Does How you Pay Affect How you Eat? Assessing Differences in Nutritional Quality of Food Acquisitions by Payment Type

Eliana Zeballos[1] , Lisa Mancino[2], and Biing-Hwan Lin[3]

Abstract

In this paper we explore 1) whether people acquire more healthful food when paying with cash than using other methods of payment; and 2) whether the effect of payment type differs between food-at-home and food-away-from-home events. We use the National Household Food Acquisition and Purchase Survey (FoodAPS) data to assess whether the nutritional quality of food purchases differs by payment type. Specifically, we test whether FoodAPS households acquire healthier items when paying with cash compared to households that pay with other methods of payment. We use the Guiding Stars Program (GSP) algorithm as a measure of nutritional quality to compare the nutritional quality of purchases by payment type. We find that individuals who use cash acquire less-healthful food items compared to when individuals use other methods of payment. Furthermore, when we compare the healthfulness of food-at-home and food-away-from-home events, we find that people are consistent with their purchasing behavior and method of payment. Finally, we find that the GSP score of food acquired with cash is higher compared with other methods of payment only among Millennials and Generation X.

JEL Classifications: I12, I18,

Keywords: FoodAPS, Guiding Stars, Payment Type

The opinions expressed here are those of the authors and cannot be attributed to the Economic Research Service or the U. S. Department of Agriculture.

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What is the Issue?

Unplanned purchases are characterized by (i) rapid decision-making, (ii) a bias towards immediate possession, and (iii) little attention to potential negative consequences (Rook and Hoch 1985, Rook 1987, Kacen and Lee 2002). As such, it is not surprising that unplanned purchases when grocery shopping tend to be associated with unhealthful food items (Thomas, Desai et al. 2011). The use of credit cards may also nudge shoppers to make more unplanned choices, thus buying more impulse items when paying by credit versus paying with cash. An explanation for why payment type can impact what we buy is based on the finding that the link between the consumption experience and paying for that experience is tighter when paying with cash compared to paying with credit (Prelec and Loewenstein 1998). This concept, known as coupling, refers to the degree to which consumption calls to mind thoughts of payments. Thus, when we pay with cash we are more likely to evaluate the cost of an item and more carefully consider whether or not we actually need it. In this sense, paying by credit cards tend to weaken coupling, whereas paying with cash increases the degree of coupling. On the other hand, paying with cash is less traceable as there is no monthly bill that records the transaction, which could contribute to more unplanned purchases. In order to test these contradictory theories we explore 1) whether people acquire more healthful food when paying with cash than using other methods of payment; and 2) whether the effect of payment type differs between food-at-home and food-away-from-home events.

What did the Study Find?

In this paper we find that individuals who use cash acquire less-healthful food items compared to when individuals use other methods of payment. Furthermore, when we compare the healthfulness of food-at-home and food-away-from-home events, we find that people who use cash acquire less-healthful food items at home as well as away from home. When we look at different store types and eating places we do not find statistically significant differences except for when shopping at other healthy FAH venues, which includes farmers markets and specialty stores. At these venues, the GSP score of food acquired with cash

is higher than when food is acquired with other methods of payment. Finally, among Millennials and Generation X, we find that the GSP score of food acquired with cash is higher than when using other methods of payment.

How was the Study Conducted?

We use the USDA's National Household Food Acquisition and Purchase Survey (FoodAPS). To assess nutritional quality, we use the GSP, which rates the nutritional quality of food using information from the Nutrition Facts Panel and ingredients list. The scores that each food item receives is based on the assignment of credits and debits. Since the GPS was designed to point consumers towards foods that have more vitamins, minerals, dietary fiber, whole grains, and less fats, cholesterol, sugar and sodium, the GSP is used only to show positive "stars" (one guiding start for good nutritional value, two guiding stars for better nutritional value, and three for best nutritional value). In this study, we construct the GSP for all food items acquired at home and away from home. Instead of censoring negative values to zero, we use negative values as a measure of unhealthfulness. Once each item purchased is scored, we calculate the average star rating of each event, where we use three different weighting methods to calculate averages: no weights; weighting each item purchased by its share of total calories purchased; and weighting each item by its share of total grams purchased.

We use two separate models to examine the relationship between nutritional quality and payment type. In the first, we simply regress payment type on each measure of nutritional quality, while controlling for a number of observable characteristics, such as household income, race, education, use of grocery lists and self-perceived diet quality. However, it is likely that payment type is correlated with unobserved characteristics that also influence diet quality. Thus, we also look use a fixed effects model to examine how changes in payment type correlates with changes in nutritional quality of food purchases. We do separate analysis for food at home (FAH) and food away from home (FAFH) events and test whether the effect of payment type in the FAH models differs from the effect of payment type in the FAFH models.

Does How you Pay Affect How you Eat? Assessing Differences in Nutritional Quality of Food Acquisitions by Payment Type

1 INTRODUCTION

Unplanned purchases are characterized by (i) rapid decision-making, (ii) a bias towards immediate possession, and (iii) little attention to potential negative consequences (Rook and Hoch 1985, Rook 1987, Kacen and Lee 2002). As such, it is not surprising that unplanned purchases when grocery shopping tend to be associated with unhealthful food items. The use of credit cards may also nudge shoppers to make more unplanned choices, thus buying more impulse items when paying by credit versus paying with cash. For instance, Thomas, Desai et al. (2011) show that consumers are more likely to buy less healthful food products when they use a credit card as the method of payment than when they use cash. One explanation for why payment type can impact what we buy is based on the finding that the link between the consumption experience and paying for that experience is tighter when paying with cash compared to paying with credit (Prelec and Loewenstein 1998). This concept, known as coupling, refers to the degree to which consumption calls to mind thoughts of payments. Thus, when we pay with cash we are more likely to evaluate the cost of an item and more carefully consider whether or not we actually need it. In this sense, paying by credit cards tend to weaken coupling, whereas paying with cash increases the degree of coupling.

