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**The Association between Socioeconomic Status and Adult Fast-Food
Consumption in the U.S.**

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Abstract Health follows a socioeconomic status (SES) gradient in developed countries with disease prevalence falling and health measures rising as status increases. This pattern is partially attributed to differences in nutritional intake, with the poor eating the least healthy diets. This paper examines whether there is an SES gradient in one specific aspect of nutrition: fast-food consumption. Fast food is generally high in calories, salt, and sugar and low in nutrients and several studies find a positive association between fast food and BMI. We use data from the 2008, 2010, and 2012 waves of the National Longitudinal Survey of Youth (NLSY79) to test whether adult fast-food consumption falls as income and wealth rise in the United States ($n = 8,136$). This research uses more recent data than previous fast-food studies and includes a comprehensive measure of wealth in addition to income to measure SES.

We find little evidence of a gradient in adult fast-food consumption with respect to wealth. While adults in the highest quintile are 53.7% less likely to report fast-food consumption than those in the lowest quintile, they are no less likely than adults in the middle quintiles. Contrary to popular belief, fast-food consumption rises as income rises from the lowest to middle quintiles. The variation in adult fast-food consumption across income and wealth groups is, however, small. Other factors play a bigger role in explaining fast-food consumption: reading ingredient labels is negatively associated while soda consumption and hours of work are positively associated with fast-food consumption.

JEL Codes: D01, I10, I12, I14

Keywords: Fast food, nutrition, income, wealth, socioeconomic status

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1. Introduction

In developed countries socioeconomic status (SES) gradients in general health and several specific medical conditions are well documented (e.g., Braveman et al. 2010; Marmot 2004). For example, many studies find that obesity prevalence follows an SES gradient, especially among women (Ljungvall and Zimmerman 2012; Ogden et al. 2010; Zhang and Wang 2004). The U.S. Department of Health and Human Services' plan for improved public health lists the elimination of such health disparities as a major goal (National Center for Health Statistics (NCHS) 2012). Because SES disparities in health are thought to be partially caused by an SES gradient in nutrition (Darmon and Drewnowski 2008; Kirkpatrick et al. 2012; Wang and Chen 2011; Wang et al. 2014), this paper examines one aspect of diet: fast food. We use a large, nationally representative sample of adults born between 1957 and 1964 in the U. S. to investigate whether an SES gradient in fast-food consumption exists. The National Longitudinal Survey of Youth (NLSY79) offers more recent data and more extensive economic measures than data sets used in previous investigations of the relationship between SES and fast-food consumption. In addition to testing for an income gradient in adult fast-food consumption, this research is the first to test whether fast-food consumption varies by wealth. This enables us to examine whether the flow measure of resources has a different relationship with fast-food consumption than the stock measure.

After presenting background information on fast food and health, the paper reviews the literature on the association between SES and fast-food consumption. We then estimate the relationship between adults' fast food intake and SES, as measured by income and wealth, controlling for an array of demographic and health factors and test whether fast-food

consumption falls as income and wealth increase. Estimation results are used to simulate changes in fast-food consumption due to changes in income and wealth to assess the magnitude of the effects. We conclude with a discussion of the results and their policy implications.

2. Literature

2.1 Fast Food and Health

Our focus on fast food derives from the association of this food type with nutritional intake and health. Fast food includes non-beverage items that “lend themselves to production line techniques,” such as hamburgers and pizza (Bender 2009). The U.S. Department of Agriculture (USDA) identifies fast-food restaurants as places where customers order and pay before receiving their food, which is then eaten on site, delivered, or taken out (USDAa n.d.). Fast food is convenient and is designed to appeal to consumer tastes through the use of salt, sugar, and fat (Moss 2013; Rudelt et al. 2013). These ingredients make fast food high in calories and sodium and low in nutrients, and thus unhealthy (Bowman and Vinyard 2004; Jaworowska et al. 2013; Lin and Guthrie 2012; Paeratakul et al. 2003; Prentice and Jebb 2003; Stender et al. 2007; Todd et al. 2010).

In addition, some argue these ingredients may make fast food addictive (Corwin and Grigson 2009) and can induce physiological responses that promote weight gain (Isganaitis and Lustig 2005). Indeed several studies find links between fast-food and obesity (Alviola et al. 2014; Boone-Heinonen et al 2011; Chen et al. 2013; Chou et al. 2004; Dunn et al. 2011; Garcia et al. 2012; Miura and Turrell 2014; Morland and Evenson 2009; Pereira et al. 2005; Rosenheck 2008), a risk factor for several costly chronic illnesses (Cawley and Meyerhoefer 2012; Finkelstein et al. 2009; Smith 2009; World Cancer Research Fund 2007). Some studies also find

an association between fast food and insulin resistance and diabetes (Kahr et al. 2016, Krishnan et al. 2010, Pereira et al. 2005) and other metabolic problems (Duffey et al. 2009).

Americans have increased their consumption of fast food considerably over the past decades (USDAb n.d.) and there has been concern that this trend is more pronounced among low-income individuals. For example, the *Wall Street Journal* published a series of articles in the 1990s describing the high prevalence of fast-food consumption in poor, urban areas, noting that fast-food restaurants provide affordable food in safe, comfortable settings as well as opportunities for employment and business ownership (Freedman 1990; Kaufman 1995). Such news items reflect and perpetuate the perception that the poor eat more fast food than those in the middle and upper classes. More recently, *New York Times* food columnist Mark Bittman (2013) summed up the stereotype that the poor eat more fast food by saying “The ‘fact’ that junk food is cheaper than real food has become a reflexive part of how we explain why so many Americans are overweight, particularly those with lower incomes.”

Research indicating greater density of fast-food establishments in poorer neighborhoods (Fleischacker et al. 2011; Fraser et al. 2010; Hilmers et al. 2012) also contributes to perceptions that the poor eat more fast food and has motivated interest in using zoning policies to control the growth in fast-food outlets (Ashe et al. 2003; Mair et al. 2005), particularly in low income neighborhoods. Notably, in 2008 Los Angeles adopted a moratorium on the construction of fast-food establishments in south L.A. (Los Angeles City Council 2008). The effectiveness of such policies in reducing SES health disparities hinges in part on whether the poor actually do eat more fast food than their middle and upper class counterparts.

2.2 Socioeconomic Status and Fast-Food Consumption

Fifteen studies have investigated the association between SES and adult fast-food consumption using nationally representative U.S. data, all of which measure SES as income (Table 1). Income is generally measured at the household level and is often organized into high, middle, and low income groups. Table 1 shows the extant literature relies largely on data that are at least a decade old. Seven of the studies use the Continuing Survey of Food Intakes by Individuals from 1994 to 1996 (CSFII), two use the Consumer Expenditure Survey 1998-2000 (CES), and two use the National Panel Diary 1982-1989. Fast-food consumption is operationalized as either a dichotomous variable tracking whether fast food was consumed or not, or as a quantitative variable measuring the number of fast-food meals or expenditures on fast food in a specific time period

The findings are mixed: six studies report no statistically significant association between income and fast-food consumption, two report a negative association, six report a positive association, and three report an inverted U-shaped association. The specific results do not depend on the data employed. For example, among the CSFII studies three report no association between income and fast food, one reports a negative association, one reports a positive association, and two report an inverted U-shaped association.

The present analysis re-examines the association between fast food and SES using a different data set, the National Longitudinal Survey of Youth (NLSY79): 2008, 2010, and 2012 waves. This data set offers two important advantages: more recent information and extensive data on wealth, not just income, as an SES measure.

