

**Mushroom Buyers:  
A Segmentation Analysis**

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# Mushroom Buyers: A Segmentation Analysis

## Introduction

Despite enjoying substantial gains in per capita consumption during the past several decades and becoming a leading produce item in terms of retail and grower sales, little is known about the purchase behavior of mushroom buyers beyond the findings of a limited number of studies. Lucier, *et al.*<sup>1</sup> provide a descriptive analysis of mushroom consumer demographics, based on the USDA's Continuing Survey of Food Intake by Individuals. This survey, conducted periodically by the USDA, collects information on food consumption from a national sample of adults and children. Data are collected on the food consumed during a 24 or 48 hours period at-home and away-from-home. While these data are being used increasingly for market analysis, they are collected primarily for use by nutritionists and public health policy makers. Lucier, *et al.* use data from the 1994/96 and 1998 surveys to provide information on the consumption rates and demographics of mushroom consumers, the location of their consumption (at-home or away-from-home), and the type of mushroom consumed (fresh or processed). Since the survey does not collect information on food prices, they are unable to explain how price influences mushroom consumption. They also do not differentiate between the characteristics of consuming and non-consuming individuals.

Rose Research<sup>2</sup> reports on an exhaustive nationwide survey of 1,000 men and women. Their attitude and usage survey was designed to assess factors influencing mushroom purchases, including an advertising campaign, and to determine what types of mushrooms are purchased and how they were prepared. Respondents were asked to recall the number of times their household purchased mushrooms during the previous year. Although they do explore how price influences purchases, they are reliant on consumer recollections on prices and how it influenced their purchase. Furthermore, all their purchase frequency information is based on consumer recall, which is sometimes shown to be biased.

So while the previous studies provide good information on mushroom buyers (consumers), they do not finely delineate the factors influencing user status and usage rate. They also do not provide any information on how consumers respond changes in price or promotions. By using detailed data on household purchases, which includes information on mushroom type, price, quantity, and household characteristics, this report provides new information on mushroom buyers.

The analysis in this study is divided into three phases. We first assess the factors influencing fresh mushroom usage by dividing households into buying and non-buying households. Specifically, we evaluate how household characteristics influence the purchase of mushrooms in an attempt to identify demographic segments that are more likely to be mushroom buyers. This will provide information to mushroom marketers on how they may best reach their current

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<sup>1</sup> Lucier, Gary, Jane Allshouse, and Biing-Hwan Lin. "Factors Affecting U.S. Mushroom Consumption." Economic Research Service, USDA, March 2003.

<sup>2</sup> Rose Research. "Fresh Mushroom Consumer Attitude and Usage Advertising Study: Wave I Report." Mimeo, June 1999.

consumers. Secondly, we evaluate how these characteristics influence the volume of mushrooms purchased. This will provide information on how important these consumer segments are in terms of their buying volume. Third, we analyze buying volume directly by segmenting households on usage rate by defining a category of heavy mushroom buyers. We again evaluate the demographic correlate to usage rate (heavy buyers). Then, we test for difference in responses to changes in price and promotions according to usage rate.

## **Data**

This analysis relies on the ACNielsen's Homescan data, which is composed of a panel of 8,574 households. These panel members scan their grocery purchases at home after each shopping trip. Thus, the data provide information on the products purchased by the households on each shopping trip. For this panel, it includes both random weight and fixed weight items. For random weight items, the households use a codebook to scan the product type and then enter the quantity and price. All this information is fully captured in the UPC code for fixed weight items. In addition to providing information on product type, price, and quantity, the Nielsen data provides information on the use of coupons and special promotions.

Data on all mushroom buying households were obtained for the period December 2001 through November 2002 for this analysis. This sample of consumers contained 3,788 households. Thus, approximately 44% of the Nielsen panel households purchased fresh mushrooms during this period. It is important to recognize that these data reflect the habits and behavior of those who purchase mushrooms for consumption at home. According to Lucier, *et al.* this would account for about 59% of all fresh mushroom consumption with the remainder occurring at restaurants.

The sample of households maintained by ACNielsen is intended to be representative of the U.S. population, upon which projections on national consumptive behavior may be predicted. The observation is at the household level. Hence, in addition to providing information on the types and quantities of products purchased, the panel data provides a host of demographic variables on the households.