On the other hand, paying with cash is less traceable as there is no monthly bill that records the transaction, which could contribute to more unplanned purchases. In order to test these contradictory theories this report examines whether individuals who use cash acquire more-healthful food items compared to when individuals use other methods of payment. Furthermore, we are interested in comparing the healthfulness of food-at-home and food-away-from-home events to test whether people are consistent with their purchasing behavior and method of payment. Specifically, this paper answers the following two questions:

1. Do people acquire more healthful food when paying with cash than when using other methods of payment?
2. Does the effect of payment type differ between food at home and food away from home events?

We use the USDA's National Household Food Acquisition and Purchase Survey (FoodAPS). To assess nutritional quality, we use the guiding stars program (GSP). The GPS rates the nutritional quality of food using information from the Nutrition Facts Panel and ingredients list. The scores that each food item receives is based on the assignment of credits and debits. Since the GPS was designed to point consumers towards foods that have more vitamins, minerals, dietary fiber, whole grains, and less fats, cholesterol, sugar and sodium, the GSP is used only to show positive "stars" (one guiding start for good nutritional value, two guiding stars for better nutritional value, and three for best nutritional value). In this study, we construct the GSP for all food items acquired at home and away from home. Instead of censoring negative values to zero, we use negative values as a measure of unhealthfulness. Once each item purchased is scored, we calculate the average star rating of each event, where we use three different weighting methods to calculate averages: no weights; weighting each item purchased by its share of total calories purchased; and weighting each item by its share of total grams purchased.

We use two separate models to examine the relationship between nutritional quality and payment type. In the first, we simply regress payment type on each measure of nutritional quality, while controlling for a number of observable characteristics, such as household income, race, education, use of grocery lists and self-perceived diet quality. However, it is likely that payment type is correlated with unobserved characteristics that also influence diet quality. Thus, we also look use a fixed effects model to examine how changes in payment type correlates with changes in nutritional quality of food purchases. We do separate analysis for food at home (FAH) and food away from home (FAFH) events and test whether the effect of payment type in the FAH models differs from the effect of payment type in the FAFH models.

2 DATA

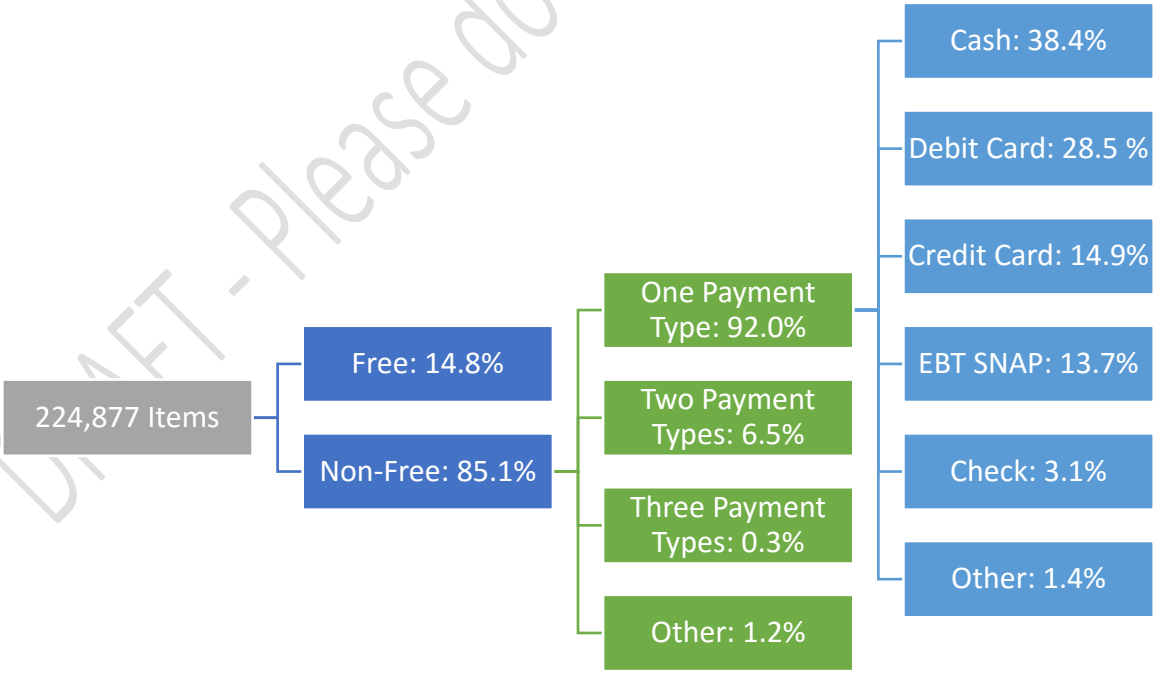
2.1 FOOD ACQUISITION PURCHASE SURVEY (FOODAPS)

The USDA's Food Acquisition and Purchase Survey (FoodAPS) is a nationally representative survey of households in the United States that collected information on all foods purchased and acquired by all household members over a one week period from April 2012 to January 2013 that is comparable to other national-level surveys (Clay, Ver Ploeg et al. 2016). The survey collected detailed information about all of a

household's food acquisitions, which is comprised of all food and drinks, that were brought into the home (FAH) as well as meals, snacks, and drinks acquired outside of the home (FAFH), including the nutritional quality of each item acquired, the amount paid for each item, and the payment method for each event.