Table 1: Literature on the Association between Income and Fast-Food Consumption

Findings	Study	Data Set
No Association	Beydoun, Powell, Wang (2008)	CSFII 1994-96
	Binkley (2006)	CSFII 1994-96
	Fryar & Ervin (2013)	NHANES 2007-2010
	Jekanowski et al. (2001)	Census data on 85 MSAs 1992
	Lin et al. (2001)	CSFII 1994-96
	McCracken & Brandt (1987)	Nationwide Food Consumption Survey 1977-78
Negative Association	Byrne et al. (1998)	National Panel Diary 1982-1989
	Paeratakul et al. (2003)	CSFII 1994-96
Positive Association	Bowman & Vinyard (2004)	CSFII 1994-96 Adults 20 & older
	Dugan (2013)	Gallup Poll July 2013
	Hiemstra & Kim (1995)	National Panel Diary Summer 1989
	Jekanowski et al. (2001)	Census data on 85 MSAs 1982
	Stewart et al. (2004)	BLS-CES diary 1998, 1999, 2000
	Stewart & Yen (2004)	BLS-CES diary 1998, 1999, 2000
		Dugan (2013)
Inverted U-shape Association	Fanning et al. (2010)	CSFII 1994-96 & Supplemental Children's Survey 1998
	Kim & Leigh (2011)	CSFII + DHKS 1994-96

3. Theory

Like earlier studies, we use Becker's theory of household production to model the consumer's choice of fast food (Becker 1965). This model posits that demand for fast food depends on price (P), income (I), household manager's time (T), and preferences (H). Standard

demand theory predicts price and the quantity of a food consumed will be inversely related, so lower priced foods will attract more consumers. Several studies confirm the relatively low cost of fast food, especially when measured by spending per unit of energy (Carlson and Frazão 2012; Drewnowski 2004; Jetter and Cassady 2006; Monsivais and Drewnowski 2009; Monsivais et al. 2010). The low monetary cost of fast food may particularly appeal to poor individuals due to their more restricted budget constraints (Chandon and Wansink 2012; Darmon et al. 2002). In addition, fast food requires less home infrastructure, skill, and time.

While the standard household production model uses income we instead use a broader concept; monetary resources (M), which includes both income and wealth. If consumers spread their consumption over their lifetimes per the permanent income hypothesis (Friedman 1957) or life-cycle hypothesis (Modigliani and Brumberg 1954), then current wealth would not influence the demand for fast food. However, behavioral economists argue that consumers may not be consistently rational or capable of such smoothing behavior and present evidence that consumers' planning horizons are generally shorter than predicted by these hypotheses (Wilkinson and Klaes 2012). Furthermore, wealth could influence preferences because foods are often used to mark social status (Cockerham 2005).

M has two, possibly conflicting effects. First, when M increases due to higher earnings the price of leisure rises, so less leisure is consumed via the substitution effect. In terms of food choice, less leisure means greater demand for time-saving foods such as fast food. Second, the income effect predicts that as M rises, the demand for fast food decreases as the household can afford more dining amenities. In other words, fast food is an inferior good. It is unclear *a priori* which of the two effects will dominate or if the effects are linearly or non-linearly related to consuming fast food.

Time (T) includes the time required to prepare and clean up after a meal, as well as the time involved in consumption and, if eating out, transportation. Home food preparation is time intensive, but fast-food consumption is not. Indeed fast food's convenience is an important characteristic motivating its demand (Binkley 2006; Hayden et al. 2006). Individuals with more leisure time are consequently more likely to prepare meals at home, while individuals who work longer hours are more likely to eat fast food. The farther restaurants are from a customer the less likely s/he will eat there due to higher time and transportation costs. Thus, the more fast food outlets nearby the greater is the demand for fast food. Review articles report evidence of greater fast-food availability in lower income areas (Fleischacker et al. 2011; Fraser et al. 2010; Hilmers et al. 2012), which would encourage low SES adults to consume fast food.

Finally, preferences (H) play a role in the demand for fast food. Demographic characteristics such as gender, age, race and region can shape food preferences. For example, Grier and Kumanyika (2008) review articles on racial differences in food and beverage marketing and report a consistent pattern of greater promotion of high-calorie, low-nutrient items to African-American than to White consumers. Such racial differences in advertising could lead to racial differences in fast-food preferences. Health knowledge and concern can also influence preferences for fast food (e.g., Glanz et al. 1998). Individuals who are more knowledgeable about nutrition and concerned with their health will value nutrition more highly than taste and convenience when selecting foods and will thus be less likely to demand fast food.

The basic theoretical model can be summarized as:

$$\text{Fast Food Consumption} = f(P, M, T, H)$$

4. Methodology

4.1 Data

We use the National Longitudinal Survey of Youth 1979 cohort (NLSY79), a large nationally representative sample of Americans, to estimate the model. The NLSY79 has questioned the same group of individuals born between 1957 and 1964 annually from 1979 to 1994 and every other year since 1994. Respondents are part of the young baby boomers.

From 1979 until the late 1990s the majority of respondents were interviewed face-to-face. Since that time the survey has shifted to phone interviewing. The average survey takes about 1 hour each time the respondent is contacted. Survey details and the raw data are available online from the Bureau of Labor Statistics (www.bls.gov/nls).

While the NLSY79 has an extensive longitudinal component, it is not possible to do a true longitudinal analysis since fast food consumption were only asked in just three survey waves (2008, 2010 and 2012). This means the respondents were in their 40's and 50's during the period of analysis. The NLSY79 has high retention rates with 82%, 81% and 79% of all living NLSY79 respondents participated in the 2008, 2010 and 2012 surveys respectively.

Because the NLSY79 is a multi-stage random sample that over-sampled Blacks and Hispanics, all descriptive statistics are adjusted by survey weights to account for over-sampling effects and attrition. Reported regression results are not adjusted with sampling weights but instead include dummy variables for oversampled groups, as recommended by Zagorsky (1997, Chapter 3.9) to ensure coefficient estimates are not biased. While not recommended, the regressions were also run with sampling weights. Weighted regression results produced smaller wealth and income coefficients than reported in the tables, strengthening the findings that monetary resources have relatively little impact on fast food consumption.

4.2 *Fast-Food Consumption Measures*

The NLYS79 survey asked respondents three times “In the past seven days, how many times did you eat food from a fast-food restaurant such as McDonalds, Kentucky Fried Chicken, Pizza Hut, or Taco Bell?”¹ The primary variable in this research is a simple summation of these three questions. The summation identifies all individuals who ate any fast food in a combined 21-day observation period. To identify “frequent fast-food eaters,” another variable was calculated by defining a frequent eater as any respondent who consumed fast food more than three times in any one of the seven-day study periods.

Because our measures of fast-food consumption rely on respondent recall, there could be measurement error. Hill and Davies (2001) review validation studies of self-reported energy intake and find evidence of underreporting. Willett (2013), however, concludes that self-reported diet recall for periods of up to ten years can be reasonably accurate.

4.3 *Wealth and Income Measures*

To understand the amount of resources available to a consumer it is important to examine both income and wealth. Income is the flow of money received periodically from doing activities, predominantly working. Wealth is the stock of financial resources stored in bank accounts, stocks, homes and possessions. Some individuals, like retirees, have low income but high wealth. Others, like new doctors, have little wealth but high income. The NLSY79 is one of the few nationally representative U.S. data sets that collects both income and wealth information. The Pearson correlation of 0.59 between income and wealth in the 2008 data shows these two SES measures are related, but not identical.

¹ The fast-food survey questions are labeled Q11-GENHLTH_7C_1 and Q11-GENHLTH_7C_2.

