

Food Insecurity in Higher Income Households

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Abstract

Twenty percent of U.S. households classified as food insecure had midrange or high incomes, according to responses to the 1995-97 Current Population Survey. This study investigates the extent to which these households are food insecure and what proportion of them may have been identified as food insecure because of problems in the measurement methods. The study finds that a small proportion, at most, of measured food insecurity among middle- and high-income households appears to be due to misunderstanding of questions or to random or erratic responses. Some households in these income groups are food insecure due to factors such as uneven incomes or changes in household composition during the year or to the existence of multiple economic units in the same household.

Keywords: Food security, food security measurement, food insecurity, hunger, welfare, income

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Summary

Most of the food-insecure households in the United States have low levels of income. However, a substantial number of middle-income households, and a few high-income households, also register some level of food insecurity in the nationally representative Current Population Survey (CPS) Food Security Supplements. A smaller number of those households register hunger. During the 3-year period from 1995 to 1997, these middle- and high-income households accounted for 20 percent of all food-insecure households and 17 percent of all households with hunger in the Nation. This apparent anomaly raises questions about the measurement process. Are these households really food insecure, or are their scores false positives? This issue is examined by comparing households classified as food secure, food insecure without hunger, and food insecure with hunger in three income groups, using data from the 1995, 1996, and 1997 CPS Food Security Supplements. First, household patterns of responses to the individual questions in the food security and hunger series are compared across the three income groups: low-income (below 1.85 percent of the poverty line), middle/high-income (over 1.85 percent of the poverty line, and high-income (above \$50,000). Then households classified as food secure, food insecure without hunger, and food insecure with hunger in the three income groups are compared on a wide array of characteristics that are known, or expected to be, associated with food security status.

Item scores and item-fit statistics, which measure how households at various levels of food insecurity respond to each question in the food security scale, are generally consistent across income groups. This suggests that food insecurity as measured is the same phenomenon in the three income groups. Item scores from Rasch-model scales, estimated independently for low- and middle/high-income households, were highly correlated between the groups ($r = .994$), indicating that households in the two income groups that registered the same level of food insecurity generally affirmed the same subset of questions in the food security and hunger series. Even among households with annual incomes above \$50,000, response patterns did not differ much from those of low-income households. There is evidence in these analyses that some of the food insecurity and hunger registered by middle- and high-income households is due to misunderstanding of questions or erratic responses; response patterns of these households are

somewhat less consistent than those of low-income households. But these inconsistencies are not serious or widespread, and they can account for only a small proportion of the incidence of food insecurity registered by these households.

In their responses to the survey, both low-income and middle/high-income households registered similar associations of food insecurity and hunger with household structure, alternative indications of food stress, coping strategies for avoiding food insufficiency, use of food assistance and other welfare programs, employment, income in an earlier period, migration, and change in household composition. This suggests that determinants of, and responses to, food insecurity are similar across the income range even though the prevalence of food insecurity and hunger is much lower among households with higher incomes.

The association of food insecurity and hunger with household characteristics also sheds light on why these conditions are registered by households in the middle- and high-income range. For the most part, the food insecurity and hunger registered by these households reflect real instances of constrained access to food, despite their relatively high annual incomes, because:

- ***Income was uneven during the year.*** Even though annual income was normally adequate to meet food needs, during part of the year it fell much lower. Food insecurity and hunger questions are referenced to the previous 12 months, and the household was food insecure during a low-income period.
- ***Multiple families (or economic units) resided in the same household and did not fully share resources.*** In the CPS, both food insecurity and income are reported at the household level. In some cases, the unit with food insecurity is not the unit with the higher income.
- ***Household composition changed during the year.*** For example, a person or family may have had low income and been food insecure during part of the year and then married a higher income person. In the CPS, combined annual income of the two units is recorded for the household.

Some higher income food insecurity may also reflect unusual or unexpected economic need during the year, such as uninsured accident, illness, or loss. However, this hypothesis could not be tested with the available data.

Introduction

Food insecurity and hunger, as measured by the household food security scale (Hamilton et al., 1997a; Hamilton et al., 1997b; Bickel et al., 2000), are expected to be linked to inadequate financial resources. Every question in the food security scale specifically references this, as, for example, "In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?" or "In the last 12 months, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?" As expected, food insecurity and hunger are found to decline with increasing income, whether income is measured by household income categories or household income-to-poverty-ratios (i.e., income adjusted for household size and composition) (Hamilton et al., 1997a, p. 49). Nevertheless, some middle- and high-income households also register food insecurity in the nationally representative Current Population Survey (CPS) Food Security Supplements. Of the 57 million U.S. households with incomes above 185 percent of the poverty line (average 1995, 1996, and 1997), 3.8 percent were classified as food insecure, including 1.2 percent classified as food insecure with hunger. Nationally, these middle- and high-income households accounted for 20 percent of all food-insecure households and 17 percent of all households with hunger.

This raises questions about the measurement process. Are these households really food insecure, or are their scores false positives? A number of hypotheses can be proposed to explain why higher income households register food insecurity.

1. ***Temporal mismatch/uneven income***—The food security items reference the previous 12 months, while the income measures refer to the year prior to a household's entering or re-entering the survey. For some households, 1, 2, or 3 months have elapsed since their income was recorded. It may have been high during that earlier period, but due to job loss, illness, or other factors, income in the past few months may have been much lower, and the experience of food insecurity may have occurred then. Even when the two measures reference the same 12-month period, income may have been variable during the year, with food insecurity occurring during periods of low income.

2. ***Change in household composition***—Household income in the CPS refers to the combined incomes of all persons who are in the household at the time of the survey. However, these persons may not have lived together the entire year. For example, in a recent marriage, one of the spouses may have lived for part of the previous year on a very limited income, even though the combined income of the two persons is relatively high.
3. ***Multiple economic units in a residential household***— Income and food security measures refer to all the persons living at the same address. In some cases, these persons comprise more than one economic unit, with little or no sharing of resources. For example, roomers and boarders may not share income with the primary householder, and roommates or housemates may not fully share income. Thus, the adequate income of one unit may not prevent food insecurity in the others.
4. ***Unusually high economic needs***—Some households have either episodic or chronic needs that deplete economic resources. Medical conditions, personal or household disasters, uninsured liabilities, high costs of education, addictive behaviors, and other contingencies can reduce money available for food to inadequate levels, even though household income is quite high.
5. ***Intrahousehold allocation of money***—One or more individuals within the household may control access to household funds and fail to allow enough food money for other members.
6. ***Accidental identification of food insecurity and hunger due to noneconomic causes***— Respondents may have mistaken the intention of the food-sufficiency questions and described insufficient food intake or hunger that resulted from health, mobility, or limitations of facilities, rather than from inadequate money to buy food as requested by the questionnaire.
7. ***Inappropriate responses to food security questions***—Respondents may have misunderstood the intent of questions or answered randomly or erratically. Some may have assessed minimal or very infrequent food stresses as more serious or long lasting than they

really were. Some may have mistaken the intention of the food-sufficiency questions and described insufficient food intake or hunger that resulted from dieting or other voluntary actions, rather than from resource constraints as specified by the questionnaire.

Households conforming to hypothesis #7 (inappropriate responses) are correctly considered "false positives" on the food security measure. Those described by hypothesis #6 (noneconomic causes) experienced involuntary food insecurity or hunger, although not from causes the food security scale was intended to measure. The other hypotheses describe households where involuntary, resource-constrained food insecurity or hunger have, in fact, occurred despite a relatively high income. In households conforming to hypotheses #2, #3, and #5 (change in household composition, multiple economic units in the household, or inadequate allotment of food money by members in control), the food insecurity or hunger did not extend to the entire household. Therefore, the prevalence of these conditions, as measured by the number of persons living in food-insecure households, may be overestimated.

These hypotheses are not mutually exclusive at the aggregate level. We expect some households conform to each of them. The object of the research is to assess the relative importance of the various measurement anomalies, especially false positives. More understanding of measurement issues is necessary to properly interpret food security statistics.

To explore these issues, we compare three income categories of households who responded to the Food Security Supplement during the first 3 years the survey was conducted, 1995, 1996, and 1997. (The categories--low-income, middle/high-income, and high-income--are explained in the next section, "Data and Methods.") First, we compare their patterns of responses to the individual items in the food security and hunger series. Then we compare the households classified as food secure, food insecure without hunger, and food insecure with hunger across the three income groups on a number of dimensions. These include household structure at the time of the interview, alternative indications of food stress, use of various coping strategies to avoid food insufficiency, use of food assistance and other welfare programs, employment, income in an earlier period, migration, and change in household composition.

Data and Methods

Data on food insecurity and hunger are from the CPS Food Security Supplements of April 1995,¹ September 1996, and April 1997. The CPS is a nationally representative survey of about 50,000 households, conducted monthly by the U.S. Census Bureau. Beginning in 1995, one of the monthly surveys each year has included additional questions, referred to as the Food Security Supplement, that ask about household spending for food, use of food assistance programs, and conditions, experiences, and behaviors indicating food insecurity and hunger. We used the variable HRFS12M1 to classify households as to their 12-month food security status, excluding households with HRFS12M1 missing (i.e., households lacking valid answers to any of the items in the food security scale). This left 127,558 household records for the analyses.

We used the HRPOOR variable to classify the households as *low-income* (less than 1.85 times the poverty threshold) or *middle/high-income* (above 1.85 times the poverty threshold) categories. The HRPOOR variable compares the "control card income"² for each household with a household poverty threshold approximating that specified by the Census Bureau (Hamilton et al., 1997a). The 3-year combined sample included 51,855 households with incomes below 1.85 times the poverty threshold and 75,703 households with incomes above that level. Households lacking income information (9,314, or 7.3 percent) were excluded from comparative analyses, but were included as a separate income category in the preliminary analysis of prevalence rates. To examine the more extreme cases of high-income food insecurity, we also identified households with annual incomes above \$50,000 (n=32,008),

¹ The April 1995 data were assembled by matching the public-use file published by the Census Bureau with the FNS/ERS CPS update file available from the ERS Web site (www.ers.usda.gov/briefing/foodsecurity/data).

² Control card income (HUFAMINC in the CPS data file) is a categorical variable, specifying total household income in 14 categories. This income information is requested for "the last 12 months" at the time a household enters the sample and is updated when the household re-enters the sample a year later. To compare income with poverty thresholds, income was assigned at the midpoint of the income category. HUFAMINC was missing for 7.3 percent of households in the combined 1995, 1996, and 1997 data file, representing 10.9 percent of households when the data are weighted to represent all households in the Nation. Food insecurity was nearly twice as prevalent in the households with HUFAMINC missing (estimated at 85 percent, based on analysis not shown) as in those with recorded income above 1.85 times the poverty line (6.5 percent compared with 3.8 percent), but far less prevalent than in households with income below 1.85 times the poverty line (24.6 percent). Thus, most of the households with HUFAMINC missing probably had incomes higher than 1.85 times the poverty line.

creating the category "*high-income households*." These households were included in the middle/high-income category, but were also analyzed as a separate comparison group.

We created separate analysis files for low-income, middle/high-income, and high-income households.³ Each income group's responses to the 18 items comprising the food security scale were submitted separately to Winsteps software for Rasch scaling (Linacre and Wright, 1998). We then compared item severity scores and item-fit and household-fit statistics for the three income groups. (See appendix for further information on the meaning of item severity scores and fit statistics.) These comparisons assess the extent to which the phenomenon measured by responses to the 18 scale items is invariant across the income groups.

We carried out two sets of comparisons of household characteristics across income and food security categories. The first set compares characteristics that can be calculated from data in the Food Security Supplement (other than the 18 core food security items) and from the corresponding CPS "core" monthly data files. These characteristics include household structure at the time of the interview, an alternative measure of food sufficiency and quality provided by the USDA/NHANES food-sufficiency questions, and use of coping strategies to avoid food insufficiency or hunger. The second set of comparisons is based on a match of the March 1995 CPS Annual Demographic Supplement with the April 1995 CPS and Food Security Supplement. The March supplement provides more precise income information than the April CPS, as well as information on cash-welfare program participation, employment, and migration in the previous year, none of which is available in the April CPS. Construction and coding of variables measuring household characteristics are described as they are encountered in the "findings" section of the paper.

We matched person records in the March 1995 and April 1995 files based on month-in-sample (HRMIS), State (GESTCEN), household ID number (HRHHID), household serial suffix (HRSERSUF), and person's line number (PULINENO). We verified the identity of matched

³ Rasch analysis is not informed by "extreme" response patterns, households that denied all items or affirmed all items. This reduces the sample size for the scaling analysis (but not for other analyses). Sample sizes in the scaling subsamples were 15,029 low-income, 5,158 middle/high-income, and 959 households with annual incomes above \$50,000.

individuals by age and sex. Potentially, six of the eight CPS rotation groups can be matched from March to April.⁴ However, a small proportion of households in the April file did not match because they were not available for interview in March, and a few were excluded because they had moved between March and April. (CPS is a sample of addresses, and the same address is sampled even if the residents move.) We restricted the matched sample to households with no changes in composition between March and April, since information from the March file and food security information from the April file might not refer to the same consumption unit if individuals had moved into or out of the unit. These restrictions resulted in a matched sample of 30,446 households, or 91.8 percent of the households in the rotation groups common to the 2 months.

We calculated population estimates of food security status by income level (presented in table 1), using household supplement weights.⁵ We used unweighted household cases for all other analyses. There was no compelling reason to use case weights because the issues under investigation have to do with response patterns and characteristics of respondent households, not with prevalence rates in the population.

⁴ The CPS sample is divided into eight rotation groups, each an independent sample of U.S. households. Each month, two new rotation groups are added and two are retired. Thus six of the eight rotations are common between any month and the month following.

⁵ The supplement weights are based on sampling probabilities and are adjusted by the Census Bureau to match State and national control totals by age, sex, race, and Hispanic ethnicity. They are further adjusted for both core survey nonresponse and supplement response. Applying these weights allows the households that responded to the Food Security Supplement to represent the entire noninstitutionalized U.S. population.

Findings

Prevalence of Food Security and Hunger by Income Level

As expected, food insecurity and hunger declined sharply with increasing household income (fig. 1). The prevalence rate of food insecurity was more than six times as high among households with incomes less than 1.85 times the poverty line than among households above that line (24.6 percent vs. 3.8 percent; see table 1). Food insecurity with hunger was over seven times more prevalent for low-income households than for middle/high-income households (9.0 percent vs. 1.2 percent). However, as seen in figure 1, food insecurity and hunger did not decline to negligible levels until income rose to about five times the poverty threshold. Because such a large proportion of households were in this middle-income range, households with incomes above 1.85 times the poverty threshold accounted for a substantial share of all food-insecure households—about 20 percent—and for 17 percent of all households with hunger.

For households with annual incomes above \$50,000, the prevalence of food insecurity and hunger was lower still, and these households accounted for only about 3 percent of all food insecurity and 2 percent of all hunger in the Nation.

