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Public assistance, living environments, and food insecurity: A comparative community case study

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Abstract

Food insecurity continues to affect certain segments of the U.S. population at the household and individual levels even when the economy is experiencing growth. This recognition has led to the design and implementation of food assistance programs, such as the Supplemental Nutrition Assistance Program, targeting food hardship in low-income families. This is in addition to other types of government assistance, such as housing subsidies and public housing, as low-income households and individuals face similar challenges in housing security. Concern over "concentrated poverty" in traditional public housing environment has contributed to a shift toward mixed-income developments, envisaged to improve the living conditions and economic opportunities of public-housing residents. This paper provides a comparative assessment of food insecurity in traditional and mixed-income public housing communities. It also examines the effect of nonhousing public assistance on food insecurity and the temporal relationship between the timing of food hardship and the receipt of assistance. Administering a modified version of the U.S. Department of Agriculture (USDA)'s Household Food Security Module to the majority of residents in the two communities, the researchers found negligible differences in food insecurity between recipients and nonrecipients of government assistance. Nevertheless, government assistance appeared to improve the probability of being food secure as it interacted with living environments, suggestive of greater beneficial effect in the environment of mixed-income housing. The results show that the number of households experiencing reduced food intake was lowest in the first two weeks and highest during the fourth week of the month.

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food security, government assistance, mixed-income housing, public housing

Introduction

Achieving food security, conceptualized as "access by all people at all times to enough food for an active, healthy life," continues to challenge a substantial number of U.S. households, even during periods of economic growth and low unemployment (Coleman-Jensen et al., 2022; Gundersen & Ziliak, 2018; Nord, Andrews, & Winicki, 2002). The extent of food security and insecurity in the U.S. is measured using the Household Food Security Survey Module (FSSM). The module is designed to obtain "information on a variety of specific conditions, experiences, and behaviors that serve as indicators of the varying degrees of the severity of the condition" (Bickel et al., 2000, p. 9) from household direct responses to a series of 18 questions. The 18 survey questions reflect different severity levels of household food insecurity ranging, for example, from worrying about running out of food (least severe) to skipping meals or going without food all day (most severe). The survey responses from each respondent collectively generate a single score on the household food security scale.

The scale classifies the extent of food security or insecurity as described by respondents into four categories which, originally, were food secure, food insecure without hunger, food insecure with moderate hunger, and food insecure with severe hunger. Since 2006, the categories have been food security (high and marginal), low food security, and very low food security.[1] The construction of the scale reflects and underscores household financial resource constraints as the ultimate cause of food insecurity. Although food insecurity is primarily related to poverty status (e.g., Alaimo et al., 1998), the food security scale is believed to provide more comprehensive information about the sense, occurrence, and degree of food deprivation than can be known through traditional income and poverty measures, since it additionally reflects related household conditions, events, behaviors, and subjective reactions.

The 2021 household food security report indicated that the household food insecurity rate over the 1998–2021 period ranged from 10.1% (in 1999) to 14.9% (in 2011), with an average of 12.1%. These figures represent the percentage of households who "were, at times, unable to acquire adequate food for one or more household members because they had insufficient money and other resources for food" (Coleman-Jensen et al., 2022, p. 7).[2] The very low food security category represents a more severe range of food insecurity characterized by a reduction in food intake by some household members and a disruption of eating patterns at times during the year. The percentage of households experiencing very low food security ranged from 3% in 1999 to 5% in 2021, with an average of 4.2%. In 2021, the year for which the most recent data were available at the time of writing, 13.5 million U.S. households, or 10.2% of households, were food insecure at some point during the year. Of these, 5.1 million households (3.8%) were experiencing very low food security.

A closer look at the disaggregated data reveals that some segments of the population are more vulnerable to food insecurity than others. For example, in 2021, 19.8% of non-Hispanic Black households and 16.2% of Hispanic households were food insecure, more than twice the 7% rate for non-Hispanic whites. According to a study by Myers and Painter (2017) based on the 1999–2010 waves of the National Health and Nutrition Examination Survey, the white/nonwhite divide is observed regardless of nativity status: both Blacks

[1] The USDA Economics Research Service notes the comparability of the old and new labels: "High food security (old label = Food security): no reported indications of food-access problems or limitations. . . . Marginal food security (old label = Food security): one or two reported indications—typically of anxiety over food sufficiency or shortage of food in the house. Little or no indication of changes in diets or food intake . . . Low food security (old label = Food insecurity without hunger): reports of reduced quality, variety, or desirability of diet. Little or no indication of reduced food intake. . . . Very low food security (old label = Food insecurity with hunger): reports of multiple indications of disrupted eating patterns and reduced food intake" (USDA ERS, 2023, "Ranges of food security," paras. 2–7).

[2] Unless otherwise noted, the source of data on food security status in this section is Coleman-Jensen et al., 2022.

and Latinos are significantly more food insecure than their foreign or native-born white counterparts. Viewing groups based on household composition, the food insecurity rate was 7.4% for married-couple families and 24.3% for households with children headed by a single female (i.e., "female-head, no spouse"). As to be expected, the food insecurity rate was the highest, at 32.1%, for households with incomes below the federal poverty line. The corresponding figure for households with incomes below 185% of the poverty threshold was 26.5%.

There is a general recognition that food insufficiency poses long-lasting challenges to nutrition, health, and social policy. Consequently, there is growing interest in assessing the prevalence of food insufficiency in the U.S. among various segments of the population. These include single female–headed families, children, the elderly, food-assistance recipients, ethnic minorities, immigrants, and other potentially vulnerable groups (Alaimo et al., 1998; Carlson et al., 1999; Himmel Green et al., 2000; Kasper et al., 2000; Myers & Painter, 2017; Polit et al., 2000; Tarasuk & Beaton, 1999; Alaimo et al., 1998[3]). The present study seeks to assess the effects of government food assistance on food insecurity events in low-income households in two different public housing communities. Additionally, it explores the implications of living environment for the prevalence and frequency of food insecurity events. More specifically, the study's objectives are to address two sets of related questions:

1. What is the relationship between food insecurity events and receipts of government assistance including the Supplemental Nutrition Assistance Program (SNAP), formerly known as food stamps? How often does a food insecurity event occur? When does it occur? For how long does it occur? How severe is it?
2. Are recipients of nonhousing public assistance, such as SNAP and Temporary Assistance for Needy Families (TANF), living in traditional public housing communities worse (or better) off than those living in mixed-income communities with respect to the events and degree of food insecurity?

As mentioned earlier, the study focuses on low-income households residing in two public housing communities: traditional public housing (TPH) and mixed-income housing (MIH) communities. The data used for the analysis are primary data collected by conducting a modified FSSM survey in the abovementioned two communities. The remainder of this paper is organized as follows. The second section provides a brief review of the literature related to food assistance and food security. The third section provides an overview of the sampled communities and describes the food security status of households. The fourth section assesses the relationship between nonhousing public assistance receipt and food insecurity events. The fifth section explores the implications of living environments (traditional versus mixed-income housing) for food security and investigates the relationship between the timing of the receipt of nonhousing public assistance and food insecurity events. The final section summarizes the findings and implications.