## **Mushroom Buyers**

Table 1 provides a comparison of the demographic characteristics of the entire ACNielsen sample and subsets of mushroom buyers. A couple of apparent differences arise in reviewing these data. First, mushroom buyers appear to have a slightly higher income level and tend to be more educated. While the average household income for the ACNielsen panel is \$55,199, mushroom buying households have an annual income of \$60,756. Also more of the mushroom buying household heads (men or women) attended or graduated from college. Income and education are often strongly and related to occupation. Mushroom buyers appear more likely to hold a professional or government official position or are more likely to be the manager or owner of a business. Mushroom buying households are also more likely to be non-Hispanic, Caucasians. Finally, it would appear that a greater proportion of mushroom buying households are concentrated along the West Coast.

Lucier, *et al.* finds greater per capita consumption in the West and by Whites and Asians. They also point to lower per capita consumption by Blacks and Hispanics. Rose Research, however, suggests that usage rate, measured by the number of times the product is served at home per month is higher in the East and Southeast. Furthermore, they contend that mushrooms are served more often households with less education, limited to high school or less.

So while find some corroborating evidence on the usage status of mushroom buyers, we also find some disparities. Furthermore, it is important to clearly differentiate between the users and non-users and to assign probabilities to how the household characteristics influence usage status.

## **Buyer Status**

In this first phase of the analysis we divide the ACNielsen panel into users and non-users. Then, through the use of a probit model, we are able to statistically test how household characteristics and changes in these characters influence usage status. Table 2 summarizes the results from this analysis.

Income : First, we see that each thousand dollar increase in household income increases the probability of being a mushroom buyer by 0.22%. So, a \$10,000 increase in income increases the probability of the household being a mushroom buyer by 2.2%. This would suggest that a household with an income of \$75,000 is 11% more likely to be a mushroom consumer than a household with an income of \$25,000.

College Education: Although income is statistically important in determining a household's status as a mushroom buyer, education has a greater impact. In particular, households where the household head (man or woman) has either attended or graduated from college are 9% more likely to be mushroom buyers.

Professionals, Business Owners, Government Officials: Occupation does not, however, play a statistically significant role on buyer status. When professionals, business owners, and government officials were treated as a group, they were not found to be any more likely to be mushroom buyers than those in other occupations, including those who are retired, students, or unemployed. So while mushroom buyers may be better educated and their likelihood of buying mushrooms increases with income, buyers come from a variety of occupations.

Household Composition: Households composed of family members, whether headed by a man or a woman, are 9% more likely to be mushroom purchasers than households composed of men or women living alone or with non-relatives. These family units may place more of an emphasis on preparing meals at home and appear more likely to include mushrooms in these meals. These family units may include married couples with or without children.

Presence of Children: The presence of children in these family units, though, does not necessarily influence the probability of purchasing mushrooms. Although the estimated probability is negative for households with children, it is not statistically significant. This means that we cannot rule of the likelihood of this estimated probability is in fact zero. Therefore, the

presence of children neither increases nor decreases the probability of a household buying mushrooms.

Household Size: Similar to our finding on the presence of children, we also find that household size does not play a significant role on whether the household buys mushrooms or not.

Gender of Household Head: However, the results do show that households headed by men are 5% less likely to be mushroom buyers, than households headed by women. This difference in gender is admittedly small. And, it is perhaps more important to know, who the primary shopper and meal preparer is, rather than who “heads” the household, particularly as men play an increasingly important role in “traditional” household chores. We do know that among our mushroom buyers that 82.8% of the primary shoppers are women (see table 1). Unfortunately, we do not know the gender of the primary shopper amongst the non-buyers, as this information is tied to the mushroom purchase volume portion of the data set. Still, this information would suggest that women are a more receptive target for information on mushrooms.

Age of Household Head: Mushroom purchasing also appears to rise with age, as measured by the age of the household head, although at a very gradually rate. Each yearly increase in age by the household head increases the probability of the household being a mushroom buyer by 0.12%. Thus, for example, a household headed by a 50 year old is 3.6% more likely to buy mushrooms than a household headed by a 20 year old. It should be appreciated that this reflects the cross sectional nature of this panel, meaning that older consumers are currently more likely to buy mushrooms than younger consumers. It not known whether this reflects changes in tastes and preferences that occur over time or if these differences reflect stable preferences for these age cohorts.