Item-Response Patterns

The first question we address is whether response patterns of higher income households differed from those of low-income households. That is, did they typically affirm a different subset of items to get the same scale score?⁶ The severities of item scores⁷ indicate the typical response pattern of the population for which the scores are calculated, and similar relative severities of items in two subpopulations indicate similar response patterns. Comparing item scores based on independent Rasch-model scaling of low- and middle/high-income households

⁶ One of the assumptions of the single-parameter Rasch model is that all items discriminate equally. Given this assumption, households that affirm the same number of items (provided they respond to all items) are assigned the same scale score.

⁷ See appendix for more detailed information on the meaning of item severities.

indicates that response patterns were nearly identical for the two income groups (fig. 2). Item scores were highly correlated between the two groups ($r = .994$), and no item had substantially different scores for the two groups. This indicates that low- and middle/high-income households registering the same level of food insecurity showed substantially identical patterns of response, generally affirming exactly the same items. The significance of this finding is that it rules out any substantial proportion of erratic or random responses—and consequent false positive classification—on the part of the middle/high-income respondents.

There were some minor differences in response patterns. Compared with low-income households with the same scale scores, middle/high-income households were slightly more likely to report that adults cut the size of meals or skipped meals,⁸ ate less than they felt they should, and were hungry but did not eat. Middle/high-income households were slightly less likely to report having worried that food would run out, that children were not eating enough, that children were hungry, and that adults did not eat for whole days in 3 or more months. However, even for these items, differences between income groups were not great. The phenomenon measured by the item set, as summarized by the scaled measure, is essentially the same for the two income groups.

Comparing item-fit statistics for the two income groups provides further information on whether responses of middle/high-income households were consistent with the assumptions of the measurement model or were erratic. Two item-fit statistics, *infit* (information-weighted) and *outfit* (outlier sensitive), measure the extent to which responses to individual items are consistent with Rasch-model assumptions. In brief, the Rasch model assumes that, for a given item, the probability that a household will affirm the item increases as the severity of food insecurity in the household increases, and that the probability is related to the severity of the household's food insecurity by a logistic function.⁹ The item-fit statistics measure how well each item conforms to this probabilistic expectation. In general, the information-weighted fit statistics (*infit*) were at least as good (i.e., near unity) for middle/high-income households as

⁸ Abbreviated descriptions of the items are used throughout the description of findings. For full wording of the questions, see appendix.

⁹ The Rasch model assumes, specifically, that the log of the odds that a household will affirm a particular item is equal to the difference between the severity experienced by the household and the severity of that item.

for low-income households, indicating similar, or perhaps slightly greater, levels of consistency in response patterns by the middle/high-income households (table 2). Outfit statistics, which are sensitive to highly unexpected responses, would be high for any items that were answered erratically. In fact, on only three items did middle/high-income households register outfit statistics notably higher than those of low-income households—"Adult did not eat whole day," "Child hungry," and "Child did not eat whole day"—while the reverse was true for about an equal number of items. The dispersion of the item scores (measured either by standard deviation or mean absolute deviation) was about 5 percent smaller for middle/high-income than for low-income households. This is a measure of overall or average discrimination of the items, an indicator of how consistently response patterns reflected the severity order of the items. Substantially lower discrimination would indicate less consistent, more erratic responses, but the observed item dispersions indicated only a slight difference between the two groups.

Household infit and outfit statistics, analogous to the corresponding item-fit statistics, were also examined to assess the extent to which response patterns of middle/high-income households differed from those of low-income households. The household-fit statistics measure the extent to which a household's responses are consistent with the severity order of the items, as estimated from the responses of all households. In this analysis, response data from households in both the low- and middle/high-income groups were scaled together. All households were then ranked by their infit and outfit statistics. The highest decile of households on each fit statistic, that is, the households with the most erratic response patterns, were found to include somewhat disproportionate shares of middle/high-income households, but the disparity was not great. Households in the top decile on infit included 9.0 percent of all low-income households and 12.8 percent of all middle/high-income households. Households in the top decile on outfit included 9.5 percent of all low-income households and 11.6 percent of all middle/high-income households.

Response patterns of households with incomes above \$50,000 also were quite similar to those of low-income households (fig. 3). Item scores for the two income groups were highly correlated ($r = .992$). Items showing significant inconsistency included the same items that

were inconsistent between low- and middle/high-income households. Compared with low-income households with the same scale score, high-income households were slightly more likely to report that adults cut the size of meals or skipped meals and that children skipped meals in more than 3 months. They were slightly less likely to report that adults did not eat for a whole day in 3 or more months. The general consistency in item scores is evidence that the phenomenon measured by the food security scale is essentially the same even when registered by households with incomes above \$50,000. Item-fit statistics (not shown) were somewhat better for households with incomes above \$50,000 than for low-income households, although the average discrimination of items was about 12 percent lower for the high-income households. The lower average item discrimination indicates somewhat less consistency in response patterns of high-income households. This could result from higher variability in the ways in which food insecurity is experienced and managed by these households, or it could result from a somewhat higher proportion of careless or random responses. The distribution of household-fit statistics for households with incomes above \$50,000 was essentially the same as for all middle/high-income households.

Taken together, the comparisons of item scores and fit statistics across the three income groups indicate that food insecurity and hunger in middle- and high-income households are essentially the same phenomena as those measured in low-income households. While there is evidence that a few middle- and high-income households responded differently and more erratically to the items comprising the scale—potentially resulting in misclassification of food security status (consistent with hypotheses #6 and #7)—the evidence suggests that these were relatively few and had, at most, a small effect on the measurement of food insecurity and hunger in middle- and high-income households.

Household Characteristics

Household Structure

Earlier research has demonstrated that food insecurity and hunger are associated with household structure (Andrews et al., 2000; Bickel et al., 1999; Hamilton et al., 1997a; Nord

and Winicki, 2000). To assess whether this association is similar across income levels, we cross-tabulated household structure by income category and food security status. We identified nine household structural types, as follows: Households with children were classified as either (1) "two-parent with child," (2) "single male with child," or (3) "single female with child," depending on the marital status of the household reference person, or as (4) "complex household with child" if multiple family units or unrelated individuals were present in the household. Complex households are more likely to contain more than one economic unit, and therefore provide a test of hypothesis #3 (multiple economic units in residential household). Households without children were classified as (5) "multi-adult" (related adults living together, most commonly a married couple), (6) "sole male," or (7) "sole female." Sole male and female households were further subdivided into (8) elderly (age 65 and up) and (9) nonelderly.

The prevalence rates of food insecurity and hunger for each income category are compared across household types in figures 4 and 5. Allowing for the differences in overall prevalence rates among income categories, the associations of food insecurity and hunger rates with household types were strikingly similar across income categories. In all three income categories, food insecurity rates were higher for single males with children, and much higher for single females with children, than for two-parent families with children and multi-adult households. In all three income categories, rates of food insecurity and hunger were relatively low for elderly persons living alone, both male and female, and substantially higher for nonelderly men and women living alone. Complex households with children registered prevalence rates of food insecurity and hunger higher than the average for all households, and this was especially true of households with incomes above 1.85 times the poverty threshold. Among complex households in the middle/high-income range, the prevalence of food insecurity was twice the average for all middle/high-income households, and the prevalence of food insecurity with hunger was 2.5 times the average for all households in this income range.

In summary, the similar associations between household structure and food security status in all three income categories indicate that household structure affects food insecurity and hunger similarly for high-, middle-, and low-income households. This is further evidence that the phenomenon measured by the food security scale is similar across income categories,

consistent with the evidence from the scale analysis. However, among middle/high-income households registering food insecurity and hunger, a disproportionate share is complex. This provides evidence that some small proportion of middle/high-income food-insecure households conform to hypothesis #3. That is, they are classified as food insecure or food insecure with hunger in spite of a relatively high household income because there are multiple units in the residential household that do not fully share economic resources.

An Alternative Measure of Food Sufficiency and Quality

Households in the CPS were asked, in addition to the questions used to create the food security/hunger scale, a food-sufficiency question that has been used for a number of years in other surveys. The question classifies households into four categories, based on the statement that best describes the eating pattern in their household: (1) enough of the kinds of food they want to eat, (2) enough food, but not always the kinds they want, (3) sometimes not enough to eat, and (4) often not enough to eat. In addition, those who responded that they sometimes or often did not have enough to eat were asked whether this was due to any of five reasons: not enough money for food, too hard to get to the store, no working stove, no working refrigerator, or not able to cook or eat because of health problems. Respondents could affirm more than one reason. Although the answers, like those to the questions in the food security scale, provide a self-reported assessment, this is a shorter, more direct way of measuring food adequacy. Its association with the food security scale also provides a test of whether items in the scale may have been misunderstood or answered erratically. Further, the reasons given by households that did not get enough to eat provide a check on whether the scale might be picking up food insecurity or hunger not directly due to inadequate money for food.

The association of this alternative measure with the food security/hunger scale was similar for low-income and middle/high-income households (fig. 6). Of all middle/high-income households with food insecurity that fell short of hunger, 28 percent reported that they had enough of the kinds of food they wanted. This was nearly the same as the corresponding proportion for low-income households in that food security category (26 percent). Of middle/high-income households with hunger, 17 percent reported they had enough of the kinds

of food they wanted, while 41 percent reported they had enough to eat but not always the food they wanted, and 42 percent reported that they sometimes (34.6 percent) or often (7.8 percent) didn't have enough to eat. The corresponding figures for low-income households were 11, 31, and 58 percent, indicating somewhat higher levels of food stress, by this alternative measure, among the low-income households. Households with an income above \$50,000 also conformed generally to the patterns of the low-income households (fig. 7).

In all three income categories, high proportions—around 90 percent—of the households that were classified as food insecure without hunger or food insecure with hunger, and who stated that they sometimes or often didn't get enough to eat, cited "not enough money" as a reason (figs. 8 and 9). Much smaller proportions of those households cited other reasons for not getting enough to eat, the most common being "too hard to get to the store" and "not able to cook or eat because of health problems." The responses of middle/high-income food-insecure households indicate that a rather small proportion of them conform to hypothesis #6: they experienced food insecurity for reasons not measured by the food security scale, rather than as a specific result of lacking enough money for food. The responses suggest, however, that the proportion of middle/high-income food-insecure households reporting reasons other than lack of money for food insecurity does not exceed 10 percent, not much larger than the proportion of low-income households giving the same reasons.

Coping Strategies To Avoid Food Insufficiency and Hunger

Middle/high-income households that gave any indication of food insecurity or insufficiency on preliminary screening questions, and all low-income households, were asked whether they engaged in a number of activities or behaviors known to be used by some limited-resource households to avoid food insufficiency and hunger. The questions were as follows:

People do different things when they are running out of money for food in order to make their food or their food money go further. In the last 12 months, did you ever:

- Get food or borrow money for food from friends or relatives?

- Send or take the children to the homes of friends or relatives for a meal because you were running out of food?
- Put off paying a bill so that you would have money to buy food?
- Get emergency food from a church, a food pantry, or food bank?
- Eat any meals at a soup kitchen?

The proportions of middle/high-income food-insecure households engaging in each of these coping strategies were similar to the corresponding proportions of low-income food-insecure households (fig. 10). Among middle/high-income households, almost 70 percent of those that were food insecure without hunger, and 80 percent of those with hunger, reported that they put off paying a bill so they would have money to buy food. These, as well as the proportions of households using other coping strategies, were generally similar to the corresponding statistics for low-income households with the same food security status and provide evidence that measured food security status was consistent with related experiences and behavior. The coping strategies reported by households with incomes above \$50,000 were also generally consistent with those of low-income households, although their use of remedies other than putting off bill-paying were somewhat lower than those of low-income households (fig. 11). Most of the food-secure households were screened out of these questions, so we cannot compare their responses with those of the food-insecure households.

Participation in Welfare Programs

The proportion of middle/high-income food-insecure households participating in the major welfare assistance programs was greater than that for food-secure households in that income range, but much smaller than that of low-income households (fig. 12). Among middle/high-income food-insecure households, 7 percent received food stamps and about 9 percent received free or reduced-price school lunches. Two inferences can be drawn from these statistics. First, the generally low program participation rates validate the general income status of most of these households, since their recorded income levels would make them ineligible for most welfare programs. Second, the fact that a minority of the households in question received welfare assistance suggests that those households may conform to hypotheses # 1, #2, or #3.

That is, income was lower than control card income either during part of the reference period or for some members of the household, making the household eligible, to that extent, for assistance.

Employment of Adults in the Household

Among the middle/high-income group, the proportions of food-insecure households with only part-year or part-time workers were somewhat higher than for food-secure households (fig. 13). About three-fourths of all middle/high-income households, however, irrespective of food security status, had at least one full-time, full-year worker. This majority was even larger—about 90 percent—in high-income households (not shown).

Income in Calendar Year 1994

The CPS March file records annual income during the previous calendar year. This is a more accurate and reliable measure of income than the control card income, since it is built up from reports of income from many sources. For many households in the sample, it is also a measure of income during a slightly earlier period than that of the control card income, so that comparing the two incomes can provide an indication of income instability. About 19 percent of food-insecure households with control card income above 185 percent of the poverty line had incomes below that threshold during calendar year 1994, including about 4 percent that were below the poverty line in 1994 (fig.14). This observation provides additional evidence that a substantial minority of households conform to hypothesis #1, that is, that their income varied over time and was potentially low enough to result in inadequate purchasing power for food, during at least some part of the year. Although this pattern was less pronounced for households with annual incomes above \$50,000, about 3 percent of those households that were food-insecure without hunger and 12 percent of those with hunger had incomes below 1.85 times the poverty level in the previous calendar year (fig.15).

Migration and Change in Household Composition

The March CPS file includes information on where each person (older than 1 year) was living 1 year prior to the survey. We used this information to identify households that had moved between March 1994 and March 1995 (households in which all persons older than a year had lived elsewhere 1 year earlier). For nonmoving households (those in which at least one person had not moved), we also identified those in which composition changed due to persons moving into the household.

Households that had moved during the previous year were overrepresented in both food-insecure categories of both low-income and middle/high-income groups (fig. 16). Migration and residential moves are sometimes (though by no means always) undertaken in response to job loss or to increased expenses that make it impossible to keep up with rent or mortgage payments. Thus, the overrepresentation of movers among middle/high-income food-insecure households may be taken as evidence of income change or changes in economic need during the year, consistent with hypotheses #1 (temporal mismatch/uneven income) and #4 (unusually high economic needs).

Among middle/high-income households, nonmoving households that changed composition during the year made up 4 percent of those classified as food-insecure without hunger and just over 5 percent of those with hunger, but only 2 percent of those that were food secure.¹⁰ This suggests that, at most, 2 or 3 percent of middle/high-income food-insecure households conform to hypothesis #2 (change in household composition). This could be a slight understatement, since some proportion of households that moved would also have changed composition. Indeed, households that changed composition are likely to be overrepresented among households that moved. Even so, it seems unlikely that changes in household composition account for more than about 5 percent of middle/high-income food insecurity.