A Review of the Related Literature

The effects of food assistance on food insecurity among low-income households in the U.S. has been a subject of extensive empirical investigation. The first part of this section provides a brief and selective review of the literature focusing on the effect of SNAP on household food security.[4] The second part outlines the arguments for mixed-income housing relative to traditional public housing as a background to our exploration of the possible effects of living environment on food security.

Food Assistance and Food Security

As the brief review below reveals, the empirical evidence on the effect of food assistance on food

[3] See, for example, Gunderson & Ziliak, 2018 for a review of food security research in the United States.
[4] See Barrett (2002), e.g., for theoretical and empirical issues related to food security and food assistance programs and Nord (2009), Gundersen and Ziliak (2018), and Schanzenbach (2023) for a review of food insecurity research in the United States.

security in the U.S. is mixed, with neutral, negative, and positive effects reported. Gundersen and Oliveira (2001) reported that the probability of food insufficiency is the same between food stamp recipients and nonrecipients. Similarly, Huffman and Jensen (2008) found no evidence that food participation in the food stamp program reduced food insecurity. Based on an analysis of longitudinal data, Gibson-Davis and Foster (2006) reported that receiving food stamps did not lower the probability of being food insecure, but it lessened the severity of being food insecure, according to some variations of the model. On the other hand, Jensen (2002) and Wilde and Nord (2005) found a positive correlation between food stamp participation and food insecurity.

In contrast, a number of authors, such as Borjas (2004), Yen et al. (2008), Nord (2009), Ratcliffe et al. (2011), Mabli et al. (2013), Mykerezi and Mills (2010), Mabli and Ohls (2015), and Schmidt et al. (2016), have reported results suggesting that food assistance reduces food insecurity. Most recently, Schanzenbach (2023) concluded in an overview of recent research that many empirical studies reporting participation in SNAP have found that increased benefits improved food security, health, and other indicators of well-being. However, as the brief review above shows, there are studies with results suggesting that food assistance is not effective in improving food security or even worsens it. The differing results may, in part, be explained by differences in specification, estimation methods, and sample composition. A key estimating issue commonly mentioned is the endogeneity of participation in food assistance programs and the self-selection effect arising from the possibility that food-insecure households or those who would otherwise be food insecure would likely participate in the program. An econometric analysis that fails to address these estimation issues could lead to a misleading conclusion by seeming to show a positive relationship between program participation and the extent of food insecurity.

Traditional Low-Income versus Mixed-Income Housing

Government programs such as subsidized housing or public housing have long been in place as an attempt to alleviate housing insecurity experienced by low-income households.[5] Public housing in the U.S. was "established to provide reasonable, transitional housing to poor individuals and families" (Bowly, 1978, as cited by Chaskin and Joseph, 2011, p. 209). However, rather than being transitional, as Chaskin and Joseph (2011) noted,

> by the 1980s public housing in many cities came to exemplify concentrated urban poverty and the social problems associated with it—high levels of crime and violence, deteriorating housing and physical infrastructure, weak institutions, poor services, social isolation, racial segregation, joblessness, and welfare "dependency" among them. (p. 209)

The observed worsening problems over the years associated with concentrated poverty and neighborhood disinvestment led to a series of public housing policy initiatives including the HOPE (Homeownership and Opportunity for People Everywhere) series of programs. The HOPE VI program, enacted in 1990, is described as "the major federal initiative driving the transformation of distressed public housing development nationwide" (Popkin et al., 2002, p. 1-1). With the launching of the program, "public-private partnerships have emerged as the dominant model to leverage private sector know-how, private funds, and market principles to create, own and operate sustainable, affordable housing in a mixed-income setting" (Glover et al., 2017, p. 4).

The concept of mixed-income housing encompasses "either developments with both market-rate and subsidized housing units or the development of affordable housing in mid- to upper-income communities—in essence, project-defined or neighborhood-defined mixed-income communities" (Glover et al., 2017, p. 3). Indistinguishable from any housing community at a market rate,

[5] Public housing refers to housing owned by a housing authority, while subsidized housing refers to housing owned and operated by private owners.

mixed-income housing is expected to provide low-income families with better living environments that are conducive to restoring hope and opportunity. Chaskin and Joseph (2011) identified four theoretical propositions for the potential benefits accruing to low-income households living in a mixed-income community.[6] One of them is access to social capital, creating the potential for instrumental relational networks (social interaction) between low-income families and non-poor residents in mixed-income housing and leading to improved access to information on, and connections for, employment opportunity and better jobs. "Role modeling" by higher-income residents "that will have a positive influence on the behavior and aspirations of their poor neighbors" is a second hypothesized benefit of living in a mixed-income environment (Chaskin & Joseph, 2011, p. 210).

The third channel through which the potential benefit of living in a mixed-income community is the presence of order and social control, which high-income residents help maintain in the neighborhood and which is expected to reduce criminal activity and increase the sense of security, thereby benefitting low-income co-residents. Fourth, higher-income residents, with their influence on local governments and the private sector, are in a better position to attract more investment, infrastructure, retail stores, government services, amenities, and other socioeconomic activities, leading to improvements in neighborhood environment and living conditions. Summarized in terms of economic outcomes, mixed-income housing is hypothesized to increase access to better employment, higher-paying jobs, infrastructure, retail stores, and private investment activity in surrounding neighborhoods, hence improving the living conditions of low-income residents.

The abovementioned benefits of moving to or living in a mixed-income development for low-income households are generally theoretical, which lend themselves to an empirical investigation. However, to our knowledge, the effect of living in a mixed-income development on food security among low-income residents has received little or no empirical attention, although one could draw implications for it from the few studies conducted with respect to economic outcomes, such as employment, wages, and socioeconomic status. The evidence on the latter is reported to be mixed (Glover et al., 2017; Boston, 2005; Chaskin & Joseph, 2011; Levy et al., 2013; Popkin et al., 2002, and the references therein). In view of the hypothesized outcomes and the lack of relevant empirical evidence, this study explored the implications for food security by comparing the experiences of households residing in traditional public housing and mixed-income communities.

Study Sites, Sample Description, and Methodology

Two sites were used for this study: one traditional low-income housing (TPH) and one mixed income community (MIH), both located in Atlanta, Georgia.[7] Atlanta was the first city in the country to design, develop, and implement a strategy of establishing mixed-income/mixed-financing housing communities by inviting private investors in public housing (Newman, 2002; Boston, 2005; Glover et al., 2017).[8] In 1994, the Atlanta Housing Authority (AHA), took a hard look at its public housing units in preparation for the 1996 Centennial Summer Olympic Games (Newman, 2002). It placed 50% of its housing stock under private management and began to outsource the rest to private investors. The mixed-income/mixed-financing strategies allowed AHA to obtain approval from the federal Department of Housing and Urban Development (HUD) to demolish all public housing facilities, and to seek effective private development partners

[6] For details, see e.g. Popkin et al., 2002; Joseph, 2006; Chaskin and Joseph, 2011; Levy, McDake, and Bertumen, 2013; Glover, Carpenter, and Duckworth, 2017; and the references therein.

[7] The traditional public housing in the study was University Homes, which has since been demolished, and the mixed-income housing was the Village of Castleberry. The description of the study sites in this and the following paragraph is based on the demographics data summary obtained from the management offices of University Homes and Village of Castleberry.