Race and Ethnicity: The ACNielsen data uses the categories White, Black, Oriental (ACNielsen terms), and other race to categorize the racial background of their household panels. Households of Hispanic origin are also identified in the data. Using individuals of other races as a point of comparison, it was found that Whites are 6% and Orientals are 14% more likely to be mushroom consumers, while Black households are 17% less likely to be mushroom buyers.<sup>3</sup> By comparison, we can say that Whites are 23% (6%+17%) more likely than Blacks to be mushroom buyers. However, Orientals (Asians) are 8% more likely than Whites to be mushroom buyers. While the estimated probability that a Hispanic household would be a mushroom buyer is negative, it is not statistically different from zero. Hence, being of Hispanic origin does not necessarily reduce the probability of being a mushroom buyer.

Geographic Region: Finally, we look at the geographic residence of households in evaluating their probability of being mushroom buyers. Using the regionally information provided by ACNielsen, we divide the nation into five regions—Northeast, East (Central and Atlantic Coast), Southeast, Midwest, Southwest, and West Coast. Using the Midwest as a basis of comparison, we find that households in the Southeast and Southwest are five and six percent less likely to be mushroom buyers, respectively. Buyer status is not found to be significantly different in the

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<sup>3</sup> In estimating parameters for categorical variables, such as race (White, Black, etc.) or region, (Northeast, East, etc.) it is necessary to treat one category as a base on which all other parameters are compared. The estimated parameters indicate how they differ from the base.

West or East, when compared to the Midwest. However, households in the Northeast are 3% more likely to be mushroom buyers when compared households in the Midwest.

Overall, the contributions of these demographic variables towards influencing mushroom buying are relatively modest. Most significant among the results were that Blacks are less likely to be mushroom buyers and that Asians are more likely to be mushroom buyers. Households in the Southeast are less likely to be mushroom buyers. Finally, mushroom buyers are more likely to be well educated and have higher incomes. However, they come from a variety of occupations. Next, we continue with our discussion on how these demographic variables influence mushroom volume purchases in the second phase of the analysis. Thus, with our knowledge of how these characteristics influence the household's decision on whether or not to buy mushrooms, we can see how it influences the volume purchased. The model used in this analysis incorporates the influence of price and total expenditures on mushrooms. Hence, it is consistent with the theory of consumer demand. We discuss the role price plays on purchase volume later in this report. In the next section, we begin with a discussion on the types of mushrooms purchased by consumers.

### **Mushroom Volume**

The mushroom buyers in our sample are largely white mushroom buyers with this variety accounting for nearly 94% of all mushroom sales by weight after combining both random weight and packaged products (see table 3). Portabella and Baby Bellas account for about 3% and 2% of sales, respectively. The remaining sales are accounted for by specialty mushrooms – Crimini, Italian, Shiitake, and other specialties (Enoki, Oyster, Maitake, Wood Ear, and others). These shares are not too different from other data sources. For instance The Perishable Group's regional scanner data shows that white mushrooms account for about 92% of all mushroom sales, while Portabella and other browns capture about 5% and 1%, respectively. The dominance of white mushrooms does have some important analytical implications. With this level of concentration in one variety, we are unable to apply statistical methods, which could be used to explain consumer choices over alternative mushroom types. Hence, our analysis focuses on purchase volumes of white and other mushrooms, which includes Portabella, Baby Bellas, Shiitake, and other specialty mushrooms. Sales of all of these kinds of mushrooms are dominated by packaged (fixed weight) products (73%). By far the most common package form is the 8-ounce package (56%).

The mushroom buyers in this sample purchase mushrooms 0.45 times per month or about every other month. This compares to Rose Research's estimate that mushrooms are served 3.7 times per month in their household panel. It could perhaps be argued that single purchases result in multiple serving occasions, as a way of rationalizing these results. When buying mushrooms, the Nielsen households purchase on average 0.31 pounds per month or just slightly more than one half pound every two months. Given that the Nielsen household panel has approximately 2.6 persons, this would suggest a per capita consumption rate of 1.43 pounds. This compares to the 1.52 pounds reported by USDA for fresh mushroom consumption at home. Furthermore, over the course of the year, the mushroom buying households purchase on average 1.2 varieties. Hence, it is easy to envision a typical mushroom buyer selecting an eight-ounce package of white mushrooms every other month. This would likely represent the bulk of consumer purchases.