¹⁰ Household composition that changed due to a household member's leaving is not registered in the CPS and is, therefore, not taken into account in this analysis.

Food insecurity was not found to be associated with migration status among households with incomes above \$50,000 (fig. 17). However, the substantial overrepresentation of households that changed composition among these households that were classified as food insecure with hunger was striking—15 percent, compared with 2 percent for high-income food-secure households. This suggests that changes in income or economic need during the year associated with changes in household composition were important contributing factors to hunger among these households, consistent with hypotheses #1 (temporal mismatch/uneven income) and #4 (unusually high economic needs).

Discussion and Summary

These findings shed light on most of the hypotheses as to why food insecurity is observed in households with relatively high incomes. Most important, they provide convincing evidence that the food insecurity phenomenon measured by the food security scale is essentially the same for middle- and high-income households, including the few with annual incomes above \$50,000, as it is for low-income households. Item scores were highly correlated between the low-income group and each of the two higher income groups (middle/high-income and income over \$50,000), indicating that response patterns were nearly identical for households with the same scale scores across the income range. The Rasch-model fit statistics indicate that the responses of middle- and high-income households fit the statistical assumptions of the model about as well as the responses of low-income households. There was evidence that the response patterns of middle- and high-income households were slightly less consistent than those of low-income households, but this was not widespread.

Substantial experiential and behavioral evidence corroborates the measured food security status of the higher income households. Food insecurity and hunger were similarly related to household structure across income groups. The alternative measure of food adequacy—the USDA/NHANES food-sufficiency measure—was as consistently associated with food security status for higher income as for low-income households. Coping strategies that are not means-tested, especially putting off paying bills to have money for food and getting food or

borrowing money to buy food from friends or relatives, were as common among higher income food-insecure households as among their low-income counterparts.

Taken together, these findings suggest that hypothesis #7 (false positives due to inappropriate responses to food-sufficiency questions) accounts for only a small proportion of the food insecurity in higher income households registered in these national surveys.

The findings provide evidence for some of the alternative hypotheses. Hypothesis #1 (temporal mismatch/uneven income) was clearly supported by the comparison to calendar year 1994 income. A modest role is demonstrated by the analysis, and a much larger role is not ruled out. An upper bound could not be estimated with the available data. Hypothesis #2 (change in household composition) was clearly supported by the overrepresentation among higher income food-insecure households of those that changed composition during the previous year. The evidence suggests an upper bound of around 5 percent for the contribution of such changes to middle/high-income food insecurity. Additionally, change in household composition likely contributed, along with a temporal mismatch and uneven income (hypothesis #1) and multiple economic units in the household (hypothesis #3), to the use of means-tested welfare programs by households that had annual household incomes too high to qualify for those programs. There is convincing evidence for the role of multiple economic units in that complex households made up a larger share of high-income food-insecure households than of high-income food-secure households. However, this hypothesis probably accounts for less than 5 percent of middle/high-income food insecurity. It may be a somewhat more important factor in households with incomes above \$50,000. There is weak support for hypothesis #6 (accidental identification of food insecurity and hunger due to noneconomic causes), based on reasons those households gave for not having enough to eat. However, this hypothesis cannot account for more than about 10 percent of higher income food insecurity, since about 90 percent of such households that sometimes or often did not have enough to eat cited lack of money as a reason.

Hypothesis #5 (intrahousehold allocation of money) could not be tested by these data, and can probably be tested only by ethnographic, case-study methods. It is not expected to be a major factor, but may account for some small proportion of high-income food insecurity.

It appears, then, that a large proportion of the middle- and high-income food insecurity and hunger measured by the CPS is genuine, not artifactual or a result of erratic responses. The most important reasons appear to be temporal mismatch/uneven income (hypothesis #1) and unusually high economic needs (hypothesis #4). Upper bounds on hypotheses #2, #3, and #6 place their combined contribution at no more than 20 percent, and probably substantially less. Hypothesis #5 is not expected to account for more than a very small proportion of the remainder. By default, this leaves hypotheses #1 (temporal mismatch/uneven income) and #4 (unusual economic needs), or other factors not considered here, to account for most of the food insecurity and hunger among higher income households. A modest role for the former is demonstrated in this analysis, and a larger role is not ruled out. The latter, very important, hypothesis could not be tested with the CPS data, nor could the full extent of the former be estimated. An adequate test of both of these hypotheses and estimation of the magnitude of their effects will be possible when data from longitudinal surveys, with expenditure information as well as the food security measure, become available.

Future Research Directions

Further research attention might usefully be given to understanding the causes of food insecurity and hunger in middle- and high-income households. In particular, analysis of longitudinal data such as the Survey of Program Dynamics (SPD) and the Panel Study of Income Dynamics (PSID) may shed light on how changes in household composition and variability in income affect household food security. It will also be important to assess the extent to which such households have resources to cope with episodes of food insecurity, as well as whether action is needed to ensure that they have access to enough food for healthy, active living and for the well-being and sound development of their children.

Appendix

Measuring Household Food Insecurity and Hunger

The food security scale assessed in this paper was developed by the U.S. Food Security Measurement Project, an ongoing collaboration among Federal agencies, academic researchers, and private commercial and nonprofit organizations. The measure was developed over the course of several years in response to the National Nutrition Monitoring and Related Research Act of 1990 (NNMRR). The Ten-Year Comprehensive Plan developed under that Act assigned to an interagency working group the task of recommending “a standardized mechanism and instrument(s) for defining and obtaining data on the prevalence of food insecurity or food insufficiency in the United States and methodologies that can be used across the NNMRR Program and at State and local levels.”

What Is Food Security?

Extensive research in the late 1980s focused on understanding household food security, food insecurity, and hunger. This work led to the development, by an expert working group of the American Institute of Nutrition, of the following conceptual definitions, published in 1990 by the Life Sciences Research Office (LSRO) of the Federation of American Societies for Experimental Biology (Anderson, 1990):

- ***Food security***—Access by all people at all times to enough food for an active, healthy life. Food security includes at a minimum: (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, or other coping strategies).
- ***Food insecurity***—Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.
- ***Hunger***—The uneasy or painful sensation caused by a lack of food. The recurrent and involuntary lack of access to food. Hunger may produce malnutrition over time.... Hunger ... is a potential, although not necessary, consequence of food insecurity.

Food insecurity and hunger, as the terms are used here, are conditions resulting from *financial resource constraint*. Hunger, for example, can occur for many reasons, including dieting and being too busy to eat. The measurement procedure described here, however, is concerned only with food insecurity and hunger that occur because the household does not have enough food or money to buy food. Hunger, in this perspective, may be seen as a severe stage or level of food insecurity, rather than as a distinct or separate condition.

How Is Food Security Measured?

Food security status can be thought of as lying along a continuum from complete food security to severe hunger. Each household's food security status is assessed by a series of 18 questions (10 for households without children) that ask about behaviors and experiences known to characterize households having difficulty meeting their food needs. The questions (listed in full below) ask about conditions in the past 12 months and cover a wide range of severity, from having worried about whether food would run out to going a whole day without eating because there was not enough money for food. Each question specifies lack of resources as the reason for the behavior or experience (because we couldn't afford more food," or, "because there wasn't enough money for food."). This is to ensure that the measure does not register as food deprivation any behavior associated with dieting to lose weight, fasting for religious reasons, or undergoing food shortages for any reason other than resource constraints. Because each question refers specifically to the previous 12 months, the resulting scale is sensitive to any occurrence of food insecurity or hunger during that period.¹¹ These questions have been found to reliably measure a single underlying dimension of the severity of food insecurity as experienced within U.S. households.

The food security scale, which is a graduated measure of food insecurity, is calculated from responses to the 18 food security questions by statistical methods based on the Rasch

¹¹ Three of the items, however, are based on the number of months in which a behavior occurred. Thus households with recurring reductions of food intake are more likely to be classified as food insecure with hunger than those in which the reductions occurred in only 1 or 2 months.

measurement model (Linacre and Wright, 1998). Respondent households are further classified into one of three categories (food secure, food insecure without hunger, food insecure with hunger) based on their scores on the food security scale. Thus, the categorical classifications represent successive ranges of severity on the underlying measurement scale.

Severity of Items

A key analytic tool used in this report to compare the food security scale across income groups is the concept of item (or question) severity. The severity of items is measured on the same scale as the severity of food insecurity of households. Households with severity scores below that of a given item are more likely to deny than to affirm the item, while those with severity scores above that of the item are more likely to affirm it. Households with severity scores equal to that of the item are equally likely to affirm or deny it.

The range of severity of the conditions identified by the items is intuitively evident from the items. For example, Q12 (see question listing below), *“In the last 12 months, did you or other adults in your household ever not eat for a whole day because there wasn’t enough money for food?”* references a more severe food situation than does Q8, *“In the last 12 months, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food?”* And the latter question indicates a more severe level of food insecurity than does Q2, *“We worried whether our food would run out before we got money to buy more.”* These differences in severity are observed in two ways in the response patterns of surveyed households. First, the more severe questions are less frequently answered in the affirmative than the less severe questions. In 1995, 13 percent of households affirmed the least severe question, while only 0.2 percent affirmed the most severe question. Second, a household that affirms an item of midrange severity is likely to have also affirmed all items that are less severe. Similarly, a household that denies an item at midrange is likely to deny all items that are more severe. Note, however, that these response assumptions are only probabilistically true. That is to say, not all households follow these expected patterns exactly.

This highly regular pattern of severity ordering of the food security-indicator items is the basis of the statistical model used to calculate and assess the food security scales. The statistical model expresses and summarizes, in succinct quantitative form, the consistently ordered pattern that exists in the U.S. population of the conditions, experiences, and behavioral responses that indicate—and to some extent constitute—the phenomena of food insecurity and hunger.

Item- and Household-Fit Statistics

Item- and household-fit statistics based on the Rasch model are used in this report to assess the extent to which response patterns by households in various income categories were consistent with the severity ordering of the items and to what extent they were erratic. The statistics commonly used to assess how well responses to items correspond to the Rasch-model assumptions (or “fit” the model) are “infit” and “outfit.” After item calibrations and household scores have been estimated, the probability of an affirmative response in each cell of the household-by-item matrix is calculated. The infit and outfit statistics are then calculated for each cell by comparing the actual response to the probabilistically expected response in that cell. Infit is an “information-weighted” fit statistic for each item that is sensitive to responses by households with severity scores in the range near the severity level of the particular item. Outfit is sensitive to unexpected responses from households with severities much higher or lower than that of the item—that is, to highly improbable responses (outliers). Item-fit statistics are then calculated for each item by aggregating across households, and household-fit statistics are calculated for each household by aggregating across items. Both statistics compare the aggregated deviations of observed responses from predicted responses to the aggregated deviations that would be expected under Rasch assumptions, so the expected value of the statistics is 1. Infit and outfit values above 1.0 indicate a disproportionate share of “out-of-order” responses (i.e., affirmative responses by households with severity scores below that of the item or denials by households with severity scores above that of the item), while deviations below 1.0 indicate a smaller proportion of such responses than would be expected. The single-parameter Rasch model, which is used in creating the food security scales, assumes that all items discriminate equally sharply, so item-fit statistic values (especially infit) that are far from

unity call into question the suitability of the item for use in the scale. As a general rule, item-infits in the range of 0.8 to 1.2 are considered to be good, and 0.7 to 1.3 are acceptable. Similar standards may be applied to item-outfit statistics, but, in practice, outfits are very sensitive to a few highly unexpected observations. As few as two or three highly unexpected responses (i.e., denials of the least severe item by households that affirm most other items) among several thousand households can elevate the outfit for that item to 10 or 20.

Questions in the Food Security Survey Module

NOTE: Only the wording appropriate for the household being interviewed is read from the options in parentheses.

Transition into Module: These next questions are about the food eaten in your household in the last 12 months, since (current month) of last year and whether you were able to afford the food you need.

Now I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for (you/your household) in the last 12 months.

Q2. The first statement is "(I/We) worried whether (my/our) food would run out before (I/we) got money to buy more." Was that often true, sometimes true, or never true for (you/your household) in the last 12 months?

Q3. "The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more." Was that often, sometimes, or never true for (you/your household) in the last 12 months?

Q4. "(I/we) couldn't afford to eat balanced meals." Was that often, sometimes, or never true for (you/your household) in the last 12 months?

*Q5. "(I/we) relied on only a few kinds of low-cost food to feed (my/our) (child/the children) because (I was/we were) running out of money to buy food." Was that often, sometimes, or never true for (you/your household) in the last 12 months?

*Q6. "(I/We) couldn't feed (my/our) (child/the children) a balanced meal, because (I/we) couldn't afford that." Was that often, sometimes, or never true for (you/your household) in the last 12 months?

*Q7. "(My/Our child was/The children were) not eating enough because (I/we) just couldn't afford enough food." Was that often, sometimes, or never true for (you/your household) in the last 12 months?

Q8. In the last 12 months, since last (name of current month), did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?

Q8a. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

Q9. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money to buy food?

Q10. In the last 12 months, were you ever hungry but didn't eat because you couldn't afford enough food?

Q11. In the last 12 months, did you lose weight because you didn't have enough money for food?

Q12. In the last 12 months, did (you/you or other adults in your household) ever not eat for a whole day because there wasn't enough money for food?

Q12a. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

*Q13. The next questions are about children living in the household who are under 18 years old. In the last 12 months, since (current month) of last year, did you ever cut the size of (your child's/any of the children's) meals because there wasn't enough money for food?

*Q14. In the last 12 months, did (your child/any of the children) ever skip meals because there wasn't enough money for food?

*Q14a. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

*Q15. In the last 12 months, (was your child/ were the children) ever hungry but you just couldn't afford more food?

*Q16. In the last 12 months, did (your child/any of the children) ever not eat for a whole day because there wasn't enough money for food?

END OF FOOD SECURITY/HUNGER CORE MODULE

*Questions about children were omitted for households with no children under 18 years of age.