[8] These communities are referred to as mixed-income/mixed-finance since these communities are composed of families of varied income levels and are being developed with funding from public and private equity, private debt, and tax credit sources (Newman, 2002).

to design communities to serve families of varied income levels and demographics. (AHA, 1999). This initiative led to the development of a number of mixed-income communities in the city in the subsequent years, one of which is the study site of the present investigation.

The traditional low-income public housing community site of this study had 500 apartment units, of which 493 were occupied. The community housed a total population of 1,201, with an average age of 24 years—half under 18 years of age, and 65% female. Single heads of households constituted the overwhelming majority in the community (97%). The annual household income averaged $7,449 in this community, with a mean household size of 2.4 members. Roughly one third of heads of households and more than a quarter of adults aged between 18 and 54 were unemployed. Twenty-nine percent of households in the community had one or more disabilities, 30% received Social Security benefits, and 21% received temporary assistance for needy families.

At the time of the survey, 182 low-income households living in the mixed-income community were receiving a housing subsidy and were available to complete the survey. The total number of low-income residents was 365, including 163 children (45%) and 264 females (72%). Ninety-seven percent of household heads were single, and 50% were unemployed. Forty-six percent of adults between 18 and 54 years of age were unemployed. In a community where the mean family size was 2.4, the average household income stood at $11,493. One out of five households had persons with disabilities and a lower proportion received Social Security benefits (14%) and TANF (9%).

The study sample was randomly drawn from households residing in the two communities described above. Enumerators were then trained and assigned to specific households for final face-to-face interviews. We were able to obtain clean data for 322 households, which constituted the sample size of the present study. The sample accounted for 48% of the residents of the two communities at the time of the survey. Table 1 presents the basic profile of the sample. A slight majority of the survey respondents were households with children, having an average of two and a count of 383 children under 18 years of age. A typical family had fewer than two dependents, totaling 412 in the sample. Family size ranged between one and seven, the former accounting for a third of the sample and the latter found in only two households. The ages of heads of household ranged between 19 and 91 with a mean of 44 years for the entire sample. Heads of families with children were on average 23 years younger than were households with no children.

Table 1. Selected Sample Profile by Household Child Status and Type of Community

		Children		Community	
Characteristic	Full Sample	With	With No	Traditional Public Housing (TPH)	Mixed-Income Housing (MIH)
Number of Households					
Total	322	179	143	251	71
% of Total	100	55.6	44.4	78	22
Mean Age of Household Head	44.3	34.1	56.9	46.7	35.6
Mean Number of Children	1.2	2.1	0.0	1.2	1.2
Mean Number of Dependents	1.3	2.2	0.1	1.3	1.4
Mean Household Size	2.5	3.4	1.3	2.4	2.6
Female-Headed Households (%)*	85.4	93.3	75.5	86.9	80.3
Government Assistance Recipients (%)*	60.9	62.6	58.7	70.1	28.2

* Figures represent % of the relevant sample and subsamples.
Note: Government assistance refers to nonhousing assistance including food stamps, Temporary Assistance for Needy Families (TANF), Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), and Supplemental Security Income (SSI).

Most of the households in the sample were female-headed (85%); the corresponding figure for households with no children was 10 percentage points lower. Of the 383 children in the sample, only 16 lived in male-headed households. Nearly two-thirds of the survey respondents reported receipt of some type of government assistance in addition to a housing subsidy, with receipt more frequently reported by households with children than by households with no children. Dichotomizing the sample between the two communities indicated that they shared similar attributes with respect to family size, number of children, and dependents. However, the two communities differed substantially in their participation in government assistance programs. The proportion of households in MIH receiving government assistance is far lower than the proportion of households in TPH. Householders in MIH were on average younger than those in TPH were, with a slightly lower proportion of female headship. To sum up, the sample is composed of 322 households, disproportionately female-headed, with 383 children, 412 dependents, and a head count of 792.

This study used the modified form of the Household FSSM. The standard U.S. food security scale is measured based on a 12-month reference period, although it can be adjusted for shorter reference periods (Bickel et al., 2000). As the focus of this study was low-income families who are likely to experience frequent and severe food insecurity, it was important to measure and understand the severity of food insecurity not only within the conventional 12-month reference period, but also within a single month. The adjusted 30-day reference period allowed us to examine food insecurity events in relation to the timing of receiving food and other forms of public assistance. The relevant questions in the FSSM were modified so a 30-day reference period could be used. Furthermore, in line with the other objectives of the study, additional questions that elicited information on the timing of food hardship and the receipt of government assistance were included in the survey. The statistical analysis in this study was descriptive, involving interpretive tabular and cross-tabular classificatory analysis using means and frequencies along a vector of household characteristics.

Household Food Security Status of Respondents: Summary of Findings

As indicated previously, one of the purposes of this paper was to investigate the prevalence and degree of food insecurity among the study population. To this end, the present section summarizes the findings on food security status in three parts. First, we present and describe the frequencies of responses to the 18 standard questions and then provide a synopsis of findings on household food security and insecurity. The last subsection focuses on instances of very low food security among children.

Household Food Security Scale Questions: An Overview of the Responses

Table 2 presents the 18 standard FSSM questions asking whether or not certain conditions occurred and the percentage of households affirming that they experienced these conditions. We observed that 63% of the respondents worried that their food would run out before they got money to purchase more, and 57% indicated that the food they bought did not last. A smaller, but still sizable, proportion of the respondents viewed the quality of their food as inadequate. Thus, in approximately two out of five households, adults felt that they could not afford to eat balanced meals and had to feed their children a few kinds of low-cost food. Adults cut the size of their meals or skipped meals in one out of five families; and 70% of them did so for at least three days during the month. In 30% of the sample, adults ate less than they felt they should, although this figure dropped by half (to 15%) when participants were asked if they ever were hungry but did not eat.

Nine percent of the respondents experienced weight loss for lack of food. The same proportion did not eat for a whole day; two-thirds of respondents missed eating at least three days during the month. Events of reduced food intake and the consequences thereof were relatively few among children. Eleven percent of the relevant sample cut the size of children's meals. The incidence of children skipping meals was even less prevalent, at 5%. The majority of the children who had to skip meals for lack of food did so for three days or more in the course of the month. Eight percent of families with children reported very low food security

(VLFS) among children but reported fewer events of not eating for a whole day.

Also presented in Table 2 is a dichotomous view of the sample by child status and type of community. Households with no children expressed a slightly stronger perception of food hardship than families with children (in seven out of 10 items), although the observed difference is for the most part negligible. A considerable difference emerged from partitioning the sample according to the type of living community. Families in TPH affirmed all but a couple of items at a higher rate than did their counterparts in MIH. A differential of at least 60% is observed in their affirmation rates to 11 of the 18 questions. For example, the proportion of households in TPH in which adults and, in some cases children, (a) cut the size of or skipped meals, (b) ate less than they felt they should, (c) lost weight, and (d) did not eat for whole day, was at least 70% higher than the same rates in MIH. This suggests that food distress was more prevalent in the former community. In summary, the data show that the perception of inadequate food supply is more prevalent than the perception of low food quality, and the latter is more prevalent than instances of reduced food intake for adults and children.