In total, 4,826 households participated in the survey and 98 percent of households (4,724 households) reported acquiring food at least one time during the week. The data contains a total of 224,877 food items with nutrition information (calories and grams) acquired by a household member 15 years or older. Figure 1 presents a breakdown of the food items by method of payment. About 85 percent of all items were non-free. Out of the non-free items, 92.0 percent were acquiring using only one method of payment. Out of these items, 38.4 percent were acquired using cash, 28.5 percent a debit card, 14.9 percent a credit card, 13.7 percent EBT-SNAP benefits, 3.1 percent using a check, and 1.4 percent other method of payment (0.2% EBT-TANF, 0.1% EBT-Unknown, 0.6% WIC, 0.2% Gift Card, and 0.3% unknown). For the rest of the analysis we will focus only on non-free items that were acquired using only one method of payment that can be either cash, check, credit card, debit card, or EBT-SNAP (173,545 food items).

FIGURE 1: FOOD ITEMS ACQUIRED AND METHOD OF PAYMENT



Source: Authors' calculations using 2012-2013 FoodAPS data.

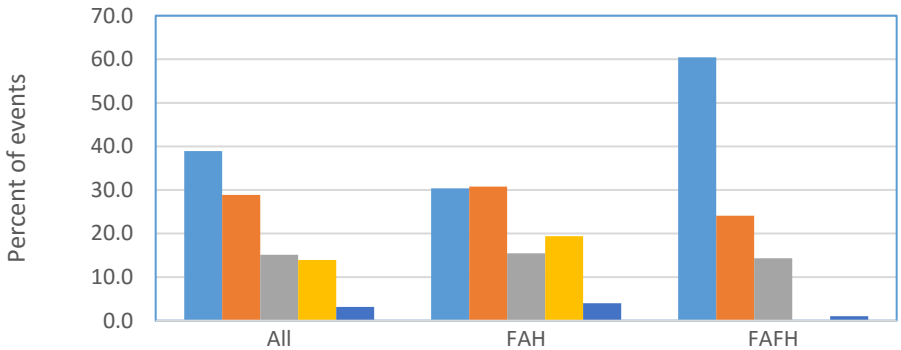
2.1.1 Food at Home

We consider food to be food at home if it was acquired: (1) at large grocery stores and supermarkets; (2) at small and specialty FAH stores (such as seafood or meat specialty stores and bakeries); (3) at all other FAH stores (convenience stores, pharmacies, dollar stores); (4) via own production (gardening, hunting, and fishing); or (5) at food banks. About 71.6 percent of all food items are considered FAH (124,215 items); of these, 85.8 percent were reported to have acquired food from large grocery stores and supermarkets; 2.8 percent from small and specialty FAH stores; 11.3 percent from all other FAH stores; and 0.01 percent from own production. About a third of FAH events were by SNAP households, 21.7 percent by eligible non-SNAP households, and 46.4 percent by non-eligible households. Finally, 30.4 percent of these items were acquired using cash, 30.8 percent a debit card, 15.5 percent a credit card, 19.4 percent EBT-SNAP benefits, and 4 percent using a check (Figure 2).

2.1.2 Food Away From Home

We consider food to be food away from home if it was acquired: (1) at restaurants and eating places; (2) at school, preschool, or afterschool programs; (3) from friends, family, or places of workshop; (4) at work; or (5) from Meals on Wheels. About 28.4 percent of all food items are considered FAFH (49,330 items); of these, 93.7 percent were reported to have been acquired at restaurants and eating places, 2 percent at school, 0.7 percent from friends and family, 3.5 percent at work, and 0.1 percent from Meals on Wheels. About 22.9 percent of FAFH events were by SNAP households, 21.2 percent by eligible non-SNAP households, and 55.9 percent by non-eligible households. Finally, 60.5 percent of these items were acquired using cash, 24.1 percent a debit card, 14.3 percent a credit card, 0.1 percent EBT-SNAP benefits, and 1.4 percent using a check (Figure 2).

FIGURE 2: FAH VS FAFH AND METHOD OF PAYMENT



	All	FAH	FAFH
Cash	38.9	30.4	60.5
Debit Card	28.9	30.8	24.1
Credit Card	15.1	15.5	14.3
EBT-SNAP	13.9	19.4	0.1
Check	3.2	4.0	1.0

Source: Authors' calculations using 2012-2013 FoodAPS data.

2.2 GUIDING STARS

To assess nutritional quality, we use the GSP because of the programs capacity to effectively discriminate between nutritious and less nutritious food products. The GPS program evaluates the nutrient content of foods with the goal to help consumers choose foods that are consistent with the dietary guidelines for Americans (DGA). The scores that each food item receives is based on the assignment of credit points to products for nutrients to encourage and assigns debits point for nutrients to limit. Specifically, the program encourages vitamins and minerals, whole grains, and dietary fiber, and it limits trans fatty acids, saturated fat, cholesterol, added sodium, and added sugars (Fischer, Sutherland et al. 2011).

We use two separate algorithms: 1) for general foods and beverages (Table 4), and 2) for meats, poultry, seafood, dairy, and nuts (Table 2). This distinction is made to recognize that there are different types of foods with inherently different nutrient profiles. Meats and seafood have intrinsically higher levels of certain nutrients such as saturated fat and cholesterol, and do not contain fiber and whole grains. Similarly, nuts have higher levels of saturated fat, but do not contain naturally occurring fiber.