References

- Anderson, S.A. (ed.). 1990. "Core Indicators of Nutritional State for Difficult-to-Sample Populations," *Journal of Nutrition* 120(11S):1557-1600.
- Andrews, Margaret, Mark Nord, Gary Bickel, and Steven Carlson. 2000. *Household Food Security in the United States, 1999*. Rood Assistance and Nutrition Research Report Number 8. U.S. Department of Agriculture, Economic Research Service, Washington, D.C.
- Bickel, Gary, Mark Nord, Cristofer Price, William Hamilton, and John Cook. 2000. *Guide to Measuring Household Food Security, Revised 2000*. U.S. Department of Agriculture, Food and Nutrition Service, Alexandria, VA.
- Bickel, Gary, Steven Carlson, and Mark Nord. 1999. *Household Food Security in the United States, 1995-1998: Advance Report*. U.S. Department of Agriculture, Food and Nutrition Service, Alexandria, VA.
- Hamilton, William L., John T. Cook, William W. Thompson, Lawrence F. Buron, Edward A. Frongillo, Jr., Christine M. Olson, and Cheryl A. Wehler. 1997a. *Household Food Security in the United States in 1995: Summary Report of the Food Security Measurement Project*. U.S. Department of Agriculture, Food and Consumer Service, Office of Analysis and Evaluation, Alexandria, VA.
- Hamilton, William L., John T. Cook, William W. Thompson, Lawrence F. Buron, Edward A. Frongillo, Jr., Christine M. Olson, and Cheryl A. Wehler. 1997b. *Household Food Security in the United States in 1995: Technical Report*. U.S. Department of Agriculture, Food and Consumer Service, Office of Analysis and Evaluation, Alexandria, VA
- Linacre J.M., and Benjamin Wright. 1998. *A User's Guide to BIGSTEPS/WINSTEPS Rasch-Model Computer Programs*. Chicago: MESA Press, University of Chicago.
- Nord, Mark, and F. Joshua Winicki. 2000. "Prevalence of Hunger Declines in Rural Households," *Rural Conditions and Trends* 11(2): 80-86.

Table 1—Food security status of U.S. households by income level, average 1995, 1996, and 1997

	Total	Food secure	Food insecure		
			All	Without hunger	With hunger
All households:					
Number (thousands)	101,320	90,298	11,022	7,097	3,925
Percent of row total	100	89.1	10.9	7.0	3.9
Sample size (unweighted)	127,558	114,450	13,108	8,525	4,583
Low-income households (<1.85 poverty):					
Number (thousands)	33,168	25,022	8,146	5,163	2,983
Percent of row total	100	75.4	24.6	15.6	9.0
Percent of column total	32.7	27.7	73.9	72.7	76.0
Sample size (unweighted)	42,541	32,728	9,813	6,292	3,521
Middle/high-income households (>1.85 poverty):*					
Number (thousands)	57,087	54,930	2,157	1,480	677
Percent of row total	100	96.2	3.8	2.6	1.2
Percent of column total	56.3	60.8	19.6	20.9	17.2
Sample size (unweighted)	75,703	72,976	2,727	1,873	854
Income not known:					
Number (thousands)	11,065	10,346	719	454	265
Percent of row total	100	93.5	6.5	4.1	2.4
Percent of column total	10.9	11.5	6.5	6.4	6.8
Sample size (unweighted)	9,314	8,746	568	360	208
Households with annual income >\$50,000:*					
Number (thousands)	24,328	23,998	330	250	80
Percent of row total	100	98.6	1.4	1.0	0.3
Percent of column total	24.0	26.6	3.0	3.5	2.0
Sample size (unweighted)	32,008	31,581	427	325	102

*Middle/high-income category includes households with income above \$50,000.

Note: All prevalence estimates were calculated using household supplement weights.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

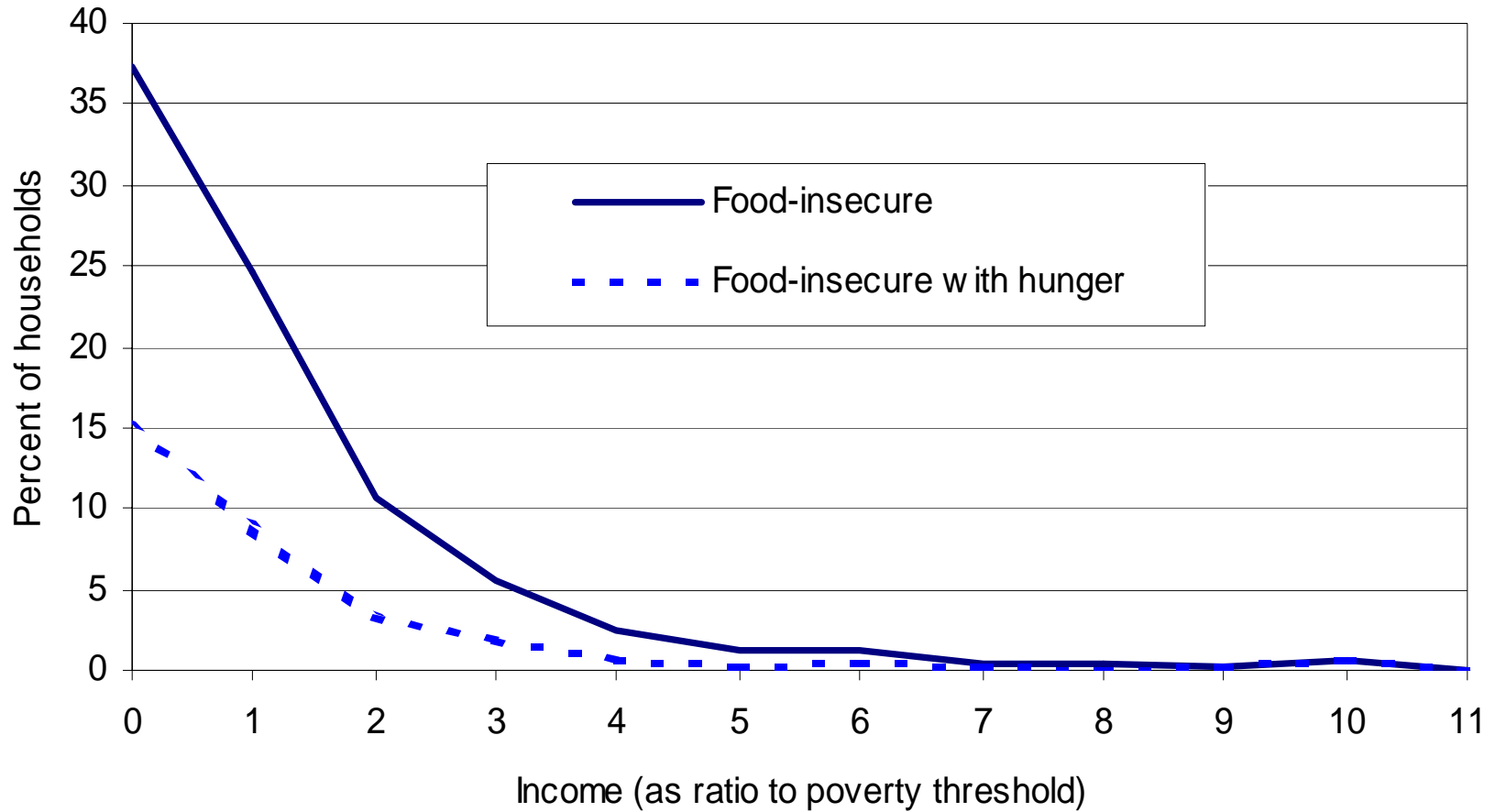
Table 2—Item statistics from independent Rasch-model scaling of food security items for low-income and middle/high-income households

Item	Item score		Std. error		Infit (mean sq)		Outfit (mean sq)	
	Income level*		Income level*		Income level*		Income level*	
	Low	Mid/high	Low	Mid/high	Low	Mid/high	Low	Mid/high
Worried food would run out	1.75	2.46	0.03	0.04	1.13	1.14	3.73	1.99
Food bought didn't last	3.17	3.50	0.02	0.04	0.91	0.94	1.05	1.14
Could not afford to eat balanced meals	3.55	3.78	0.02	0.04	1.04	1.04	1.47	1.51
Children fed few low-cost foods	3.94	4.05	0.03	0.05	1.18	1.13	1.47	1.20
Adult cut size or skipped meals	5.35	4.87	0.02	0.04	0.86	0.88	0.87	0.83
Couldn't feed children balanced meals	5.38	5.65	0.03	0.06	1.07	1.11	0.94	1.05
Adult ate less than felt he/she should	5.43	5.21	0.02	0.04	0.95	0.91	1.01	0.89
Adult cut size/ skipped meals, 3+ mos.	6.31	6.26	0.03	0.05	0.91	0.96	0.76	0.74
Children not eating enough	6.84	7.18	0.04	0.08	1.07	1.03	0.82	1.00
Adult hungry but didn't eat	7.31	7.00	0.03	0.05	0.91	0.93	0.79	0.90
Respondent lost weight	8.45	8.25	0.04	0.07	1.14	1.05	1.18	0.98
Cut size of child's meals	8.79	8.58	0.05	0.12	1.08	1.00	1.24	0.97
Adult did not eat whole day	8.82	8.92	0.04	0.08	0.94	0.97	1.12	1.27
Child hungry	9.13	8.97	0.06	0.13	0.91	0.92	0.74	1.36
Adult did not eat whole day, 3+ mos.	9.52	9.88	0.05	0.10	0.88	0.87	0.49	0.49
Child skipped meal	9.91	9.41	0.07	0.15	0.89	0.93	1.12	0.57
Child skipped meal, 3+ mos.	10.51	10.08	0.08	0.18	0.86	0.90	0.58	0.79
Child did not eat whole day	11.84	11.97	0.13	0.38	0.99	1.19	3.59	8.94
Mean	7.00	7.00						
Standard deviation	2.74	2.60						
Mean absolute deviation	2.36	2.25						
Discrimination coefficient	1.00	1.00						
Number of cases (nonextreme)	15,029	5,158						

*Low-income households had income below 1.85 times the poverty line. Middle/high-income includes all other households except those with income data missing.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 1
Prevalence of food insecurity and hunger, by income, average 1995-97

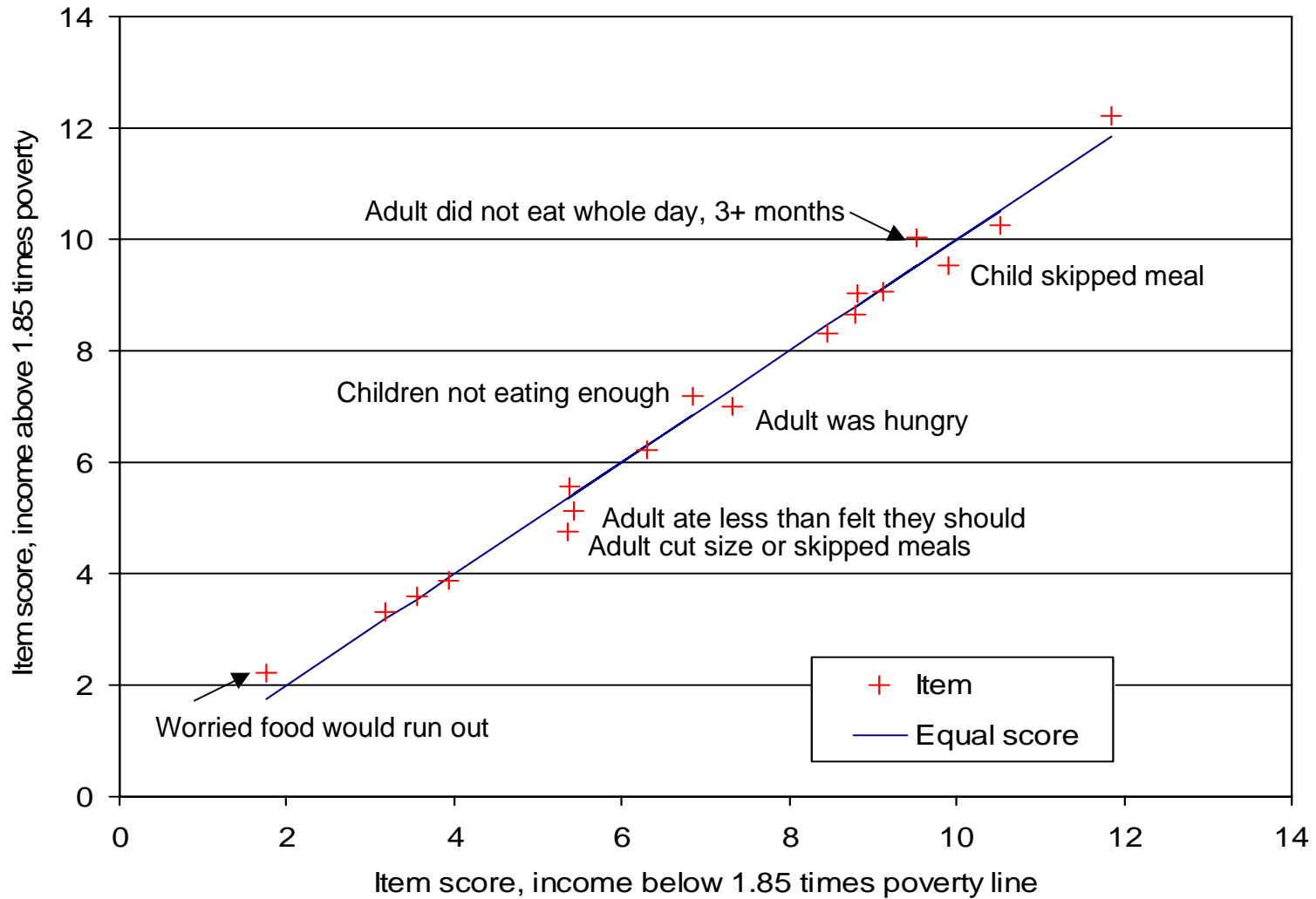


Note: Income (as ratio to poverty threshold) was rounded to nearest whole unit to categorize households.

Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 2

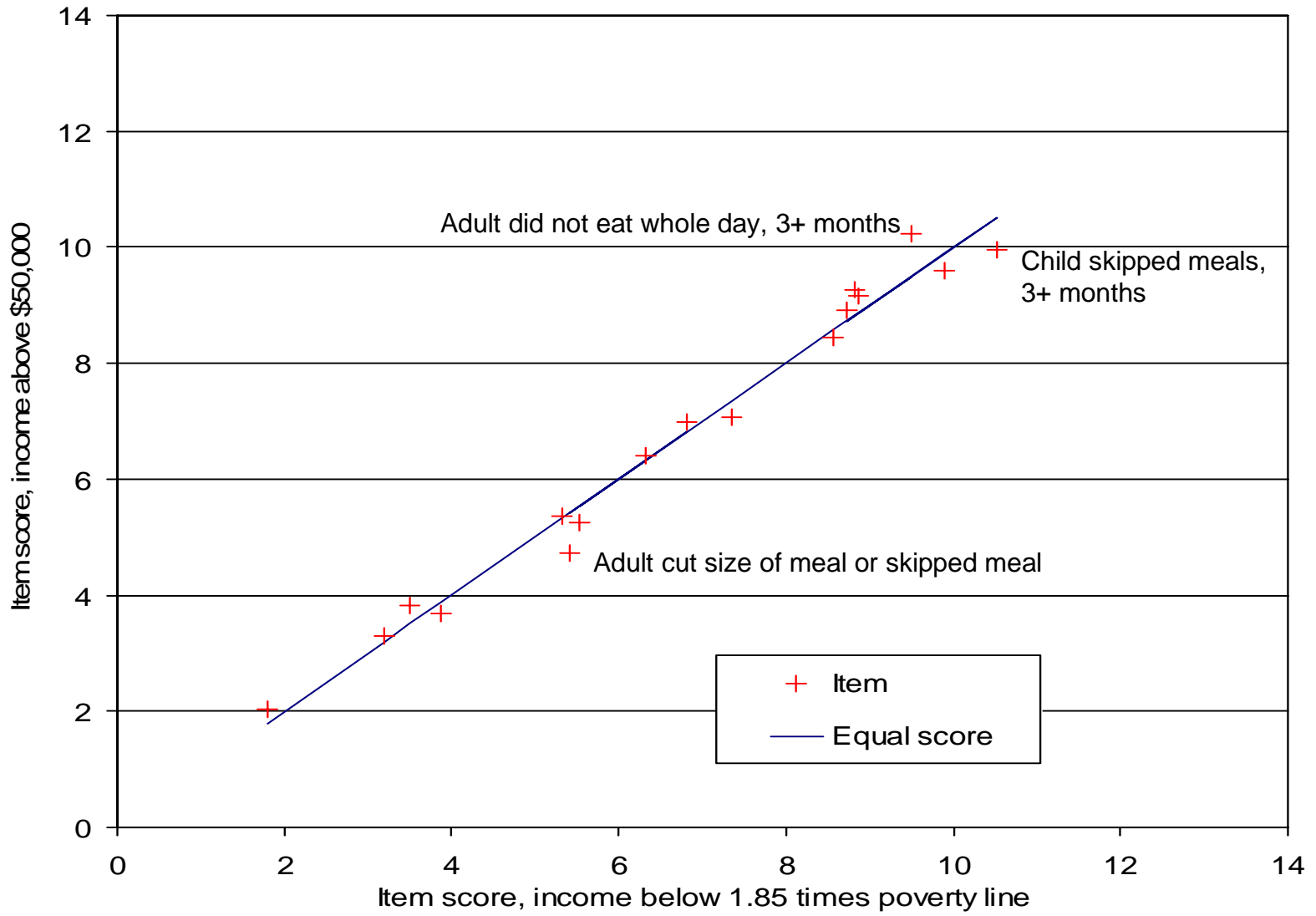
Comparison of item scores: Middle- and high-income households versus low-income households



Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 3

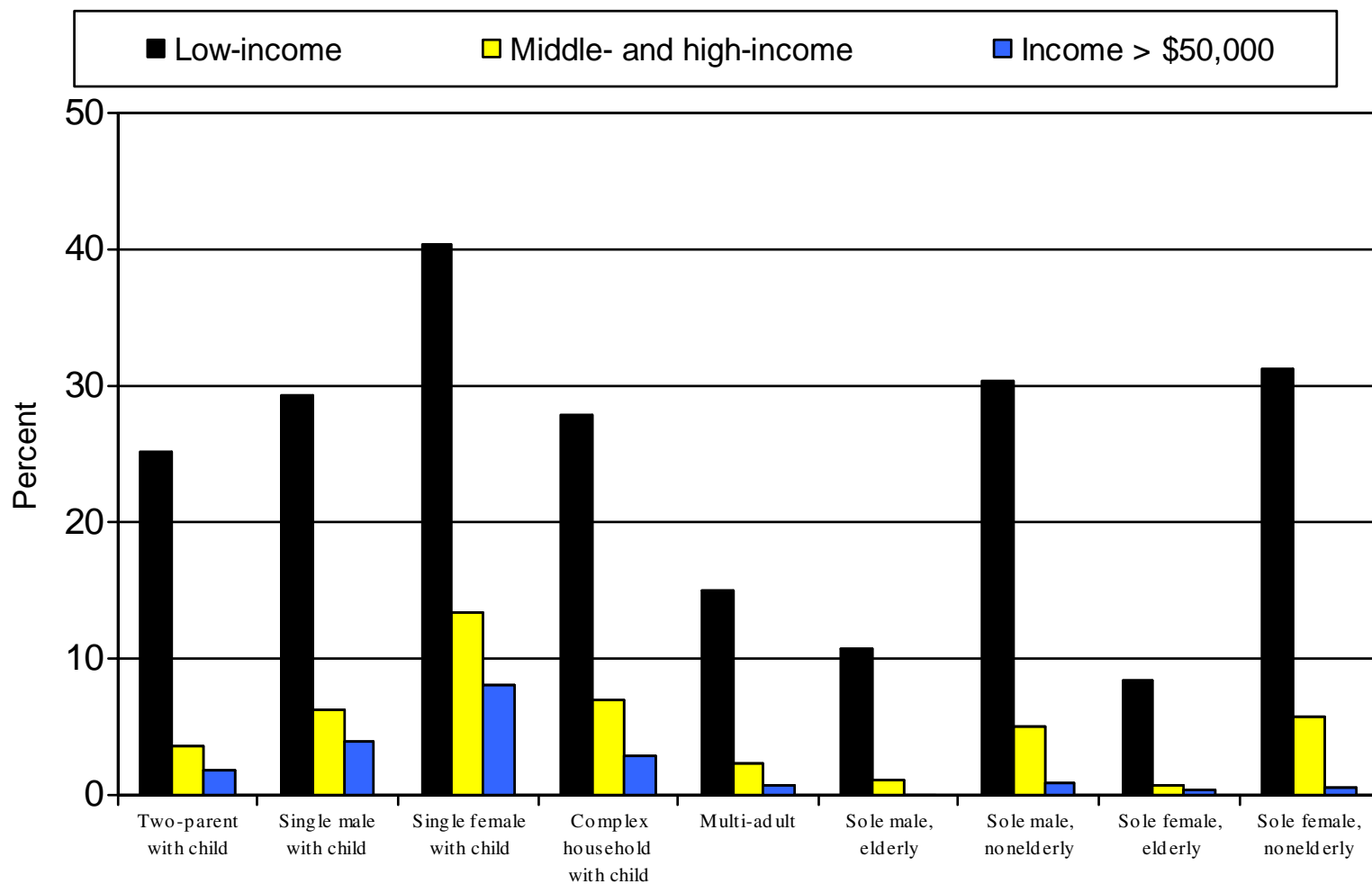
Comparison of item scores: Households with annual income > \$50,000 versus low-income households



Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 4

Percentage of households classified as food-insecure, by household structure and income level

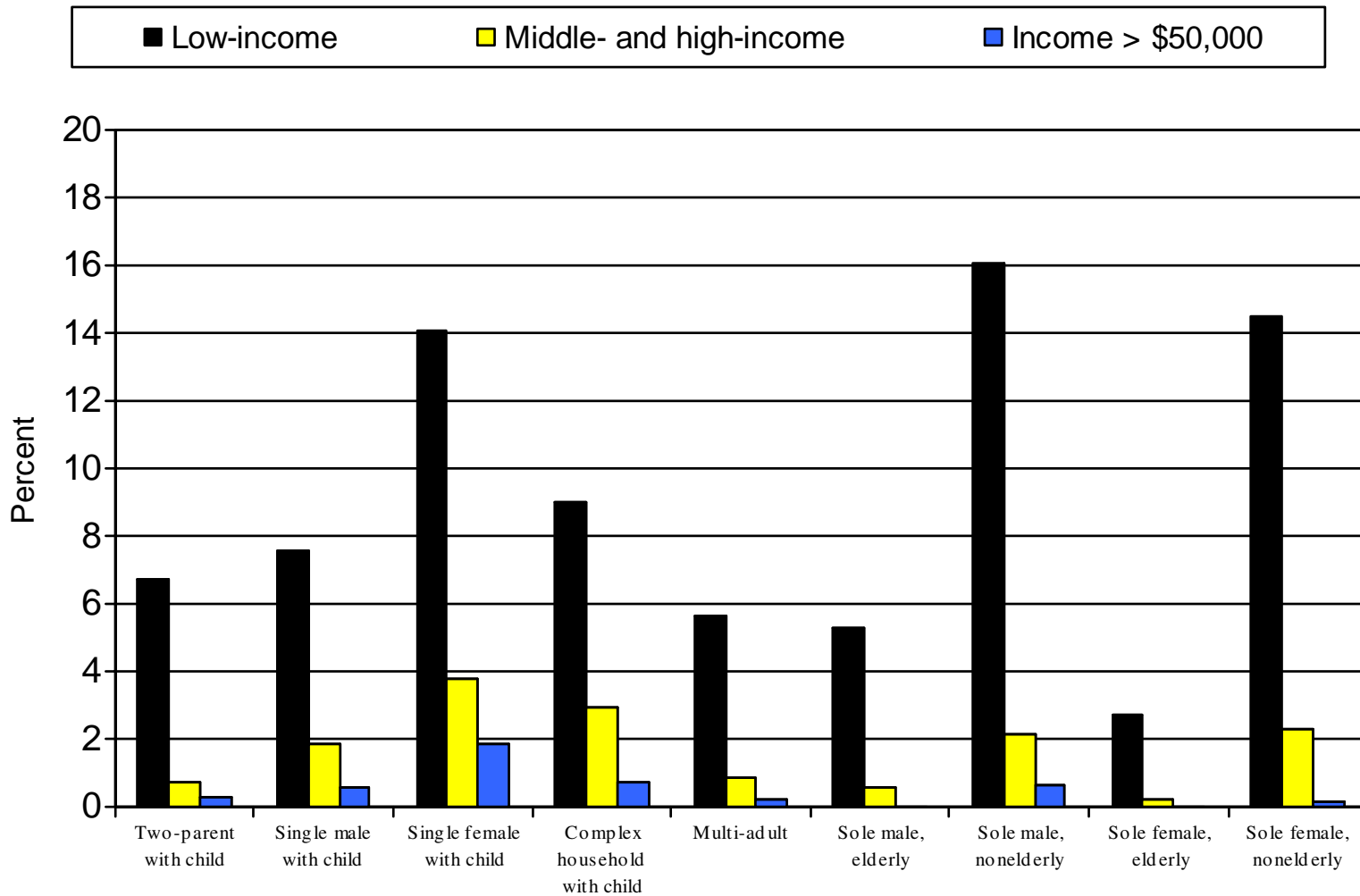


Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 5

Percentage of households classified as food-insecure with hunger, by household structure and income level

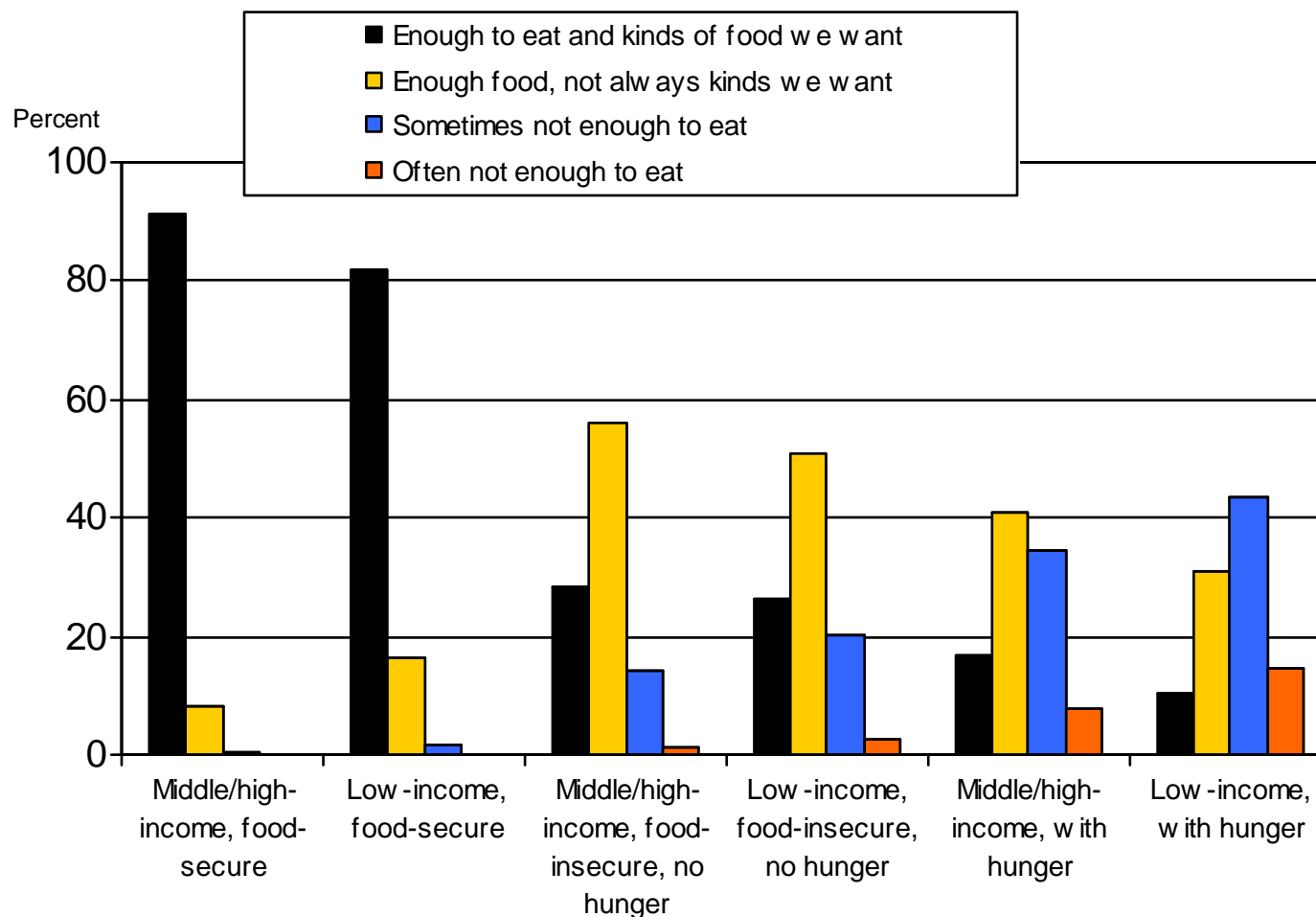


Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 6

Percentage of households reporting each food sufficiency status, by food security status: Middle/high-income households versus low-income households