Household's Food Security Status: Summary of Findings

The preceding section described the frequencies of affirmative responses to the survey questions. These item frequencies across households are useful, individually and in subgroups, for assessing the

Table 2. Percentage of Affirmative Responses to Household Food Security Survey Module (FSSM) Questions

QN	In the last 30 days:	Households Affirming (%)				
		Full Sample	Children		Community	
			With	With no	TPH	MIH
	Stage 1 Questions					
Q2	Worried whether food would run out.	63	64.2	61.5	63.7	60.6
Q3	Food bought just did not last.	57.1	54.7	60.1	56.6	59.2
Q4	Could not afford to eat balanced meals.	40.7	33.0	50.3	41.8	36.6
Q5	Relied on only a few kinds of low-cost food to feed the children.	41.3	41.3	N/A	42.9	37.0
Q6	Could not feed the children a balanced meal.	26.8	26.8	N/A	29.3	19.6
	Stage 2 Questions					
Q7	The children were not eating enough.	19.6	19.6	N/A	21.1	15.2
Q8	Adult(s) in the household cut size of meals or skipped meals.	21.8	19.6	24.6	24.0	14.1
Q8a	Adult(s) cut or skip meals, 3 or more days.	15.2	15.1	15.4	16.7	9.9
]Q9	Ate less than felt he or she should.	29.8	25.7	35.0	33.1	18.3
Q10	Hungry but did not eat.	14.9	13.4	16.8	16.3	9.9
Q11	Lost weight because there was not enough food.	9.0	6.7	11.9	10.0	5.6
	Stage 3 Questions					
Q12	Adult(s) did not eat for a whole day.	8.7	9.5	7.7	9.6	5.6
Q12a	Adult(s) did not eat for whole day for 3 or more days.	5.9	7.3	4.2	6.4	4.2
Q13	Cut size of child's meals.	10.6	10.6	N/A	12.0	6.5
Q14	Child skipped meals.	4.5	4.5	N/A	5.3	2.2
Q14a	Child skipped meals 3 or more days.	2.8	2.8	N/A	3.0	2.2
Q15	Child hungry but could not afford more food.	7.8	7.8	N/A	9.0	4.3
Q16	Child did not eat for a whole day.	2.2	2.2	N/A	2.3	2.2

Notes: QN denotes the serial number of the questions as they appear in the Household FSSM. Figures represent percent of the relevant sample. TPH = Traditional public housing; MIH = Mixed-income housing

various manifestations and events of food deprivation. However, to determine the extent and severity of food insecurity, we need the aggregated value of these frequencies across the survey questions for each respondent. Accordingly, we derived a food security scale based on the number of affirmative responses as per USDA's guideline (Bickel et al., 2000). We then classified the sample into the three categories of food security outlined above. Table 3 summarizes the findings by family attributes.

Of the respondents in the full sample, 48% were food-secure, with no or minimal perception or experience of food hardship during the reference period. The other 52% were food insecure, with lower percentages of respondents expressing the higher degrees of food deprivation. The food-insecure households were food insecure at least in the sense that they "were uncertain of having, or unable to acquire, enough food to meet basic needs of all their members" at some time during the month (Nord, Andrews, & Carlson, 2002, p. 3). Of the food-insecure group, 31%, representing 16% of the entire sample, experienced very low food security (VLFS), representing 16% of the entire sample.

The disaggregated data reveals no strikingly different profile from the one just described. Households with children appear to be more food secure than do households with no children. Male-headed families faced a greater probability of LFS than female-headed families did. Families with multiple adults experienced lower food security than families with one adult. Living alone or with others in a household seemed to matter little in regards to the probability of being food secure, except in the case of VLFS, which multiple-member households were more likely to experience. Lastly, Table 3 divides the responses to the food security scale into two cohorts according to the age of the heads of households, with the sample mean age of 45 serving as the cutoff point. The table shows that households headed by persons older than the sample mean age were, on average, more food insecure than were households headed by younger ones.

Table 3 also presents a measure of food insufficiency, based on the pattern of responses to the first screening question of the FSSM. Respondents were classified as food insufficient if they "sometimes" or "often" did not have enough to eat. Although this measure is weaker because it is based on less information than the food security measure, it is nonetheless juxtaposed for comparative purposes and as a complementary indicator of food hardship. According to this indicator, the overwhelming majority of the survey respondents were food sufficient. Seventeen percent of the sample expressed food insufficiency.

In contrast, 52% were food insecure as gauged by the pattern of their responses to the 18 survey questions. Regardless of household characteristics, the proportion of food-insecure households invariably exceeded that of food-insufficient families. However, the proportion of the sample classified as VLFS approximates the food insufficiency figure

Table 3. Food Security and Sufficiency Status by Selected Household Characteristics

Category and Outcome (%)	Full Sample	Children		Members in Household		Adults in Household		Sex, Household Head		Age, Household Head	
		With	With no	One	Two+	One	Two+	Female	Male	Under 45	45 & Over
Food Secure	47.8	50.3	44.8	47.6	47.9	49.0	44.0	48.4	44.7	52.0	42.6
Food Insecure	52.2	49.7	55.2	52.4	52.1	51.0	56.0	51.6	55.3	48.0	57.4
LFS	36.0	33.0	39.9	38.1	35.0	34.8	40.0	35.6	38.3	34.1	38.3
VLFS	16.1	16.8	15.4	14.3	17.0	16.2	16.0	16.0	17.0	14.0	19.1
Food Insufficient	16.8	13.4	21.1	19.0	15.7	15.0	23	16.4	19.6	12.8	22.1
Sample Size	322	179	143	105	217	247	75	275	47	179	141

Notes: Figures, except sample size, represent (within-group) percentages of the relevant sample size.
The sample size of the "Age, Household Head" category is 320 due to two missing observations.
LFS and VLFS stand for low food security and very low food security, respectively.

reported for the full sample. This demonstrates that the majority of households in the category of LFS did not characterize their food supply as inadequate at the time. However, questions such as Q2 and Q3 suggest that the sense of the inadequacy and insecurity of the food supply was increasingly evident over a longer horizon.

In summary, a slight majority of households suffered food insecurity. The probability of being food insecure was similar among the various subsamples, although some differences emerged when viewed by degree of insecurity. Thus, individuals living alone, multiple-adult households with no children, and families headed by males and by persons older than the sample mean age faced a slightly higher prevalence rate of LFS than their respective counterparts. The incidence of VLFS was higher among multiple-member families with children and among households headed by older persons than among their respective comparators.

The findings suggest a high prevalence of food insecurity, including VLFS, within the study population, which is not surprising for a sample drawn from low-income housing communities whose residents are generally very poor and more disadvantaged than other households in the low-income category (Zedlewski, 2002, and the references therein). In any case, the results do not seem to underestimate the prevalence and severity of food insecurity. The average rate of food insecurity in the nation during the year of the study's survey was around 11% (Nord, Andrews, & Carlson, 2002). The corresponding number for the category of VLFS was 3%, which is far less than the 16% recorded for our sample. Looking at groups sharing certain similar characteristics, at the national level the rate of food insecurity was about 21% in Black non-Hispanic households, and 6% experienced VLFS. Of households with incomes below the poverty line, the food insecurity rate was 37%, still lower than the rate found for our sample. VLFS was experienced by 13% of of households with incomes below the poverty line, which is closer to the corresponding figure in our sample.

