

Implementing the Children's Food Security Scale

This appendix describes procedures that researchers can use to calculate the children's food security scale from CPS Food Security Survey data. This includes the operational steps required to:

- Code the survey responses collected using the core CPS Food Security Survey module into the format needed to calculate the children's food security scale
- Calculate the children's food security scale, which is an interval-level measure of the severity of food deprivation among children in the household
- Classify households as to whether children have been hungry due to lack of household resources for food.

It is assumed that the child-referenced items are collected in the context of the entire 18-item module.²⁴ (The food security core module questionnaire is included in appendix A.) Detailed instructions for calculating the household-level food security measures are available in *Guide to Measuring Household Food Security, Revised 2000* (Bickel et al., 2000). We summarize here some of the material from the Guide that is needed to calculate the children's food security scale and provide additional detail that is specific to this scale. Readers should consult the *Guide* for additional information.

Coding Survey Responses for the Food Security Scale

NOTE: If the child-referenced items have already been recoded in order to calculate the household food security scale, there is no need for further recoding, and this subsection may be skipped.

In order to determine a household's score on the children's food security scale, it is first necessary to code their response to each of the child-referenced items as

either "affirmative" or "negative." Some of this coding is obvious because the only response choices are "yes" or "no." Two groups of questions, however, have less obvious response categories, and responses missing because of screening may need to be dealt with. The procedure for coding these questions is described below and summarized in table B-1.

Questions Q5, Q6, and Q7 have three response categories: "often true," "sometimes true," and "never true." For these questions, "often true" and "sometimes true" are considered affirmative responses because they indicate that the condition occurred at some time during the year. The distinction between the "often" and "sometimes" responses is not used in the scale.

Question Q14a is a followup question whose response categories are "almost every month," "some months but not every month," and "only 1 or 2 months." For purposes of the scale, the first two responses are considered affirmative and the third is considered negative.²⁵ Thus, the negative condition on these indicators is "only 1 or 2 months" while the positive, or affirmative, is that the condition occurred in 3 months or more during the year. Q14a is coded negative for households that are skipped over this question because they responded "no" to Q14. Q14a is coded missing for households that are skipped over it because they responded "don't know" or refused to answer Q14.

Questions that a household does not answer because it has been screened out are coded as negative responses. The household was screened out precisely because it was deemed, on the basis of earlier information, not to have experienced the conditions represented in those questions.

²⁴ It is probably practical to collect just the child-referenced items, but to date there is no research evidence as to whether response to these items is affected substantially if they are asked outside of the context of the full module.

²⁵ Thus, households that report that children skipped meals in only 1 or 2 months register a single affirmative response (for Q14), while those reporting that children skipped meals in 3 or more months register two affirmative responses, one for Q14 and one for Q14a.

Table B-1—Coding survey responses for items in the children’s food security scale

Question Number	Question	Negative responses (Code = 0)	Affirmative responses (Code = 1)	Missing data (Code = .)
Q5	Relied on a few kinds of low-cost food for children	Never true <i>(or screened out at preliminary screen)</i>	Often true; Sometimes true	Refused; Don’t know
Q6	Couldn’t feed the children a balanced meal	Never true <i>(or screened out at preliminary screen)</i>	Often true; Sometimes true	Refused; Don’t know
Q7	Children were not Eating enough	Never true <i>(or screened out at preliminary or 1st- level)</i>	Often true; Sometimes true	Refused; Don’t know
Q13	Cut size of child’s Meals	No <i>(or screened out at preliminary, 1st, or 2nd level screen)</i>	Yes	Refused; Don’t know
Q14	Children ever skipped meal	No <i>(or screened out at preliminary, 1st, or 2nd level screen)</i>	Yes	Refused; Don’t know
Q14a	Children skip meals, 3 or more months	Only 1 or 2 months; Skipped because of “no” on Q14; <i>(or screened out at preliminary, 1st, or 2nd level screen)</i>	Almost every month; Some months but not every month	Refused; Don’t know
Q15	Children hungry but Couldn’t afford more Food	No <i>(or screened out at preliminary, 1st, or 2nd level screen)</i>	Yes	Refused; Don’t know
Q16	Children did not eat for whole day	No <i>(or screened out at preliminary, 1st, or 2nd level screen)</i>	Yes	Refused; Don’t know

Note: Include options in italics in coding criteria when screens are used; if screens are not used, disregard.