Wealth, or net worth, is calculated by subtracting all debts from a family's total assets (in dollars). The NLSY79 contained a detailed wealth module 14 out of the 24 times the survey has been fielded. Each module asked respondents to report details about their assets, such as the current market value of their home, mortgage, savings, possessions, stocks, and bond holdings, and their liabilities, such as mortgages, credit card debt and unsecured loans. Zagorsky (1999) provides details on response rates, handling of missing values, and accuracy of the NLSY79 wealth data. Wealth variables in the statistical analysis are based on the 2008 information

Every NSLY79 survey wave asks respondents four sets of income questions. First, respondents answer questions about income from wages, salaries, tips, and self-employment. The second set of questions collects information on government transfers. The third set asks about private transfers such as child support, alimony, and gifts. Finally, respondents list income from other sources such as scholarships, interest, dividends, and rent. For the most important items, like wages, the questions are asked once about the respondent's income and then a second time about the spouse or partner. For less important items, such as interest or dividends, a single question asks how much money both the respondent and spouse, if applicable, received. Total Net Family Income (TNFI) sums the various components from each survey wave's income module and is measured in dollars. The primary source of income data is also the 2008 survey. All wealth and income variables are adjusted for inflation and presented in 2012 dollars.

4.4 Time and Access Measures

The public release version of the NLSY79 does not contain data on the distance between respondents' homes and fast-food outlets, so the analysis includes four proxy variables for the time it takes to access fast food: Live in Central City; Live in Suburbs, Live in the South, and Owned a Car. Fast-food outlets are more numerous as urbanicity increases (Richardson et al.

2011), indicating less transportation time is involved in fast-food consumption in more densely populated areas. According to Census data, the South ranks first among the U.S. regions in the density of limited service restaurants (per thousand population and per square mile), indicating greater fast-food access. Car ownership also indicates quicker access to fast food.

Two variables track a respondent's leisure time. First, the binary variable "Worker" indicates if the respondent was employed at least one week in the past calendar year. The second variable tracks the number of hours worked in that year. Being employed and working more hours indicates less leisure time available for home food preparation.

4.5 Preferences: Health and Demographic Measures

The NLSY79 contains information on several variables that track health and health interest. The first, "ever smoked" indicates if the respondent smoked more than 100 cigarettes in their lifetime. Smoking can indicate less interest in health and poorer health. Second, in 2008 respondents reported if they exercised, indicating greater interest in health.

In addition to smoking and exercise, reading food product labels indicates health interest. The NSLY79 asked "When you buy a food item for the first time, how often would you say you read the nutritional information about calories, fat and cholesterol sometimes listed on the label - would you say always, often, sometimes, rarely or never?" Respondents who stated "always" or "often" are categorized as individuals who "check nutrition." Similarly, the variable "check ingredients" identifies respondents who answered "always" or "often" to the question: "When you buy a food item for the first time, how often would you say you read the ingredient list on the package?"

Drinking sugary beverages suggests less interest in health, so respondents who reported consuming three or more sugary drink in the past seven days are classified as "soda drinkers."

Finally, the regressions include self-reported 2008 body mass index ($\text{BMI} = \text{kg}/\text{m}^2$) and a dummy variable indicating if the respondent was trying to lose weight. Other preference-related variables, including highest grade completed and alcohol consumption, were explored in preliminary regressions, but were not statistically significant.

Finally, the regressions include basic demographic variables to control for race, ethnicity, age in 2008, whether the respondent was born in the U. S., gender, and 2008 marital status. Including family size did not contribute explanatory power or impact the results so they are not included. To account for the 15.9% of respondents who did not complete all three surveys we include a variable that tracks whether the respondent completed all three surveys with fast-food questions since we did not impute any missing data.

4.6 Estimation Methods

We used four different types of estimation methods. Logistic models were first used to determine who eats and does not eat fast food. Then to estimate how often fast food was eaten OLS and Negative Binomial models were used. These models primarily use only the 2008 data and a variable that combined fast food eating from the 2008, 2010 and 2012 surveys.

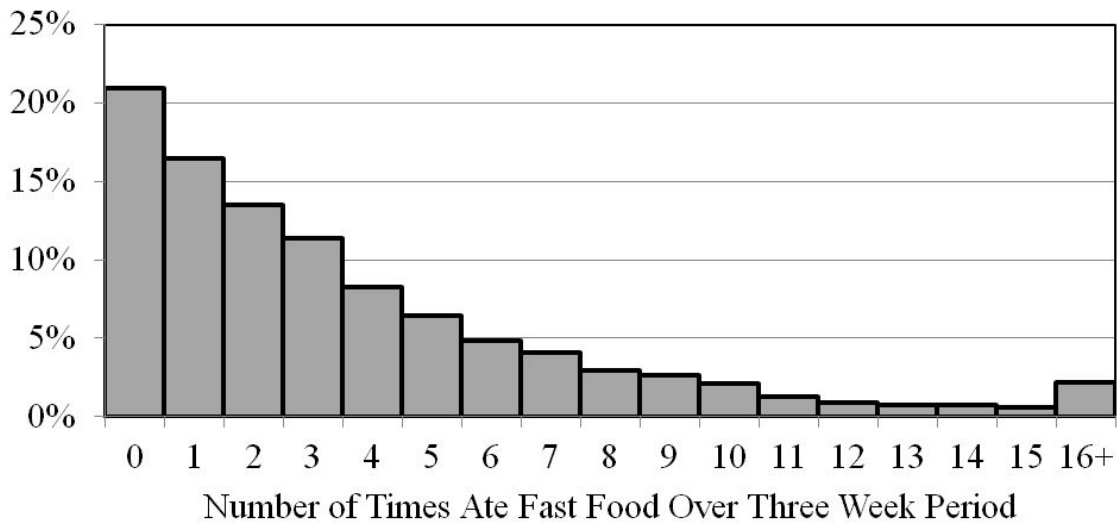
Because the OLS results potentially suffer from omitted variable bias and there are other data available in 2010 and 2012 a more sophisticated mixed model was tried to both check for any bias and include the additional information. Since results using the more complex mixed model were not very different from the OLS findings, the mixed model coefficients are not included but are available upon request from the authors.

5. Results and Discussion

5.1 Descriptive Analysis

Figure 1 shows the distribution of the number of times respondents reported eating fast food over the combined 21-day sample period. The majority of respondents (79.1%) ate fast food at least once and 23.4% were frequent fast-food eaters (more than three times in any 1 week period). More than one-fifth (20.9%) did not eat any fast food, one-sixth (16.5%) ate fast food only once, and more than half (50.9%) ate fast food multiple times.

Figure 1



At the upper extreme, four respondents reported eating two or more fast-food meals per day over the three-week sample period. Ten respondents in 2008, five in 2010 and two in 2012 matched Morgan Spurlock’s consumption frequency in the 2004 documentary “Supersize Me,” by eating fast food for all three meals for an entire week. Multiplying the number of visits by the relative frequencies shows the average respondent ate fast food 3.6 times during the three-week period. Since the NLSY79 represents the experiences of almost 34 million people, this means the baby boomer cohort consumed about 41 million fast-food meals a week, or about 2.1 billion fast-food meals a year.

Table 2 presents the means and relative frequencies for the explanatory variables by fast-food consumption status. The 2008 mean income of a respondent who ate fast food was

\$90,887, about seventeen thousand dollars less than the mean for those who did not eat fast food (\$107,827). Similarly, respondents who ate fast food had a lower mean wealth (\$328,743) compared for those who did not (\$508,656). While fast-food consumers' mean income and wealth are lower than non-fast-food eaters, they are far from poor. The mean income of fast-food eaters is four times the 2008 poverty threshold for a family of four of \$22,025 (Social Security Administration, 2013, Table 3.E) and around seventeen thousand dollars higher than the 2008 national median household income of \$72,940, after adjusting this figure for inflation (DeNavas-Walt et al. 2009).