Indeed, purchases of a single package dominate product sales. For any single product defined by its UPC code, consumers buy only a single package on any given shopping trip 87% of the time. When looking across all products, consumers on average buy 1.2 packages per trip, implying that they buy a single package 84% of the time. Allowing for up to two packages of any UPC on a single trip would account for 98% of all sales. This low volume of purchases should be expected for a product that is highly perishable, used in low volumes, and typically used in combination with other products. However, it has some important analytically and marketing implications.

Indeed, analysis showed that on any given shopping occasion, decreases in price or special promotions do not significantly increase the quantity of products purchased by any single household. However, it was verified that decreases in price and promotions do increase sales volume in aggregate in a given market during a defined period (week or month). This implies that sales and promotions will bring more buyers to the market, but do they not necessarily increase the volume purchased by individual buyers on any given shopping trip. It was also found that price reductions and promotions are effective in increasing the frequency of mushroom purchases.

Therefore, in our analysis of mushroom purchase volume we aggregate quantity over a monthly period for each household so that we can measure the affect of price and promotions on volume. In addition to aggregating over time, we aggregate over all white mushroom UPC and PLU codes; we also aggregate over all other mushroom UPC and PLU codes to form our other mushroom category. The prices of all products are adjusted using the procedure employed by Cox and Wohlgenant<sup>4</sup> to adjust for the premiums associated with certain value adding activities, such as slicing and packaging. This assures that the products can be aggregated in a consistent manner. All prices are reported in dollars per pound and volume is recorded in pounds.

Table 4 reports the estimated results for the white and other mushroom volume models, showing the affect of the demographic variables on product sales. These variables enter the model in the form of demand shift variables. Hence, they show how household demand varies according to these household characteristics. Keeping in mind that the average household in this panel purchases 0.31 pounds per month, the estimated parameters in this table show how volume shifts for households with particular characteristics. We begin with a discussion on white mushroom purchase volume.

White Mushrooms: Income: One of the most surprising findings in this analysis is that monthly purchases per household actually decline with income by 0.0005 pounds per thousand dollars. While statistically significant, this is a change that is little economic consequence. Further analysis also showed that consumption declines as income rises up to an annual household income of about \$79,000. Thereafter, consumption rises in income. This later analysis concurs with the findings of Lucier, *et al.*, who also that consumption rises with income.

White Mushrooms: Education and Occupation: While education played a significant role in determining a household's status as a mushroom buyer, it does not play a significant role in explaining the volume of mushrooms purchased on a monthly basis. Also, just as occupation did

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<sup>4</sup> Cox, Thomas L. and Michael K. Wohlgenant. "Prices and Quality Effects in Cross-sectional Demand Analysis." *American Journal of Agricultural Economics*, 68(1986):908-919.

not play a significant role in determining a household's status as a mushroom buyer, it is not significant in explaining household purchase volume.

White Mushrooms: Household Composition and Children Present: Recall we found that married couples or single parent households were 9% more likely to be mushroom buyers, than individuals living alone or with non-relatives. However, these family units are found to purchase 0.06 pounds per month less than the single or non-related households. Again, this amount, equivalent to about an ounce, is not a substantial, economic volume. It is also seen that the presence of children do not significantly reduce purchase volume.

White Mushrooms: Household Size: Although household size did not have a statistically significant role in predicting mushroom purchase status, we do find that monthly purchase volume does increase with the number of household members, increasing by 0.02 pounds per member.

White Mushrooms: Household Head Gender and Age: Male headed households were 5.5% less likely to be mushroom buyers. However, once they become mushroom buying households, they buy 0.05 pounds per month more. We also find that purchase volume increases with age, though, at a very gradual rate of only 0.001 pounds per year. Thus, the model predicts that a household headed by 50-year old would consume 0.03 pounds more than one headed by a 20-year old. This contrasts with the findings of both Rose Research and Lucier, *et al.* Rose Research found that households with 21 to 34 year heads served mushrooms 4.4 times per month, compared to 3.3 times per month by 35 to 44 year olds. Lucier, *et al.* finds total fresh mushroom annual per capita consumption to peak among 20 to 39 year olds at 3.53 pounds. However, the USDA study does not differentiate between at-home and away-from-home consumption in this analysis. In a further analysis using the Nielsen data, the age of the household head was assigned to nine age categories and the model was re-estimated. In this variant of the model, age was found to be unrelated to mushroom consumption volume.

