Mollie Orshansky's Strategy to Poverty Measurement as a Relationship between Household Food Expenditures and Economy Food Plan*

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Mollie Orshansky's Strategy to Estimate Poverty Thresholds

Mollie Orshansky worked for the U.S. Department of Agriculture (USDA) from 1945 to 1958, at which time she relocated to the Social Security Administration (SSA) where she worked until 1982. A research project at SSA was to use the Current Population Survey to assess the economic well-being of children in the United Sates. To do so, she developed a measure of income inadequacy (poverty thresholds) for families to compare the well-being of children in families of different size and composition. This was initially done in Orshansky (1963), and further refined in Orshansky (1965). Her poverty thresholds became the official poverty thresholds, which have not changed much since then, though they are adjusted for price changes (Citro and Michael; Fisher; Ruggles).

Poverty thresholds were presented as a measure of income inadequacy. In her words, "if it is not possible to state unequivocally how much is enough, it should be possible to assert with confidence how much, on an average, is too little," she goes on to note that such poverty thresholds may be "arbitrary, but not unreasonable" (Orshansky 1965). They are meant to be appropriate for the cultural setting in which they are used.

The poverty thresholds are built on two empirical findings from food consumption research at USDA. First, she made use of the 1962 Economy Food

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Plan that meets the nutritional requirements of a healthy diet at minimal cost (not minimum cost) for individuals of different age-gender groups and families of different size and composition. The cost of the food plan was treated as an adequate standard of food expenditures for a household with income at the poverty threshold. Second, she made use of the 1955 Household Food Consumption Survey finding that for all households of two or more persons, the average dollar value of food used during a week (both at-home and away-from-home) accounted for one-third of after tax cash income. The inverse of the expenditure share was multiplied by the cost of the Economy Food Plan to calculate the poverty threshold of income. This multiplier approach to specifying a poverty threshold is in contrast to a family budget approach or a relative income approach (Fisher). The multiplier is based on a standard of adequacy for food and a food expenditure share, but not other necessities purchased by households. Orshansky (1965) noted that there was no generally accepted standard of adequacy for essentials of living except for food.

For calculating poverty thresholds, Orshansky made two key contributions in her use of these two research agendas, development of equivalence scales for families of different size and composition, and use of the average food expenditure share for all households, and not just that of low-income households. At issue in this article is how the two research agendas that underlie the poverty thresholds have evolved over time. Do they suggest a need for change to the basis for measuring poverty thresholds?

Minimal Cost Healthy Diet

Mollie Orshansky Used the 1962 Economy Food Plan

The 1962 Economy Food Plan was a minimal cost food plan that met the nutritional requirements of a healthy diet for individuals distinguished by seventeen age-gender groups plus pregnant and lactating women, and for families distinguished by size and composition (Cofer, Grossman, and Clark).[1] The food plan was the quantity of food needed in one week from each of eleven food groups to provide three meals at home every day. The cost of the food plan varies by age-gender group. It was not designed to be a minimum cost food plan but a palatable food plan at minimal cost that met the 1958 recommended dietary allowances.

The Economy Food Plan was designed for temporary or emergency use when funds are low. It included foods that require a considerable amount of home preparation with little waste and required skill in food shopping and preparation. Due to the frugality of the Economy Food Plan, Orshansky (1965) also proposed poverty thresholds based on the low-cost food plan. Her preference was to use these poverty thresholds, which would be at higher income levels. The decision on what poverty thresholds to use as official ones was not hers to make, but rather the decision of the administration. As history shows, the administration chose to use the poverty thresholds based on the Economy Food Plan.

Development of a minimal cost, Economy Food Plan was and still is an elaborate and complex process. Two steps in the process are distinguished. First,

determine the food plan for the individual age-gender groups. Second, use the individual food plans to create family food plans where family types are distinguished by size and composition.

First, develop a minimal cost food plan for each individual age-gender group, starting with historical average consumption by food group for low-income individuals. For the 1962 Economy Food Plan, average consumption was from the 1955 Household Food Consumption Survey. The amount of food by food group in the food plan was selected to meet nutrient requirements while maintaining minimal costs and diet palatability. One means of maintaining palatability in the food plan was to minimize the change in food consumption from historical average consumption while adjusting the amount of foods in the food plan to meet the nutritional requirements of a healthy diet.

