

Session VII: Toward a Research Agenda: The Next Steps

Christine Olson

It is widely quoted that \$3 in Medicaid expenditures is saved per WIC dollar spent for a pregnant woman. That figure is used to build support for food assistance programs in a society that sometimes uses savings in public expenditures as a metric. Johanna Dwyer said that we need to look at consequences of hunger and food insecurity that have major costs to society. What consequences might these be? Children, school failure and academic achievement; adults, depression, disability, and other hindrances to work and productivity; and the elderly and those with chronic diseases, hospitalization and other health care costs are examples of consequences of hunger and food insecurity with major social costs. I would like to think that as a society we care about hunger and food insecurity in and of itself. Kathy Radimer gave an eloquent plea for that perspective. But I fear that to keep hunger and food insecurity on the social policy agenda, we must talk about dollars saved by investments in alleviating food insecurity.

How should we operationalize food insecurity in research on health and nutrition? Food insecurity exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited and uncertain. In past work, we have looked at the quantitative component, the total amount of food. In addition, the balanced meals question involves nutritional quality. To look at health and nutritional outcomes, the psychological component of food insecurity may need more attention in research. We talked about anxiety related to the certainty of food availability, which potentially could be linked to depression in women. We may also need to look more at the temporal pattern to eating and its health implications. To illustrate, we studied body mass index (BMI) and obesity in adult women in a random sample from a county in upstate New York. In our linear regression model, BMI is the outcome. Control variables included income, education, marital status of the mothers and their employ-

ment status. We had three distinct food insecurity variables, each capturing a different level of severity along a continuum of severity: household-level food insecurity, individual adult insecurity, and child hunger in the household. We also had an eating pattern measure that came from a Stanford University set of items that captures binge eating. Household-level food insecurity was the only food insecurity variable significantly related to BMI. The eating pattern was by far the most significant predictor of BMI when added to the model with the control and food insecurity variables. The result says that food insecurity may relate to BMI through its effect on the temporal pattern of eating. It may not be that the quantity and nutritional quality of food are all that are important as mediating mechanisms between food insecurity and BMI.

It is worth noting that in the model each level of food insecurity was a separate variable; we did not put these together in a continuous scale. In studying health and nutrition outcomes, it may be misleading to construct a continuous variable and expect it to be related in a linear way to certain health outcomes. Hopefully the above example illustrates this in an understandable way.

We are making a major social investment in food assistance programs for low-income Americans. We know poverty is related to poor health in adults and children and is also related to food insecurity. The questions now are: How is food insecurity related to poor health consequences and is it one of the possible explanations for poorer health among low-income persons in our country?

Lynn Parker

My topic today is research priorities in State and local surveys. I feel that we have come full circle. Back in the early 1980's, FRAC, the Food Research and Action Center, was instrumental in beginning this whole discussion about measuring hunger. We had the first national conference on measuring hunger in 1984, where we brought together academics and some local anti-hunger

organizations. Each had been looking in isolation at the issue of hunger and trying to measure it in their own very different ways. In the early 1980's, there was an enormous change across the country. All of a sudden, people were lining up at food pantries and soup kitchens who had never been there before. They had not suddenly forgotten how to do time management or budgeting. Rather, there were major economic and political changes that were going on. The reason people ultimately created hunger measures like the CCHIP measure was because they needed to document a problem that they were seeing. They needed to bring the problem to the attention of policymakers and community members, and it was not enough to say, "Fifty more people showed up at our food pantry." Community people, city council members, mayors, governors, and Federal officials were skeptical that there could be this problem in this country at that time. We needed a hunger measure that had scientific validity and would stand up to scrutiny.