White Mushrooms: Race and Geographic Region: In terms of mushroom volume, race was not found to be a significant factor. Again, this is another surprising finding using the ACNielsen data. Race clearly played an important role in determining a household's status as a mushroom buyer. Also, the USDA study show pronounced variation in annual per capita consumption by race with Asians, their other race category, and Whites consuming the most. These results, however, include both at-home and away-from-home consumption. With regard to region, consumers on the West Coast were found to purchase 0.05 pounds per month less than those in the Midwest in the Nielsen panel data.

Other Mushrooms: Geographic Region: Greater variability in regional mushroom volume purchases is found for the other mushroom model, which aggregates sales of Portabellas, other browns, Shiitake, and other specialty mushrooms. Sales of these mushrooms are found to be highest in the East, Northeast, and Southeast. In comparison, the USDA study finds consumption of all types of mushrooms to be highest in the West, followed by the Northeast and Midwest with the South accounting for the lowest per capita consumption rate. Rose Research reports mushrooms (all types) to be served at home more frequently in the East, followed by the Southeast.



Other Mushrooms: Income: The only other significant difference in monthly household purchase volume of other mushroom types found in the Nielsen data related to income. Although significant at only the 11% level, it is found that the volume of these specialty mushrooms rises slowly with income at a rate commensurate, though opposite in direction, to the rate associated with white mushrooms.

Surprisingly, these results on purchase volume and household characteristics do not fully support previous findings nor are they fully consistent with the factors that predict whether a household buys mushrooms or not. Most surprising in these results was the finding that there is no significant difference in consumption rates among different racial groups. This clearly contrasts with the conventional wisdom that consumption is higher among Asians. Also, varying results were found on regional consumption. However, the two other cited studies were in contrast with one another, as well. Finally, it was found that income is positively correlated with consumption, but only above certain levels of income for white mushrooms.

Undoubtedly, the results relating to consumption volume and demographic characteristics likely reflect differences in samples and sample periods. As time progresses, our nation will become more ethnically diverse, while also promoting more cultural assimilation and the sharing of cultural customs. Who ever thought salsa would become the leading condiment in retail grocery sales? Thus, one alternative explanation for these diverse results on demographic segmentation is that it is perhaps too simplistic. Mushroom consumption is likely better explained by behavioral segmentation variables or psychographic variables, which are tied to consumers' activities, interests, and opinions. We, therefore, in the last phase of this analysis evaluate one important behavioral segment—heavy mushroom purchasers.

### **Heavy Mushroom Buyers**

Given an average purchase rate of 0.31 pounds per month, we define heavy users as households buying 0.71 pounds of mushrooms per month. This represents those households who are buying fully one standard deviation above the mean purchase rate. This select group represents only 11% of the households, but accounts for 42% of all sales. Hence, it is an economically significant market segment. Like the larger mushroom buying group, heavy buyers are largely buyers of white mushrooms, which account for about 94% of their purchases. When compared to all mushroom buyers (see table 1), this group of buyers appear to have a higher income, larger household sizes, older household heads, more married couples, more buyers employed in professional positions, higher levels of educational attainment, and a larger proportionate share of Whites.

Again, a probit model is used to test the affect of these and other demographic variables have on the probability of a household being categorized as being a heavy mushroom buyer. These results presented in table 5, show that indeed income, the age and gender of the household head, and race do play a statistically significant role. Specifically, Whites and Orientals (Asians) are about 10% more likely to be heavy mushroom buyers than those of other race. Households headed by males are also 3% more likely to be heavy mushroom buyers. While these demographic characteristics are statistically significant for this segment of buyers, they do not

necessarily help to identify them in a manner that would facilitate targeted marketing efforts. However, this segment could be identified through the use of retailer's frequent shopper data. The question that remains, though, is do they respond different to marketing stimuli.

To address this last question, we evaluate how mushroom buyers and heavy buyers in particular respond to changes in price and retail promotions. The price responses are measured as elasticities of demand, which shows the percentage change in the quantity demanded to a one percent change in price. The price variable used in the analysis includes the net effect of any store sales, specials, or coupon offers. Hence, it measures the price the consumer paid. However, the effect of promotions on demand are not limited to their affect through price. Promotions may also affect demand by shifting the demand curve outward. This is sometimes referred to as the announcement effect, reflecting the possible advertisements or point-of-sale materials associated with the promotion. The outward shift in demand represents the acceleration in purchase frequency at the household level or the entrance of new buyers in the market at the market level. In this regard, its affect on demand is much like that obtained through advertising. Responses to this aspect of the promotions are reported as changes in monthly household purchases. These response measures and the price elasticities of demand are reported in table 6 for white mushrooms.

