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Examining the influence of perceived and objective time constraints on the quality of household food purchases

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A B S T R A C T

Background: Obesity is a major public health concern in the United States. From the late 1970s through the mid-1990s, the reduction in the amount of time individuals spent preparing food coincided with changes in the food environment. This led to increased consumption of energy and contributed to the dramatic rise in obesity rates over the same period. Research and policy aimed at improving American diets has largely focused on ensuring that healthy foods are accessible and affordable. Although these are important determinants of food choice, time constraints also factors into purchasing decisions.

Purpose: To examine the relationship between time constraints, both perceived and objective, and the quality of Americans' food purchases by income level.

Methods: USDA's National Household Food Acquisition and Purchase Survey was used to examine the relationship between time constraints (objective and perceived) and HEI-2010 score of food purchases and examines this relationship by income. It estimates an econometric model that controls for other factors that influence time resources and food choice.

Results: The relationship between the perceived time constraint and estimated HEI score of food purchases varied by income level, though the relationship was only significant for higher-income households, or those between 400% and 600% of the poverty line. There was no significant relationship between the objective time constraint and HEI score of food purchases.

Conclusions: Nutrition education and interventions aimed at improving household food purchasing decisions may benefit from focusing on improving time management skills and emphasizing healthier convenience food substitutions when consumers feel time-constrained. Higher-income consumers eat out more frequently than lower-income consumers, so menu labeling aimed at nudging higher-income individuals to purchase healthier options could help improve food choice in these settings.

1. Introduction

Obesity is a major public health concern in the United States, afflicting over one third of the population (Cawley & Meyerhoefer, 2012; Guh et al., 2009; Ogden, Carroll, & Flegal, 2014; Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008). Its main cause is weight gain due to overconsumption of energy from food and decreased energy expenditure (Centers for Disease Control and Prevention, 2016), though increased energy consumption has driven most weight gain (Cutler, Glaeser, & Shapiro, 2003; Lee, Djoussé, Sesso, Wang, & Buring, 2010). Increases in energy consumption have been driven, in part, by changes in the food environment, such as changes in food product assortment and composition, food product advertising, portion sizes of meals eaten out, and the physical access – or lack thereof – and the higher relative price of healthy foods (Andreyeva, Kelly, & Harris, 2011; Darmon & Drewnowski, 2015; Drewnowski & Darmon, 2005; Wansink, 2004).

Of the multiple influences on food choice (see Furst, Connors, Bisogni, Sobal, & Falk, 1996; Story, Kaphingst, Robinson-O'Brien, & Glanz, 2008), individuals commonly report those related to the cost, taste, and convenience of foods to be most important (see, for example, Glanz, Basil, Maibach, Goldberg, & Snyder, 1998; Mancino & Guthrie, 2014; Nestle et al., 1998). A preference for convenience implies the significance of a time component related to meal production, which has also been suggested by economic theory. Becker's theory on the allocation of time implies that time is both an input into and a constraint on meal preparation (Becker, 1965). Thus individuals with higher time costs, as measured by their wage rate or potential wage rate, are expected to trade off money for time and consequently spend more money on prepared food and less time cooking.

The significance of the differential influence of time costs on diet quality for low-income and high-income consumers became relevant in the late twentieth century, the point that marks changes in food-related time use and food prices, as well as greater disparities in diet quality between low-income and higher-income consumers. During the 1960s, rising labor force participation by women coincided with a dramatic reduction in the amount of time spent in food preparation (Smith, Ng, & Popkin, 2013). This resulted in a more general reliance on time-saving convenience foods as time-pressed people substituted prepared or partially prepared foods for time spent cooking. Consequently, convenience foods, such as ready-to-eat and ready-to-cook foods, currently

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make up over 75% of the calories purchased by Americans at food stores (Poti, Mendez, Ng, & Popkin, 2015). Additionally, the price of basic ingredients increased at a faster rate than prices of ready-to-cook and ready-to-eat foods from 1999 to 2008, meaning that these foods were not only time-saving but became cheaper relative to basic ingredients over time. Changes in time allocation and food prices over time likely made convenience foods more attractive to all Americans, yet low-income consumers may have been especially likely to substitute ready-to-cook and ready-to-eat foods for basic ingredients because they are not only more price-sensitive, but some research suggests that they may also be more time-constrained (Devine, Connors, Sobal, & Bisogni, 2003; Jabs & Devine, 2006; Mancino & Newman, 2007). Low-income individuals are more likely to rate convenience high in importance when food shopping than higher-income individuals (Mancino & Guthrie, 2014) and although low-income consumers consume more calories from home sources and spend more time cooking, the amount of time this group spends cooking showed greater declines between 1960 and 2008 than higher-income consumers (Smith et al., 2013). Taken together, this suggests that time constraints may be contributing to the poor diets of all Americans and of low-income Americans in particular.