TABLE 1: ALGORITHM TO EVALUATE GENERAL FOODS AND BEVERAGES

Nutrients to limit	Points 0	-1	-2	-3	-10
Trans fatty acid	<0.5 g (not listed in ingredients)	<0.5 g (listed in ingredients)	≤1 g	> 1 g	
Saturated fat	≤1 g (5% DV)	≤2 g (10% DV)	≤3 g (15% DV)	>3 g (>15% DV)	
Cholesterol	≤15 mg (5% DV)	≤30 mg (10% DV)	≤45 g (15% DV)	>45 mg (>15% DV)	
Added sugars	None Added	≤10% kcal	≤25% kcal	≤40% kcal	>40% kcal
Added sodium	≤120 mg (5% DV)	≤240 mg (10% DV)	≤360 g (15% DV)	≤600 g (25% DV)	>600 mg
Nutrients to encourage	**Points 3**	**2**	**1**	**0**	
Dietary fiber	≥3.75 g (15% DV)	≥2.5 g (10% DV)	>=1.25 g (5% DV)	<1.25 g (<5% DV)	
Vitamins and minerals	>=10% DV of 2 or more	≥10% DV of 1 OR ≥5% DV of 2 or more	≥5% DV o 1	<5% DV of 1	
Whole grain			≥1.5 g fiber		

Source: Fischer, Sutherland et al. (2011)

All foods are standardized to a 100 kilocalorie (kcal) serving size. This standardization allows us to compare products and adjust for serving size variation. Thresholds values for each nutrient are based on nutrient to calorie ratio per 100-kcal of energy, i.e., equivalent to 5 percent of energy intake based on a 2000-kcal diet. We use established daily values (DVs) for saturated fat, cholesterol, sodium, vitamins/minerals, and fiber.

Thresholds values for added sugar, whole grains, and trans fatty acids, which don't have DVs, are based on established dietary guidance and are assigned different ranges. In the case of added sugars, the cutoffs were calculated on the ideal of no added sugars, ≤10% of calories (based on WHO recommendations), and ≤25% of calories (based on the Institute of Medicine recommendations). In the case of trans fatty acids, the cutoffs were calculated if the amount was greater than zero (or >0.5 g), however, if no amount was listed (or <0.5 g), then to avoid a debit, ingredient list should have no indication of partially hydrogenated ingredients (Table 4 and Table 2).

TABLE 2: ALGORITHM TO EVALUATE MEATS, POULTRY, SEAFOOD, DAIRY, AND NUTS

Nutrients to limit	Points				
	0	-1	-2	-3	-10
Trans fatty acid	<0.5 g (not listed in ingredients)	<0.5 g (listed in ingredients)	≤1 g	> 1 g	
Saturated fat	≤1.5 g (7.5% DV)	≤2 g (10% DV)	≤2.5 g (12.5% DV)	>2.5 g (>12.5% DV)	
Cholesterol	≤60 mg (20% DV)	≤90 mg (30% DV)	≤120 g (40% DV)	>120 mg (>40% DV)	
Added sugars	None Added	≤10% kcal	≤25% kcal	≤40% kcal	
Added sodium	≤120 mg (5% DV)	≤240 mg (10% DV)	≤360 g (15% DV)	≤600 g (25% DV)	>600 mg
Nutrients to encourage	**Points**				
	3	**2**	**1**	**0**	
Dietary fiber	NA	NA	≥1.25 g (5% DV)	<1.25 g (<5% DV)	
Vitamins and minerals	≥10% DV of 2 or more	≥10% DV of 1 OR >=5% DV of 2 or more	≥5% DV o 1	<5% DV of 1	

Source: Fischer, Sutherland et al. (2011)

Finally, thresholds values for vitamins and minerals were based on FDA's daily values recommendations[4] (Table 3).

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TABLE 3: ALGORITHM TO EVALUATE VITAMINS

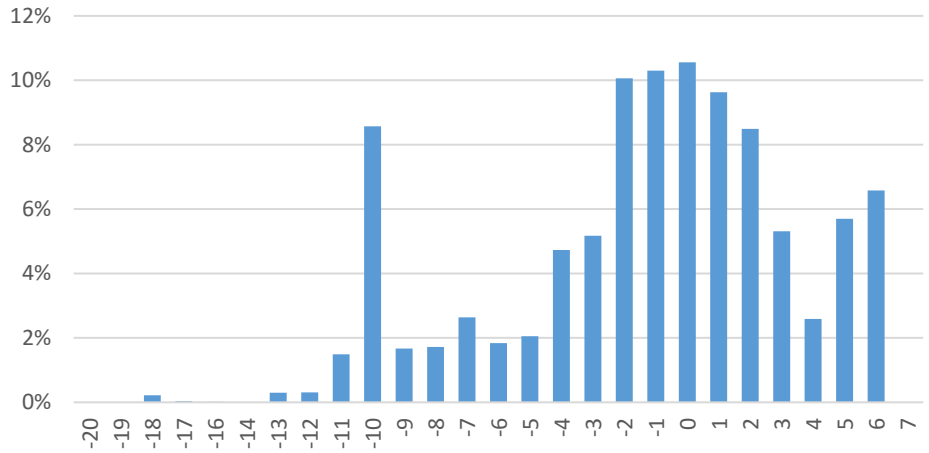
Vitamins	DV	Minerals	DV
Folate/Folic Acid	400 mcg	Calcium	1,000 mg
Niacin	20 mg	Copper	2 mg
Riboflavin	1.7 mg	Iron	18 mg
Thiamin	1.5 mg	Magnesium	400 mg
Vitamin A	5,000 IU = 1500 mcg	Phosphorus	1,000 mg
Vitamin B6	2 mg	Selenium	70 mcg
Vitamin B12	6 mcg	Zinc	15 mg
Vitamin C	60 mg		
Vitamin D	400 IU = 10 mcg		
Vitamin E	30 IU = 20 mg		
Vitamin K	80 mcg		

Source:https://www.accessdata.fda.gov/scripts/InteractiveNutritionFactsLabel/factsheets/Vitamin_and_Mineral_Chart.pdf

Then, the net score of a product is translated into stars for foods with a score above zero, which indicates that the positive nutrient contribution outweighs the negative nutrient contribution. Food products receive one start if the total score is 1 or 2 points, two stars if the total score is 3 or 4 points, and three stars if the total score is equal or greater than 5. In other words, food products receive one guiding star for good nutritional value, two guiding stars for better nutritional value, and three for best nutritional value.