Regarding health interest, fast-food eaters have higher BMIs than non-eaters and are more likely to report trying to lose weight. They are less likely to check nutrition information and ingredients, and are more likely to drink sugary beverages. Contrary to expectations, non-fast-food eaters are slightly more likely to have smoked than fast-food eaters. Smoking may not indicate lack of health interest, but instead reflect concern about weight gain and the use of nicotine as an appetite suppressant (Jo, Talmage, and Role 2002; Mineur et al 2011).

The time variables indicate that fast-food eaters are more likely to live in central cities and in the South, where fast-food outlets tend to be more densely located. They also are more likely to own a car than non-eaters, which also suggests greater access. Furthermore, fast-food eaters appear to have less leisure time because they are more likely to work and work more hours compared to non-fast-food eaters. Demographically, fast-food eaters are more likely to be male, younger, Black, and Hispanic. There are only small differences in the coefficients on family size and grades completed for fast-food eaters and those who do not eat fast-food.

Table 2: Descriptive Statistics for Explanatory Variables by Fast-Food Consumption Status

	(1) Did Not Eat Fast Food	(2) Ate Fast Food	(3) Means Distinct	(4) Infrequent Eater	(5) Frequent Eater	(6) Means Distinct
Mean Family Wealth	\$508,656	\$328,743	***	\$348,713	\$264,495	***
Mean Family Income	\$107,827	\$90,887	***	\$93,746	\$81,588	***
Live In Central City	20.9%	26.1%	***	25.5%	28.2%	
Live In Suburbs	57.9%	60.0%		60.0%	59.8%	
Live In South	24.8%	38.3%	***	37.1%	46.3%	***
Owned car 2008	77.7%	86.3%	***	86.1%	86.8%	
Exercise 2008	78.5%	81.6%		82.2%	79.5%	***
Ever Smoked	60.5%	60.1%	**	59.8%	61.0%	
Check Nutrition	55.4%	43.9%	***	46.6%	35.2%	***
Check Ingredients	44.4%	30.6%	***	33.2%	22.1%	***
Soda Drinker	36.2%	63.2%	***	59.7%	74.7%	***
BMI	27.1	28.6	***	28.4	29.3	***
Trying To Lose Weight	47.5%	50.2%	**	51.2%	46.8%	***
Worker	82.4%	85.6%	***	84.5%	89.4%	***
Hours Worked	1,713	1,826	***	1780	1973	***
Black	10.0%	15.3%	***	14.6%	17.5%	**
Hispanic	4.8%	7.0%	***	7.1%	6.9%	
Age	47.1	46.7	***	46.8	46.5	***
Born in US	94.7%	96.2%	*	96.0%	96.8%	
Female	52.2%	48.3%	***	51.5%	37.9%	***
Married	67.2%	68.7%		69.9%	64.9%	***
Family Size	2.7	2.9	***	2.9	2.7	***
Highest Grade	14	13.6	***	13.7	13.5	***
Did All 3 Surveys	73.6%	87.1%	***	86.4%	89.6%	
Number Respondents	1,496	6,635		5,038	1,597	
Number People Represented	7.0 mill.	26.5 mill.		20.3 mill.	6.2 mill.	

Note: *** p < 0.01, ** p < 0.05, * p < 0.10

Columns (4) through (6) of Table 2 compare frequent fast-food eaters to infrequent eaters. Frequent-fast-food eaters are more likely to be male, Black, married and living in the South. They are less likely to check nutrition information and ingredients, more likely to drink soda, and less likely to exercise than infrequent fast-food eaters. They also appear to have less leisure time than infrequent fast-food consumers. Lastly, respondents who ate fast food

frequently exhibit higher BMIs than those who eat fast food infrequently and have less income and wealth. Overall, the descriptive results in Table 2 offer preliminary support for the hypothesis that poorer individuals eat more fast food than those in middle and upper classes. They also suggest that greater access to fast food, less leisure time, and less interest in health are associated with more frequent fast-food consumption.

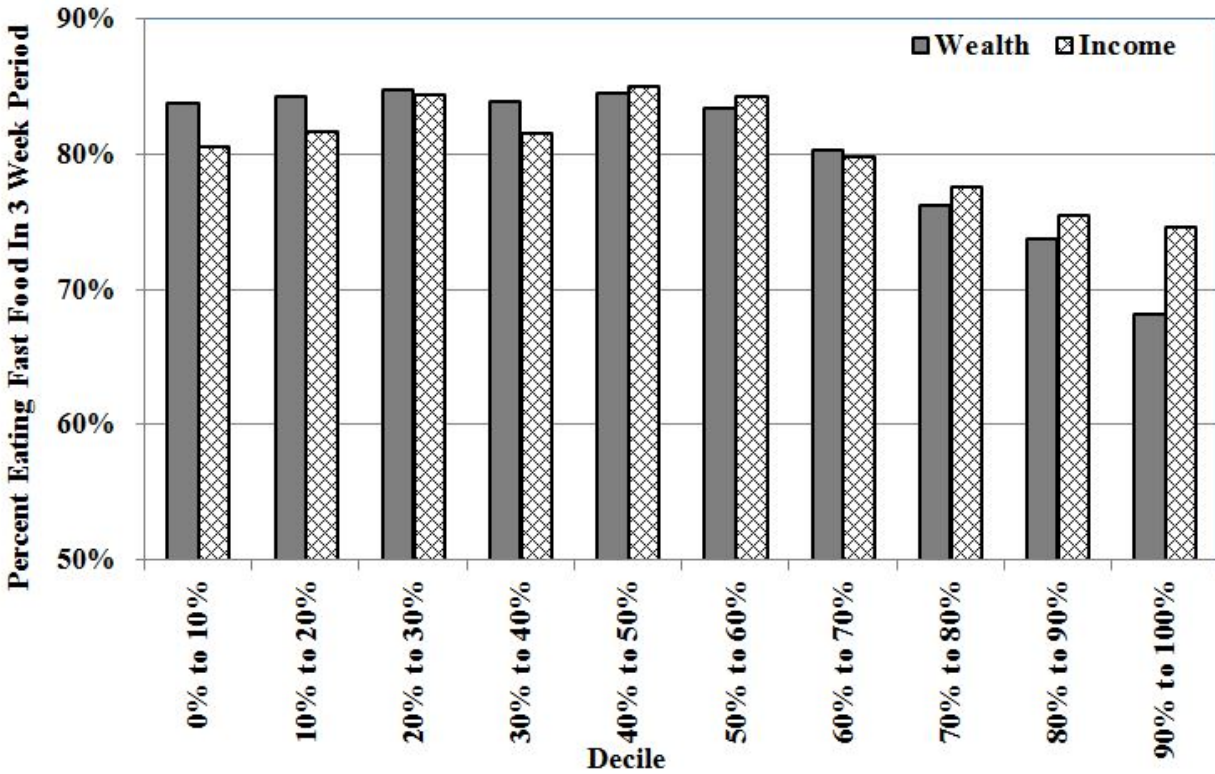
To visualize the pattern in adult fast-food consumption by SES, Figure 2 shows the percentage of fast-food eaters by income and wealth deciles. The far left column shows results for the poorest 10% while the richest 10% is on the far right. This graph shows there is little variation in the share of respondents who ate fast food across the income and wealth distributions and does not indicate an SES gradient. Instead the variation that does exist suggests an inverted U-shaped pattern with the poorest and richest deciles eating fast food less frequently than the middle deciles. This U-shaped pattern matches results in a recent Gallup Poll (Dugan, 2013) and two academic studies (Fanning et al. 2010; Kim and Leigh 2011).

