

An Experimental Comparison of Alternative 24-Hour Diet Recall Questionnaire Protocols for Children

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I. Introduction

When proxy reports of children's behaviors are not possible, obtaining data from the children themselves is one alternative. Yet, there is very little in the survey research literature about interviewing children. Two of the many questions one might raise about surveying children are: At what age can children provide reliable answers to survey questions? And, how should questionnaires be structured to aid reporting by children? We address these issues in a pilot project to investigate how to improve reporting of dietary intake by children in large-scale surveys.

The Department of Agriculture's Continuing Survey of Food Intakes by Individuals (CSFII) is a national survey of the household population which obtains -- among other information -- reports of all foods eaten by each household member on the day prior to the interviewer's visit. The instrument used as a comparison in this project was the Day One Individual Intake Record used in the 1989-91 CSFII. For children under the age of 12, Day One data were obtained from a proxy respondent, usually a parent. However, children may often have some meals or snacks when the parent is not present, such as at school, in day care, or while visiting friends or relatives. In such instances, the parent either cannot report about some or all of the things the child ate that day. This situation may lead to a substantial problem of missing data for children, especially those of school age.

The exploratory study's general purpose is to begin to explore the possibility of obtaining the Day One data directly from children age 6-11. The goal of this exploratory research is to suggest some data collection strategies for USDA to test with larger samples.

Several considerations informed the design of the pilot, not least of which was that there was little previous survey methodology to guide the development of survey instruments for children. Additionally, there may be wide developmental differences among children in this age range. And, it is also in the nature of exploratory research that unanticipated results may suggest new routes for further inquiry or shifts in the

planned focus of the analysis. We tried to take each of these factors--along with government sample size limitations--into account in the study design.

The question of how a survey instrument might be best structured for obtaining complete dietary reports was a key factor. Based on a literature review and extensive pretesting, we developed three protocols as alternatives to the current closed, highly-structured, chronological Day One format, which we used as a control. We also stratified the sample by the age of the child, with one group aged 6-8 and a second aged 9-11. These two factors created a 4 by 2 design, with 9 cases for each interview protocol, divided between the two age groups. All interviews were audio and video taped. Transcriptions were made from the audio tapes and checked against the video tapes. In this way, along with post-interview debriefings (described below), we hoped to maximize the kinds of data available, in addition to the actual survey responses. Where possible, we also obtained validation data (discussed below).

II. Protocol development and administration

The CSFII Day One questionnaire was designed for adult respondents. It is constructed as a series of closed-response items in which all the times one has eaten on the reference day are asked about in chronological order. For each time the respondent ate something, he or she is asked the name of the "eating occasion," who else was there, what was eaten, and several details about each food item and where it was obtained.

The 1991 CSFII Day One questionnaire served as a control. We developed three other interview protocols: Open, Meal and Location. These protocols were designed to investigate a different notion about how children's recall might be aided, while also making the interview situation less forbidding.

In the Open protocol, children were allowed to report about foods eaten the previous day without any imposed structure. Indeed, it was developed to be quite the opposite of the CSFII instrument. The children were able to choose the pattern of

reporting that they preferred, without the possibly inhibiting task of answering a series of formal questions. Children were given an introduction and were then asked, "Now tell me all the things you ate or drank yesterday." This format was developed in response to several concerns that emerged from our literature review. For example, it was shown by Wood and Wood (1983) that children's length of responses go down the more frequently they are questioned. It was also suggested that children may not have a structured sense of their day and would then, be more comfortable reporting in a free-form format (Medrich, et al. 1982). In addition, we thought this unstructured approach might yield information about the strategies children naturally used in trying to recall the preceding day's food consumption.

The second structure was a Meal/Non-meal format. It may be that memory of the foods one has eaten is organized by regular meals and the other times one has eaten. If so, then an interview organized in the same way may be best for aiding recall of foods. The Meal/Non-meal instrument asked directly about each traditional meal of the day: breakfast, lunch and dinner. It also asked specifically about eating before breakfast, between breakfast and lunch, between lunch and dinner, and after dinner.