Since, the GPS was designed to point consumers towards foods that have more vitamins, minerals, dietary fiber, whole grains, and less fats, cholesterol, sugar and sodium, the GSP is used only to show positive stars. In this study, we construct the GSP for all food items acquired at home and away from home but we don't censor negative values to zero and use negative values as a measure of unhealthfulness. Figure 3 presents the histogram of the total score by food item, which ranges from -20 to 7, with a mean of -1.3. The GPS score is slightly skewed to the left with almost half (48.9 percent) of items presenting a non-negative score.

FIGURE 3: GSP SCORE - HISTOGRAM



Source: Authors' calculations using 2012-2013 FoodAPS data. Survey weights were used to compute nationally representative estimates.

Table 4 presents the scores of food items by food categories. Fruits and vegetables account for 19.9 percent of all food items acquired with an average score of 3.4, where more than half (55.0 percent) received three stars reflecting their high nutrition value. Grains and Infant formula & baby foods are the other two categories with a positive average score (1.3 and 2.5, respectively). Beverages is the category with the lowest average score followed by fats and oils (-4.6 and -4.1 respectively).

TABLE 4: GSP SCORES BY FOOD CATEGORY

Food Category	% of all items	Average Score	Stars			
			0	1	2	3
Milk and dairy	7.0%	-2.1	18.1%	14.0%	3.8%	0.0%
Protein foods	13.3%	-1.9	15.3%	9.9%	5.3%	2.5%
Mixed dishes	15.0%	-1.6	12.8%	14.3%	1.2%	0.0%
Grains	8.3%	1.3	11.2%	44.8%	25.9%	3.7%
Snacks and sweets	12.8%	-3.0	9.5%	20.6%	1.0%	0.3%
Fruits and vegetables	19.9%	3.4	3.0%	16.2%	15.7%	55.0%
Beverages	15.9%	-4.6	13.9%	22.2%	6.2%	0.0%
Fats and oils, condiments, and sugars	7.7%	-4.1	4.8%	7.4%	4.0%	7.4%
Infant formula and baby food	0.2%	2.5	7.3%	13.3%	22.1%	43.0%

Source: Authors' calculations using 2012-2013 FoodAPS data. Survey weights were used to compute nationally representative estimates.

2.3 OTHER VARIABLES AND CONTROLS

The regression analysis we present in section 3 controls for a range of socioeconomic characteristics at the individual level and other controls at the household level[5] that may affect consumers' food choices, such as whether the consumer uses a grocery list and consumers' self-perceived diet quality (Table 5). Participants are, on average, 47 years old; 56 percent are female, and 49 percent are married. A quarter (25 percent) of the participants report their highest level of educational attainment to be a high school diploma or GED, and 20 percent a bachelor's degree. Overall, 60 percent of the participants are employed. Fourteen percent of PRs report being Hispanic, 78 percent being white, and 12 percent report being black (Table 1).

The mean household size is 2.4 people and 34 percent of households are in rural areas. On average, 15 percent of the households are food-insecure[6]. About 33 percent believe that it costs too much to eat healthy food, 22 percent are too busy to take the time to prepare healthy foods, and more than a third are on a food diet of some kind (either to lose weight or for some other health-related reasons). On average, 79 percent of the families don't think healthy food tastes good.

[5] In FoodAPS, the main food shopper or meal planner is selected to be the primary respondent (PR). The PR is asked to complete two in-person interviews: one before reporting any food acquisitions, and one after the food reporting week has been completed. These interviews collect demographic and other information, such as diet-related and health information. Therefore, since only the primary respondent completes the two in-person interviews, we will generalize their responses at the household level.

[6] We classify as food-insecure those households who reported experiencing either low or very low food security in the last 30 days.

TABLE 5: SUMMARY STATISTICS

	Questions	Mean	Std. Err.	[95% Conf. Interval]	
Individual level	Female (Yes = 1; No = 0)	0.56	0.01	0.54	0.58
	Age	46.7	0.40	45.9	47.6
	Age category (Millennials =1; Gen x = 2; Baby boomers = 3; Traditionalist = 4)	2.30	0.03	2.24	2.35
	High school diploma/ GED	0.25	0.01	0.22	0.28
	Bachelor's degree	0.20	0.02	0.16	0.23
	Married	0.49	0.01	0.46	0.52
	Employed	0.60	0.01	0.58	0.62
	Hispanic	0.14	0.01	0.13	0.15
	Race: White	0.78	0.01	0.75	0.81
	Race: Black	0.12	0.01	0.11	0.13
	BMI (Underweight = 1; Normal = 2; Overweight = 3; Obese = 4)	2.93	0.03	2.87	2.98
Household level	Food insecure (Low or very low food security = 1; otherwise = 0)	0.15	0.01	0.14	0.17
	Rural	0.34	0.04	0.25	0.42
	Household Size	2.43	0.02	2.40	2.47
	In general, how healthy is your family's overall diet? (Poor = 1 to Excellent = 5)	3.20	0.04	3.10	3.29
	It costs too much for (me/my family) to eat healthy foods (Agree = 1; Disagree = 0)	0.33	0.01	0.30	0.36
	I'm too busy to take the time to prepare healthy foods (Agree = 1; Disagree = 0)	0.22	0.01	0.20	0.24
	People in my family don't think healthy foods taste good (Agree = 0; Disagree = 1)	0.79	0.01	0.76	0.81
	The things that (I/my family) eat and drink now are healthy so there is no reason for (me/us) to make changes (Agree = 1; Disagree = 0)	0.42	0.02	0.39	0.46
	Do you think you eat the right amount of fruits and vegetables now, or do you think you should eat more? (Right amount = 3; More = 2; Less = 1)	2.30	0.02	2.26	2.34
	Are you on any kind of food diet? (Yes = 1; No = 0)	0.34	0.02	0.30	0.38
	How often do you shop with a grocery list? (Never = 1 to Almost always = 5)	3.40	0.07	3.25	3.55

Source: Authors' calculations using 2012-2013 FoodAPS data. Survey weights were used to compute nationally representative estimates.

