	2.9	10.2	32.0	20.7	14.2	17.5	100.0
Purch index (%)	5.9	6.9	11.9	15.1	16.1	22.1	24.6	—
Avg lb. purchased	1.21	0.93	0.75	0.74	0.66	0.58	0.70	0.71
Tomatoes								
Purch dist. (%)	4.5	5.7	12.2	32.2	21.1	10.9	13.4	100.0
Purch index (%)	26.7	35.0	36.8	39.0	42.0	43.8	48.1	—
Avg lb. purchased	1.59	1.37	1.49	1.43	1.19	1.17	1.16	1.32
Cabbage								
Purch dist. (%)	8.7	7.4	16.7	32.6	17.6	8.0	8.9	100.0
Purch index (%)	32.6	28.8	31.5	24.8	22.0	20.1	20.1	—
Avg lb. purchased	3.29	2.93	2.93	2.85	2.72	2.85	2.36	2.84
Celery								
Purch dist. (%)	2.7	5.0	10.2	30.1	23.3	12.1	16.7	100.0
Purch index (%)	11.5	21.9	21.8	26.0	33.0	34.6	43.0	—
Avg lb. purchased	0.75	0.72	0.78	0.76	0.80	0.65	0.82	0.77
Sweet corn								
Purch dist. (%)	3.1	6.3	10.4	34.4	24.0	7.3	14.6	100.0
Purch index (%)	1.1	2.3	1.9	2.5	2.8	1.7	3.1	—
Avg lb. purchased	2.52	1.96	2.08	1.83	1.55	1.13	1.97	1.79
Strawberries								
Purch dist. (%)	5.2	5.2	9.1	23.4	23.4	11.7	22.1	100.0
Purch index (%)	1.5	1.5	1.3	1.4	2.2	2.2	3.8	—
Avg lb. purchased	1.69	2.09	1.18	1.24	1.76	2.53	1.47	1.62
Purchasing Total								
Households (n)	214	251	564	1444	956	501	638	4568
Purch dist. (%)	4.7	5.5	12.3	31.6	20.9	11.0	14.0	100.0
Purch index (%)	79.3	96.5	105.2	108.7	118.2	124.6	142.7	—
Sample Total								
Households (n)	270	260	536	1328	809	402	447	4052 ^z
Samp. dist. (%)	6.7	6.4	13.2	32.8	20.0	9.9	11.0	100.0

^zThere were 17 missing observations that were not used in the contingency table, chi-square analysis for this demographic characteristic.

peppers, tomatoes and sweet corn very often. These households did, however, tend to purchase the greatest amounts of each of the 3 vegetables when they did buy them. This indicated a negative relationship between increasing levels of education and the amount of each vegetable purchased. Although the frequency of purchases increased with education level, the amount of purchase decreased.

The purchasing total distribution was greater than the sample total distribution in households with heads that had more than a high school education. This may be due to the greater variety of vegetables being purchased in households with heads educated above the high school level. It could also be due to better educated people wanting the freshest produce possible in their diet.

Head of household occupation. Table 6 contains the contingency table for head of household occupation and fresh vegetable purchases. Head of household occupation and fresh vegetable purchases were found not to be independent with a chi-square significance statistic of 773.78, significant at the 0.005 level of significance. The individual vegetable purchasing distributions showed that the greatest number of purchasing households had heads in the professional-technical occupations for every vegetable except sweet corn. A total of 19.3% of the households in this category purchased vegetables. The farmer and operative occupations had the lowest frequencies with an overall 2.1 and 6.2% purchasing at least one of the vegetables.

In McCabe's study (2) of fresh citrus consumers, incomes tended toward the higher levels for professional-technical and manager-officer occupations, toward the middle to upper levels for farmer, clerical-sales, craftsman-foreman, and operative occupations, and toward the lower levels for service occupations. Since this study used the same sample data set as McCabe, a similar income-occupation relationship was assumed. This relationship was consistent with the results obtained from the occupation portion of this study, and the income results. The purchasing total index increased from 90.4 for households with heads in service occupations to 132.7 for the manager-officer occupations. The total purchasing index for income increased similarly for increasing levels of household income. This indicates a positive relationship between households with heads in high income occupations and the purchase of fresh vegetables.

Households with heads in the professional-technical and manager-officer occupations tended to purchase peppers, tomatoes, celery and strawberries most often. The results from Tables 2 and 5 show that this was also true for households with incomes greater than \$30,000 and with heads having a post graduate education. Industry promotions toward households with well educated heads in high income occupations could increase consumption of these 4 vegetables, especially for peppers and tomatoes. Although these market segments had high rates of purchase for

Table 6. Distribution of fresh vegetable purchases by head of household occupation.