Figure 3 shows the number of meals consumed at fast-food restaurants, broken down by income and wealth deciles. Like figure 2, the pattern suggests an inverted U -shape for the income distribution. The number of fast-food meals consumed is lowest in the poorest and richest two deciles, and highest in the third through sixth deciles. The wealth distribution follows a similar pattern, although less pronounced.

In sum, Figures 2 and 3 show relatively little variation in adult fast-food consumption across income and wealth deciles, suggesting that SES does not play a large role. This result is consistent with the six studies in the literature review which reported no association between income and adult fast-food consumption. The patterns observed also suggest a non-linear

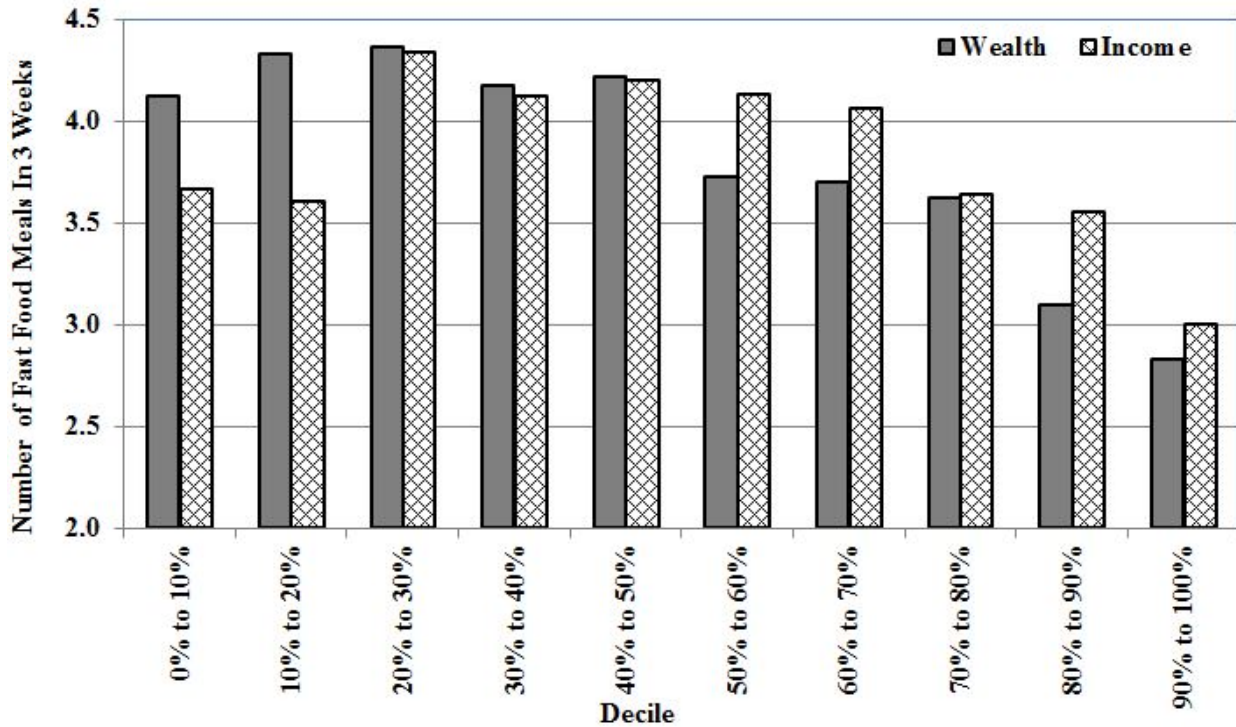
association with income rather than a gradient. However, these descriptive analyses do not control for other explanatory variables.

Figure 2



Note: Individuals with income below \$15,100 were in the 0% to 10% decile. Those with income greater than equal to \$15,100 but below \$28,950 were in the 10% to 20% decile. The other income decile cutoffs are \$42,800, \$56,800, \$69,600, \$85,600, \$105,000, \$128,600, and \$177,000. Wealth decile cutoffs were below \$1, \$7,400, \$37,500, \$83,400, \$146,500, \$222,000, \$325,000, \$498,500, and \$882,300.

Figure 3



Note: See figure 2 for decile cutoffs.

5.2 Logistic Analysis

Table 3 presents logistic regression results controlling for the explanatory variables described in the methodology section. We use two different strategies to account the possible non-linearity in the association between fast-food consumption and income and wealth. Columns (1) and (3) include the squares of income and wealth, whereas columns (2) and (4) include the second through fifth quintiles of the income and wealth distributions.

The first two columns report the logistic estimates of the probabilities a respondent ate any fast food in the 21-day study period. These results indicate that wealth is negatively associated with the likelihood an adult eats fast food, consistent with the gradient hypothesis that the poor eat more fast food than the wealthy. However, the wealth coefficients are negative and

statistically significant at the 5% level only for the top two quintiles (column 2), meaning the wealthiest 40% are less likely to eat fast food than the poorest 20%. Income is positively associated with the likelihood of adult fast-food consumption at quintiles 2 and 3, contrary to gradient hypothesis. This result is consistent with the descriptive findings of greatest fast-food consumption in the middle class. Estimates for the probability of being a frequent fast-food eater are similar. Those in the wealthiest quintile are less likely to be frequent fast-food eaters than adults in the lowest quintile, while those in the fourth income quintile are more likely.

Among the time variables, living in a Central City and in the South are both consistently positively associated with the likelihood of fast-food and frequent fast-food consumption. Owning a car is positively associated with the probability of eating any fast food, but not with frequent fast-food consumption. Among the health variables, checking ingredients is consistently negatively associated with the likelihood of fast-food consumption, while drinking soda and BMI are positively associated. This offers some support for the hypothesis that adults who are interested in health are less likely to eat fast food. However, checking nutrition information is not statistically significant. This result is similar to Loureiro and Rahmani's (2016) experimental finding that providing calorie information does not alter meal choice at a fast-food outlet.

Time appears to matter only for the probability of being a frequent fast-food eater. Both being a worker and working more hours is positively associated with the likelihood of being a frequent fast-food eater, but neither are statistically significantly associated with the likelihood of eating any fast food. Age is inversely related with the probability of eating fast food in all four model specifications, indicating that older adults are less likely to eat fast food than younger adults. The Black, Hispanic, USA-born, Married and Family Size variables are positively

associated with the likelihood of eating fast food, and highest grade completed is negatively associated, but most are not statistically significantly associated with the likelihood of being a frequent fast-food eater.