3 RESULTS

We start this section by calculating the average star rating of each event, where we use three different weighting methods to calculate averages: no weights; weighting each item purchased by its share of total calories purchased; and weighting each item by its share of total grams purchased. Then, we use two separate models to examine the relationship between nutritional quality and payment type. In the first, we simply regress payment type on each measure of nutritional quality, while controlling for a number of observable characteristics, such as household income, race, education, use of grocery lists and self-perceived diet quality. However, it is likely that payment type is correlated with unobserved characteristics that also influence diet quality. Thus, we also look use a fixed effects model to examine how changes in payment type correlates with changes in nutritional quality of food purchases. We do separate analysis for food at home (FAH) and food away from home (FAFH) events and test whether the effect of payment type in the FAH models differs from the effect of payment type in the FAFH models.

Table 6 shows the average score by food event for the three types of weighting methods by payment method, the number of items acquired in each event, and the average percentage of the items with 0, 1, 2, and 3 stars in each event. More than half of the food events were acquired using cash (53.7%) and a quarter of the food events were acquired using a debit card (25.1%). Although the lowest percentage of events were acquired using EBT-SNAP and Check, those events had the largest number of items overall (12.6 and 12.5, respectively) and also the highest percentage of items with three stars (10.8% and 11.8%, respectively).

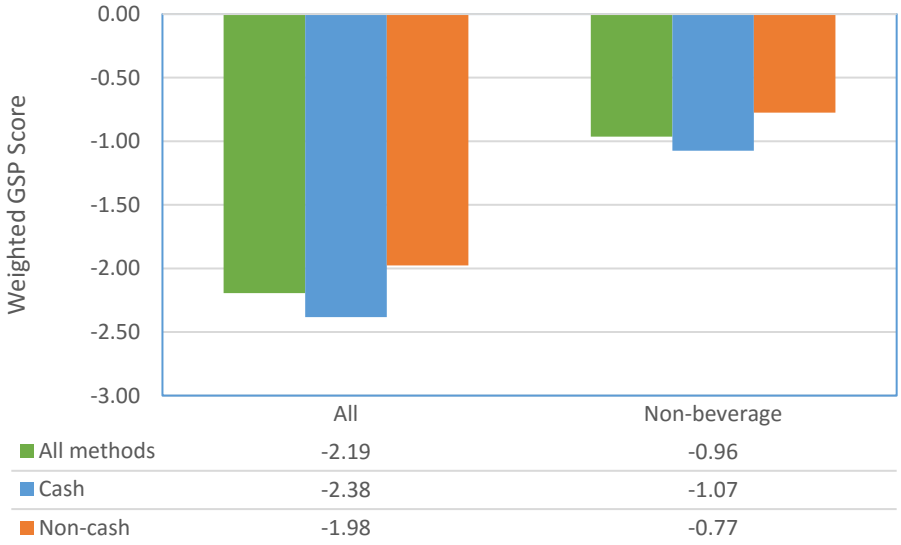
TABLE 6: WEIGHTED GSP SCORES BY METHOD OF PAYMENT

Method of Payment	% of all events	Weighted mean			# of items	% of items w/stars per event			
		Calories	Grams	None		0	1	2	3
Cash	53.7%	-2.0	-2.4	-1.9	3.6	11.1%	22.2%	4.6%	6.2%
Debit Card	25.1%	-1.9	-2.3	-1.7	7.0	11.9%	19.9%	6.1%	8.1%
Credit Card	17.0%	-1.4	-1.5	-1.1	6.9	11.9%	19.1%	7.2%	10.5%
EBT - SNAP	2.2%	-2.3	-2.8	-2.2	12.6	9.9%	13.8%	6.2%	10.8%
Check	2.0%	-1.5	-1.4	-1.1	12.5	11.1%	17.2%	9.2%	11.8%
All methods	100.0%	-1.9	-2.2	-1.7	5.4	11.4%	20.8%	5.6%	7.6%

Source: Authors' calculations using 2012-2013 FoodAPS data. Survey weights were used to compute nationally representative estimates.

Figure 4 presents the weighted GSP scores by grams for all items and non-beverage items by method of payment. GSP score is 20.2 percent lower when those events were acquired using cash compared to other methods. When we eliminate beverages, we find that the GSP score of events that were acquired using cash is 39.0 percent lower compared to other methods ($p<0.01$).

FIGURE 4: WEIGHTED GSP SCORES BY METHOD OF PAYMENT



	All	Non-beverage
All methods	-2.19	-0.96
Cash	-2.38	-1.07
Non-cash	-1.98	-0.77

Source: Authors' calculations using 2012-2013 FoodAPS data. Survey weights were used to compute nationally representative estimates.

