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Abstract

The consumption of fast-food in the United States has seen strong growth in recent decades and fast-food itself is becoming somewhat of a staple in many Americans' diets. The proportion of overweight Americans has also risen substantially over the same time period, reaching alarming levels. Over the years, legislators and health care activists have attempted to inform the public about the dangers of eating large amounts of fast-food and the effects of becoming overweight. This study analyzes how groups of people and different consumer behaviors effect the consumption of fast-food. One group of variables focuses on demographic factors such as race and education, while another group focuses on consumer behavior such as grocery shopping and time spent cooking. The data for the research was acquired from the 2009-2010 National Health and Nutrition Examination Survey, particularly the Flexible Consumer Behavior Survey module. The study finds that gender, age, and time spent cooking had a significant negative effect on the consumption of fast-food, while race had a positive influence. With this research, groups who have been indicated to consume more fast-food may be better targeted about the dangers of consuming large amounts of it.

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Since World War II, the increasing prevalence of fast-food restaurants and the associated U.S. consumption have markedly changed our eating habits. This is in conjunction with a rising proportion of the U.S. population that is overweight and/or obese. When you put these two trends together, the per-capita number of fast-food restaurants in the United States doubled from 1972 to 1999 with the obesity rate increasing from 13.9 percent to 29.6 percent— 113 percent increase in the obesity rate (Dunn, 2010). Numerous studies have attempted to explain a link between fast-food consumption and increasing obesity, however, many studies are either inconclusive or conflicting. Studies have indicated that the expanding consumption of high fat fast-food by children and adolescents may be a significant role in the increasing obesity (Paeratakul et al, 2003). Other studies note that the relationship between fast-food consumption and obesity may be linked because the now larger obese population is buying more fast-food (Jeffery et al, 2006). Biologically weight gain from fat consumption is caused by increased energy intake while maintaining a constant or decreased amount of energy expenditure. This knowledge is coupled with also knowing that fast-food meals are high in fat and energy (Paeratakul et al, 2003). Educating the public on the consequences of high-fat diets and promoting healthier eating habits has not greatly impacted the U.S. consumption of fast-foods. Such educational impacts may be enhanced by targeting education to specific groups of households that consume large quantities of fast-food. However, this requires knowledge of the factors that determine a household's fast-food consumption habits. The aim of this analysis is to shed light on these factors. Factors consisting of economic decisions made by households, along with demographics and socioeconomic factors are investigated in explaining household food consumption patterns.

Theoretical Framework

How often a household consumes fast-food as a meal can be influenced by several economic choices including time spent on grocery shopping, money spent on groceries, time spent on preparing dinner, how often a family eats together, and money spent on non-food items. It can also be influenced by different demographic factors such as household race, income, educational attainment, and head of household gender and age. For households to become well advised on the health implications of their meals, public health officials should be well versed on the significant factors that determine a household's food consumption pattern.

Based on the literature, a theoretical framework for household food consumption is developed. Recent research attempts to link per capita density and distance from fast-food restaurants as major causes of obesity. Recent articles by Dunn (2010) and Jeffery et al. (2006) addressed both living and working near fast-food restaurants as primary factors with per capita density factors as secondary. Jeffery et al. (2006) failed to find a significant link between obesity and how close someone was to living or working near fast-food. Dunn's (2010) found both positive and negative relationships for eating fast-food with varying density factors, yielding contradictory results. In contrast to past literature, this research will exclude a household's proximity to fast-food, given the large rise in the per capita number of fast-food restaurants in the U.S., proximity to fast-food is no longer a constraint in household consumption. The transportation cost of households consuming a fast-food meal has decreased to a second-order small cost, making it irrelevant in explaining consumption patterns.

One important economic concept that flows from both the literature and economic theory is opportunity cost. A major opportunity cost of preparing a household meal is the time that is put into purchasing commodities and then producing the meal. This limited time can be saved by instead consuming fast-food. However, if a household frequently shops for food and makes it a habit to produce the meal together as a family, then it is expected it will consume less fast-food.

Fast-food consumption is generally considered a component of a larger category typically called food away from home (FAFH) that has been widely studied over the past few decades. Following research in FAFH by Binkley (2006), the theoretical model is based on household production theory. This theory names the household as "both a consumer and producer of final goods," (Binkley). He formulates the general model

$$Y_i = f(P, I, T, H, D),$$

where Y_i measures the household's food choice, P is a set of relevant prices, I represents household income, T involves measure of time cost, H measures nutrition concerns and knowledge, and D represents demographic and other factors. The independent variables account for the opportunity cost of time. Research by Paeratakul et al. (2003) found that a household with a higher income was positively associated with fast-food consumption. Unfortunately, the data set is lacking in prices, nutritional concerns and knowledge, however, prices are reflected by income and diet knowledge and concerns will be reflected by the demographic factors. The demographic factors are gender, age, race (Hispanic, White, and

Black), and whether or not someone has graduated from high school. Consistent with theory, both studies by Binkley (2006) and Paeratakul et al. (2003) determine that women and adults along with the elderly consumed less fast-food. For this study it is hypothesized that being female and an older age have a negative relation with consuming fast-food. As for the racial variables, the hypothesis is non-whites have a positive relationship with fast-food. Education is another important demographic factor that may play into fast-food consumption, and the research by Paeratakul et al. (2003) suggests that more education may lead to more fast-food consumption.

Data and Model Specification

The data set underlying the empirical model is the 2009-2010 National Health and Nutrition Examination Survey (NHANES), specifically the Flexible Consumer Behavior Survey (FCBS) module. The survey is carried out by the National Center for Health Statistics and the FCBS module was placed in NHANES in 2006 by partnership with the USDA to assist in studying how different economic choices and factors play a role in our nation's health.