For the typical mushroom buying household, their elasticity of demand is  $-0.22$ , meaning that a one percent drop in price only generates a 0.22 percent increase in the quantity demanded. This reflects demand conditions, which at the household level, particularly within a month period, would be described as very inelastic. Products with inelastic demands are ones with few substitutes, such as necessity items or very unique products, and products that make up a small share of the consumer's budget. Given low volume of mushroom purchases typical of most households, they do compose a small share of their food expenditures. With an inelastic demand, individual household increases in quantity demanded will be commensurately less than the decrease in price, resulting in declining sales revenues for retailers and growers. Some products with elastic demands produce increases in sales revenues following a price decrease. For mushrooms, the only opportunity for increased revenue for retailers rests with the sales attributable to a shift in demand. At the household level for all white mushroom buyers, it is seen that monthly demand increases by 0.11 pounds during each promotion. Households also become more price responsive during promotions, as their elasticity of demand increases in absolute value to  $-0.32$ .

Heavy buyers, though, exhibit greater responsiveness to price reductions with an elasticity of demand of  $-0.61$ . When confronted with a promotion, these households will also increase their purchases by 0.16 pounds due to the announcement effect. However, they also become less price responsive during promotion periods. This may reflect the possibility that heavy users are approaching a satiation point, where they gain little additional benefit from purchasing more mushrooms, even at a lower price. So while these consumers are an important segment, the opportunity to generate substantial additional sales through them is limited. Furthermore, they too exhibit price responses characteristic of inelastic demands. Therefore, gains in retailer and grower revenues are dependent on increases in the number of consumers in the market, possibly through accelerated purchases by heavy buyers and others.

## Summary and Discussion

This study presents a review of the affect household demographic variables play in influencing mushroom purchases using ACNielsen's Homescan data. It also evaluates how households respond to changes in prices and store promotions. The findings and recommendations from this study are summarized below:

Mushroom Buyers: The analysis first focused on the household characteristics, which influence whether a household buys mushrooms or not, independent of volume. The analysis shows that the households that buy mushrooms generally have higher income and higher levels of educational attainment. However, occupation does not play a significant role in predicting whether someone is a mushroom buyer. White-collar professionals are no more likely to be a mushroom buyer than a tradesman, craftsman, or clerical worker. It was also found that households composed of families are more likely to be mushroom buyers, than households composed of single individuals living alone or with other unrelated persons. Male-headed households are less likely to be mushroom buyers and the likelihood of buying mushrooms increases with the household head's age. Whites and Asians are more likely to be mushroom buyers, while Blacks are significantly less likely to be mushroom buyers. Being of Hispanic origin does not significantly influence one's status as being or not being a mushroom buyer. Finally, mushroom buying households are less likely to be located in the Southeast and Southwest.

Mushroom Buying: White mushrooms continue to dominate mushroom sales, accounting for about 94% of all sales. Furthermore, consumers typically only buy a single package of mushrooms on any shopping occasion, most often in an 8-ounce package. Even price reductions and promotions have little impact in inducing larger volume purchases on any shopping trip. However, price discounts and promotions are effective in bringing more buyers to the market or accelerating the rate of household purchases within a month's time.

Mushroom Volume Purchased: The Nielsen panel data showed that income, particularly at higher levels, does promote increased purchase volume. However, educational attainment does not influence purchase volume. Household size increases purchase volume, but household units organized as families tend to purchase less. Once in the market for mushrooms, male-headed households buy larger volumes of mushrooms. Also, mushroom volume increases with age. For specialty mushrooms, purchase volume is higher in the Northeast, East, and Southeast. Surprisingly, the Nielsen data did not show that race, notably being Asian, had a significant impact on the volume a household purchases on a monthly basis.