Only three studies have examined the relationship between time spent preparing food and diet quality, reporting mixed results. One used the HEI-2010 to measure diet quality, while two others used an indicator of dietary quality, such as consumption of fruits and vegetables, frequency of eating out, and/or energy intake from food prepared at home and away from home. The study looking at HEI found no relationship between time spent cooking and diet quality, while the two other studies found a positive relationship between time spent cooking and indicators of diet quality (Mancino & Gregory, 2012; Monsivais, Aggarwal, & Drewnowski, 2014; Wolfson & Bleich, 2015).

The way in which diet quality and food preparation time were measured may have contributed to these mixed results. Daily minutes spent in food preparation were insignificant in a model that included the number of daily meals eaten out (Mancino & Gregory, 2012). This suggests that patterns related to home food preparation and food eaten away from home matter more than the marginal differences in daily time spent cooking. Rather than examine the number of minutes spent in food preparation, Wolfson and Bleich (2015) and Monsivais et al. (2014) both measured weekly time in food preparation categorized into low, medium, and high frequency. These categories better reflect differences in food preparation patterns, suggesting that preparing an additional meal (an average increase of 30 min in weekly preparation time) positively influences diet quality more than spending an additional minute in daily food preparation. Diet quality differences were likely driven by eating out, as Mancino and Gregory (2012) report, which is supported by the negative association between frequency of fast and convenience food consumption and frequency and time in food preparation (Monsivais et al., 2014; Wolfson & Bleich, 2015).

This paper hypothesizes that a more direct measure of time constraints may help explain the mixed findings of previous studies, but also that time constraints may influence the quality of food purchases differently for lower-income and higher-income households. It constructs time constraint measures to directly assess the relationship between having less time available to prepare meals (objective time constraint) and perceived time constraints on the quality of food purchases and interacts the time constraints with household income to assess variation in this relationship by income. Additionally, it is the first study to consider time constraints measured in different ways, both objective and perceived constraints. This research was not supported by funding from any organization.

2. Methods

This analysis uses USDA's National Household Food Acquisition and Purchase Survey (FoodAPS) to examine the influence of time constraints on the quality of food purchases, including the impact of income on this relationship. FoodAPS is a new dataset that contains information on household food purchases and acquisitions, including expenditures and nutrient content, from a nationally representative cross-section of 4826 households. The survey was sponsored by USDA's Economic Research Service (ERS) and Food and Nutrition Service (FNS) and designed to capture comprehensive food purchasing and acquisition data and factors that influence household food choices, including household size, composition, income, demographics, diet/health knowledge, food security status, food shopping patterns, and the types of foods available in the food environment (Economic Research Service [USDA-ERS], 2017). The household food preparer and all household members (including children) reported all food acquired for at home and away from home consumption during a 7-day period. The survey design and methodology are described in detail elsewhere (ERS, 2017).

3. Dependent variable: Healthy Eating Index, 2010 for food purchases

The quality of household food purchases was measured using the Healthy Eating Index (HEI-2010). The HEI measures conformance to the Dietary Guidelines for Americans, which form the basis of nutrition policy for the United States government and the foundation of all federal nutrition guidance (Center for Nutrition Policy and Promotion [USDA-CNPP], 2016). Quality is assessed based on adequacy and moderation; increasing levels of adequacy components receive increasingly higher scores, whereas increasing levels of moderation component intake receive decreasingly lower scores. The nine adequacy components include total fruit, whole fruit, total vegetables, greens and beans, whole grains, dairy, total protein foods, seafood and plant proteins, fatty acids. The three moderation components include refined grains, sodium, and empty calories. HEI scores range from zero to one hundred.

Because the HEI is a density-based measure, it can be used to assess the healthfulness of any mix of foods. For example, researchers have used the HEI to measure the healthfulness of grocery store purchases, fast food menus, and the US food supply (Reedy, Krebs-Smith, & Bosire, 2010; Volpe & Okrent, 2012). This analysis assesses the healthfulness of household food purchases over the course of one week.

4. Key independent variables

4.1. Time constraints

Constraints on time likely influence food choice through several mechanisms. First, individuals who work long hours, commute long distances to work, work multiple jobs, or spend time taking care of family members or children have less time left over in the day (or week or month) to purchase and prepare meals. This may lead to a tendency to purchase more convenience, packaged, or prepared foods at the grocery store or to rely more on fast food. Second, feelings of being too busy or stressed, regardless of whether or not time is actually limited, may lead to reliance on more fast food or convenience and prepared foods at the supermarket. For example, two people may be working the same number of hours and have family responsibilities that require a similar time commitment, but one may feel more stress related to those time commitments relative to the other person. This could result in one substituting more time-saving foods in their diet – and potentially their household meals – than the other. Both cases potentially have negative implications for diet quality if purchases (and presumably consumption) of time-saving foods increases. For the purposes of this paper, the first case is considered an *objective* time constraint and the second case is considered a *perceived* time constraint.

The usual number of minutes spent traveling to work and whether or not the food shopper believes he/she is too busy to take the time to prepare healthy food were both included in the analysis to account for