In order to stablish whether these correlations hold when controlling for different socioeconomic characteristics, we estimate the following equation where we have a panel data and specify each individual as the panel variable (i) and each food event as the time variable (j):

$$GSP_{ij} = \beta_0 + \beta_1 Cash_{ij} + \beta_2 X_i + u_i + \epsilon_{it} \quad (1)$$

where GSP_{ij} is the GSP score of event j acquired by individual i; $Cash_i$ is a dummy variable equal to one if event j was acquired by individual i using cash, and zero otherwise; X_i is a series of sociodemographic variables of individual i described inTable 5: Summary Statistics Table 5 (individual effect), and ϵ_{it} is the individual, event-specific error term. Since there are more than one observation for an individual, ordinary least squares (OLS) estimates will yield inefficient parameter estimates if the error terms are correlated across observations for a given individual. Therefore, we also estimate equation (1) with individual fixed

effects. A fixed –effect model, as specified in equation (2), will yield consistent estimates as long as the remaining individual-specific, event-specific disturbance (ϵ_{ij}) is also uncorrelated with the regressors (Greene 2003):

$$(GSP_{ij} - \overline{GSP_i}) = \beta_0' + \beta_1'(Cash_{it} - \overline{Cash_i}) + (\epsilon_{it} - \bar{\epsilon}_i) \quad (2)$$

where $\overline{GSP_i}$, $\overline{Cash_i}$, and $\bar{\epsilon}_i$ represent individual averages. The fixed-effects estimator allows us to tease out the impact of event-varying variables. So in this case, the FE estimates would measure the impact of using cash on the GSP score of an event. Table 7: OLS Regression and FE Panel Regression: GSP Score Table 7 presents results from the estimation of equations (1) and (2) for all items and non-beverage items (specifications (1) through (4)). Cash has a negative effect on the weighted GSP score by total grams. This result is robust when we use individual fixed-effects and when we eliminate beverages.

TABLE 7: OLS REGRESSION AND FE PANEL REGRESSION: GSP SCORE WITH CASH VS. NON-CASH

	All food items		Non-beverages items	
	(1)	(2)	(3)	(4)
Cash	-0.30***	-0.30***	-0.15***	-0.22***
	(0.04)	(0.06)	(0.04)	(0.06)
Constant	-4.40***	-2.35***	-2.39***	-0.89***
	(0.28)	(0.04)	(0.23)	(0.03)
Observations	31,373	31,373	23,742	23,742
R-squared	0.06	0	0.02	0
Individual fixed effects	NO	YES	NO	YES
Controls	YES	NO	YES	NO

Robust standard errors in parentheses

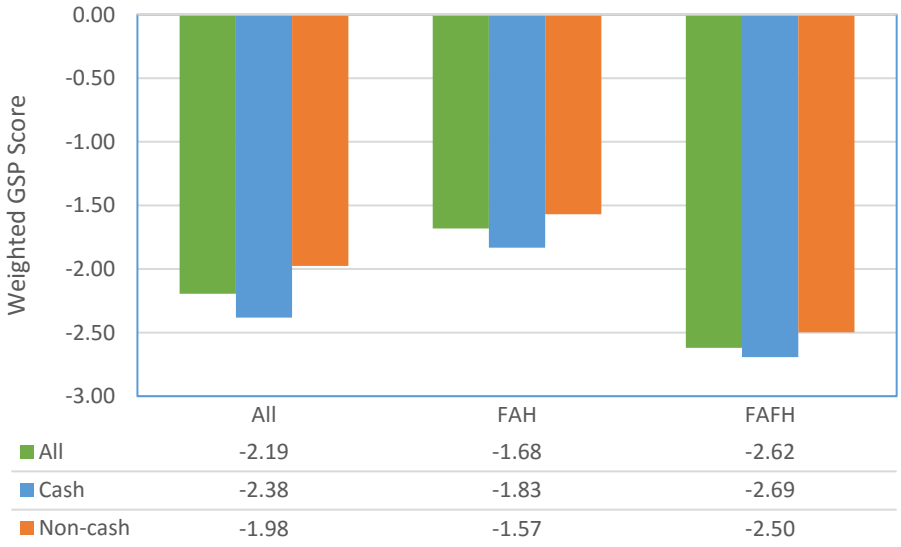
*** p<0.01, ** p<0.05, * p<0.1

Source: Authors' calculations using 2012-2013 FoodAPS data.

Figure 5 compares the weighted GSP scores by grams for FAH and FAFH events by method of payment. GSP score is 56 percent lower for FAFH compared to FAH events (p<0.01). The GSP score is 20.2 percent lower when those events were acquired using cash compared to other methods, and this difference is lower and

not statistically significantly different from zero when we look at just FAH and FAFH (16.6% and 7.6%, respectively).

FIGURE 5: GSP SCORE BY METHOD OF PAYMENT FOR FAH AND FAFH

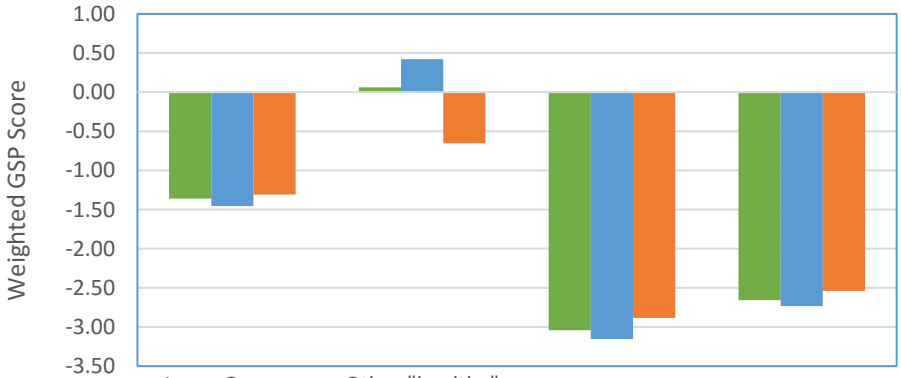


	All	FAH	FAFH
All	-2.19	-1.68	-2.62
Cash	-2.38	-1.83	-2.69
Non-cash	-1.98	-1.57	-2.50

Source: Authors' calculations using 2012-2013 FoodAPS data. Survey weights were used to compute nationally representative estimates.