The cost of the Economy Food Plan was the lowest of the four food plans developed by USDA (Cofer, Grossman and Clark), but it was not a minimum cost at which nutritional needs can be met. They state that, "plans for adequate diets at still lower cost could be developed, but they would deviate further from average food habits" (p. 8). Though the cost of the economy food plan was not prespecified, they clearly targeted it to be lower than the low-cost plan and lower than average cost of food purchased by the lowest income class (p. 25–26). They accomplished this by selecting the less expensive food items in each food group (p. 8). It cost about 20% less than the low-cost food plan and about 22.5% less than the average cost of food for the lowest income class, with about 25% of nonfarm households in the lowest income class having food expenditures less than the cost of the Economy Food Plan (p. 26). There was a cost-palatability tradeoff in developing the Economy Food Plan that was arbitrary but not unreasonable.

Developing a food plan at a minimal cost, while also accounting for diet palatability in a scientific manner, is a challenge. This was a key point made by Stigler. "The dieticians take account of the palatability of foods, variety of diet, and other cultural facets of consumption" when developing a food plan and setting its cost, but in doing so, "the judgments of the dieticians as to minimum palatability and variety are highly personal and non-scientific" (p. 313–314). The task of "objectively" incorporating palatability into the development of food plans remains an issue.

The second step is to develop a family food plan and estimate its cost from the individual age-gender food plans. This step is started by summing the food amounts and cost of the individual food plans into a family food plan, where even for families of the same size the summed family food plan cost varies due to the composition of age-gender members in the family. Then the sum of the family food plan cost is multiplied by the family-size adjustment factor for economies of scale in family food costs. Cofer, Grossman, and Clark present the procedure used to estimate the family size adjustments (Appendix B and Table 9). Column 1 of table 1 presents the family size adjustments used in the 1962 food plans. The adjustments increase the summed food plan cost for families smaller than four persons and decreases the cost for larger families. A four-person family is a reference family, so its Economy Food Plan cost is the sum of individual food plan costs.

Table 1. Family-size adjustment factors, poverty thresholds, poverty guidelines, and equivalence scales

Family Size	Cofer, Grossman, and Clark	Kerr and Peterkin	Orshansky Poverty Threshold $ Thousand	Orshansky Equiv. Scale	Census Poverty Threshold $ Thousand	Census Equiv. Scale	HHS Poverty Guideline $ Thousand	HHS Equiv. Scale
1	1.20	1.20	1,538	1.97	10,294	2.00	10,210	1.98
2	1.10	1.10	1,986	1.27	13,167	1.28	13,690	1.33
3	1.05	1.05	2,440	1.04	16,079	1.04	17,170	1.11
4	1.00	1.00	3,130	1.00	20,614	1.00	20,650	1.00
5	0.95	0.95	3,685	0.94	24,382	0.95	24,130	0.93
6	0.90	0.95	4,135	0.88	27,560	0.89	27,610	0.89
7+	0.90	0.90	5,090	0.93	31,205	0.87	31,090	0.86
8+	0.90	0.90			34,774	0.84	34,570	0.84

Source: Orshansky (table 9), U.S. Bureau of Census 2006 data, and U.S. Department of Health and Human Services 2007 data.

Subsequent Work on the Economy—Thrifty Food Plan

Subsequent development of the food plans has not affected the poverty thresholds, which remain tied to the 1962 Economy Food Plans, but are annually revised by inflating them with the Consumer Price Index. Still, the 1975 food plan update offers some insight into the relevance of the Economy Food Plan as a basis for estimating poverty thresholds. More recent updates for 1983, 1999, and 2006 have maintained procedural consistency with the 1975 update, though the consumption data and dietary standards for each revision were more up-to-date, and the model more elaborate.