Any other question that a household fails to answer, for any reason other than being screened out or skipped over, is coded as “missing” (i.e., item nonresponse). This includes all responses with codes such as “don’t know” or “refused to answer.”

Assigning Children’s Food Security Scale Scores to Households and Classifying Households as to Children’s Hunger Status

Both the children’s food security scale (the continuous, interval-level measure of food deprivation among children) and the categorical measure identifying households with hunger among children can be computed from the eight child-referenced items. The two measures and their applications are described in detail in chapter 2. This section specifies how to calculate each measure from the child-referenced items, recoded as described above.

For households with valid responses to all the child-referenced items, that is, with no responses coded as “missing” after the recoding described above, both scale score and categorical assignment can be read directly from table 7. More severe food deprivation, represented by a higher number of affirmative responses, is represented by a higher scale score. Two metrics are in common use, and both are presented in table 7. One is a linear transformation of the other, so the choice is a matter of preference.²⁶ The score of zero for households with no affirmative responses is arbitrary. The appropriate score for these households cannot be determined by the measurement model,

²⁶ Researchers working on scaling issues will generally prefer the “computational metric,” because it is a logit-unit metric. See *Guide to Measuring Household Food Security, Revised 2000* (Bickel et al., 2000), Appendix C, for further information on alternative units of measure used in U.S. food security reports and data products and the relationships among them.

except that it is known to be lower than the score of households that affirmed one item, and may vary from household to household. Researchers should take this into consideration when carrying out analyses that include households with raw scores of zero.

If any households have missing responses to the items in the children’s food security scale after recoding as described above, the choice must be made either to utilize one of several direct imputation methods to replace missing values with imputed affirmative or negative responses, or to employ Rasch model software to calculate household scale values. The direct imputation method described below is simple, and in most cases is quite adequate for the small proportion of missing values typically found in CPS Food Security Survey data. Using Rasch methods has the advantage of applying a sophisticated statistical imputation formula for the missing data, but requires special software as well as considerable statistical background and programming experience. Rasch methods may be needed if large proportions of responses are missing, or if the same item is missing for a large proportion of households, as may result from survey administration problems. For detailed information on imputation and an overview of Rasch-model capabilities, see *Guide to Measuring Household Food Security, Revised 2000* (Bickel et al., 2000).

If missing values for the child-referenced items have already been imputed in the context of the entire 18 items, those imputed responses may be retained for the children’s food security scale. Alternately, the following procedure can be used to impute missing responses based just on the child-referenced items.

1. Preparatory to imputation, order the eight items by severity:
 - 1st (Q5) Relied on a few kinds of low-cost food for children
 - 2nd Q6) Couldn’t feed the children a balanced meal
 - 3rd (Q7) Children were not eating enough

- 4th (Q13) Cut size of children’s meals
- 5th (Q15) Children were hungry but couldn’t afford more food
- 6th (Q14) Children skipped meals
- 7th (Q14a) Children skipped meals in 3 or more months
- 8th (Q16) Children did not eat for whole day

2. Impute “yes” to a missing item if, for that household, there is a valid affirmative response to at least one item more severe than the missing item and no negative response to any item less severe than the missing item.
3. Impute all other missing items as “no.” (Note that this procedure is methodologically conservative, tending to minimize false positives.)
4. Determine if cases with very few valid responses have enough information to be imputable, or if the entire case should be declared missing (i.e., unscalable—children’s hunger status unknown). There are no hard and fast rules for this. It depends somewhat on how good you believe the partial data that you have are. If a household gave no valid responses to any of the child-referenced items, then it should almost certainly be declared unscalable. Note that a household could refuse all of the first stage questions and then be skipped out of the rest of the questionnaire at the 1st level screener. For such a household, it is probably not appropriate to score the skipped questions as “no” responses. Rather, those responses also should be assigned as missing and the household classified as unscalable—children’s hunger status unknown.

Following imputation of any missing responses, children’s food security scale score and categorical assignment for these households can be read directly from table 7 based on the number of items affirmed by the household. Any items imputed as affirmative are included in the count of affirmative responses.