Placing our findings in sharper perspective, 41% of low-income households (with an income below 130% of the poverty line) in the Black community were food insecure. Nord, Andrews, and Carlson (2002) found that 34% of low-income families from the South and from central cities in metropolitan areas were food insecure. These percentages, albeit closer, still represent a lower prevalence rate of food insecurity than found in our study. On the other hand, our findings are comparable to the results of some specific investigations carried out not long before the present study. For example, an investigation of food security among poor, female-headed families reported a food-insecurity rate of 49%, about 15% with hunger. Households with hunger among children were around 5% of the sample (Polit et al., 2000).

A comparative view of our results should consider the fact that our study uses a sample drawn from low-income housing communities where rental payments were subsidized. By living in subsidized housing, households avoid the additional expenses that they would otherwise incur to pay full rents, possibly reallocating the monies to augment their food budgets and thereby abate food insecurity.

Government Assistance and Living Environment: Implications for Food Security

Most of the various groups constructed along household attributes exhibited similar patterns of prevalence and degree of food insecurity. As previously mentioned, 61% of the sample reported receiving nonhousing government assistance in the month prior to the interview period,[9] and 78% resided in a traditional low-income public housing community. This section assesses the implications of these differences in government assistance and living environment for food security along two dimensions. First, the separate and interactive effects of government assistance and living environment on the degree of food security scale are examined, followed by an assessment of the temporal relationship between instances of food hardship and receipt of public assistance.

[9] Henceforth, we use government assistance and public assistance interchangeably to refer to nonhousing government assistance, which includes social security benefits, TANF (welfare), and food stamps, as reported by respondents.

Government Assistance, Living Environment, and Food Security Status

This subsection compares (a) the food security status of recipients of nonhousing public assistance with nonrecipients, and (b) food security status of residents in traditional public housing. In addition, the interactive effects of government assistance and living environment are described.

Government Assistance and the Degree of Food Security

Various forms of public assistance, especially SNAP (formerly food stamps), are expected to alleviate food insecurity and hunger and to enhance the food security status of recipients. To investigate whether public assistance exerted the desired and expected favorable effect on the food security status of the sampled households, the "with–without" comparative approach was employed, with nonrecipients serving as the control group (Nord, Andrews, & Winicki, 2002). Table 4 records the results of this comparison.

Fifty-seven percent of households who received government assistance were food insecure, with 17% experiencing VLFS. The corresponding figures for nonrecipients were somewhat smaller. Recipients affirmed VLFS among children at more than twice the rate of nonrecipients. Although the differential is hardly sizeable, recipients appeared to be less food secure, or more insecure, than households who did not receive government assistance.

The foregoing comparison assumes that the two groups are otherwise homogenous. This, however, is not the case, as a look at the third panel of Table 4 shows. Summarized in that panel are some of the distinguishing features that are apparently pertinent to household food condition and on which data were available. The group who received government assistance included a slightly higher proportion of families with children than the group of nonrecipients which, in turn, included a higher percentage of households with at least two adults. More strikingly, among nonrecipients, the proportion of families with employed members is roughly five times the rate among recipients. The corresponding factor of differential with respect to the rate of employment is four. The size of differential aside, the observed difference in employment between recipients and nonrecipients is to be expected, as employed individuals are less likely to satisfy eligibility requirements for receipt of public assistance.

Controlling for these household characteristics somewhat magnified the intergroup difference previously described (Figure 1). Compared to nonrecipients, the prevalence of food insecurity among recipients was lower in one-member households and in families with no children and higher in households where there were at least two members, two adults, and one or more wage earners. On the other hand, the

Table 4. Household Food Security and Selected Household Characteristics by Receipt of Government Assistance

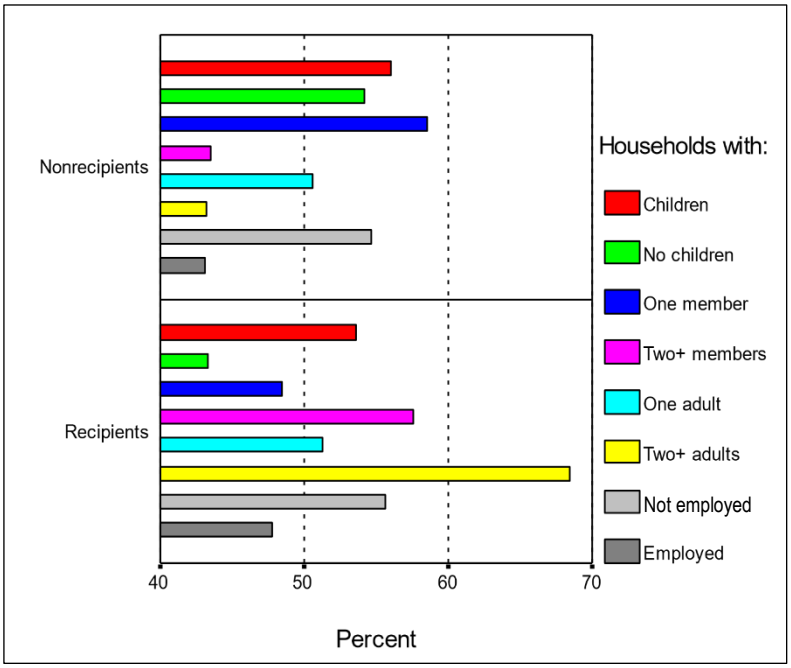
	Public Assistance	
Category	Recipients (%)	Nonrecipients (%)
Food security status		
Secure	45.4	51.6
LFS	37.2	34.1
VLFS	17.3	14.3
Child's food condition[a]		
No child classified as VLFS	92.9	97.0
Child classified as VLFS	7.1	3.0
Selected household characteristics		
Households with children	57.1	53.2
Households with two or more adults	19.4	29.4
Households with one or more persons employed	11.9	57.6
Adults employed	11.3	47.9
Sample	**196**	**126**

[a] The child food security subscale is calculated from the responses to the eight child-referenced items in the survey that ask about the conditions and experiences of children (Nord & Bickel, 1999; 2002).
Notes: Sample size refers to the number of households in the dichotomous classifications of each column. Other figures represent percentages of households (in one case, of adults in households) in the relevant group with the specified attributes, indicated in the column captions.

food insecurity rate of the two groups was roughly equivalent among households with children, with one adult, and with no employed member.

With respect to intragroup differences, among those who did not receive government assistance, a higher rate of food insecurity occurred among households with (a) one member than with two or more, (b) no wage earners than with employed adults, and (c) one adult than with two or more adults. Among recipients, households with children and with no employed adults were found more food insecure than their counterparts with contrasting attributes. The food insecurity rate in the presence of multiple members and adults was higher among recipients than nonrecipients. The continued experience of food insecurity in spite of government assistance or lack of substantial difference in the rate of food insecurity between recipients and nonrecipients is consistent with other studies reviewed above, which reported neutral or perverse effect of food assistance (e.g. Gibson-Davis & Foster, 2006; Gundersen & Oliveira, 2001; Jensen, 2002; Wilde and Nord, 2005).

Figure 1. Prevalence of Food Insecurity by Receipt of Government Assistance



Living Environment and Degree of Food Security

Does living environment in the sense of residing in a TPH versus an MIH community affect the degree of food insecurity? In other words, are residents in TPH better or worse off than are residents in MIH in their food-security condition? A comparison of the food security status of the two groups of residents indicates that the prevalence of food insecurity was nine percentage points higher in TPH than MIH (Table 5). The intercommunity differentials across the three levels of food security slightly, but consistently, exceed those observed between recipient and nonrecipient groups compared earlier.

