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How do food retail choices vary within and between food retail environments? ☆, ☆ ☆

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ABSTRACT

There is mixed evidence on whether the local food environment explains differences in food choices. It is valuable in such research to use strong research designs, taking account of the endogeneity of household residential decisions. This article offers a literature review, emphasizing two promising approaches in the most recent research: (1) longitudinal studies of supermarket or retailer entry and exit within particular locations and (2) studies of variation in food choices across multiple households within particular locations. We review how these approaches address the endogeneity problem. Because this literature review indicates the importance of understanding variation across households within locations, our empirical analysis uses nationally representative data from USDA's National Household Food Acquisition and Purchase Survey (FoodAPS) to measure the expected values, variances, and intracluster correlations for selected outcome variables and explanatory variables typical of those used in studies of the food retail environment. We find that geographic variation in supermarket proximity does not account for most of the variation of a household's choice of a primary food retailer and does not account for much of the high-level of variation across households in food security and dietary quality. These results and our review of the literature suggest that food store access may modestly influence food choices, but that other household-level factors may matter more.

1. Introduction

A vibrant research literature has explored the relationship between food retail environments and household-level and individual-level food outcomes, ranging from food spending to fruit and vegetable intake to body weight and body mass index. Early studies, which were mostly cross-sectional and often studied fairly localized populations, largely showed a positive correlation between access to supermarkets and healthier diets and less obesity (see [Larson et al., 2009](#), and [Institute of Medicine and National Research Council, 2009](#) for reviews of these studies). In 2009, the U.S. Department of Agriculture released a Congressionally-mandated report that examined how limited access to supermarkets may impact food choices, diet and health and estimated the national number of people who may have limited access to healthy food ([USDA, 2009](#)). The study also highlighted key household, demand-side and key market, supply-side factors which may explain how store access affects food choice, diet and health. Household factors include resources, access to transportation, time constraints and preferences, while market factors include store development costs, retail

competition, and aggregate consumer demand. Early studies largely relied on neighborhood measures of store density or distance to the nearest store to measure access, under the assumption that households are constrained by their hyper-local food environment.

Researchers have more recently suggested that the early research suffered from an endogeneity problem, because residential location is itself in part a choice variable, and some people may consider the quality of their food retail environment as a factor in residential decisions. The cross-sectional association between a particular retail access measure (such as being in a supermarket desert) and a particular outcome (such as elevated body weight) might not reflect cause and effect. Moreover, characteristics of the food retail environment may be associated with confounding variables, both observable (such as being in a low-income neighborhood) and unobservable (such as being in a neighborhood where food quality and access are comparatively more highly or less highly valued, for idiosyncratic reasons).

This article offers a literature review and empirical analysis. The literature review emphasizes two promising approaches in the most recent research: (1) longitudinal studies of supermarket or retailer entry

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and exit within particular locations and (2) studies of variation in food choices across multiple households within particular locations. We review how these approaches may address the endogeneity problem. Each approach, in its own way, makes use of variation in particular variables within locations. In approach (1), the key feature is that food retail conditions and food outcomes vary within particular locations, over a time period that is sufficiently short that the endogeneity of household residential decisions is not a major problem. The household population is largely held constant before and after the change in retail conditions. In approach (2), the key feature is that food choices and other outcomes vary across households within a particular place. If the variance in food choices within locations is sufficiently great, it may suggest that factors other than the food retail environment are most important.

Because the literature review indicates the importance of understanding variation across households within locations, our empirical analysis uses nationally representative data from USDA's National Household Food Acquisition and Purchase Survey (FoodAPS) (Economic Research Service, 2017) to measure the expected values, variances, and intracluster correlations for selected outcome variables and explanatory variables typical of those used in studies of the food retail environment. The empirical question is, to what extent do key determinants of food spending and consumption outcomes vary across food environments, and to what extent do they vary across households that share the same food environment?

The article is organized as follows. First, we consider the types of variation across locations and across households that one would expect to see for key explanatory factors in research on the food retail environment. Second, we provide a review of the research literature, focusing on studies that offer a strong research design with promise for addressing the endogeneity challenge. Third, we offer the empirical analysis using FoodAPS data.