The local studies CCHIP did can help us a lot in thinking now about local and State research with the hunger measure. At each local site, we had an advisory committee made up of two groups: technical members, who tried to keep the study scientific; and community members, such as the bank president or the city council member, who recognized by the end of the study that a problem existed and felt committed to ending hunger, and who started thinking of solutions. Solutions included making school breakfast available in all the elementary schools, increasing the emergency food assistance money available to soup kitchens and food pantries, or doing outreach on the Food Stamp Program. Solutions varied a lot from place to place. Thus, the local CCHIP studies were a kind of public alert that there was a problem in the community that could be documented, and their results were meaningful to community leaders and compelling enough to push them into action.

Now we have a national measure, and we are talking about how to use it at the State and local level. The same need exists today as existed in the early 1980's. For example, in California, there was a concern about what would happen to

some immigrants when food stamps were cut off. The California Food Policy Advocates looked at the impact of the cut-off on the prevalence of food security using the new food security measure. The need still exists to document the problem of hunger and work toward a policy solution.

My recommendations for research on the State and local level include, first, encouraging communities to do this kind of research by making the instruments available to their people. Social workers, physicians, pediatricians, and anti-hunger organizations can do surveys comparable to the larger surveys. Experts such as those attending this conference need to provide the technical assistance that the people need, put them in touch with the local university and extension people who can be part of their technical advisory committees, and think about shorter surveys to save resources for local groups.

Two other efforts also could help local groups. One is to help them look at specific policy issues. For example, it would be useful to compare a State that has a waiver for able-bodied working poor and one that does not have a waiver, or to help local groups study how a specific population is affected by recent changes in public policy. The second effort is to help them conduct some demonstration projects where we actually say, "Let's create a hunger-free community" and we think about all the resources that could be brought to bear. A baseline study could be carried out before the community project is implemented, and several years later the study could be repeated to gauge impact.

It would also be useful to look at the issue of stress on families and its relationship to food insecurity. A local small-scale survey could be done on this. Local studies could also look at causes and consequences of hunger. This would put important information into the hands of people who are trying to solve problems at the local level.

Finally, there are two issues that I would like to raise related to discussions that occurred during this conference. First, I want to stress the importance of having a stable hunger measure released

on an annual basis. We can talk a long time about what the best measure is or how to refine it, but we have thousands of people suffering from food insecurity every day, and we have a measure that comes closer than anything we have ever had to documenting this problem. We need to get the results out to the public on an annual basis, just as we do poverty data and unemployment data, so that concerns can be raised and policy solutions can be developed.

Second, I want to discuss the issue of nutrition education. I am a proponent of nutrition education. I am certainly familiar with the issues of time management and food preparation skills. But from my experience of working for years in this field, the reality is that the major issue when it comes to hunger is a lack of resources. That is not to say that people could not use more information. Certainly the poorest and the most constrained people need as much information as they can get, but that is not the solution to the problem of hunger, although I wish it were. Income and food stamps matter, not just time management and food preparation skills.

Richard Bavier

As results from including the food security questions on more surveys become available and are used to educate the public and policymakers, they will be subject to a kind and level of scrutiny different from the vigorous differences of opinion among experts who characterized the developmental process. In fact, the more effectively the data are used, the more critical scrutiny they will receive.

I suggest a couple of areas where outside scrutiny may eventually be focused. I may be suited for this task as someone who has not been involved with the development of the current food security measure. But I, as a staff employee at the Office of Management and Budget, have asked skeptical questions about proposals to add food security questions to several national surveys.

In the CPS data reported in *Household Food Insecurity in the United States in 1995*,¹⁴ 38 percent of the households classified as “food inse-

cure with moderate hunger” answered “No” every time they were asked a direct question about hunger. All household respondents were asked question 35, “In the last 12 months, since May 1994, were you ever hungry but didn’t eat because you couldn’t afford enough food?” In addition, households with children were asked question 47, “In the last 12 months, (was child’s name/were the children) ever hungry, but you just couldn’t afford more food?”