Heavy Mushroom Buyers and Price Responses: Heavy mushroom buying households are an important market segment. Though they only account for about 11% of all mushroom-buying households, they account for about 42% of all sales. These buyers are higher income professionals living in families. They are also most likely to be White or Asian. Like other mushroom buyers, heavy mushroom buyers are not particularly responsive to decreases in price. Hence, price promotions alone are not a way to increase sales revenue. Promotions are, however, effective in bringing more consumers to the market or accelerating purchases. In essence, this effect, referred to as an announcement effect, is similar to the role advertising plays.

Strategies to promote mushroom consumption, independent of a price promotion, could have a similar effect. Though, it is recognized that the Mushroom Council cannot directly engage in advertising.

The Ideal Target Market: While mushroom buyers, including heavy buyers, do have some identifiable characteristics, these demographic characteristics may not be particularly useful in designing target market strategies. Furthermore, some of the findings in this study contradicted findings in earlier studies. Still, in an effort to make a recommendation on who should be targeted by mushroom marketers, we recommend that older, White or Asian, upper-income women, living in a male-headed household with or without children be targeted. However, we would also suggest that segmentation using psychographic variables, which describe mushroom buyer's interests, activities, and opinions, may be more useful and is an area for future research. Furthermore, the recurring evidence that consumption rises with age could be problematic. If this reflects the buying behavior of current age cohorts that do not change over time, future sales of mushrooms could be in jeopardy.

New Product Strategies: The low volume of purchases of standard units of white mushrooms is also a troubling state of affairs. Obviously ways of increasing volume is needed. However, it should possibly come through purchases of more varieties more frequently, even if they are purchased in smaller portions. Smaller package sizes may prove useful, along with sufficient inducements to buy new varieties or buy these smaller portions more frequently.

**Tables 1. Demographic Characteristics of ACNielsen Household Panel and Subsets of Mushroom Buyers.**

<b>Household Characteristics</b>	<b>Panel</b>	<b>Mushroom Buyers</b>	<b>Heavy Buyers</b>
Housholds (No.)	8,574	3,788	409
Average Household Income (\$)	55,199	60,765	66,290
Average Household Size (No. Members)	2.50	2.60	2.71
Average Age Male Household Head (Years)	50.70	51.00	52.90
Average Age Female Household Head (Years)	49.90	50.90	51.50
Households with No Male Head (%)	26.56	23.73	14.18
Households with Children (%)	29.18	29.38	30.32
Female Primary Shopper (% Households)	n/a	82.81	82.21
Average Age Primary Shopper (Years)	n/a	51.60	53.19
Household Composition (% Households)			
Married Couple	57.79	64.78	74.82
Female Household Head with Relatives	9.59	7.37	4.40
Male Household Head with Relatives	3.81	3.38	3.91
Female Living Alone	16.38	15.81	9.78
Female Living with Non-Relatives	0.61	0.58	9.78
Male Living Alone	8.92	5.25	3.91
Male Living with Non-Relatives	2.90	2.82	3.18
Household Head Occupation (% Households)			
Professional	19.94	21.57	23.72
Business owner, Manager, Gov't Official	15.16	17.00	16.14
Clerical	6.18	5.02	3.18
Sales	5.52	5.62	4.89
Craftsman (Skilled)	11.02	11.54	12.96
Operative (Semi-Skilled)	7.07	5.86	4.65
Military	0.54	0.58	0.49
Service Worker	5.18	4.86	4.40
Farm Owner, Manager, Worker	0.58	0.50	0.24
Student	0.33	0.21	0.24
Laborer	1.20	0.95	0.73
Retired, Unemployed	27.28	26.29	28.36
Male Household Head Education (% Households)			
Grade School	1.19	0.84	0.73
Some High School	3.95	3.12	2.93
High School Graduate	17.13	15.50	13.94
Some College	22.32	23.05	26.89
College Graduate	19.42	22.02	25.92
Post College Graduate	9.42	11.75	15.40