Table 3: Logistic Regressions on Fast-Food Consumption

	(1) Ever Ate Fast Food	Std. Err.	(2) Ever Ate Fast Food	Std. Err.	(3) Frequent Eater	Std. Err.	(4) Frequent Eater	Std. Err.
Wealth	-1.1e-6	1.7e-7***			-3.7e-7	1.8e-7*		
Wealth ²	2.5e-13	4.5e-14***			6.9e-14	5e-14		
Income	2.8e-7	9.8e-7			1.8e-6	1.3e-6*		
Income ²	-5.3e-13	1.5e-12			-5.1e-12	3e-12*		
Wealth Q2			-0.22	0.13*			-0.05	0.11
Wealth Q3			-0.24	0.14*			-0.23	0.11*
Wealth Q4			-0.48	0.14***			-0.25	0.12*
Wealth Q5			-0.79	0.15***			-0.44	0.14***
Income Q2			0.21	0.12**			0.15	0.11
Income Q3			0.35	0.13***			0.16	0.12
Income Q4			0.22	0.14*			0.37	0.13***
Income Q5			0.18	0.15			0.16	0.15
Live city	0.32	0.12**	0.31	0.12**	0.26	0.12**	0.25	0.12**
Live suburb	0.18	0.11*	0.17	0.11	0.28	0.11***	0.28	0.11**
Live south	0.40	0.08***	0.40	0.08***	0.36	0.07***	0.36	0.07***
Own Car	0.57	0.11***	0.57	0.12***	-0.06	0.10	-0.03	0.11
Exercise	0.18	0.10*	0.18	0.10*	-0.18	0.08**	-0.18	0.08**
Ever smoke	-0.11	0.07	-0.11	0.07*	0.05	0.07	0.06	0.07
Check nutrit	-0.001	0.10	-0.002	0.10	-0.08	0.09	-0.08	0.09
Check ingre	-0.48	0.09***	-0.48	0.09***	-0.40	0.09***	-0.40	0.09***
Soda drinker	0.99	0.07***	0.99	0.07***	0.53	0.08***	0.52	0.08***
BMI	0.03	0.01***	0.03	0.01***	0.01	0.01**	0.01	0.01**
Lose weight	0.05	0.08	0.05	0.08	-0.05	0.07	-0.06	0.07
Worker	0.17	0.13	0.16	0.13	0.24	0.13**	0.24	0.13**
Hours Work	2.6e-5	4.7e-5	1.7e-5	4.7e-5	1.2e-4	4e-5***	1.1e-4	4.3e-5***
Black	0.26	0.10***	0.28	0.10***	-0.06	0.08	-0.06	0.08
Hispanic	0.46	0.11***	0.46	0.11***	-0.04	0.09	-0.03	0.09
Age	-0.04	0.02***	-0.04	0.02***	-0.04	0.01***	-0.04	0.01***
Born in US	0.34	0.14**	0.35	0.14**	0.14	0.15	0.13	0.15
Female	0.05	0.08	0.06	0.08	-0.39	0.07***	-0.39	0.07***
Married	0.09	0.09	0.09	0.09	-0.05	0.08	-0.06	0.08
Family Size	0.12	0.03***	0.12	0.03***	-0.04	0.02*	-0.04	0.02*
High Grade	-0.002	0.02	-0.005	0.02	0.02	0.02	0.03	0.02*
Did 3 survey	0.73	0.10***	0.73	0.10***	0.30	0.12**	0.29	0.12**
Intercept	-0.17	0.80	-0.04	0.80	-0.72	0.75	-0.70	0.75
R ²	0.10		0.10		0.05		0.06	
Num. Obs.	6,955		6,955		5,794		5,794	

Note: *** p < 0.01, ** p < 0.05, * p < 0.10.

5.3 OLS Analysis

Table 4 presents the OLS regressions results for the number of fast-food meals consumed among the entire sample and among only respondents who ate any fast food during the observation periods. In general, wealth is negatively associated with the number of times a respondent ate at a fast-food establishment, while income is positively associated.

That wealth is negatively associated with the number of times a respondent eats fast food support the gradient hypothesis, but the association is small. For example, a \$1 million increase in wealth is associated with only a 0.7 decrease in the number of fast-food meals consumed on average. In the quintile specification, only the top two quintiles are statistically significant, similar to the logistic regressions. Those in the wealthiest quintile ate about one less fast-food meal on average than those in the lowest wealth quintile.

Income is positively related with the number of fast-food meals, suggesting an inverse gradient. As in the logistic regressions, the associations with income are statistically significant throughout the income distribution whereas the wealth associations are significant only at the extremes. The magnitudes of the income quintile coefficients are small, ranging from half to one meal more relative to the poorest group.

In contrast to the estimated income and wealth coefficients, the coefficients on two access variables are relatively large and statistically significant. Living in a central city and in the South are positively associated with more frequent fast-food consumption. The health coefficients, with the exception of smoking, exhibit the expected signs.

Table 4: OLS Regressions on Frequency of Fast-Food Consumption

	(1) Number Times All	Std. Err.	(2) Number Times All	Std. Err.	(3) Number Times Eaters	Std. Err.	(4) Number Times Eaters	Std. Err.
Wealth	-1.2e-7	3e-8***			-7.0e-7	3.0e-7**		
Wealth ²	2.7e-13	7e-14***			1.6e-13	8e-14*		
Income	3.2e-6	1.5e-6*			3.6e-6	1.6e-7**		
Income ²	-6.5e-12	2e-12***			-7.3e-12	3e-12***		
Wealth Q2			-0.10	0.18			0.06	0.19
Wealth Q3			-0.33	0.19			-0.27	0.21
Wealth Q4			-0.60	0.20***			-0.43	0.22*
Wealth Q5			-1.00	0.22***			-0.69	0.24***
Income Q2			0.45	0.18***			0.40	0.20**
Income Q3			0.69	0.19***			0.60	0.22***
Income Q4			0.88	0.21***			0.88	0.23***
Income Q5			0.67	0.23***			0.67	0.25**
Live city	0.62	0.18***	0.57	0.18***	0.48	0.21**	0.47	0.21**
Live suburb	0.35	0.17*	0.30	0.17*	0.25	0.19	0.24	0.20
Live south	0.86	0.11***	0.86	0.11***	0.77	0.12***	0.78	0.12***
Own Car	0.26	0.16	0.19	0.18	-0.08	0.18	-0.14	0.20
Exercise	-0.21	0.14	-0.22	0.14	-0.38	0.15**	-0.38	0.15**
Ever smoke	-0.25	0.11**	-0.25	0.11**	-0.22	0.12*	-0.21	0.12*
Check nutrit	-0.18	0.14	-0.19	0.14	-0.23	0.16	-0.24	0.16
Check ingre	-0.94	0.14***	-0.94	0.14***	-0.81	0.16***	-0.82	0.16***
Soda drinker	1.54	0.11***	1.51	0.11***	1.16	0.13***	1.15	0.13***
BMI	0.04	0.01***	0.04	0.01***	0.03	0.01**	0.02	0.01**
Lose weight	-0.15	0.12	-0.13	0.12	-0.17	0.13	-0.17	0.13
Worker	0.66	0.19***	0.60	0.19***	0.63	0.21***	0.60	0.22***
Hours Work	2e-4	7e-5***	2e-4	7e-5***	2.6E-4	8E-5***	2.2e-4	8e-5***
Black	0.18	0.13	0.19	0.13	0.07	0.15	0.07	0.15
Hispanic	0.50	0.15***	0.49	0.15***	0.30	0.16*	0.31	0.16*
Age	-0.04	0.02***	-0.06	0.02***	-0.05	0.03*	-0.05	0.03*
Born in US	0.75	0.21***	0.67	0.22***	0.60	0.25**	0.57	0.25**
Female	-0.48	0.11***	-0.48	0.11***	-0.63	0.12***	-0.63	0.14***
Married	0.05	0.13	0.07	0.13	-0.02	0.14	-0.07	0.14
Family Size	0.05	0.04	0.04	0.04	-0.02	0.04	-0.02	0.04
Highest Grade	0.01	0.02	0.04	0.04	-0.02	0.04	-0.02	0.04
Did 3 survey	1.81	0.16***	1.79	0.17***	1.78	0.20***	1.77	0.20***
R ²	0.52		0.52		0.09		0.08	
Num. Obs.	6,955		6,955		5,794		5,794	

Note: *** p < 0.01, ** p < 0.05, * p < 0.10.

Checking ingredients and drinking soda are highly statistically significant in all four specifications. Adults who check ingredients consumed fast food fewer times while those who drink sugary beverages ate fast-food more times. Again, checking nutrition labels is not statistically significant in any of the specifications. BMI is consistently significant and positive, indicating heavier adults eat fast food more often. Exercising is negatively associated with fast-food consumption when the sample is restricted to respondents who ate any fast food.