The dependent variable (MealsFastFood) is defined as how many times in the last week the household consumed fast-food. The income variable (MoFamInc) is an indexed monthly household income ranging from one to twelve. The household food shopping variable (freqMAJFOODSHOP) is how often the household participated in buying a large amount of groceries in a week. Household food preparation variable (timeCOOKING) is how much time the household put into preparing meals in the past week. Having meals together variable (numMEALFAMILY) is described as how many meals the family consumed in the home and together, in the past week. The age variable is the age of the respondent at the time of the survey. The gender variable is a dummy variable defined as female = 1 and male = 0. The racial variables are also dummy variables where, respectively, Hispanic, black, and white (nwhite) = 1, otherwise = 0. The education variable is whether or not the respondent has graduated from high school and is dummy variable where yes = 1, if not = 0.

Summary statistics for the dependent and explanatory variables are listed in Table 1. For estimation, the logarithm of the nondichotomous variables were considered and represented with an ln attached to the variable name in Table 1. As noted in the table with over 800 observations, a large variation around the mean values exists for both the dependent and explanatory variables.

Table 1. Summary Statistics

Variable	N	Mean	Std. Dev.	Min.	Max.
mealsfastfood	841	3.122	2.743	1.000	21.000
MoFamInc	841	4.573	2.128	1.000	12.000
freqMAJFOODSHOP	841	2.444	0.985	1.000	6.000
timeCOOKING	841	89.876	51.337	1.000	420.000
numMEALFAMILY	841	6.524	3.941	1.000	21.000
female	841	0.543	0.498	0.000	1.000
age	841	42.418	15.997	20.000	80.000
hispanic	841	0.423	0.494	0.000	1.000
nwhite	841	0.361	0.481	0.000	1.000
black	841	0.181	0.385	0.000	1.000
gradehs	841	0.243	0.429	0.000	1.000
lnmealsfastfood	841	0.858	0.721	0.000	3.044
lnMoFamInc	841	1.407	0.495	0.000	2.484
lnfreqMAJFOODSHOP	841	0.805	0.436	0.000	1.791
lntimeCOOKING	841	4.338	0.639	0.000	6.040
lnnumMEALFAMILY	841	1.707	0.613	0.000	3.044
lnage	841	3.677	0.375	2.995	4.382

Empirical Results

The estimation results are presented in Table 2. The overall F statistic is significant at the 0.01 percent level and although the R^2 is low, it is representative of the cross sectional nature of the data. Using a significance value of 5 percent, there are five significant variables including lntimeCOOKING, female, lnage, black, and nwhite. Results indicate that both the white and black variables have a positive effect on fast-food consumption. On the other hand, the time spent cooking, female, and age variables all have a negative effect on fast-food consumption. One interesting variable to note is monthly family income, which is not significant at the 5% level. In contrast to income other factors do explain fast-food consumption.

The results shed light on an intriguing question into how race plays into fast-food consumption. It was also interesting that the demographic variables played a larger role in explaining the dependent variable than the economic choices did given only one of choice variables was significant. The gender variable indicates that females do indeed consume less fast-food, and this may be due to the fact that females are typically more concerned with their health and nutrition. It can also be concluded that fast-food consumption is mostly associated with young adults, possibly due to a busier life-style or less regard for nutrition. As proposed, the amount of time that the household spends cooking had a significant negative effect, likely because of the opportunity costs of not using the meal production materials already purchased.

The significant racial variables, indicates that fast-food consumption is associated with minorities.

Table 2. Estimation Results

Variable	Parameter Estimate	Standard Error	t Value	Pr > t
Intercept	3.10702	0.33311	9.33	<.0001
lnMoFamInc	-0.03017	0.04887	-0.62	0.5373
lnfreqMAJFOODSHOP	-0.06578	0.05729	-1.15	0.2512
lntimeCOOKING	-0.08861	0.03789	-2.34	0.0196
lnnumMEALFAMILY	-0.05432	0.04024	-1.35	0.1775
female	-0.18301	0.04857	-3.77	0.0002
lnage	-0.50327	0.06475	-7.77	<.0001
Hispanic	0.22204	0.13580	1.64	0.1024
Nwhite	0.30636	0.13626	2.25	0.0248
Black	0.33993	0.14616	2.33	0.0203
Gradehs	0.03409	0.05613	0.61	0.5438

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	42.298	4.228	8.89	< .0001
Error	830	394.992	0.475		
Corrected total	840	437.282			

Note: $R^2 = 0.0967$.

Conclusion

The objective of this research was to determine how different factors had an influence on a household consuming fast-food. Gender, age, and time spent cooking were found to have a significant negative effect on fast-food consumption. In contrast, race had a positive influence. The results indicate the demographics—young, black or white males who do not spend much time preparing household meals—are the major consumers of fast-food. For policymakers interested in educating the public on the consequences of frequent consumption of fast-foods, their audience should be this demographic. Unfortunately, this may be the hardest group to reach given their general relatively high discount of future consumption. Nonetheless, programs which reach this demographic have the most potential to significantly impact fast-food consumption.

In terms of further research, a more thorough model that handles count data such as the Poisson regression model could yield further insights. The Poisson model may be better equipped to explain the data because it predicts probabilities of certain occurrences, such as

how many trips a person makes to a fast-food restaurant. This, along with included variables for relative prices and nutrition concerns, should be the basis for continuing research on the topic.

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