In the 1975 food plan update by Peterkin, Chassy, and Kerr, the Economy Food Plan was replaced by the Thrifty Food Plan, which was designed for more long-term use. The cost of the Thrifty Food Plan was set equal to the cost of the 1962 Economy Food Plan inflated to 1975 prices. The cost equivalency is a key feature of all updates in that the cost of a new food plan is set equal to the cost of the previous food plan adjusted for inflation with a food plan price index.[2] The price adjusted Economy or Thrifty Food Plan cost remains a reasonable minimal cost of food for poverty threshold calculations so long as the food plan price index has not been significantly altered by a change in the food shares in the food plans by the updates, an issue to research.

For the 1975 food plans, Kerr and Peterkin econometrically estimated new family-size adjustment factors for economies of scale in family food costs, with data from the 1965 Household Food Consumption Survey. The only change with the new adjustment factors from those derived for the 1962 food plans using 1955 survey data is a refinement in the treatment of larger households (compare column 2 and 1 in table 1). Subsequently, Nelson, Beebout, and Skidmore reviewed alternative estimates of family-size adjustment factors and found that there was not sufficient evidence that alternative values would be an improvement over those being used. New analysis of these factors would be useful.

Household Food Expenditure Shares

Mollie Orshansky Used the 1955 Household Food Consumption Survey

While working at the USDA, Orshansky (USDA 1957) analyzed household food consumption. Underlying her analysis are tables from the 1955 Household Food Consumption Survey (USDA 1956), from where one can recalculate the values reported in the 1957 study. For instance, all families of two persons or more spent on average 33% (one-third) of after-tax income on food, while low-income families spent 47%, median-income families spent 35%, and high-income families spent 28%. For all families with two persons the average food expenditure share was 27%. For one-person families (i.e., unrelated individuals) the consumption data were hard to interpret for all unrelated individuals because the elderly dominated and were not shown separately.

The food expenditure share used to derive the multiplier for estimating the poverty thresholds was a key decision on the part of Orshansky (1965). One choice would be to use the food expenditure share for low-income families, but she found reason to use the average food expenditure share of all families instead. The reason was related to Engel's law, which states that as the income of a family increases it spends a smaller percentage on food. In setting the poverty thresholds, a goal was to set the cost of food as a percentage of income that permits adequate expenditure on nonfood necessities. If an average food expenditure share of low-income families (47%) was used, other expenditures may not be adequate because they may be sacrificing other necessities in life to have enough to eat. A more conservative choice was to use the food expenditure share for families of higher income. What level of income is arbitrary, and a reasonable choice was average income for all families. Essentially, she adapted Engel's law by assuming that equivalent levels of an adequate diet was reached only when the proportion of income required to purchase an adequate diet was identical, that is, equal to that of the average family.

A few nuances in the 1955 food consumption data are worth noting:

(*a*) Data for families of two or more persons are used, excluding one-person families.

(*b*) Money (cash) income is net of state and federal income taxes (after-tax income).

(*c*) Food expenditures were for total foods purchased, at-home and away-from-home, but excluded home produced foods and gifts obtained without direct expense (estimated at 2.5% of total expenditures).

(*d*) Total foods purchased include alcoholic beverages (at 3% of total expenditures).

(*e*) Low-income families spent 13% of total foods purchased on food-away-from-home, while median-income families spent 16%, and high-income families spent 21%. The Economy Food Plan assumes families prepare all meals at home.

Subsequent Findings on Household Food Consumption

The USDA Household (Nationwide) Food Consumption Survey was repeated for the years 1965–1996, 1977–1998, and 1987–1998. Subsequent USDA food