Moreover, only about 38 percent of the households with moderate hunger on the 12-month scale had calendar year 1994 pre-tax money incomes below poverty. Less than half (46 percent) of the households with severe hunger were poor in 1994. What’s more, more than one-third of the moderate-hunger households, and more than one-fourth of the severe-hunger households, had money incomes above 185 percent of their poverty lines, meaning they were not even in the poorest third of all households. Around 15 percent of the moderate-hunger households and around 10 percent of the severe hunger seemed to have 1994 incomes above the median for all households!

A year is a long time, and episodes of hunger may have occurred while a household’s income was low, even though the household’s annual income was not. We don’t have the results from including the food security questions on the Survey of Income and Program Participation, which provides monthly data. However, food-sufficiency questions were asked on Wave 3 of the 1992 SIPP panel, and Wave 9 of the 1993 panel, including asking whether households had insufficient food in each of the 4 preceding months.

In both panels, only half of households reporting food insufficiency in a month had pre-tax money income below the poverty line in the same month. Less than one-third were between pover-

¹⁴Hamilton, William L., John T. Cook, William W. Thompson, Lawrence F. Buron, Edward A. Frongillo, Jr., Christine M. Olson, and Cheryl A. Wehler. *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 (currently the Food and Nutrition Service), Office of Analysis and Evaluation. Alexandria, VA. 1997.

ty and 185 percent of poverty; 17 percent in the 1992 panel and 24 percent in the 1993 panel had incomes above 185 percent of poverty, meaning they were not in the poorest third of all households. Six to 8 percent were actually above 300 percent of poverty, which is around median income.

Critics of the food security measure are likely to focus on this sort of data and argue that many households classified on the basis of inability to afford food either as hungry deny being hungry or don't look like they can't afford food.

In response, defenders of the food security measures will argue that you shouldn't pay too much attention to answers to individual questions. The Summary Report states, ". . . it is important to bear in mind that households are classified on the basis of their overall pattern of responses to the entire sequence of questions making up the measurement scale. No single question, no single condition is used to classify households."¹⁵

This logic is drawn from item response theory developed in the fields of educational and psychological testing. The total number of conforming answers is all that matters, not the answer to any individual questions.

The problem that defenders of the current food security measure will run into is that their critics will be citing types of evidence, which item response theory is not designed to handle. Item response theory, of which the Rasch model employed with the food security questions is an application, is designed to measure latent traits, such as intelligence or personality. It is reasonable to assume that we all have such traits to one degree or another, although they cannot be directly observed. So education and psychological tests are measuring how much of the trait is pres-

ent—its intensity. A wrong answer on an aptitude test or a negative answer on a personality test only fails to add to the measured intensity of the trait. In this logic, "No" doesn't count.

However, hunger is neither a trait nor latent. It is an experience or sensation with observable physiological etiology. Neither are the two unifying phenomena that underlie the food security concept—increasingly severe disruption of normal food intake and increasingly severe economic distress—latent traits. Hunger, disrupted food intake, and economic stress may look like good candidates for the application of item response theory, because they all present themselves in varying degrees of intensity with no clear boundaries. However, not one is a trait that everyone has and none are latent. They are all directly observable.

We could observe disruption of normal food intake directly if survey field staff somehow were present at all meals eaten by sample households. Instead, we ask respondents to make the direct observations for us. And, although gross money income and official poverty thresholds may not be the right measure for being able to afford food, in theory, we could have sufficient direct observations to know for certain whether a family with disruption of normal food intake could afford to buy food. Even hunger is directly observable. We should not confuse the subjective nature of hunger with the unobservable nature of a latent trait, such as intelligence. We can observe hunger directly when it is our own. In fact, the food security battery asks respondents for reports on their own direct experience of hunger.