	Prof- tech	Manager- office	Farmer	Clerical- sales	Craft- Foreman	Operative	Service	Missing	Total
Peppers									
Purch dist. (%)	24.8	15.7	1.6	13.5	13.2	5.1	5.7	20.3	100.0
Purch index (%)	21.5	21.3	10.1	16.9	16.3	10.8	10.8	11.3	—
Avg lb. purchased	0.63	0.67	0.89	0.75	0.72	0.80	0.75	0.70	0.70
Tomatoes									
Purch dist. (%)	18.7	13.1	2.1	14.8	13.8	7.4	6.5	23.6	100.0
Purch index (%)	41.4	45.4	34.3	47.2	43.8	40.1	31.4	33.6	—
Avg lb. purchased	1.16	1.42	1.38	1.28	1.42	1.48	1.41	1.33	1.33
Cabbage									
Purch dist. (%)	13.1	10.3	2.6	11.4	13.5	6.4	8.2	34.5	100.0
Purch index (%)	18.3	22.4	26.3	22.8	26.9	21.9	24.9	30.8	—
Avg lb. purchased	2.59	2.93	2.02	2.99	3.18	3.19	3.58	2.99	2.99
Celery									
Purch dist. (%)	23.3	15.1	2.3	11.5	11.6	4.9	5.7	25.5	100.0
Purch index (%)	36.9	37.4	27.3	26.4	26.3	18.9	19.8	25.9	—
Avg lb. purchased	0.78	0.81	0.64	0.78	0.84	0.76	0.76	0.79	0.79
Sweet corn									
Purch dist. (%)	12.5	14.6	0.0	13.5	19.8	8.3	7.3	24.0	—
Purch index (%)	1.7	3.0	0.0	2.6	3.7	2.7	2.1	2.0	—
Avg lb. purchased	1.61	2.06	z	1.74	1.65	1.99	3.04	1.91	1.91
Strawberries									
Purch dist. (%)	20.5	19.2	0.0	17.9	12.8	6.4	6.4	16.7	100.0
Purch index (%)	2.2	3.2	0.0	2.8	2.0	1.7	1.5	1.1	—
Avg lb. purchased	2.16	1.40	z	1.77	2.02	1.55	0.98	1.74	1.74
Purchasing Total									
Households (n)	886	617	97	598	606	285	302	1188	4579
Purch dist. (%)	19.3	13.5	2.1	13.1	13.2	6.2	6.6	25.9	100.0
Purch index (%)	121.9	132.7	98.0	118.7	119.1	96.0	90.4	104.8	—
Sample Total									
Households (n)	727	465	99	504	509	297	334	1134	4069
Samp. Dist. (%)	17.9	11.4	2.4	12.4	12.5	7.3	8.2	27.9	100.0

^zThere were no purchases of this vegetable by this demographic characteristic category in the sample. An average pounds purchased could not be estimated.

peppers and tomatoes, they also purchased small amounts of each vegetable compared to other categories.

Age of head of household. The contingency table for fresh vegetable purchases and head of household age (Table 7) indicated these were not independent with a chi-square statistic of 6.83, significant at the 0.27 level of significance.

The total purchasing distribution showed that the greatest number of households who responded to this question, and who purchased one or more of the vegetables had heads aged 50 to 70 yr. The purchasing index, however, showed that households with heads aged 30 to 50 yr more frequently purchased a greater variety of the fresh vegetables. The purchasing index for each commodity was highest for either the 30 to 39 category or the 40 to 49-yr-old category.

Households with older heads aged 60 yr or more had the lowest rate of purchase for all 6 of the vegetables studied. These households also purchased very small quantities of cabbage, celery and strawberries. Education about uses for these vegetables to the older market segments could increase commodity consumption.

Comparison of the 2 total purchasing and sample distributions showed that, on average, households with heads aged under 69 yr of age purchased one or more of the fresh vegetables. For households with heads over 70 yr of age, the sample distribution was greater than the purchasing distribution, indicating that at least some of the households did not purchase any of the vegetables. The differ-

ence between the 2 total distributions was 5.9% for the 30 to 49 yr-old categories, 4.4% for the 50 to 59 category and 1.1% for the 60 to 69 category. These results along with the magnitude of the total purchasing index indicates that fresh vegetable purchases begin to decrease in households with heads aged 50 yr or more.

Age of children. Growth patterns and nutritional needs were considered when classifying the age categories for children (Table 8). The age and presence of children and the purchase of fresh vegetables were found not to be independent with a chi-square statistic of 144.06, significant at the 0.005 level of significance.

The purchasing index for peppers, tomatoes and celery shows that a positive relationship exists between increasing ages of children and commodity purchase. This means that the frequency of purchase, and also the quantity of purchase of these 3 vegetables went up as the ages of the children increased. Cabbage, sweet corn and strawberries had a positive relationship up to the 6 to 12-yr-old category. The rate of purchases of these vegetables, and also the quantity of purchase, then decreased in households with teenagers.

The high total purchasing index for households with no children (142.2) indicated that these households did purchase more of a variety of the fresh vegetables studied. But, the quantities purchased tended to be less than the quantity purchased in households with children.