Both of the time variables are positive and statistically significant in all four specifications. This means being employed and working more hours raises the frequency of fast-food consumption. This result is consistent with convenience being a major factor in the appeal of fast food. The coefficients on the demographic factors show that Hispanics, men, younger adults and the American-born eat fast food more frequently. These results are consistent with earlier findings based on data from the National Health and Nutrition Examination Survey (NHANES) (Fryar and Ervin 2013) and the CSFII (Fanning et al. 2010; Kim and Leigh 2011).

5.4 Negative Binomial Estimates of Number of Times Respondents Ate Fast Food

Results in table 4 use OLS, but these regressions might not be appropriate since the dependent variable is limited to integers between 0 and 21. Moreover, the dependent variable is not normally distributed, but instead displays a smooth decline from 0 to 21. To account for these issues this section uses a negative binomial regression model. Two different model specifications are used to account for possible non-linearity in the association between fast-food consumption and income and wealth.

In both of the quadratic specifications (columns 1 and 3) higher wealth is associated with fewer fast-food meals. For example, column 1 shows that each \$100,000 increase in wealth is associated with a 3.4% ($1 - 0.966$) decrease in the number of fast food meals. In contrast, a

\$100,000 increase in income is associated with a 10 to 11% increase in the number of fast-food meals. These results support the hypothesis that the poor eat more fast food than the rich when we measure socioeconomic status with wealth, but not when using income as the measure. Furthermore, the association with wealth may have little practical significance as a large change in wealth corresponds to a relatively small change in the number of fast-food meals consumed.

In the specifications using quintiles (columns 2 and 4), the results indicate adults in the top three wealth quintiles eat fewer fast-food meals than those in the lowest quintile. Comparing the extremes based on all respondents, adults in the top wealth quintile eat 22.8% fewer fast-food meals than those in the lowest quintile. Income is again positively related to fast-food intake. Adults in the top four income quintiles eat more fast food than those in the lowest quintile. The biggest difference occurs at the fourth income quintile; among all respondents, adults in that category eat 20.9% more fast-food meals than those in the lowest quintile. Overall, the results suggest a more complex relationship between fast food and socioeconomic status than a simple income gradient. The poor, as measured by wealth, eat more fast food, but the poor as measured by income eat less.

The control variables exhibit the expected signs: Blacks, Hispanics, men, adults in central cities and the South eat more fast-food meals. Age is associated with less fast-food consumption. The results for the two time (employment) variables speak to the appeal of the convenience of fast food. Workers eat 15% to 18% more fast-food meals than non-workers and each additional 100 hours of work is associated with a half percent increase in the number of fast-food meals.

Most of the health-related variables are statistically significant. Adults reporting regular exercise eat fewer fast-food meals while those reporting soda consumption eat more. Smokers

consume roughly 5% to 7% fewer fast-food meals than non-smokers. This result supports the idea that nicotine can be used as an appetite suppressant rather than smoking being an indicator of lack of interest in health. Curiously, checking ingredients, but not nutrition labels, is associated with fewer fast-food meals. Regularly checking ingredient labels is associated with 16% to 23% fewer fast-food meals.

Table 5: Negative Binomial Regressions on Frequency of Fast Food Consumption

	(1) Number Times All Exp(β)	Std. Err.	(2) Number Times All Exp(β)	Std. Err.	(3) Number Times Eaters Exp(β)	Std. Err.	(4) Number Times Eaters Exp(β)	Std. Err.
Wealth	0.966***	0.01			0.984***	0.01		
Wealth ²	1.001***	0.01			1.000**	0.01		
Income	1.111***	0.04			1.104***	0.04		
Income ²	0.977***	0.01			0.978***	0.01		
Wealth Q2			0.972	0.04			1.005	0.03
Wealth Q3			0.911**	0.04			0.946	0.04
Wealth Q4			0.876***	0.05			0.930*	0.04
Wealth Q5			0.772***	0.05			0.872***	0.04
Income Q2			1.101**	0.04			1.075**	0.04
Income Q3			1.175***	0.04			1.121***	0.04
Income Q4			1.209***	0.05			1.168***	0.04
Income Q5			1.148***	0.05			1.123**	0.05
Highest grade	0.997	0.01	0.997	0.01	0.999	0.01	1.000	0.01
Live city	1.143***	0.04	1.142***	0.04	1.095**	0.04	1.093**	0.04
Live suburb	1.078*	0.04	1.077*	0.04	1.049	0.03	1.049	0.03
Live south	1.224***	0.02	1.226***	0.02	1.162***	0.02	1.164***	0.02
Own Car	1.068*	0.04	1.059	0.04	0.980	0.0325	0.972	0.04
Exercise	0.945*	0.03	0.946*	0.03	0.925***	0.03	0.926***	0.03
Ever smoke	0.935***	0.03	0.936***	0.03	0.954**	0.02	0.955**	0.02
Check nutrit	0.970	0.03	0.969	0.03	0.960	0.0279	0.960	0.03
Check ingre	0.767***	0.03	0.766***	0.03	0.837***	0.03	0.836***	0.03
Soda drinker	1.558***	0.03	1.559***	0.0	1.306***	0.02	1.305***	0.02
BMI	1.009***	0.01	1.009***	0.01	1.005***	0.01	1.005***	0.01
Lose weight	0.999	0.03	0.999	0.03	0.978	0.03	0.978	0.02
Worker	1.179***	0.04	1.169***	0.04	1.153***	0.04	1.146***	0.04
Hours Work	1.005***	0.01	1.005***	0.01	1.005***	0.01	1.005***	0.01
Black	1.061**	0.03	1.065**	0.03	1.019	0.03	1.018	0.03
Hispanic	1.124***	0.03	1.126***	0.03	1.056*	0.03	1.057*	0.03

Age	0.983***	0.01	0.983***	0.01	0.990**	0.01	0.991**	0.01
Born in US	1.198***	0.05	1.197***	0.05	1.137***	0.04	1.133***	0.04
Female	0.873***	0.03	0.875***	0.03	0.873***	0.02	0.874***	0.02
Married	1.033	0.03	1.027	0.03	0.992	0.02	0.989	0.02
Did 3 survey	1.758***	0.04	1.753***	0.04	1.53***	0.04	1.525***	0.04
Intercept	1.937**	0.27	1.957**	0.27	2.933***	0.23	2.910***	0.23
Log Likelihood χ^2	1156.1***		1162.3***		762.1***		767.4***	
Num. Obs.	6,955		6,955		5,794		5,794	

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

5.5 Model Predictions

To illustrate the magnitude of the association between the explanatory variables and fast-food consumption this section uses the estimated regression coefficients for wealth, wealth squared, income and income squared from tables 3 and 4 to calculate the chance a person with a particular set of characteristics eats fast food and how often s/he eats it. These results illustrate that large changes in income and wealth are not associated with significant changes in fast-food consumption.

The baseline characteristics are taken from rounding the mean values for a fast-food eater (table 2, column 2). The baseline person is a 47-year-old suburban married white male, born in the U.S., who lives outside the South, worked last year for 1,800 hours, smoked at some time in his life, currently drinks soda, has a BMI of 29 and completed all NLSY79 fast-food surveys. Table 6 shows what happens to the chance this baseline individual eats fast food (column 1), is a frequent fast-food eater (column 2) and number of times he eats fast food (column 3) as wealth and income vary from poor to rich.

The probabilities in the table's top row shows the chance a very poor person has of eating food. In particular if a person with baseline demographics has no income and no wealth he would have a 91.3% chance of eating fast food, a 30.1% chance of being a frequent fast-food eater, and is expected to eat fast food 5.1 times in the 21-day sample period. The results change

little moving from the bottom to the median of the wealth and income distributions. The 50th percent line shows that giving the baseline person a median income (\$65,000) and median wealth (\$138,500) results in a 90.4% chance of eating fast food, a 31.6% chance of being a frequent eater, and an expected 5.1 fast-food meals over a 21-day period. Moving the baseline person from the bottom to the top percentile only changes the expected number of fast-food meals from 5.1 to 4.6. The chance of eating any fast food falls from 91.4% to 84.6% and the likelihood of being a frequent fast-food eater falls from 30.7% to 28.9%.