The third protocol structure, Location, used the child's activities and locations on the previous day as the basis for asking about foods eaten. Reporting about what one did on the previous day may be a more natural and engaging task than trying to remember a list of foods eaten and may be a good memory trigger for foods eaten. The food reports were then obtained as a component of each activity. After an introduction, the interview began with the statement, "I'd like you to start with when you got up yesterday and tell me each place you were." After the child reported where they were, several follow-up questions and probes were used to find out whether the child ate anything at that location.

III. Sampling and Data collection

The study subjects were children from Prince George's County, Maryland who ranged in age from 6 to 11 years old. The children were recruited two ways. First, random digit dialing (RDD) was used to identify households with children ages 6 to 11. Nine children were recruited this way. Second, children were

recruited from local child care centers and community center summer programs. Twenty-seven children were recruited in this manner.

Each child was paid \$5.00 for participating in the study. Each parent received \$20.00 for participation. Child care centers and community centers were paid \$50.00 for granting access to the children.

This sampling approach allowed validation data for the children's reports to be obtained in two ways. In the nine RDD-recruited cases, a parent of the child was interviewed as well as the child. In the other 27 child-care center cases, an observer recorded what the child ate for lunch or a snack at the facility on the day preceding the interview. Interviews ranged in length from 9 minutes to 35 minutes with an average length of 17 minutes. On average, the CSFII Day One interviews were the longest, and the Open format interviews were the shortest.

After each interview, debriefing questions were asked (by a different interviewer) of the child, of the parent (where applicable) and of the child's interviewer. These questions sought to determine how well the child understood the interview overall, what parts were difficult, and whether any food items were not reported, and, if so, the reason why.

All of the interviewers were female and were trained by Survey Research Center staff.

IV. Comparison of protocols

We plan to compare the protocols on three dimensions: 1. the completeness of the reports, 2. the ease of administration, and 3. the children's reactions. The first dimension, completeness of reports, is the focus of this paper. We simply touch on the other two dimensions with some attention to our planned analyses. We also stress that the sample sizes are very small and the findings only preliminary. No statistical tests are presented, instead we focus on the general patterns they represent of reporting for each protocol.

A. Completeness of reports

The first dimension considered, the completeness of the reports, focuses on the total number of food items reported as well as the accuracy of reported items.

Table One shows the number of food items reported by the children for each protocol and for the two age groups. The items reported are broken down by meal, if that information was

given, or is listed as No Meal Reported if the meal could not be determined. Each time the child reports something eaten it is counted as one item, for example a hamburger is one item, a milkshake is one item, and so on. This table shows that the CSFII interviews yielded the lowest average number of items (10.3). The highest average number of items reported (12.6) came from the Location protocol. The younger children reported slightly more items on average than the older children, 11.8 compared to 11.1. Though these are not large differences, we note that all of the alternative protocols developed did better in total reporting of items than the Day One protocol.

The next table, Table 2, collapses the food items reported from the Open, Meal and Location protocols and compares them to the Day One protocol. We again see that the three developed protocols do better at total items reported than the Day One (12.4 and 11.2 compared to 10.2 and 10.5). In the three alternative protocols the younger children reported more items on average than the older children (12.4 compared to 11.2). For the Day One protocol the two age groups are essentially equal.

The next three tables examine the accuracy of the children's reports. Table 3 compares the child's reports for one meal, either lunch or a snack, to the observer's record of that meal. For this partial day report we see that the Location protocol yielded the greatest accuracy with 58% of the child's reported items matching the observer's record. The Open protocol was roughly equal at 57% of the items matching. The Meal protocol was the lowest at only 30% matches. The CSFII instrument matched 50% of the items recorded. The older children were more accurate than the younger children, with 55% matches compared to 44% matches.

Table 4 compares the children's reports to the parent's reports for the entire day. Here we see that for the CSFII protocol the parents reported more items on average (12.0) than the children on average (8.3). For the Open, Meal and Location protocols, the children reported the same or more items on average than did the parents. We also see that the parents of the younger children reported more items on average than the children reported (12.3 compared to 11.3). The older children, however, tended to report more items than the parents (10.0 compared to 8.8).

