



Household food security: Perceptions, behavior and nutritional quality of food purchases



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ABSTRACT

Food security is an encompassing concept that includes several dimensions: sufficiency, acceptability, safety, stability and nutritional quality. Lately, diverse studies discuss how much objective and subjective indicators are able to characterize some of the above-mentioned dimensions. This has opened the door to some apparent contradictions between different food security measurements that reflect perception (through specific surveys) and behavior (expenditure data).

This article aims to extend the food security debate, focusing on the dimension of nutritional quality and classifying food products as healthy or unhealthy, in addition to computing their calorie value. Using a nationally representative database of nearly 6700 households in Mexico, we found that food-secure households (55% of the total sample) purchase an overall food basket that is 0.7 items less diverse, spend \$85 Mexican pesos per week more, and show no significant difference in terms of purchased kcals compared to food-insecure households. After controlling for confounding factors, we found that food-secure households purchase a wider variety of healthy food items (and a smaller variety of unhealthy food items), spend more money on food, and purchase more calories in healthy food items compared to food-insecure households. Therefore, with this article, we enhance the relevance of the nutritional quality of food purchases in the food security debate.

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1. Introduction

The term *food security* is currently defined by the Food and Agriculture Organization (FAO) as the *physical, economic and social access, at all times, to sufficient, safe, and nutritious food to meet people's dietary needs and food preferences for a healthy and active life* (FAO, 1996). As noted by several authors, the definition of food security involves five dimensions: sufficiency, nutritional quality, acceptability, safety and stability (Coates, 2013). Given the complexity of the concept of food security, objective indicators have proven to be insufficient to capture all pathways to food insecurity (Maxwell, Vaitla, & Coates, 2014). Recent evidence suggests that subjective measurements such as experiential (psychological) and behavioral questionnaires capture important aspects of food insecurity, such as the stability of access to food (Maxwell, Watkins, Wheeler, & Collins, 2003). However, several studies have shown that subjective food safety measurements cannot fully characterize changes in food expenditure behavior – such as coping strategies – because some households continue to report their status

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as secure regardless of their consumption patterns. This has raised concerns with regard to the external validity of the instruments (Barrett, 2010; Gundersen, Engelhard, & Waxman, 2014; Gundersen & Ribar, 2011; Kirkland, Kemp, Hunter, & Twine, 2011; Nord & Brent, 2002; Warr, 2014). This discussion has revealed the importance of properly interpreting subjective food security data, which also extends to the relationship between food insecurity indicators and objective household data, such as the nutritional quality and the quantity of food consumption.

There are few studies that explore the nutritional quality dimension of food insecurity (measured either by calorie content or dietary diversity), mainly because it requires a comprehensive set of data. However, some efforts have been made so far. Kendall, Olson, and Frongillo (1996) found, using U.S. household data, a decrease in the quantity and nutritional quality of diet as households become more insecure, particularly in fruits and vegetables. Similar studies report a positive relationship between dietary diversity and the consumption of certain food groups and higher food security, using different subjective measurements (Melgar-Quinonez et al., 2006; Thorne-Lyman et al., 2010). Also Coates, Wilde, Webb, Rogers, and Houser (2006) and Hackett, Zubieta, Hernandez, and Melgar-Quinonez (2007) found similar results using a similar approach in Bangladesh and Ecuador, respectively. Although these studies report consistencies between dietary diversity, quantity of food consumption and food security, they fail to account for the nutritional quality of food products, which is a major factor in developed countries (Inamura et al., 2015). Our article aims to explore the relationship between the perception of food security status and the nutritional quality (objective measures) at a household level. We aim to contribute to the debate on the divergences and complementarities between objective (behavior, food purchases) and subjective (perceptions) food security measurements, and, in this way, inform policymakers on the instruments to monitor food security while taking into account unintended food purchases consequences.

We found that, after controlling for confounding factors, food-secure households purchase a wider variety of healthy food items (and a smaller variety of unhealthy food items), spend more money on food, and purchase more calories in healthy food items compared to food-insecure households. Enhancing the relevance of the nutritional quality of food purchases in the food security debate, food-secure and food-insecure households differ in healthy and unhealthy food items. Unexpectedly, food-secure households do not purchase more overall calories than food-insecure households. This finding shows the relevance of taking the nutritional quality of food purchases into account in order to improve food security.

2. Material and methods

In our analysis, we used the National Income and Expenditure Household Survey (ENIGH, Spanish acronym), which is a nationally representative income and expenditure survey conducted by the Mexican Statistical Institute (INEGI). This database contains information on food expenditure (at home and away from home) and the monetary value of food purchased during one week. The data set also contains the socioeconomic characteristics of the households, including geographical location, housing characteristics, number and age of the family members, income, gender, and the education level of the head of the household, among other variables. Moreover, the survey contains information used to officially measure poverty, as well as self-reported food security indicators. Therefore, the ENIGH is the only official, nationally representative, data set in Mexico that contains variables to measure both objective and subjective food security indicators at a household level.

The Mexican Food Security Scale (EMSA, Spanish acronym) is a survey designed to address access to food and hunger experiences at a household level, and it is based on both the Latin American and Caribbean Food Security Scale (ECLSA, Spanish acronym) and the USDA Household Food Security Survey (HFSS). EMSA distinguishes between households with only adult members and those with members under 18. In the first group, there are six questions related to food shortages and hunger experiences, whereas households with children answer six additional questions. In the Appendix B, we provide the food security questionnaire and basic response statistics. The EMSA has been proven to be internally consistent using the Rasch model, as well as Cronbach's alpha analysis (Villagómez-Ornelas et al., 2014), with similar results with regard to internal validity as the ECLSA (FAO, 2012).

As established in the EMSA, food security status is determined by the number of positive responses. It considers that a household is food secure when none of the questions in the food security questionnaire is responded affirmatively. In contrast, a household is classified as food insecure if at least one of the answers is responded affirmatively. In this article, we follow the EMSA criterion, which is the one officially accepted in Mexico. We believe this is reasonable, since an affirmative answer shows a serious food constraint.

To assess the nutritional quality of food purchases, as have other authors (Inamura et al., 2015), we used the food variety score (number of food items purchased in a representative week), calorie content per food item and *healthiness* of each food product, which required additional information. We used the weight-to-calorie or volume-to-calorie conversion factors presented by Pérez-Lizaur, Palacios-González, Castro-Becerra, and Flores-Galicia (2014); previous works by these authors have been used to conduct research (Medina, Villanueva-Borbolla, & Barquera, 2012). We also classified food products as healthy or unhealthy. However, we note that there is no unified criterion to make such a distinction, and a deep discussion of this issue is beyond the scope of this article. The complete list of food products classified as healthy or unhealthy is included in the Appendix B. In our criterion, healthy food products have more than one of the following attributes: fresh (or with a low level of processing), rich in water, rich in fiber, low in energy density, low in fat and low in sugar (especially with no sugar added). In contrast, unhealthy foods have the opposite attributes as healthy foods, particularly processed and ready-to-eat foods.

In Table 1, we present the basic statistics for food-insecure and food-secure households using representative weights. We used the data available for all households that provided food expenditure data and answered the food security questionnaire.

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