The finding that mixed-income residents were relatively more food secure could plausibly be due to intercommunity differences other than those pertaining to the neighborhood and living environment. As Table 5 shows, the two communities differed in a number of household characteristics. Higher proportions of families with children and multiple-member households resided in TPH than in MIH. The employment rates of adults and the percentage of families with at least one employed member are three times higher in MIH than in TPH, consistent with one of the hypothesized outcomes of living in a mixed-income community with respect to employment opportunity. TPH housed a far greater proportion of households (70%) who received government assistance than did MIH (28%). Residents in MIH received higher incomes than did their counterparts in TPH, although the average annual household income levels in both communities were below the federal poverty level.[10]

[10] The poverty threshold in 2001 when the survey was conducted was US$14,255 for a three-member, one-child household (U.S. Department of Health and Human Services [HHS], n.d.). The average family size and number of children for our sample are 2.5 and 1.2, respectively (see Table 1).

Table 5. Household Food Security and Selected Household Characteristics by Type of Living Environment

Category	Community (%)	
	Traditional	Mixed-income
Food security status		
Secure	45.8	54.9
Low food security	37.1	32.4
Very low food security	17.1	12.7
Child's food condition		
No child very low food security	94.0	95.7
Child very low food security	6.0	4.3
By selected household characteristics		
Households with children	53.0	64.8
Households with two or more adults	20.0	35.2
Households with one or more persons employed	20.6	62.0
Adults employed	17.5	53.5
Households receiving government assistance	70.1	28.2
Average annual household income	$7,449	$11,493
Sample	251	71

Notes: Except for average annual income and sample size, all figures represent % of households (in one case, of adults in households) in the relevant group with the specified attributes, indicated in the column captions.
Average annual household income figures were obtained from management offices of the communities and pertain to the resident population from which the sample was drawn.

Figure 2. Prevalence of Food Insecurity by Type of Community (Traditional Public Housing vs. Mixed-Income Housing

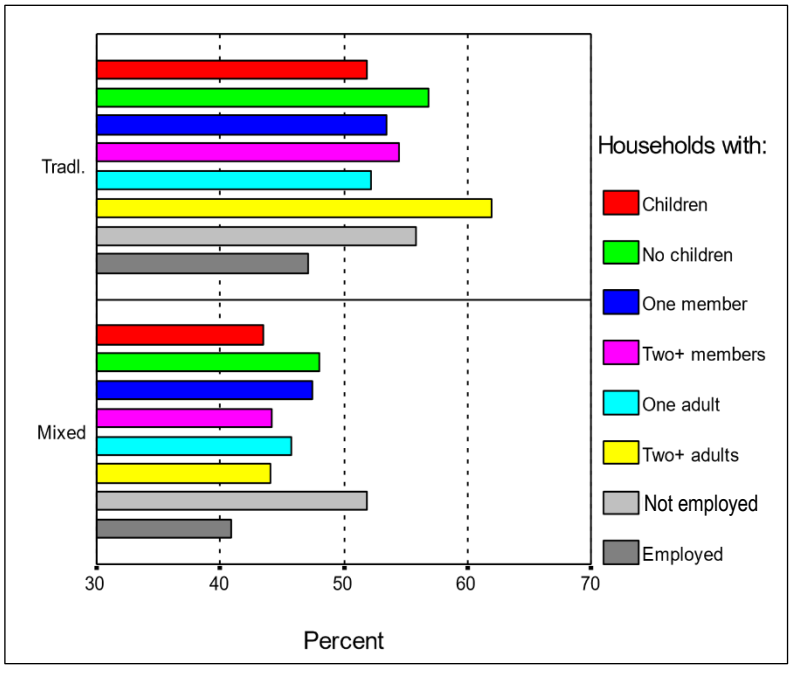


Figure 2 portrays the intra- and intercommunity differences in the prevalence of food insecurity based on most of the household characteristics identified above. Within-community differences in the probability of food insecurity were minor except between subgroups based on employment status (in both communities) and on the number of adults in a household (in the traditional community). On the other hand, differences between the two communities for a given level of household attribute were relatively large. In each category and regardless of the level of attribute considered, the prevalence rate of food insecurity in TPH exceeded that in the MIH community. For instance, residents of the traditional community were on average more food insecure than those in MIH regardless of the employment status of household members. Households with at least one employed member were less food insecure than households with no employed members; and among the latter, those residing in MIH appeared to be less food insecure than their counterparts in the other community, probably reflecting wage differentials among the two groups of employed residents.

The Interactive Effect of Government Assistance and Living Environment

The rates of participation in government assistance programs in the two communities were diametrically different: 70% in TPH and 28% in MIH. Likewise, the distribution of recipients between the two communities was lopsided, with only 10% of them living in the MIH community. Having

Table 6. Government Assistance, Living Environment, and Employment Status

Household Category by Status of Employment and Receipt of Government Assistance	Community					
	Traditional Public Housing			Mixed-Income Housing		
	Total in Row Category	Category as % of Community	Food-Secure as % of Category	Total in Row Category	Category as % of Community	Food-Secure as % of Category
Not employed, nonrecipient	40	15.9	45.0	13	18.3	46.2
Not employed, recipient	159	63.3	43.9	14	19.7	50.0
Employed, nonrecipient	35	13.9	54.3	38	53.5	57.9
Employed, recipient	17	6.8	47.1	6	8.5	66.6
Total	251	100	45.8	71	100	54.9

Note: "Not employed" refers to households with no employed members.

assessed the separate effect of government assistance and living environment, next we explored whether the two factors interacted with each other in influencing the prevalence of food insecurity among the study sample. To that end, we compared the prevalence rate of food insecurity in the two communities, given employment and participation status in government assistance programs. The following subsection explores intercommunity differences among recipients.

Comparative results emerging from the three-way classification in Table 6 include the following. First, the single largest category in the TPH community comprised government-assisted households with no working adult (63%). In contrast, roughly one half of the respondents in the MIH community were nonrecipients who reported employment income. Second, those who reported receipt of both government assistance and wage income constituted the smallest category in the two communities. Third, in the TPH community, the probability of being food secure was the highest among households with employed adult(s) who did not receive government assistance. In the MIH, on the other hand, those who received assistance and wage income were more food secure than were households in the other categories.

Fourth, given employment status, recipients of government assistance in the TPH community were generally less food secure than nonrecipients were. This contrasts with the experience of MIH residents for whom, given employment status, receipt of government assistance was associated with higher probability of food security. Fifth, in all categories, mixed-income housing residents enjoyed a higher probability of food security than do their counterparts in the traditional community, although the differential with respect to nonrecipient categories, with or with no employed adult, is negligible. Among recipients of public assistance, the probability of food security was invariably higher among MIH residents, with a gap of 20 or six percentage points depending on the status of employment.