Consequently, invoking the elegance of Rasch analysis probably will be useful only as a delaying tactic against criticism that the number of hungry households was inflated by including households that did not report hunger. Critics will cite direct evidence of the absence of the phenomenon of interest—hunger. Rasch models do not weigh such evidence. Instead, a dispute over the prevalence of hunger will eventually

¹⁵Hamilton, William L., John T. Cook, William W. Thompson, Lawrence F. Buron, Edward A. Frongillo, Jr., Christine M. Olson, and Cheryl A. Wehler. *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 (currently the Food and Nutrition Service), Office of Analysis and Evaluation. Alexandria, VA. 1997. p. 36.

turn on more familiar scientific rules of evidence. Do responses to several other questions about behavior, that is, in the words of the technical report,¹⁶ “consistent with” the presence of hunger in a household outweigh direct reports of the absence of hunger?

I’ll just offer my own view that reports of not eating balanced meals and skipping or eating reduced portions in as few as three meals over the course of a year don’t seem to make a strong case that moderate hunger was present in a household that denied hunger. My message, at last a positive one, I think, is that these points argue for rethinking so much reliance on item response theory to justify food security measures. A prevalence of hunger measure that will stand up to scrutiny and be understood by the general public and policymakers will need to be based on questions that do a better job of discriminating frequency, intensity, and duration of disrupted food intake and hunger. That would seem to require more questions in the food security battery, rather than reliance on a small subset shown to produce reliable scale scores.

Let me try to reinforce this theme when it comes to the economic well-being of food-insecure households. I mentioned two unifying phenomena underlying the food security concept. One is increasingly severe disruption of normal food intake, and the other is increasingly severe economic distress. These two underlying phenomena are related as cause and effect. We are interested in cases of the disruption of food intake insofar as they are caused by economic distress, and not, for example, due to discretionary dieting.

Logically, if a household is food insecure, then it must be experiencing economic distress. If we observe directly that the cause is not present, no scale score, however high, will demonstrate the

presence of the effect. High income in a household classified as food insecure again represents a kind of evidence not contemplated in item response theory—strong evidence of the absence of the phenomenon of interest. The difference, compared with reports of the absence of hunger, is that in the case of economic distress, the negative evidence comes from questions not included in the scaling process.

So my other positive suggestion is that we need to establish a closer empirical link between food insecurity and what is, by definition, its cause. Researchers attempting to validate the food security and food sufficiency measures typically declare victory if they can show that poverty rates of households with food insecurity or food insufficiency are significantly higher or incomes are significantly lower than for food-secure and food-sufficient households. I, however, think we would all agree that this is a pretty weak test in this context. First, it is weak because this kind of test validates any construct consistent with degrees of economic distress. Second, such validation is weak because we have good reasons to expect a much stronger correlation. Estimates of the prevalence of hunger are especially powerful because the public associates hunger with an especially severe level of poverty. If a household is experiencing chronic hunger, we assume that all discretionary spending has been eliminated and even spending on other necessities may have been cut back. If many households reporting food insufficiency are classified as food insecure with hunger do not seem very poor, we need to consider that we possibly are not measuring what we want people to think we’re measuring, or at least that we’re not measuring it very well.

Maybe a stronger empirical link between responses to food security questions and economic distress can be forged by showing that responses to the current questions are closely correlated with more sensitive resource measures, such as those that reflect spending on other needs. Or maybe questions that do a better job of discriminating more severe levels of intensity, frequency, and duration of reduced food intake and hunger will also do a better job of discrimi-

¹⁶Hamilton, William L., John T. Cook, William W. Thompson, Lawrence F. Buron, Edward A. Frongillo, Jr., Christine M. Olson, and Cheryl A. Wehler. *Household Food Security in the United States in 1995: Technical Report of the Food Security Measurement Project*. U.S. Department of Agriculture, Food and Consumer Service (currently the Food and Nutrition Service), Office of Analysis and Evaluation. Alexandria, VA. 1997.

nating cases of hunger caused by insufficient resources.

Gary Bickel

I knew that Richard Bavier would give us a very valuable perspective that otherwise would not be heard much at the conference. A thoughtful and extended response needs to be developed to all the points Richard raises. I will mention just a couple of things here.