Figure 1. Food expenditure share from BLS CE data, percentage
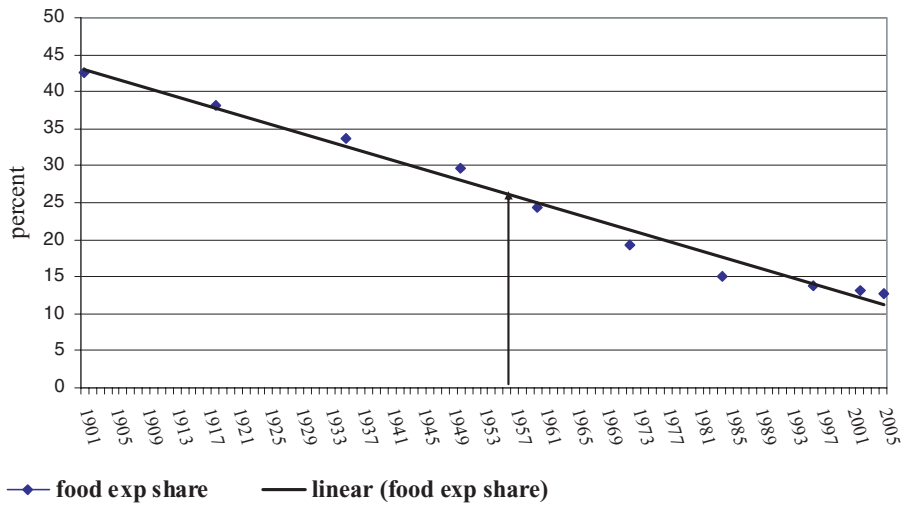
consumption surveys turned their focus from household food expenditures to individual food intake, diet quality, and health.[3] It is necessary to turn to the Consumer Expenditure Survey (CE) by the U.S. Department of Labor (USDOL), Bureau of Labor Statistics (BLS) to examine the long-term trend in household food expenditure shares and the share in more recent years. Orshansky (1965) considered using the CE for 1960–1961 in her poverty threshold calculations, which found that nearly one-fourth of urban family income (after taxes) went for food, but she chose to use the USDA survey due to its more detailed checklist of foods used in a week in the questionnaire.

The U.S. Department of Labor, Bureau of Labor Statistics reports the long-term trend for the average food expenditure share (of total expenditures) for all households from 1901 to 2002. Figure 1 illustrates how the average food expenditure share has decreased over time from 43% in 1901 to 13% in 2005 (we added three years of data). The 1955 food expenditure share of about 27% is fairly near the one-third value that Orshansky used, given the different surveys and differences in the calculations used to get the food expenditure share.

It is also of interest to compare the food expenditure shares for low-income households with those for all households using CE data. For households in the lowest quintile of income, the food expenditure share of total expenditures was around 16% in 1984 to 2005, while their food expenditure share of after tax cash income was larger and decreased from 56% in 1984 to 31.5% in 2005. For low-income households expenditures tends to exceed after-tax income in the CE data. In comparison, for all consumer units the food expenditure share of total expenditures decreased from 15% in 1984 to about 13% in 2005, while their food expenditure share of income after tax decreased from about 16% in 1984 to 10.5% in 2005. For households in the lowest quintile of income, the basis (total expenditure or income after tax) for calculating the food expenditure share changes the share by about 15 percentage points, whereas for all consumers the

basis for calculating the food expenditure share changes the share by less than 2.5 percentage points.

For all families, the average food expenditure share of after-tax income has fallen to almost 10% in 2005, about one-third the of the 33% value used by Orshansky (1965) with 1955 data. Over the same time period, the food expenditure share of after-tax income for low-income households has fallen from 47 to 31%. The 2005 food expenditure share of after-tax income of low-income households is consistent with the food expenditure share used by Orshansky in the poverty threshold calculations. But, if one adheres to the idea of using the food expenditure share of households with higher income, then the current expenditure share is smaller than what Orshansky used. The lower share results in a multiplier larger than three, which implies a higher poverty threshold and a larger share for nonfood necessities in a low-income household budget.

Mollie Orshansky's Poverty Thresholds and Equivalence Scales

Except for unrelated individuals (one-person families), Orshansky (1965) estimated the poverty thresholds for families of different size and composition by summing the cost of individual food plans, adjusting the cost for family size, and multiplying the adjusted cost of the family food plan by the inverse of the food expenditure share. For families of three persons or more, a one-third average food expenditure share of after-tax income for all families of two persons or more was inverted for a multiplier of three used with the cost of the Economy Food Plan to calculate the poverty thresholds. For families with two persons, a food expenditure share of 0.27 was inverted for a multiplier of 3.7. A larger multiplier was justified for smaller families due to economies of scale in nonfood expenditures for larger households. For one-person families the poverty threshold was set at 80% of the poverty threshold for two-person (adults) families.