2. Classification of environmental and household factors

In conceptual frameworks explicitly or implicitly used in research on food retail environments, food retail characteristics may influence shopping behavior and food spending outcomes, which in turn may influence dietary quality and household food security. This article focuses on the ways that these factors vary across and within neighborhoods, because this variation is important in new research approaches that offer promise for measuring the effect of food retail environments. Here, we systematically classify the potential environmental and household factors according to the types of variation one would expect (Fig. 1). We use the mnemonic GRAPH-M, for the first letters of the following six classes of potentially relevant explanatory variables.

The first two classes describe food retail access qualities, which are expected to vary across locations, but not to vary within locations:

1. (G) Geographic access to retailers (distance to supermarkets and other food retailers)
2. (R) Restaurant food environment (as a competitor or alternative to food retailers)

The third class describes automobile access, an explanatory variable that still is connected to food retail access (as in the previous 2 classes), and yet may vary across households in the same location (as in the later classes):

3. (A) Automobile access (acceptable distance varies with automobile access)

The final three classes are expected to exhibit considerable variation across households within geographic locations:

4. (P) Prices (and price incentives)
5. (H) Household resources for food purchases (income and nutrition assistance benefits)
6. (M) Motivation or preferences.

Average prices in principle may vary across geographic locations, and hence one might alternatively have placed prices among the food retail access variables in the top left box of Fig. 1. In practice, we anticipate that prices paid vary within geographic locations for four reasons: price variation over time is an important component of total price variation; households may strike different tradeoffs between convenience and cost when selecting retailers; the option set of prices in the surrounding environment depends on automobile access or perhaps the ability to take advantage of price discounts because of sales or being able to buy (and store) food in bulk; and some of the most policy-relevant sources of price variation are incentive programs or nutrition assistance initiatives that may vary across households, as in USDA's Healthy Incentive Pilot (Bartlett et al., 2014). In the canonical models of consumer food choices used by economists, prices and household resources have a central role in the budget constraint; motivation and preferences determine food choices from among those options that can be afforded.

In summary, food spending and consumption choices depend in part on neighborhood-level or environment-level factors, in part on household-level constraints, and in part on household level preferences. Most existing research acknowledges or addresses some of these factors, while necessarily giving less attention to others. In analysis, it may be useful to distinguish these factors more formally.

3. Research on neighborhood- and household-factors that influence food choices

Several factors determined the scope of our review of the food

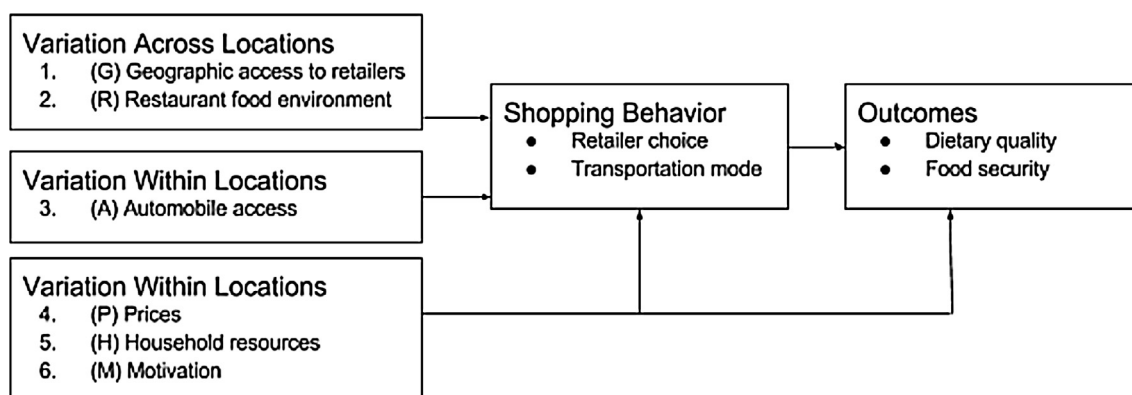


Fig. 1. The conceptual relationship between explanatory factors in the GRAPH-M classification and food shopping, food security, and dietary quality outcome variables.

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