Table 6: Predicted Fast-Food Consumption of Baseline Respondent Eats Fast Food as Income and Wealth Change

Wealth and Income	(11) Probability Ate Fast Food	(12) Probability Frequent Eater	(13) Number Meals Eaten
\$0 Both	91.3%	30.1%	5.1
10 th Percentile	91.4%	30.7%	5.1
20 th Percentile	91.4%	31.2%	5.1
30 th Percentile	91.8%	28.0%	5.2
40 th Percentile	90.9%	31.7%	5.1
50 th Percentile	90.4%	31.6%	5.1
60 th Percentile	89.8%	31.5%	5.1
70 th Percentile	89.0%	31.3%	5.0
80 th Percentile	87.6%	30.6%	4.9
90 th Percentile	84.6%	28.9%	4.6

Note: See figure 2 note for percentile cutoffs.

Changes in access also produce only small changes in fast-food consumption. Moving the baseline adult with income and wealth in the 50th percentile from the suburbs to the central city increases the chance he eats fast food from 90.4% to 91.4%. Moving him to a rural area lowers the chance to 88.6%. Moving from the suburbs to an urban area hardly changes the chance of being a frequent fast-food eater (31.6% to 31.4%). Moving the baseline suburban person to a rural area lowers the chance of being a frequent fast-food eater from 31.6% to 26.1%.

Changing the health variables produces larger changes in fast-food consumption than does changing income, wealth, and access. For example, the baseline person with median income and wealth has a 90.4% chance of eating fast food. Changing three of the characteristics so that he reads nutritional labels, checks ingredients and does not drink sugared soda lowers the probability of eating fast food to 68.2%, a drop of over twenty-two percentage points. These same three health changes lower the probability of being a frequent fast-food eater from 31.6% to 14.8% and reduce the predicted number of fast-food meals eaten by half, from 5.1 to 2.5.

Finally, only large changes in leisure time result in substantial changes in fast-food consumption. For example, changing the baseline adult from working 1,830 hours, or about 46 weeks a year, to having no job reduces the chance of eating fast food from 90.4% to 88.5%, reduces the likelihood of frequent fast-food consumption from 31.6% to 22.4%, and reduces the predicted number of fast-food meals from 5.1 to 4. Overall the results suggest that changes in health interest variables offer the most promising path to lowering adult fast-food consumption.

5.6 Longitudinal Analysis

Because the NLSY79 tracks the same individuals in each survey it is possible to investigate how changes in wealth and income are associated with changes in fast-food consumption. Because the NLSY79 did not include wealth questions in 2010, this section compares data from just two surveys (2008 and 2012).

Plotting (not shown for space reasons) changes in income and wealth against changes in fast-food consumption do not show any positive or negative association between financial changes and changes in fast-food consumption.² The correlation between the change in wealth and the change in eating fast food is -0.003 ($p = 0.79$) and the correlation between the change in

² Plots are available from the authors upon request.

income and the change in eating fast food is -0.005 ($p = 0.72$), confirming the lack of linear association. Together the graphs and correlations indicate that becoming richer or poorer does not lead adults to change fast-food consumption. Moreover, the edges of the graphs show that even extremely large changes in income/wealth are not associated with changes in fast-food consumption.³

6. Conclusions

This paper asks the question of whether there are income and wealth gradients in fast-food consumption among U.S. adults, with the poor eating more fast food than the rich. The descriptive analysis does not find such a gradient. Instead, adults from all along the income and wealth spectrums eat fast food, with the middle class eating slightly more than the poor and the wealthy. The regression analyses also produce little evidence of a wealth gradient: adults in the lowest wealth quintile eat somewhat more fast food than those in the wealthiest quintile, but not more than the middle quintiles. Contrary to the stereotype, adult fast-food consumption tends to rise as income rises, those in the poorest income quintile eat fast food less frequently than those in the higher quintiles.

The opposing signs on the wealth and income variables indicate that these two measures of SES have different relationships with adult fast-food consumption. This supports the behavioral economics argument that consumers generally do not smooth lifetime consumption per the permanent income and life-cycle hypotheses. However, the magnitudes of the associations between both SES measures and fast-food consumption are small, suggesting low

³ It is doubtful the macroeconomic downturn during the observation period impacts the relationship between wealth and fast-food changes. First, the majority of NLSY79 surveys in 2008 were completed before Lehman Brothers went bankrupt, the event that focused general attention on the deteriorating economy. Second, research by Dave and Kelly (2012) find U.S. unemployment is positively, not negatively, associated with consumption of snacks and fast food.

practical significance. Consequently, this analysis suggests that policies to reduce fast-food consumption targeted specifically at the poor are unlikely to reduce SES disparities in nutrition-related health problems.

The results offer some support for the model's prediction that greater access to fast food is positively associated with consumption: living in the central city and in the South are consistently associated with greater adult fast-food intake. Owning a car is associated with a higher likelihood of fast-food consumption, but not the other measures of fast food. In terms of geographically targeting policy to reduce adult fast-food consumption, the findings suggest that focusing on central cities and the South could be useful.

As several prior studies have reported, we find BMI is positively associated with fast-food consumption. However, respondents who reported trying to lose weight were no less likely to eat fast food than others. Curiously, checking ingredient labels, but not nutritional labels, is associated with a lower probability of eating fast food and less frequent fast-food consumption. Learning what drives this difference would help policy makers in efforts to encourage consumers to read and respond to both types of labels and could indicate useful changes in how nutrition information is conveyed.

The results also indicate that decreased soda consumption is associated with fewer fast-food meals, suggesting that policy to reduce consumption of sugary drinks might reduce fast-food consumption. If soda taxes decrease the quantity of sodas demanded, the demand for fast food might decrease, but this causal direction is questionable. It may well be that consumers stop for fast food and then get a soda as a complement, rather than vice versa. The marketing strategy of bundling of food and beverages into "value meals" encourages the consumption of both.

Finally, the consistently positive associations between hours worked and fast-food consumption indicate the power of convenience in consumers' meal choices. Rather than fight the influence of convenience, policy should strive to make healthier foods more convenient. Family and education do not seem to matter much. This suggests, but cannot prove, that educational campaigns will likely have little impact on reducing fast-food consumption.

The results of this analysis must be tempered with some caveats. First, self-reported fast-food consumption may be underreported. Furthermore, the data do not include information on the amount spent or the types of foods purchased in fast-food restaurants. Thus, a visit to McDonald's for a salad counts as a fast-food meal, just as does a Big Mac value meal. Third, the NLSY79 does not include data on the price of food items, so the analysis relies on geographic measures to account for price variations. Fourth, the NLSY79 respondents were all in their 40s and early 50s at the time of the fast-food surveys. Children and young adults may have different fast-food eating patterns. Finally, the analyses are not part of a true experiment and thus cannot establish causality.

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Figure Captions

Figure 1: Distribution of Number of Times Respondents Ate Fast Food over Three Week Period.

Bar chart of percent who ate fast food a given number of times

Figure 2: Percentage of Respondents Who Ate Fast Food by Income and Wealth Decile

Side-by-side bar chart showing percent who ate fast food in each decile of the income and wealth distributions

Figure 3: Number of Fast-Food Meals by Income and Wealth Decile

Side-by-side bar chart of number of fast-food meals consumed on average in each decile of the income and wealth distributions