**Table 1. Continued.**

<b>Household Characteristics</b>	<b>Panel</b>	<b>Mushroom Buyers</b>	<b>Heavy Buyers</b>
Female Household Head Education (%Households)			
Grade School	0.44	0.21	0.00
Some High School	3.03	2.09	2.93
High School Graduate	22.65	20.43	18.34
Some College	29.87	31.49	30.56
College Graduate	23.91	27.4	27.14
Post College Graduate	8.98	11.03	15.40
Race (%Households)			
White	78.70	82.40	93.15
Black	14.28	8.26	1.71
Asian	2.73	3.78	4.16
Other	4.29	3.72	0.98
Hispanic (% Households)	7.6	7.44	5.87
Regions (% Households)			
Northeast	9.12	10.35	12.71
New England	2.38	3.14	4.4
Metro New York	6.74	7.21	8.31
East	26.97	26.51	28.36
Middle Atlantic	20.15	20.41	22.00
East Central	6.82	6.10	6.36
Midwest	16.4	15.58	13.20
Metro Chicago	7.55	7.37	7.09
West Central	8.85	8.21	6.11
Southeast	16.82	14.76	12.71
Southwest	10.22	9.08	7.82
West Coast	20.47	23.74	25.19
Greater Los Angles	8.28	8.82	9.54
Other Pacific Coast	12.19	14.92	15.65

**Table 2. Factors Influencing the Probability of a Household Being a Mushroom Buyer.**

Household Characteristic	Probability <i>Percent</i>
Income - Per thousand dollars	0.22**
College Education - Households where either head attended college	9.34**
Professionals, Proprietors, Managers, Government Officials	0.91
Household Composition – Families	9.08**
Children Present	-0.39
Household Size – Per household member	-0.37
Household Head Gender – Male	-5.54**
Household Head Age	0.13**
White	6.42**
Black	-17.07**
Oriental	14.61**
Hispanic	-0.37
Northeast	3.26
East	-2.08
Southeast	-4.98**
Southwest	-6.12**
West Coast	-1.43

\*\* Denotes statistical significance at the 5% level. Racial parameters are estimated relative to a base category-other race; regional parameters are estimated relative to a base category-Midwest.

**Table 3. Mushroom Purchases: Varieties and Product Form.**

Variety	<i>Percent</i>
White	93.73
Portabella	3.24
Baby Bella	1.99
Brown	0.68
Shiitake	0.22
Other Specialty	0.14
Product Type	
Random Weight	27.61
Fixed Weight	72.39

**Table 4. Factors Influencing the Household Mushroom Purchase Volume.**

<b>Household Characteristic</b>	<b>White</b>	<b>Other</b>
Income - Per thousand dollars	-0.0005**	0.0006
College Education - Households where either head attended college	0.0181	-0.0470
Professionals, Proprietors, Managers, Government Officials	0.0040	-0.0288
Household Composition – Families	-0.0637**	0.0142
Children Present	-0.0020	0.0100
Household Size – Per household member	0.0207**	-0.0101
Household Head Gender – Male	0.0464**	0.0198
Household Head Age	0.0013**	-0.0004
White	-0.0059	0.0145
Black	-0.0148	0.0495
Oriental	0.0323	-0.0041
Hispanic	0.0114	0.0116
Northeast	-0.0057	0.1022**
East	0.0068	0.1109**
Southeast	0.0126	0.0629**
Southwest	0.0188	-0.0263
West Coast	-0.0491**	-0.0507

\*\* Denotes statistical significance at the 5% level. Racial parameters are estimated relative to a base category-other race; regional parameters are estimated relative to a base category-Midwest.

**Table 5. Factors Influencing the Probability of a Household Being a Heavy Mushroom Buyer.**

<b>Household Characteristic</b>	<b>Probability</b>
	<i>Percent</i>
Income - Per thousand dollars	0.04**
College Education - Households where either head attended college	0.82
Professionals, Proprietors, Managers, Government Officials	0.16**
Household Composition – Families	3.16**
Children Present	0.36
Household Size – Per household member	0.51
Household Head Gender – Male	0.39
Household Head Age	1.47
White	10.67**
Black	-2.80
Oriental	10.10**
Hispanic	-0.40
Northeast	2.64
East	1.08
Southeast	-0.13
Southwest	-0.52
West Coast	1.12

\*\* Denotes statistical significance at the 5% level. Racial parameters are estimated relative to a base category-other race; regional parameters are estimated relative to a base category-Midwest.



**Table 6. Price Elasticities of Demand and Quantity Responses to Store Promotions for White Mushrooms.**

<b>Response</b>	<b>Average Buyer</b>		<b>Heavy Buyer</b>	
	<b>No Deal</b>	<b>On Deal</b>	<b>No Deal</b>	<b>On Deal</b>
Price Elasticity (Index)	-0.2179	-0.3166	-0.6125	-0.5530
Deal Response (Lbs./HH/Month)		0.1104		0.1678