Table 7. Distribution of fresh vegetable purchases by head of household age.

	None or missing	Under 30 yr	30-39	40-49	50-59	60-69	70 or more	Total
Peppers								
Purch dist. (%)	36.7	10.5	11.3	12.9	13.7	10.0	4.9	100.0
Purch index (%)	9.8	23.5	59.7	56.3	23.1	13.6	9.5	15.5
Avg lb. purchased	0.77	0.60	0.62	0.71	0.72	0.77	0.66	0.71
Tomatoes								
Purch dist. (%)	61.6	7.0	3.3	4.3	8.4	9.5	5.9	100.0
Purch index (%)	42.0	40.2	44.5	47.9	36.6	33.0	29.1	39.6
Avg lb. purchased	1.44	1.03	1.18	1.47	1.11	1.18	1.14	1.33
Cabbage								
Purch dist. (%)	21.9	7.4	11.9	12.3	18.1	16.0	12.5	100.0
Purch index (%)	9.4	26.7	100.8	86.1	49.2	34.9	38.5	24.9
Avg lb. purchased	3.42	2.35	3.06	3.06	3.22	2.24	2.02	2.83
Celery								
Purch dist. (%)	24.1	9.5	12.8	12.0	17.2	15.6	8.8	100.0
Purch index (%)	11.8	38.8	124.4	95.8	53.2	38.8	30.9	28.3
Avg lb. purchased	0.84	0.69	0.76	0.87	0.78	0.70	0.65	0.77
Sweet corn								
Purch dist. (%)	38.5	18.8	11.5	14.6	10.4	6.3	0.0	100.0
Purch index (%)	1.6	6.4	9.2	9.7	2.7	1.3	0.0	2.4
Avg lb. purchased	2.01	1.27	2.63	1.86	1.27	1.50	z	1.80
Strawberries								
Purch dist. (%)	67.9	6.4	1.3	3.8	7.7	9.0	3.8	100.0
Purch index (%)	2.2	1.8	0.8	2.1	1.6	1.5	0.9	1.9
Avg lb. purchased	1.43	1.78	0.75	1.08	3.00	0.91	1.00	1.49
Purchasing Total								
Households (n)	1814	386	404	429	619	571	356	4579
Purch dist. (%)	39.6	8.4	8.8	9.4	13.5	12.5	7.8	100.0
Purch index (%)	76.8	137.4	339.5	297.9	166.4	123.1	108.9	112.5
Sample Total								
Households (n)	2362	281	119	144	372	464	327	4069
Samp. dist. (%)	58.0	6.9	2.9	3.5	9.1	11.4	8.0	100.0

*There were no purchases of this vegetable by this demographic characteristic category. An average pounds purchased could not be estimated.

Table 8. Distribution of fresh vegetable purchases by age of children.

	No kids or missing	<1	1-5	6-12	13-19	Total
Peppers						
Purch dist. (%)	75.4	0.8	6.0	8.1	9.7	100.0
Purch index (%)	20.6	3.1	7.0	8.8	12.5	—
Avg lbs. purchased	0.69	0.38	0.55	0.76	0.84	0.71
Tomatoes						
Purch dist. (%)	52.9	4.0	13.8	15.2	14.1	100.0
Purch index (%)	37.1	40.6	40.9	42.2	46.7	—
Avg lbs. purchased	1.21	1.30	1.29	1.47	1.55	1.33
Cabbage						
Purch dist. (%)	85.9	1.1	4.2	5.4	3.4	100.0
Purch index (%)	37.8	6.9	7.9	9.5	7.0	—
Avg lbs. purchased	2.74	3.78	3.42	3.49	2.79	2.83
Celery						
Purch dist. (%)	83.4	1.6	3.7	5.4	5.9	100.0
Purch index (%)	41.8	11.3	7.9	10.7	13.9	—
Avg lbs. purchased	0.75	0.68	0.81	0.91	0.87	0.77
Sweet corn						
Purch dist. (%)	76.0	2.1	7.3	9.4	5.2	100.0
Purch index (%)	3.2	1.3	1.3	1.5	1.0	—
Avg lbs. purchased	1.72	1.09	1.63	2.42	2.16	1.80
Strawberries						
Purch dist. (%)	48.7	3.8	10.3	21.8	15.4	100.0
Purch index (%)	1.7	1.9	1.5	2.9	2.5	—
Avg lbs. purchased	1.50	1.50	1.91	1.46	1.20	1.49
Purchasing Total						
Households (n)	3267	104	361	439	408	4579
Purch dist. (%)	71.3	2.3	7.9	9.6	8.9	100.0
Purch index (%)	142.2	65.0	66.5	75.6	83.6	112.5
Sample Total						
Households (n)	2297	160	543	581	488	4069
Samp. dist. (%)	56.5	3.9	13.3	14.3	12.0	100.0

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