One might surmise from these comparative results that the effect of government assistance on the food security status of public housing residents depended more on differences in the living environment than on employment status. It appears that, given the status of employment, the living environment interacted with participation in government assistance program in influencing the probability of being food insecure. Figure 3 depicts this possible interactive effect by controlling for selected household characteristics in addition to employment status. Clearly, intracommunity differences emerging from dividing the sample into groups based on selected household attributes are rather insubstantial in the TPH except regarding the number of adults. In contrast, the prevalence of food insecurity varies considerably within the MIH across the designated subgroups. Comparing the two communities for a given category of household characteristics, recipients of government assistance in TPH were more food insecure than those in MIH in all categories except in one-adult families with children.

In summary, there is no clear evidence that

government assistance influenced the probability of being food secure in the study population at the aggregate level. However, the living environment effect magnified the potential positive impact of government assistance. The type of living environment seemed to have a relatively noticeable effect on the prevalence of food security, even after controlling for certain household attributes that might affect the relationship between the two variables.

The Timing of Reduced Food Intake and Receipt of Government Assistance

This subsection addresses the temporal relationship between the timing of food hardship events and the receipt of government assistance including SNAP. The type of food hardship considered in the forthcoming discussion is reduced food intake. For our purpose, we focus only on four survey items, which, when affirmed, are indicative of reduced food intake, for which we added follow-up questions about timing as part of the survey instrument.

Table 7 lists said items and their associated frequencies, representing the number of respondents who reported the specified food hardship and identified the week when they encountered the hardship. In 50 households (16% of the sample), adults cut the size of or skipped meals. For 62% of these households, this occurred during the last week of the month. For 56% of households with adults who were hungry but did not eat, the stated hardship took place in the fourth week. Similarly, the majority of the reported instances of adults going without eating the whole day and children skipping meals both happened during the last week of the month. Table 7 reveals a consistent pattern in which the number of households experiencing reduced food intake was lowest in the first two weeks and highest on the last week of the month. Thus, the incidence of hunger has a time dimension to it, varying from one week to the next predictably.

The pattern in Table 7 may be due wholly or in part to the timing of government assistance. To test this hypothesis, we focus on the link between reduced food intake by adults and whether they received government assistance (Table 8). As shown in Table 8, 71 households, representing 22% of the total sample, had one or more adults who cut the size of or skipped their

Figure 3. Prevalence of Food Insecurity Among Recipients of Government Assistance by Type of Community (Traditional Public Housing vs. Mixed-Income Housing)

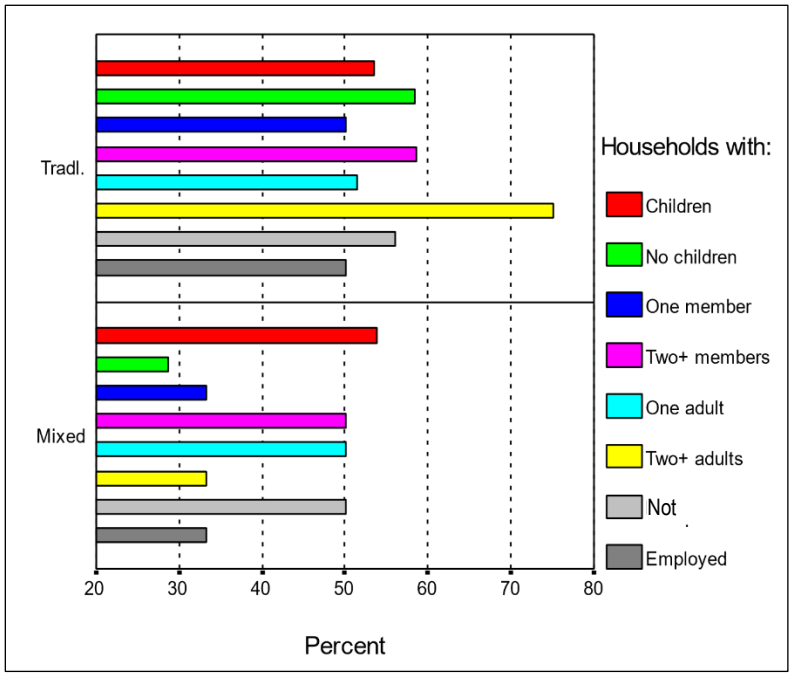


Table 7. Number of Households Experiencing Reduced Food Intake by Week of Occurrence

	Week of the Month			
Type of Food Hardship	First Two Weeks	Third Week	Fourth Week	Total
Adult cut size of, or skipped, meals	5	14	31	50
Adult hungry but did not eat	8	12	25	45
Adult did not eat for whole day	4	7	13	24
Children skipped meals	0	3	5	8

meals; were hungry but did not eat; or went without eating for a whole day for lack of food. Adults in most of the households (61, or 86%) experienced reduced food intake during the third or fourth week of the month. Sixty-two percent of the households under consideration received government assistance, which approximates the percentage obtained for the whole sample.

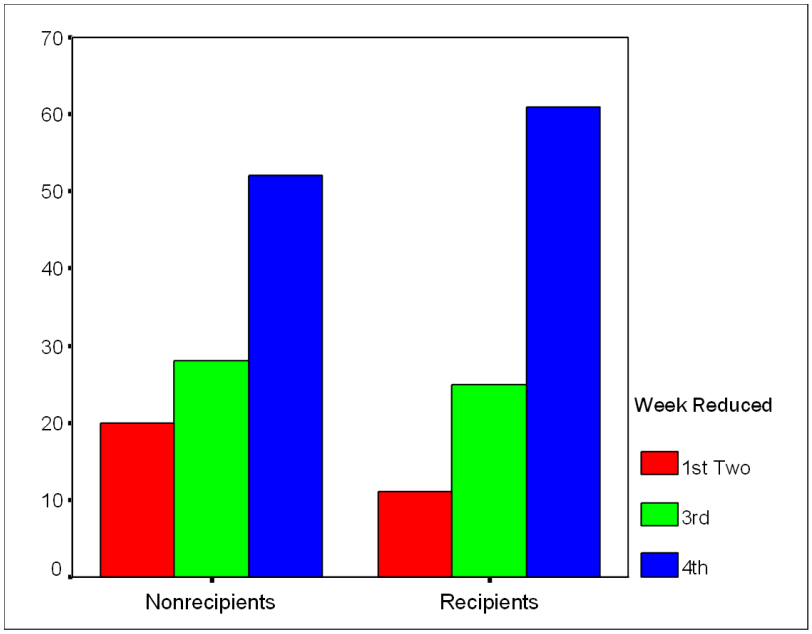
Although the occurrence of food hardship exhibited the same pattern in both groups, its profile over time is much steeper in the recipient than in the nonrecipient group. The number of recipient households with reduced food intake in the last week of the month is more than five times that recorded for the first two weeks. The corresponding increase for the nonrecipient group was by less than a factor of three (Figure 4).

To examine the temporal relationship between the timing of food hardship and of the receipt of assistance, we focus exclusively on recipients of government assistance. As shown in Table 9 and Figure 5, 80% of those who received government assistance received it in the first two weeks of the month and the remainder during the third week. No household reported receiving assistance during the last week of the month. This was the week when the majority of the relevant sample (61%) experienced reduced food intake. The proportion of households suffering reduced food intake progressively increased as the percentage of households receiving assistance decreased from the first half to the latter weeks of the month (see shaded percentage figures in the last row and column of the table). Food hardship was most prevalent when no assistance was received and least prevalent when assistance was received the most. This suggests a negative temporal relationship between the event of food hardship and the receipt of government assistance.