The number of nonfarm family types was simplified to sixty-two types, varying in size from one to six, plus seven or more members.[4] Weighted average poverty thresholds by family size are reported in Orshansky (1965, p. 28), weighted for the distribution of family types within each family size. The thresholds are reproduced in column 3 of table 1, after taking a weighted average of the one- and two-person families distinguished by age of household head. The equivalence scales for these poverty thresholds (column 4 of table 1) are the ratio of the per person poverty threshold relative to the per person poverty threshold for a family of four. Equivalence scales adjust the poverty threshold for household size and composition. Table 1 also includes the 2006 Census poverty thresholds and calculated equivalence scales, and those for the comparable 2007 poverty guidelines.

The Orshansky (1965) equivalence scales (column 4 of table 1) and the family-size adjustment factors for economies of scale in food expenditures (column 1 of table 1) are both anchored at one for a family of four. For families of three, five and six persons, the difference between the Orshansky equivalence scale and the family-size adjustment factor are small and due to differences in the food plan costs of individuals making up the families, which affect the

weighted average poverty thresholds for a family size. For a family of seven persons or more, the value would be 0.87 if we assume an average of 7.5 family members rather than the value of seven used in the calculations for the table, which is more consistent with the family-size adjustment factor of 0.9. The equivalence scale of 1.27 for a family of two persons is larger than the 1.10 family-size adjustment factor due to the larger multiplier (3.7 compared to three) applied to the cost of the Economy Food Plan. For the one-person family, the equivalence scale of 1.97 reflects the fact that the poverty threshold is set at 80% of the two-person (adult) family.

The equivalence scales for the 2006 Census poverty thresholds are close to those derived from the poverty thresholds in Orshansky (1965), once the seven-person family value is adjusted to an average family size of 7.5 persons. This is no surprise, since the method of calculating the poverty thresholds has not changed in a way that would affect the equivalence scales. The equivalence scales for the poverty guidelines are similar to those from the poverty thresholds, except for the two- and three-person families. The poverty guidelines use a slightly modified method to adjust for family size.

Summary: Adjusting the Poverty Thresholds

Mollie Orshansky had a good idea at the right time, and she delivered a pragmatic solution to a difficult measurement problem. At the same time, she was already asking how poverty thresholds should be adjusted over time. She noted that, as the general standard of living moves upward, the standard of what constitutes an appropriate measure of income inadequacy also changes (Orshansky 1963). Later, she wrote, "There must be a framework for adjusting a poverty line . . . for changes over time in the level of economic activity and the resultant rise in wages and general standard of living" (Fisher). She never did arrive at this framework, but out of a concern for children, it seems assured that she would argue for adjusting the poverty threshold for more than inflation.

To enhance our ability to adjust the poverty thresholds, there are a number of research issues in context of a multiplier approach to poverty thresholds that arise from this article:

(*a*) Cost of a nutritional and palatable food plan with an emphasis on palatability;
(*b*) Family-size adjustment factors for economies of scale in food expenditures;
(*c*) Food expenditure share with an emphasis on providing for nonfood necessities;
(*d*) Equivalence scales as derived from the multiplier approach with an emphasis on the relative needs among families of different size and composition; and
(*e*) Direct measures of minimal cost standard for nonfood necessities.

Acknowledgments

Endnotes

[1]The seventeen age-gender groups include five for children age twelve and under, two each for girls and boys between thieteen and nineteen, and four each for women and men aged twenty and older.

[2]Food plan costs are inflated by a price index derived from Bureau of Labor Statistics food item prices. The revised food plans change the mix of food groups in the food plan, and the mix of food items in a food group, which affect the food plan price index.

[3]Household surveys were replaced by the Continuing Survey of Food Intakes by Individuals, and by the National Health and Nutrition Examination Survey.

[4]Each family size was classified by sex of head and number of children under age eighteen. one- and two-person families were also classified by whether the head was under or over age sixty-five.

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