The Rasch model underlying the new food security scale has been developed primarily in educational testing, but it has been used by psychologists and social scientists in many kinds of applications. Bill Thompson, who was a young Ph.D. working for Abt Associates when they won the contract to work on developing the food security measure, had a lot of recent experience with this form of scaling. He had just completed his dissertation, using Rasch modeling to examine a phenomenon occurring among Vietnam War veterans. That work is just one example of substantial, experiential material handled by Rasch measurement that is quite unlike the measurement of educational level that Richard described.

The pharmaceutical industry is another place that uses Rasch measurement to gauge the severity of effects. Symptomatic responses to the effects of a drug—the desired effect and undesired side effects, either of which can range from light to strong—can be tracked by this same measurement methodology. An application in pharmaceuticals is far removed from the kind of psychological or latent trait of individuals that measuring educational level or intelligence might involve. So Rasch measurement has widespread applications. I have come to understand that it can be used with any kind of phenomenon that varies through a range of severity from very light to very heavy, each level of which is captured by a dichotomous indicator variable. The direct experience of food insecurity and hunger is just this sort of phenomenon that Rasch measurement is designed to capture.

Richard is right in that we do emphasize the whole pattern of response to the entire sequence

of indicator items across the full range of severity of food insecurity, rather than selected items, in deciding where to draw cut points on the scale. The food security scale estimated from the data is nearly continuous. Placing cut points on this scale defines several ranges of food insecurity and creates the simpler categorical measure that, of course, attracts popular attention. Defining these categories in relation to the entire pattern of response within the population—instead of in relation to isolated, specific items based simply on face validity—does involve judgment, but reflects the underlying logic of Rasch measurement.

We did our best to avoid being driven by the apparent face validity of individual items in creating these severity-range categories and instead tried to identify behavioral thresholds within the sequence of items. We drew from Peter Basiotis' work, which showed that there is a definite threshold where people who have inadequate budgets switch from economizing through reducing the quality of their food, which is what everybody does first, to only being able to economize further by reducing the quantity of their food.¹⁷ It was that behavioral threshold at which hunger begins to be likely or, perhaps, inescapable for at least some member of the household that we wanted to identify as the initial boundary of the “food insecure with hunger” category.

We did not want to be driven by considerations of face validity, by the question: “What will the public think about this?” I believe it is very useful to emphasize the distinction what we might call “hunger, comma, the direct experience of”—which is what the food security scale is designed to capture—and what we can call “hunger, comma, the public perception of a social problem.” Now that's important too, and it's what the face validity of the individual indicator items is

¹⁷ Basiotis, Peter P. “Validity of the Self-Reported Food Sufficiency Status Item in the U.S. Department of Agriculture's Food Consumption Surveys,” *American Council on Consumer Interests 38th Annual Conference: The Proceedings*. (V.A. Haldeman, ed.) Columbia, MO. 1992.

all about, but it simply is a different phenomenon than the one we are measuring.

Richard's point is good, and we certainly considered it at length within the technical group working with Abt: How can we call one of the severity-range categories "food insecure with hunger" if the respondent himself does not say he is hungry? However, I think the fact that a person does not respond affirmatively to that one question is not evidence that the condition defining hunger—the painful or uneasy sensation resulting from not having enough food—is not present, if the person also responded affirmatively to several other questions getting at the same thing. We know that people may have various kinds of inhibitions in responding to these questions. From the Cornell experience, we learned about one of their respondents, an elderly woman, who had no food in the house whatsoever but who simply would not say that she was hungry. She would not even say that she worried about running out of food. Instead, she said: "No, no, we do not worry. The good Lord will provide. We just pray."