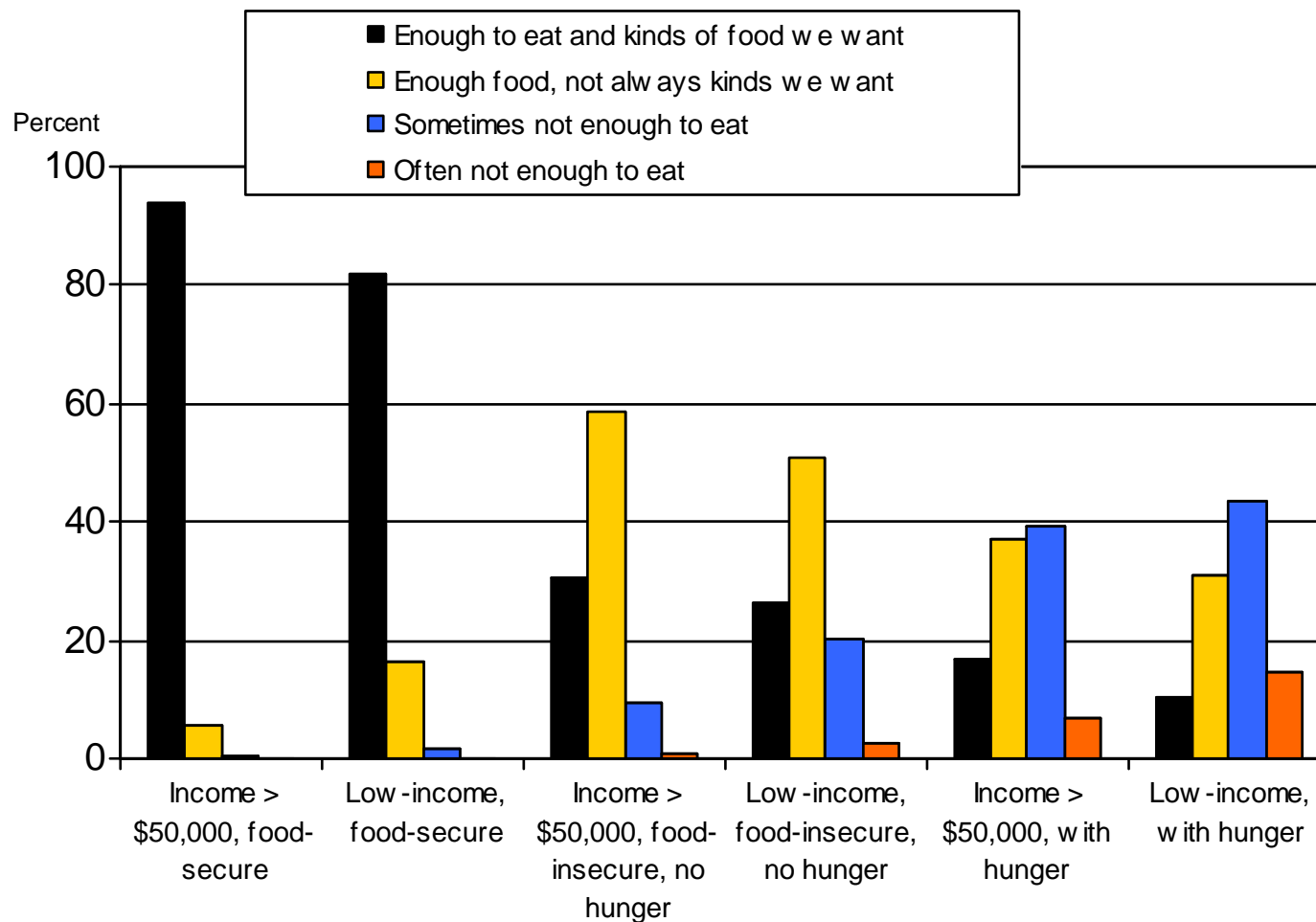
Note: The denominator for each percentage is the number of households in the specified income and food security status.

Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 7

Percentage of households reporting each food sufficiency status, by food security status: Households with annual income > \$50,000 versus low-income households



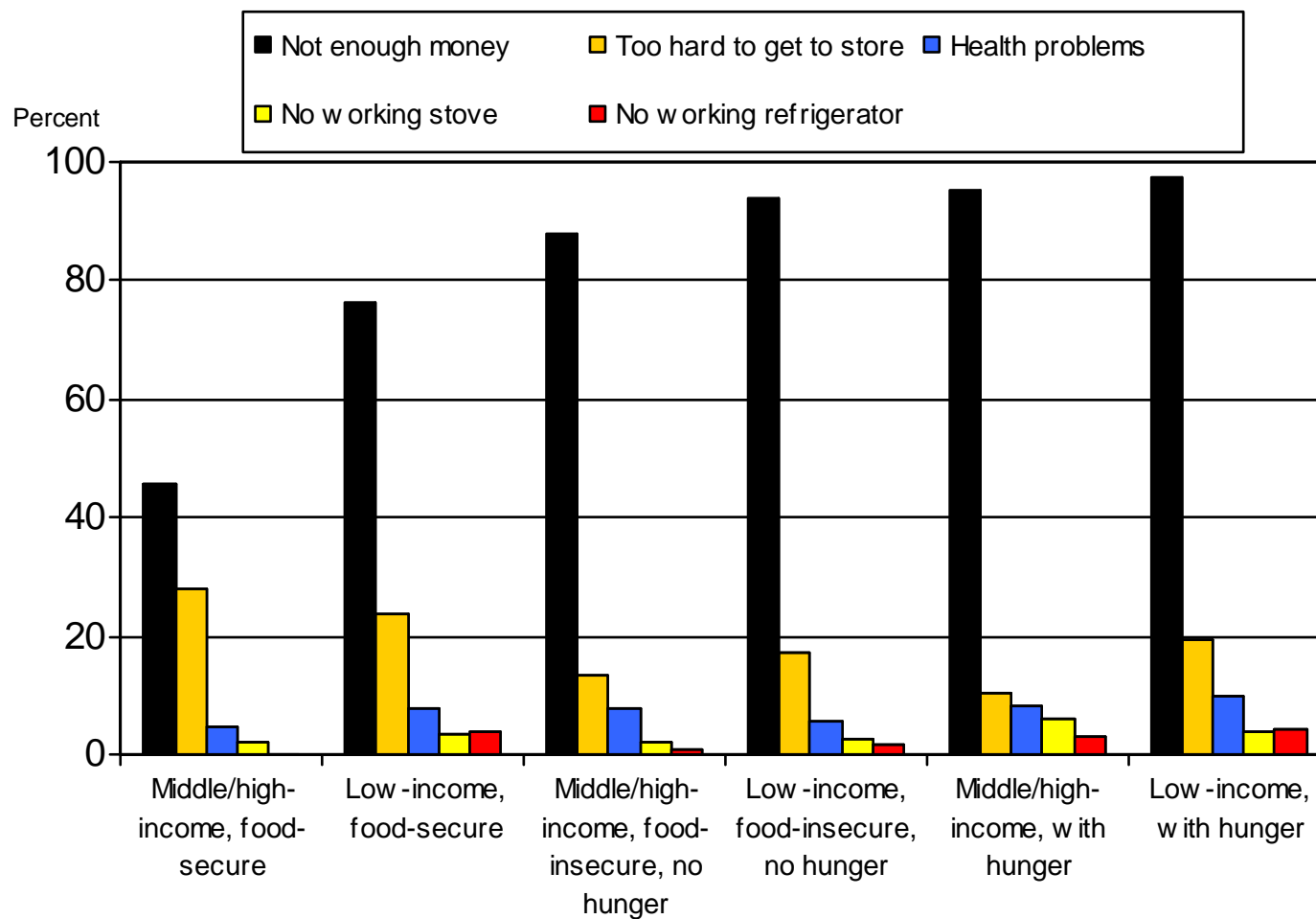
Note: The denominator for each percentage is the number of households in the specified income and food security status.

Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 8

Percentage of households reporting various reasons for not having enough food, by food security status: Middle/high-income households versus low-income households



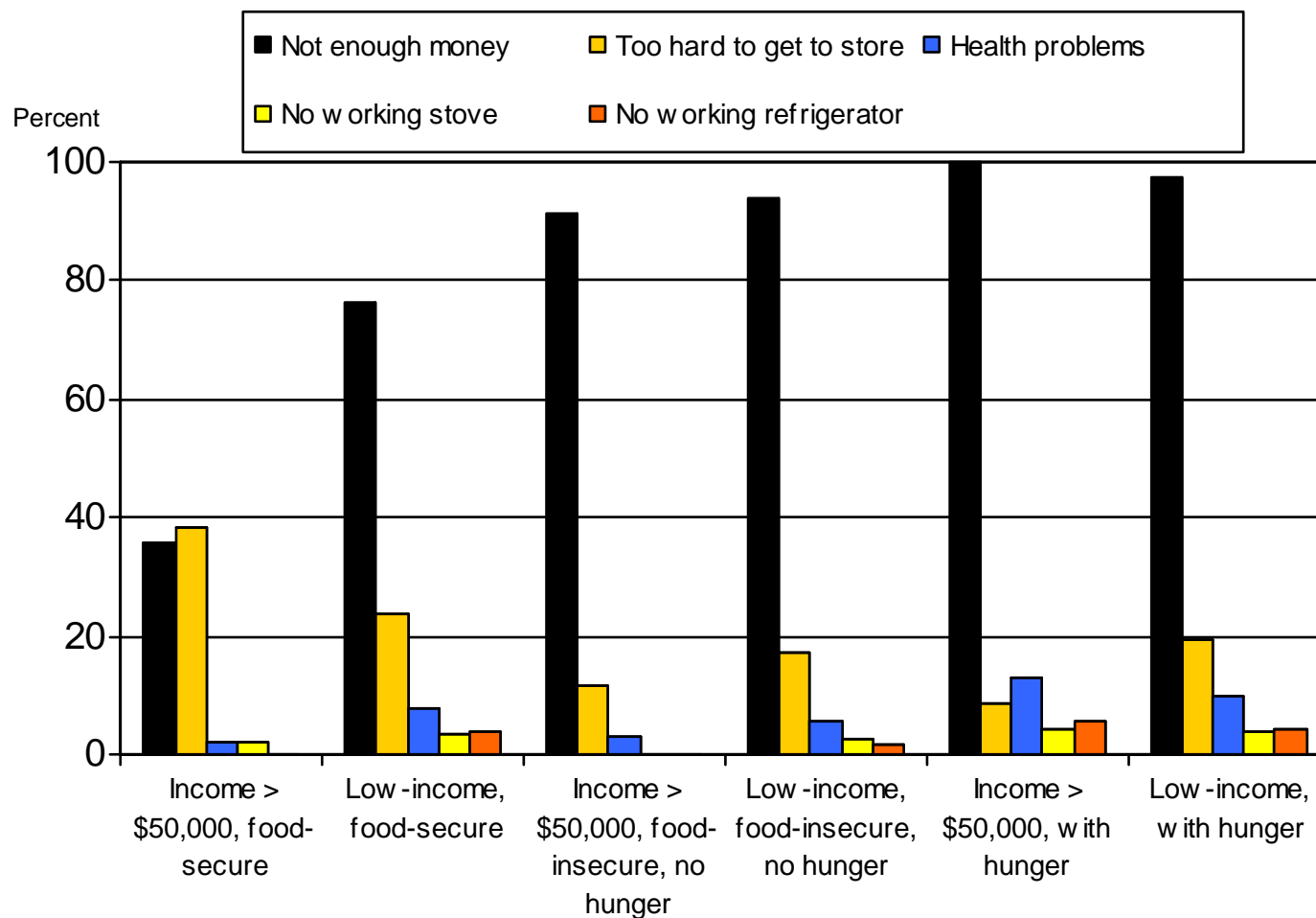
Note: The denominator for each percentage is the number of households in the specified income and food security status who reported that they sometimes or often didn't have enough to eat. Multiple reasons were reported by some households.

Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 9

**Percentage of households reporting various reasons for not having enough food, by food security status:
Households with annual income > \$50,000 versus low-income households**



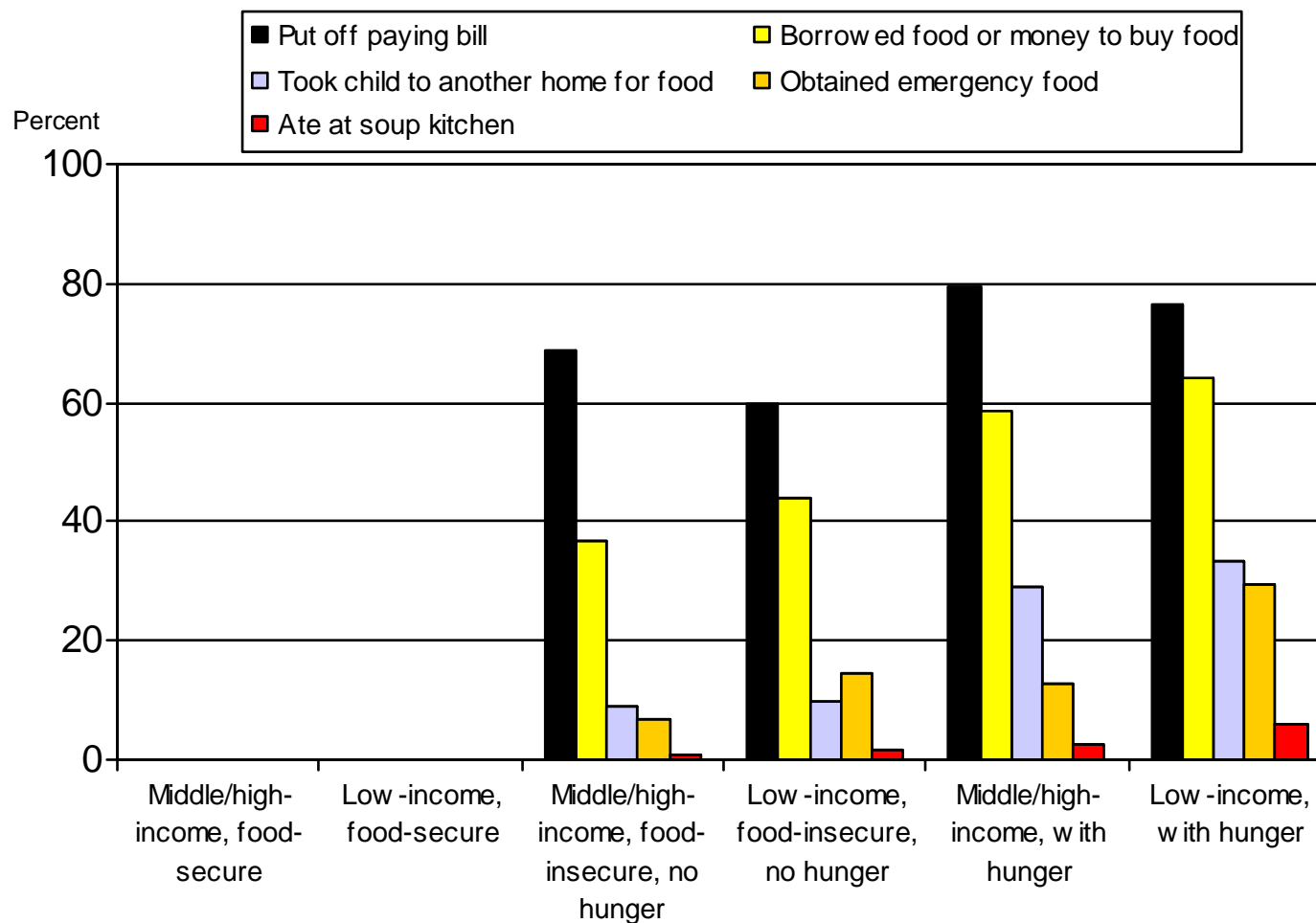
Note: The denominator for each percentage is the number of households in the specified income and food security status who reported that they sometimes or often didn't have enough to eat. Multiple reasons were reported by some households.

Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 10

Percentage of households reporting use of various coping strategies, by food security status: Middle/high-income households versus low-income households



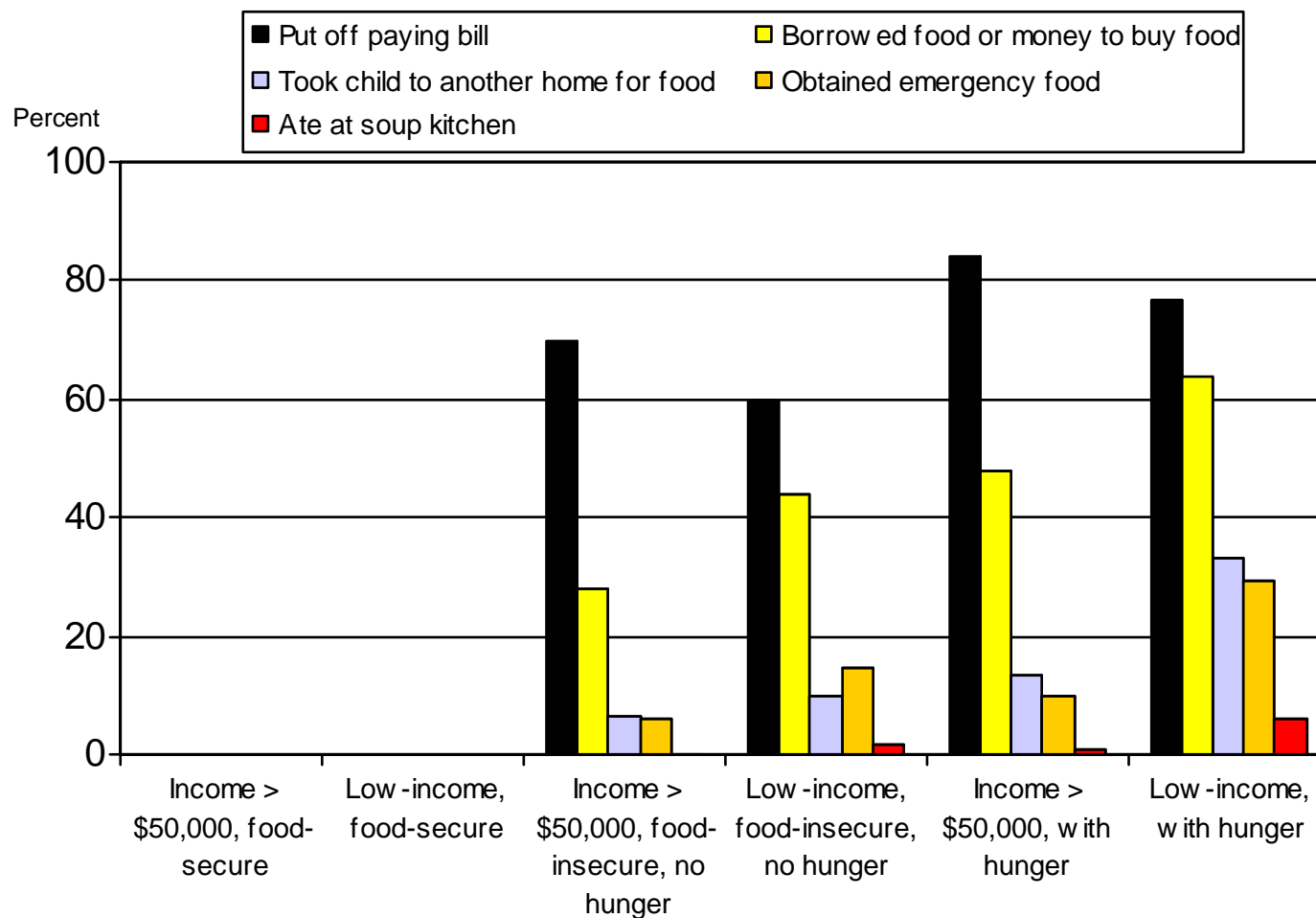
Note: The denominator for each percentage is the number of households in the specified income and food security status. Multiple coping strategies were reported by some households. Most food secure households were not asked these questions.

Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 11

Percentage of households reporting use of various coping strategies, by food security status: Households with annual income > \$50,000 versus low-income households



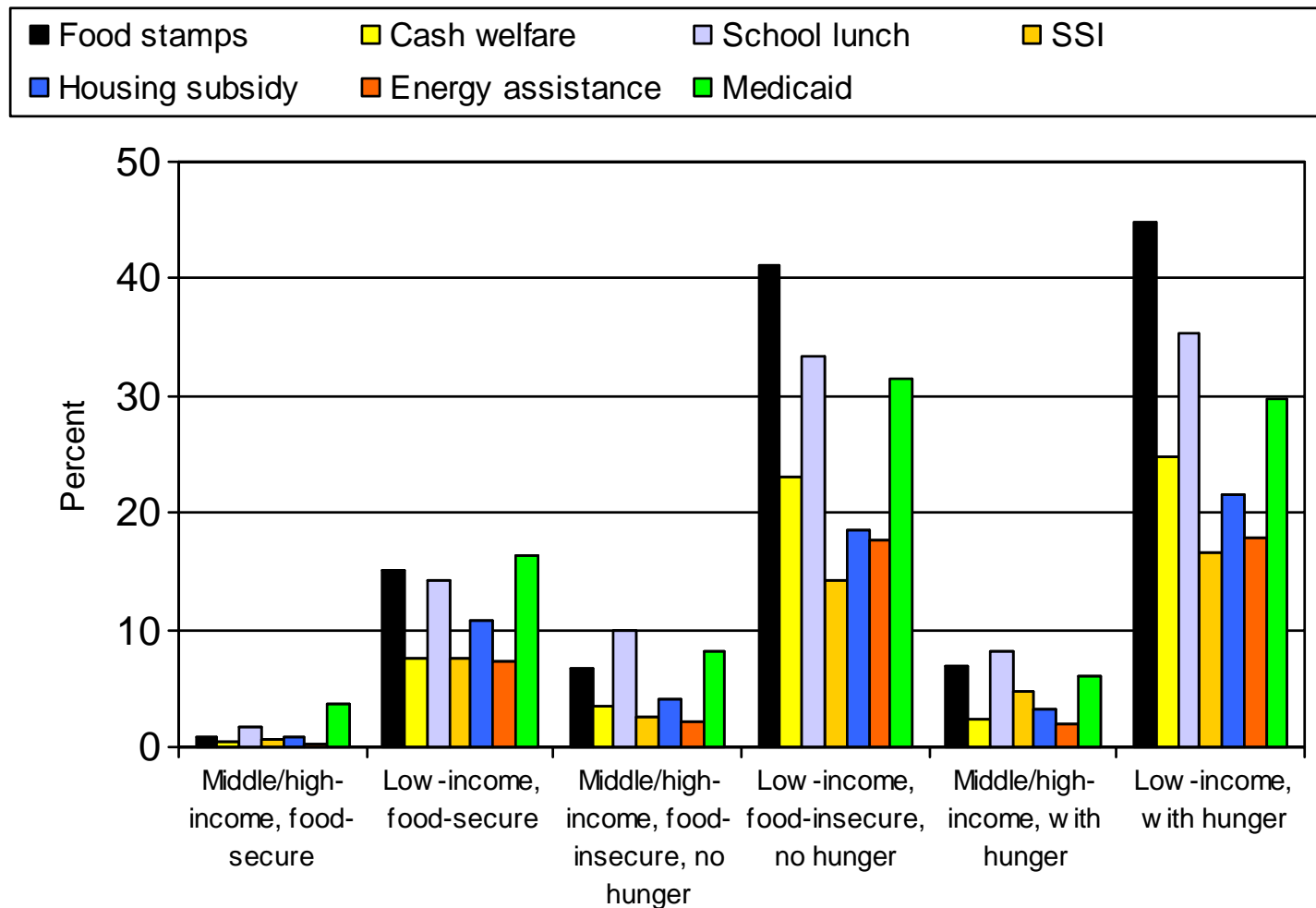
Note: The denominator for each percentage is the number of households in the specified income and food security status. Multiple coping strategies were reported by some households. Most food secure households were not asked these questions.

Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from Current Population Survey Food Security Supplements, April 1995, September 1996, and April 1997.

Figure 12

**Percentage of households receiving various types of public assistance, by food security status:
Middle/high-income households versus low-income households**



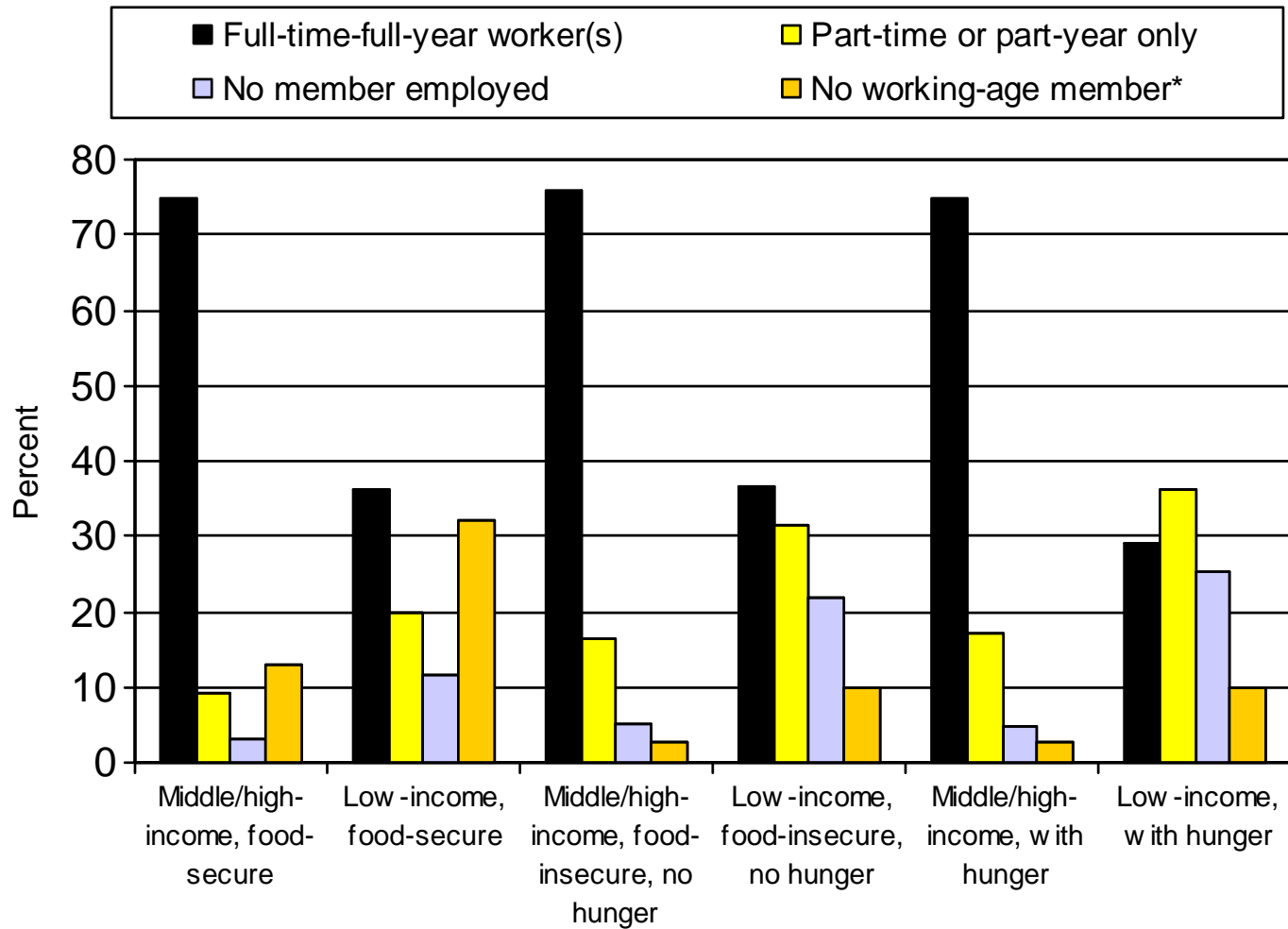
Note: The denominator for each percentage is the number of households in the specified income and food security status.

Note: Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplement, April 1995, and the Current Population Survey Annual Demographic Supplement, March 1995.

Figure 13

Percentage of households with employed adults, by food security status: Middle/high-income households versus low-income households



Notes:

*No person under age 65 in household.