Table 8. Number of Households with Adults Experiencing Reduced Food Intake by Week of Occurrence and Receipt of Assistance

Week of the Month	Recipients	Nonrecipients	Total
First Two Weeks	5	5	10
Third Week	12	8	20
Fourth Week	27	14	41
Total	44	27	71

Figure 4. Households with Adults Experiencing Reduced Food Intake, by Nonrecipient vs. Recipient of Government Assistance (Number)



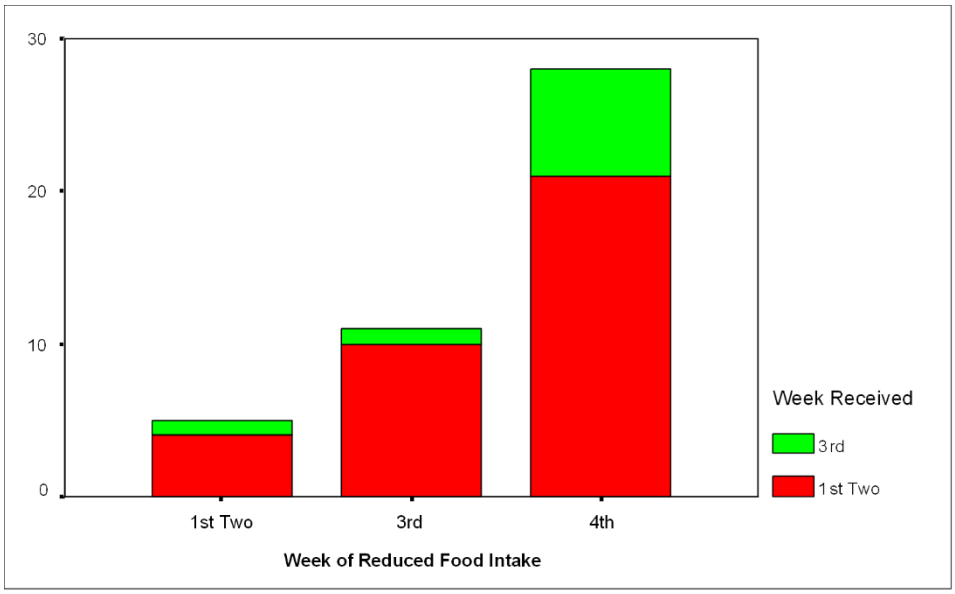
Summary and Concluding Remarks

This paper assessed the extent of food insecurity and investigated the implications of public assistance and living environment for the degree of food insecurity in a case study of two public housing communities. A little more than half of the sample experienced food insecurity, and a smaller proportion experienced VLFS. Albeit marginally in the majority of cases, food insecurity was higher among households without than with children; multiple-adult than single-adult families; male-headed than female-headed households; households headed by persons under the sample mean age than older persons; recipients of government assistance than nonrecipients; and traditional low-income than MIH residents. Overall, the findings suggest a high prevalence of food insecurity,

Table 9. Households Reporting Reduced Food Intake and Receipt of Government Assistance by Week of Occurrence

	Week When Assistance Was Received (%)				
Week of Food Hardship	First Two Weeks	Third Week	Fourth Week	Total (%)	Total (%)
First Two Weeks	5	1	0	6	13.6
Third Week	10	1	0	11	25.0
Fourth Week	20	7	0	27	61.4
Total	35	9	0	44	100
Total (%)	80	20	0	100	N/A

Figure 5. Number of Households Reporting Reduced Food Intake and Receipt of Government Assistance by Week of Occurrence



including VLFS, among the study population, although this is not surprising for a sample drawn from low-income communities.

The absence of a strong relationship between government assistance and food security status is, on the surface, contrary to conventional expectation. In general, while some households may have become food secure because of government assistance, others may have remained food insecure in spite of it. One common explanation offered for this finding is the process of self-selection whereby those households who receive government assistance do so because they are, in the first place, demonstrably more needy and more food insecure than those who do not qualify to receive assistance. This may partly explain why 64% of the food-insecure households were recipients of government assistance. Since belonging to either category is not the result of a randomized process, it is difficult to isolate the effect of government assistance on the degree of food security. That said, however, the fact that a number of households remained insecure in spite of government assistance might speak to the inadequacy of the assistance they received. Perhaps, for the assistance to make a dent on food insecurity, there may be a threshold of assistance required. The amount and kind of assistance, the frequency of receipt, and recipients' perception of its continuity all affect the efficacy of government assistance in alleviating food insecurity.

Although the average effect of government assistance on food security status was not measurable from these data, it was far from irrelevant, as disaggregated data indicated. Some recipients felt a higher degree of insecurity during the week of the month when they did not receive assistance than during the week when assistance was disbursed. Furthermore, government assistance improved the probability of being food secure in the environment of MIH. Whether independently of or interactively with government assistance, the type of living environment seemed to affect food security condition. Living in MIH appears to improve the chance of being food secure, even after considering

some household attributes that might affect the relationship between the two variables.

The inherent caveats of the household food security scale constrain the interpretation of the results of the study. Note that a household's classification as food secure does not necessarily mean that the household affirmed none of the survey items. Moreover, the food security scale does not fully reflect coping strategies. For example, it recognizes the strategy of substituting low-cost foods for preferred foods, but it does not encompass all the strategies commonly employed by low-income families. Households who somehow make ends meet using coping strategies not included in the survey instrument, such as cutting non-food expenses, could conceivably be misclassified as food secure (see, for example, Bezuneh & Yiheyis, 2020). Their sense of insecurity would probably surface if references were made to other coping mechanisms besides those included in the standard survey instrument. Coping mechanisms are likely to rise in variety and frequency for low-income families as their incomes further decrease. Furthermore, the food security scale captures neither the nutritional intake nor the safety of food eaten. Respondents could be classified as food secure while consuming nutritionally deficient food. This is important when attempting to make a causal connection between food security and health status of respondents. Despite its shortcomings, the food security scale is a valuable measure, and our study largely validates it in its modified format.

Another point of caution in the interpretation of the results of our study is its sample size. A related shortcoming is the paucity of cross-sectional units for our empirical investigation of the food-security effects of differences in living environment (traditional versus mixed-income communities). The sampling of additional study sites from each type of community would have provided more robust findings and stronger generalizations about the effect of living environment on food insecurity. Therefore, the results reported in this study, although informative, can only be taken as suggestive. A more definitive and conclusive assessment of the environmental effect on food security requires research based on a larger sample drawn from multiple sites of each type of living environment.

With the aforementioned caveats of the present study in mind, we can draw a few tentative conclusions with policy implications. First, despite receipt of government assistance, a substantial percentage of the sample remained food insecure. This may be partly due to the inadequacy of the amount and/or the ineffectiveness of the type of assistance received, suggesting that increasing the amount and/or tailoring the type of assistance provided would be appropriate policy measures to enhance food security. Second, the incidence of food hardship occurred much more frequently during the last week relative to the first two weeks of the month. This coincided with the reported timing of the receipt of government assistance, giving rise to a lagged temporal relationship between the two events. This finding suggests that public assistance would probably reduce the concentration of events of food deprivation if it were disbursed at shorter intervals. Third, living in a mixed-income setting appeared to be associated with a lower degree of food insecurity, providing another justification for the shift in emphasis from traditional to mixed-income housing.

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