Figure 6 compares the weighted GSP scores by grams for different store types and eating places by method of payment. We present the four major places where people acquire food that accounts for 95 percent of all food events: large grocery stores (31%), other healthy FAH (3%), all other FAH (11%), and eating places (50%). Overall, other FAH has the lowest GSP score of all four, which is not surprising as this category includes convenience stores, pharmacies, and dollar stores. We find that the GSP score in large grocery stores is 21.7 percent lower compared to other healthy FAH, but 55.3 percent and 48.9 percent higher compared to other FAH and eating places, respectively. In turn, GSP score in other FAH is 14.3 percent lower compared to eating places. All differences are statistically significantly different from zero. However, when we compare method of payment within each category, we do not find statistically significant differences except for other healthy FAH where the GSP score of food acquired with cash is 165 percent higher compared to food acquired with other methods of payment ($p<0.10$).

FIGURE 6: GSP SCORE BY METHOD OF PAYMENT FOR DIFFERENT STORE TYPES

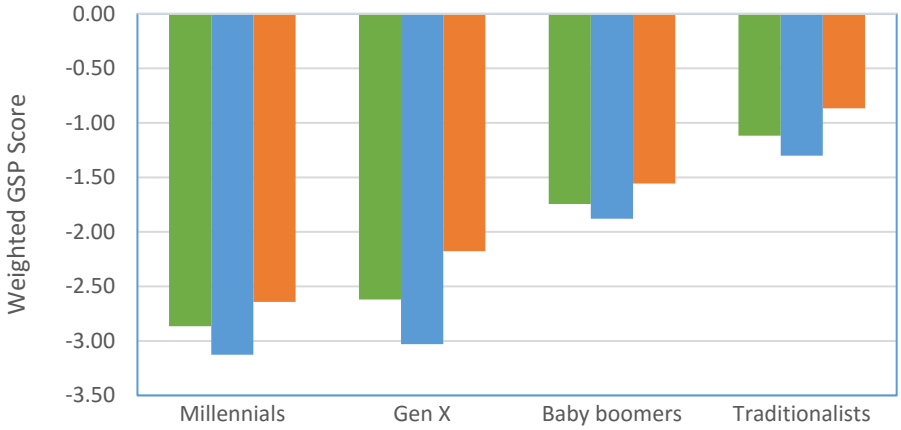


	Large Grocery Stores	Other "healthy" FAH	All other FAH	Eating places
All	-1.36	0.06	-3.04	-2.66
Cash	-1.46	0.42	-3.15	-2.73
Non-cash	-1.31	-0.65	-2.88	-2.54

Source: Authors' calculations using 2012-2013 FoodAPS data. Survey weights were used to compute nationally representative estimates.

To analyze whether older generations perceive cash differently than newer generations, Figure 7 compares the weighted GSP scores by grams for different age groups by method of payment. The four age groups are: Millennials (27%), Generation X (24%), Baby Boomers (36%), and Traditionalist (12%). Overall, traditionalists have the highest GSP score of all four age groups and Millennials the lowest. We find that the GSP score among Millennials is 64.9 percent lower compared to Baby Boomers and 156.3 percent lower compared to Traditionalists ($p<0.01$), however we do not find a statistically significant difference between Millennials and Generation X. GSP score among Baby Boomers is 55.4 percent lower compared to Traditionalists. When we compare method of payment within each category, we do not find statistically significant differences between the GSP score for events acquired with cash compared to other methods of payment among Baby Boomers and Traditionalists. However, we do find that the GSP score of food acquired with cash is 18.6 percent higher compared to food acquired with other methods of payment among Millennials ($p<0.05$) and 39 percent higher among Generation X.

FIGURE 7: GSP SCORE BY METHOD OF PAYMENT FOR DIFFERENT AGE GROUPS



	Millennials	Gen X	Baby boomers	Traditionalists
All	-2.87	-2.62	-1.74	-1.12
Cash	-3.13	-3.03	-1.88	-1.30
Non-cash	-2.64	-2.18	-1.56	-0.87

Source: Authors' calculations using 2012-2013 FoodAPS data. Survey weights were used to compute nationally representative estimates.

4 CONCLUSIONS

In this paper, we test two contradictory theories that may affect the healthfulness of food acquisitions. On one hand, cash may increase the degree of coupling and therefore when we pay with cash we are more likely to evaluate the cost of an item and more carefully consider whether or not we actually need it. On the other hand, paying with cash is not tractable as it does not leave a trace of the transaction which could contribute to more unplanned purchases. Our key findings are:

1. Individuals who use cash acquire less-healthful food items compared to when individuals use other methods of payment.
2. When we compare the healthfulness of food-at-home and food-away-from-home events, we find that people who use cash acquire less-healthful food items at home as well as away from home.
3. When we look at different store types and eating places we do not find statistically significant differences except for other healthy FAH where the GSP score of food acquired with cash is higher than when food is acquired with other methods of payment.

4. Finally, we find that the GSP score of food acquired with cash is higher compared with other methods of payment only among Millennials and Generation X.

These findings suggest that coupling may not be driving consumers' purchasing decisions. On the contrary, people seem to make more impulsive decisions when using cash and this may be explained by the fact that these transactions are non-tractable and easier to forget about.

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