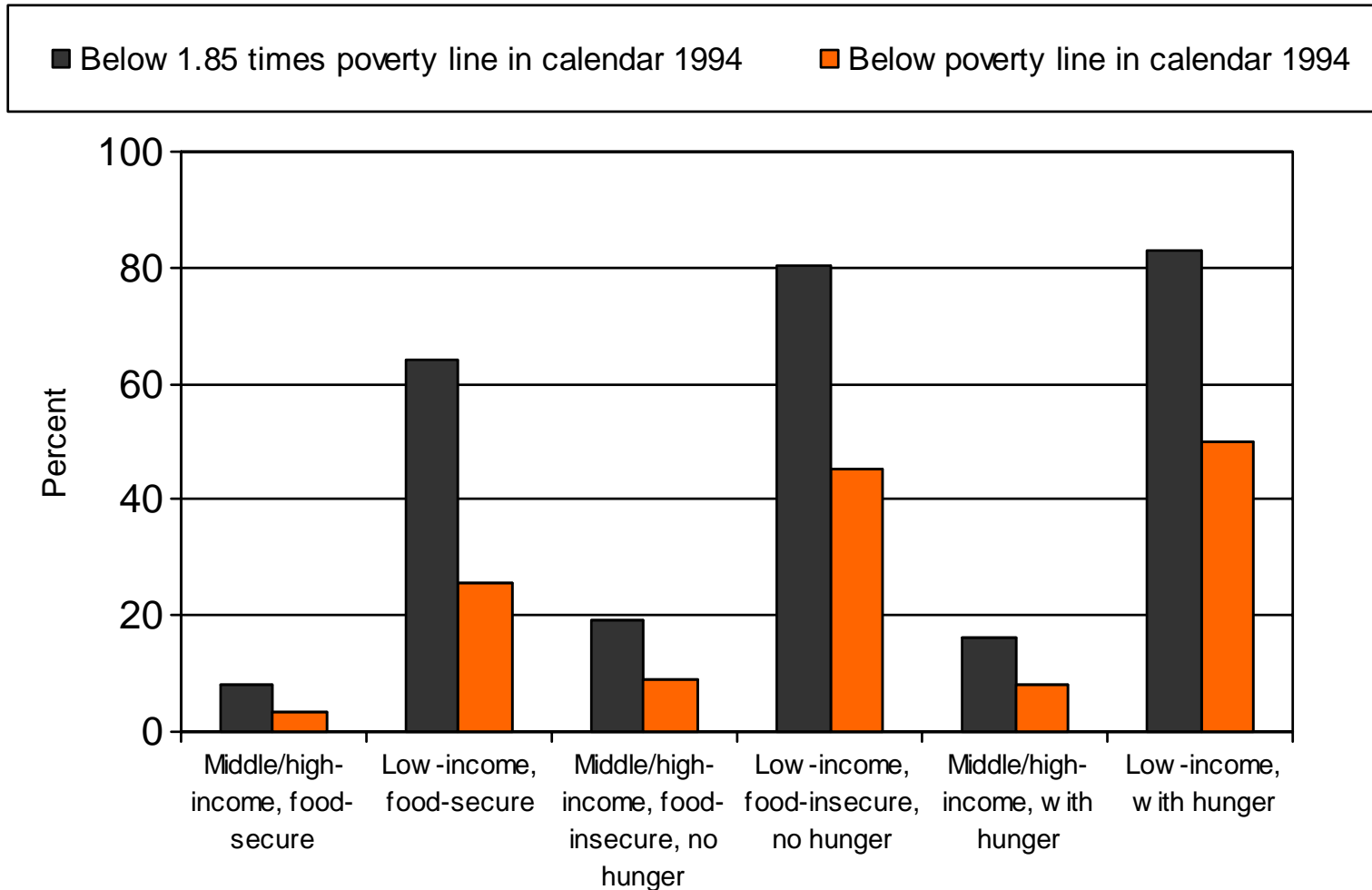
The denominator for each percentage is the number of households in the specified income and food security status.

Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplement, April 1995, and the Current Population Survey Annual Demographic Supplement, March 1995.

Figure 14

**Household income in calendar year 1994, by food security status and income in 1995:
Middle/high-income vs. low-income households**



Notes:

Middle/high-income versus low-income status is based on "control card" income as of the April 1995 survey.

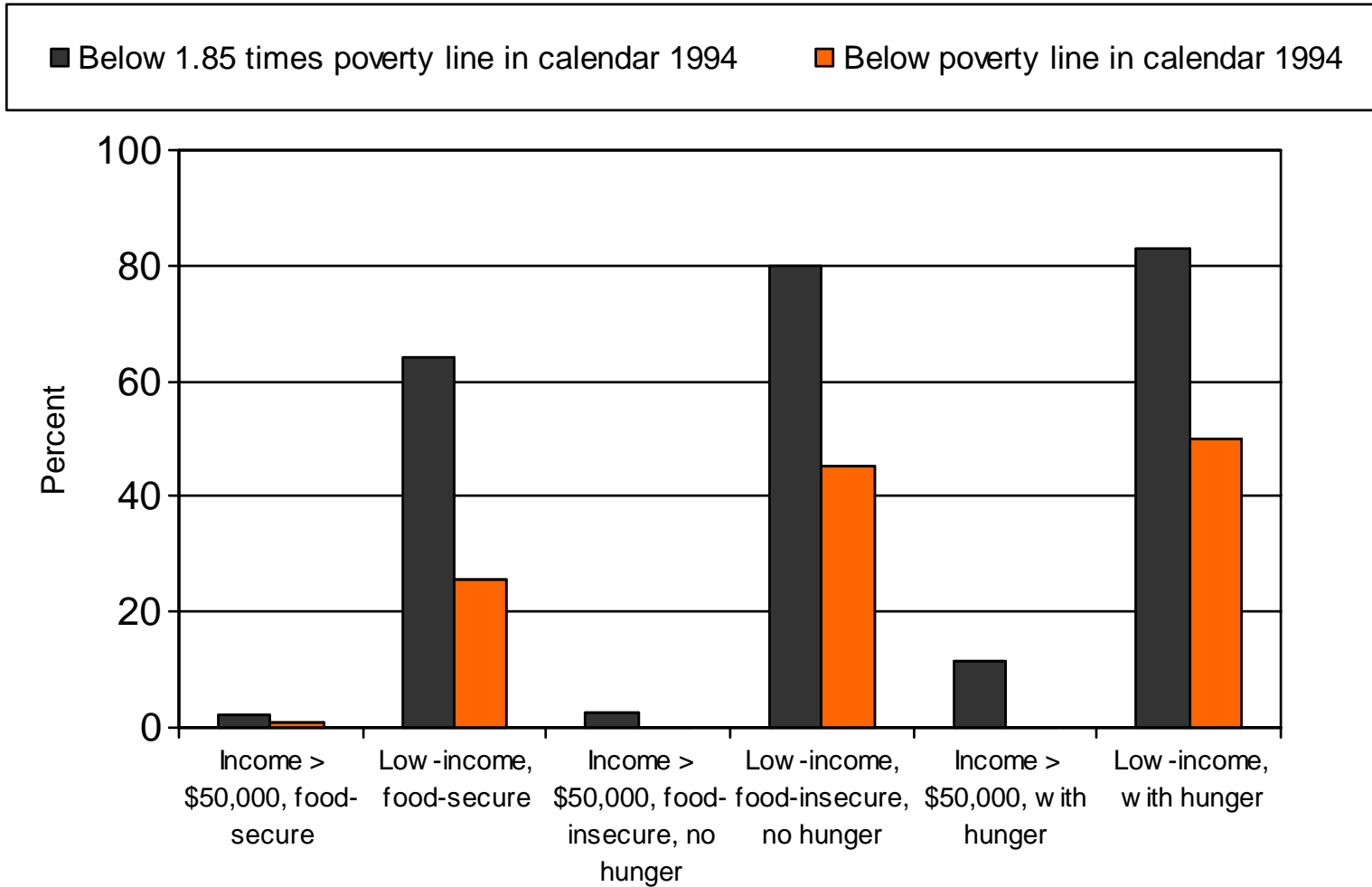
The denominator for each percentage is the number of households in the specified income and food security status.

Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplement, April 1995, and the Current Population Survey Annual Demographic Supplement, March 1995.

Figure 15

**Household income in calendar year 1994, by food security status and income in 1995:
Households with annual income > \$50,000 vs. low-income households**



Notes:

Income > \$50,000 versus low-income status is based on "control card" income as of the April 1995 survey.

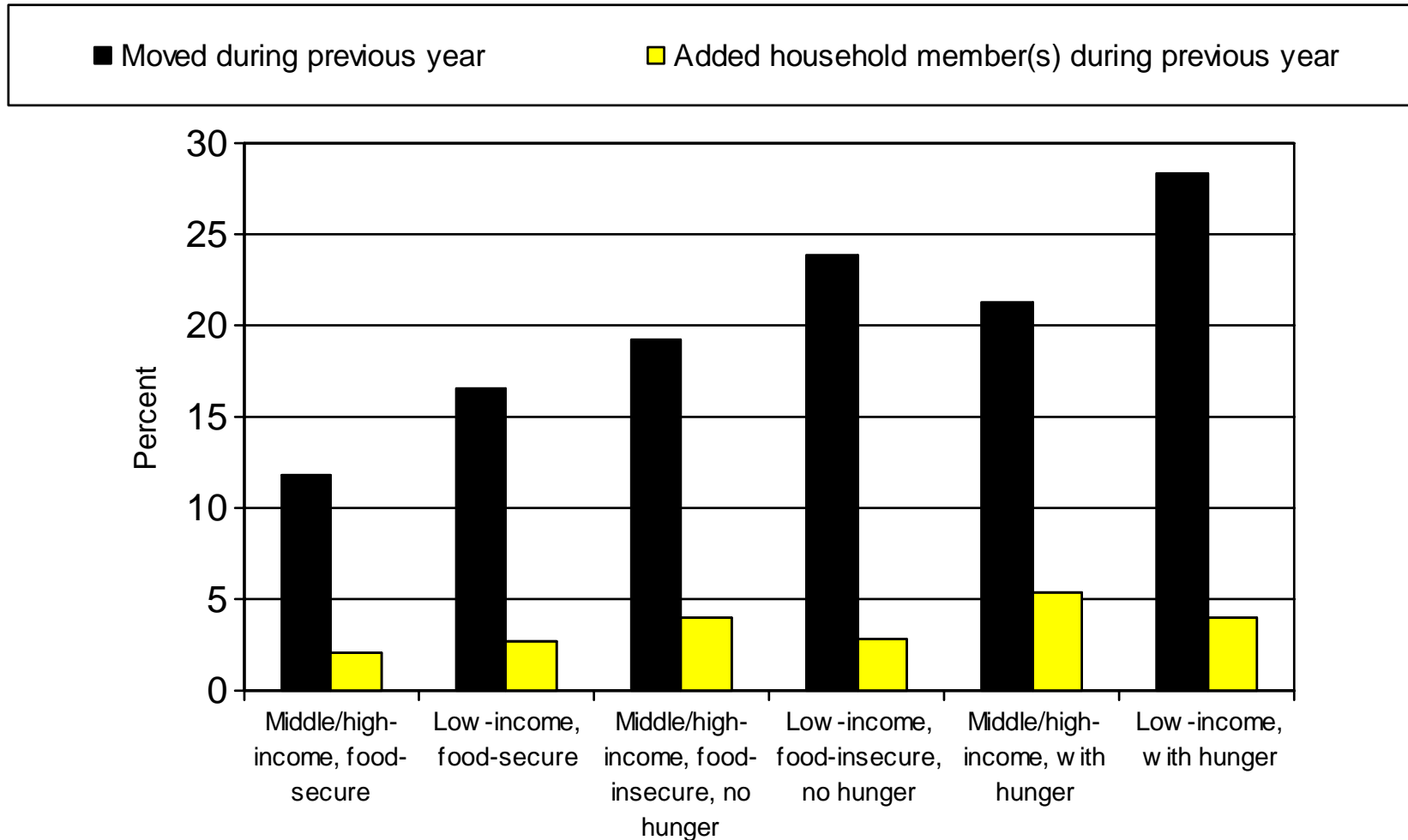
The denominator for each percentage is the number of households in the specified income and food security status.

Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplement, April 1995, and the Current Population Survey Annual Demographic Supplement, March 1995.

Figure 16

Households that moved or added one or more members during the previous year, by food security status in 1995: Middle/high-income vs. low-income households



Notes:

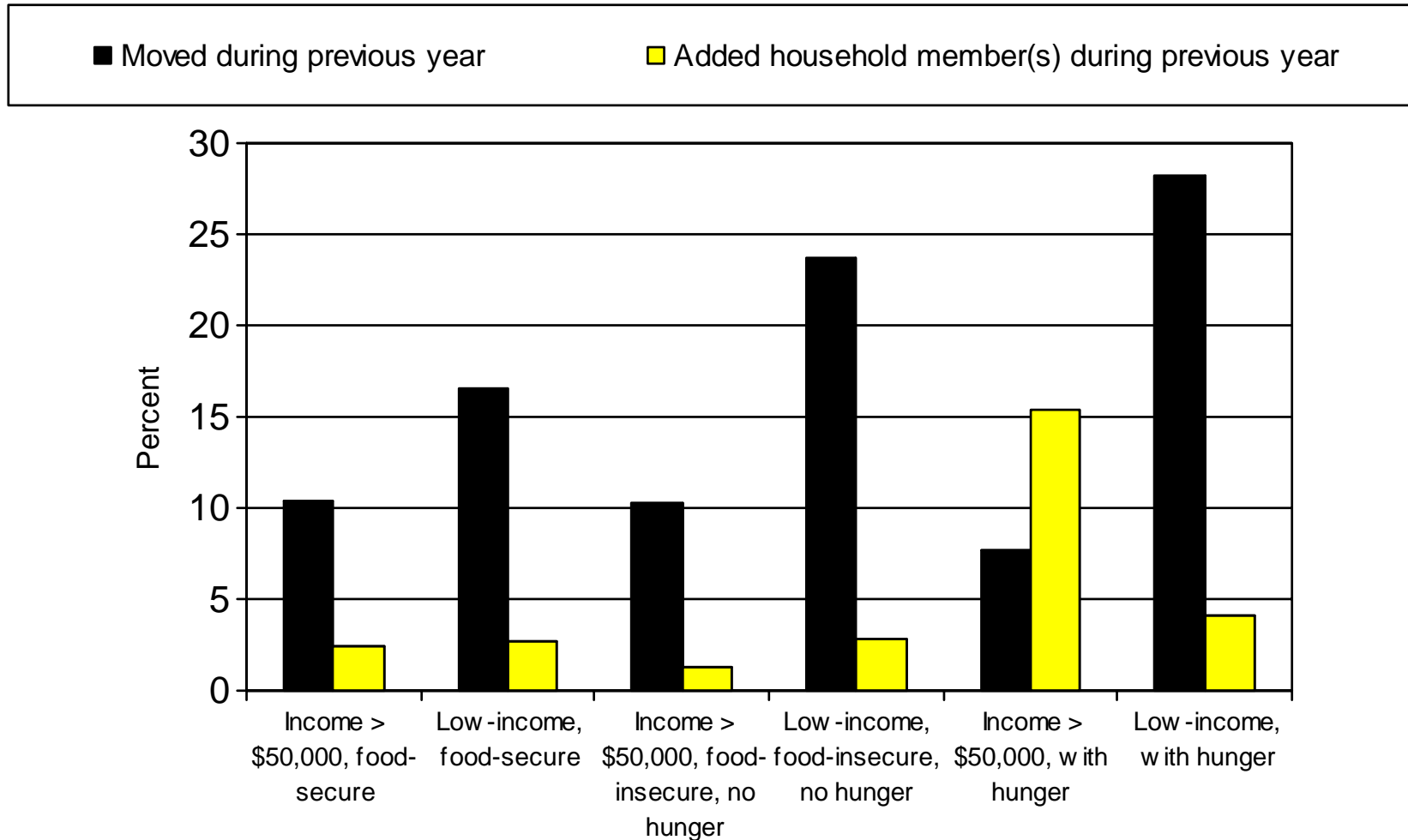
The denominator for each percentage is the number of households in the specified income and food security status.

Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplement, April 1995, and the Current Population Survey Annual Demographic Supplement, March 1995.

Figure 17

Households that moved or added one or more members during the previous year, by food security status in 1995: Households with annual income > \$50,000 vs. low-income households



Notes:

The denominator for each percentage is the number of households in the specified income and food security status.

Percentages are based on unweighted household cases.

Source: Prepared by ERS using data from the Current Population Survey Food Security Supplement, April 1995, and the Current Population Survey Annual Demographic Supplement, March 1995.