An interesting research question that we have thought about is to contract with Gallup or a similar public-opinion organization to develop a questionnaire asking a cross-section of the public: "If you heard that somebody went a whole day without eating, would you consider that person hungry?" And it would ask: "If you heard that somebody had a pattern of cutting the size of meals or skipping meals over the year because they did not have enough money for food, would you consider that the person was hungry?" and so on, through all the key items in the scale. And in each case it also would ask: "Well, if it were so, do you think that is a serious problem?" This would be an entirely different kind of research, which you would need to do to develop a measure of hunger as a perceived social problem, in contrast to the measure of food insecurity and hunger as something directly experienced, which is what our measure tries to provide.

Before the conference, I had a good idea of what I thought were the priorities among needed research steps to continue to strengthen, test, fur-

ther validate, and refine the food security measure that has been developed. We could move beyond the single household-level scale to separate individual-level adult scale and individual-level child scales. We could make it more user-friendly for wide application at the State and local levels, especially for use in local community surveys. Maybe we could encourage a clearinghouse function to bring out the fruits of all this research in a more timely way. We compiled and prioritized a long list of such ideas as part of our 1999 research and evaluation planning process. But the real judgment about the most important research priorities concerning food security will be in the hands of all of you and other researchers who will be proposing ideas, preparing careful research designs, and applying for financing to carry out the next wave of research in this area. So many good, fresh ideas have been presented at this conference that it is going to cause all of us to go back and re-think how best to prioritize all of this.

Helen H. Jensen

A basic question about a food insecurity index is: "What are the uses of the index?" The first important use is to estimate the prevalence of food insecurity in the country, for the population or various subgroups of interest. Another use is for research purposes, where a measure can be obtained for each household in the survey. There are multiple uses, and it is easier to use the current data for some purposes than others. For the purpose of obtaining estimates of prevalence, the Rasch model is not strictly necessary. In this case, we are interested in broad categories, and subject-matter knowledge is required to set the category demarcation. The categories should be easily interpretable and relevant. In this way, communicating about food insecurity does not differ from other commonly used measures like unemployment.

Another use of the index is to provide a measure of food insecurity status for each household that can be used to study cause and effect of household-level food insecurity. For this application, estimation of a food insecurity measure for individual households is required. The Rasch model

provides such estimates. I would like to comment on several aspects of the index construction that relates to its use for prevalence estimates, for comparisons over time or across subpopulations, and to research on factors associated with food insecurity.

One of the assumptions of the Rasch model is that the items are assumed to be independent of each other, that is, each is an independent measure of food insecurity. However, in fact, we know that they are not independent because of the skip patterns; the resulting pattern of responses (and non-response) is linked to the previous question. This is a problem that is likely to be even greater in the 1998 survey and other surveys that incorporate skip patterns. It would be useful to consider alternative approaches to the skips.

Because of constrained resources and limited survey time, it is important to make full use of the information available in the questions. The current index methods take categorical responses and reduce them to dichotomous responses. Researchers from Mathematica Policy Research and others have looked at this approach and didn't find much difference in estimates. However, further investigation is required on the effects of combining questions, especially when comparing across subpopulations.

The distribution of food insecurity for the population is assumed to be continuous under the

Rasch model. However, in fact, there are only a small number of values for the estimates in the current scale. The index construction leads to different nodes of values or, as Ohls put it, to "lumpiness." Even though we observe many people, we do not observe many values of the index. If the number of questions were less, this problem would be even more serious. An important statistical question will be to develop an improved approach to estimate the distribution while maintaining the sampling design information and the Rasch framework of food insecurity modeling.

Another aspect of the food insecurity index involves time periods of reference. We know that people recall things better over a short period of time than a long period of time. However, episodes of food insecurity may not occur with the same frequency in each month. Whether the problem happened all in 1 month or it happened a little bit every month makes a difference. Gundersen addressed issues of the dynamics of food insecurity. There may be better ways of understanding the frequency or the length of duration than we are now capturing. For example, ask the items in more than one period to get multiple observations, or ask questions with short periods of recall. These approaches are more likely to result in measures closer to our notion of food risk or food insecurity than the 12-month recall period.