Table 4 also compares the children's reports to the parent's reports according to the number of items matching between the child's and the parent's report. Here we see that the CSFII protocol yielded the least accurate responses with only 31% of the items matching between the child and the parent's reports. The best results were in the Open and the Meal protocols with 72% of the items matching. The Location protocol fared less well, though still better than the CSFII protocol, at 43%. The results by the age of the child are consistent with Table 3. Here again we see that the older children were more accurate with 63% of their reported items matching their parent's reports as compared to 37% of the younger children's reports matching.

Discussion:

These results suggests several things. First, although we can reach no firm conclusions with these small samples, manipulation of interview structure appears to influence both the amount of reporting and its accuracy. Although the differences are small, more food items on average are reported by both age groups and in all three alternative protocols than in CSFII interviews.

The results are less easily analyzed when child reports are compared to another source. Nevertheless, it appears from Table 4 that our tests are leading in the right direction. All three of the developed protocols performed better for reports about the entire day than the CSFII protocol for the parent-child comparison. For the observer-child comparison, the CSFII questionnaire performed better than just one of the developed protocols, the Meal protocol. But that comparison was only for one meal during the day, and the goal of the CFSII is to get a complete report of the entire day.

When comparing children's reports to observer reports, we take the observer report as the true measure. If we take the parent report as the true measure, children do much worse in CSFII (31% matched) than in the alternative protocols (43% for Locations and 72% for both Open and Meals). This is a useful comparison, since the 1989-91 CSFII survey interview rules accepted the parent's proxy report as the true measure. So this comparison suggests that under some conditions, the child report approaches the parent proxy report. Further work on alternative protocol structures would seem worthwhile. However, as noted at the outset, the parent may

not know about some of the things the child ate during the reference day. So, while in one way it is useful to use the parent report as a base, it is not really a true measure. We see this supported in the relatively large number of instances when the child reports food items not reported by the parent. More puzzling are the instances when the parent reports items not mentioned by the child, which also happens frequently. This may result from reporting typical eating behavior.

In the next phase of the pilot, we plan to conduct another series of child-parent interviews using these protocols, but adding two variations. First, we plan to use retrospective think aloud procedures as a way to examine from the perspective of response formation how the protocols work. Second, during the separate parent-child interviews an observer will list all reported food items. Then, immediately following the interview, a joint parent-child post-interview reconciliation will be conducted in an attempt to determine reason for mismatches in reporting. Our expectation is that in examining these protocols from a number of different perspectives, we will, even with the sample size limitations, have a basis for suggesting alternative interview strategies for larger scale field tests.

Finally, the results seem to indicate that the older children do better at reporting about their day than the younger group of children, even though the younger children appear to report slightly more items for the day.

B. Ease of administration

Next we briefly discuss the other two dimensions we intend to use to compare the protocols: ease of administration and the children's reactions.

One way to measure the ease of administration is to look at the amount of time each interview required. As discussed above, the open format yielded the shortest interviews on average and the CSFII interviews were the longest. Debriefings with the interviewers suggest that the Meal and Open formats were the easiest to administer. The interviewers also felt that these two protocols were the best formats for the children. The CSFII interview was seen as too cumbersome and difficult for the children to understand, and the Location format appeared to

generate a fair amount of discussion about things other than foods consumed.

The interviewers also suggested that all the children took the interview seriously, and they noticed a clear change from the introductory conversation to the actual interview. Impressionistic evidence from the interviewers also suggests that the girls were more comfortable during the interviews and were generally more talkative than the boys.

C. Children's reactions

The final dimension we plan to investigate, the children's reaction to the interviews, is perhaps the most elusive part of our project. Because the interviews were videotaped, we have a wealth of information on non-verbal behavior during the interviews. We also have debriefing interviews with each child. We plan to explore this dimension using these two sources of information to examine how comfortable the children appeared in each protocol, as well as to look for age differences between the children. We are in the process of developing coding schemes to quantify non-verbal behaviors. This process will include examination of the interaction between the interviewer and the child, based in part on the work of Cannell (1975) and others on behavior coding.

VI. Conclusions

In conclusion, we have found that interview structures may have important effects on young respondents. Given the number of mismatches between the parent and the child's reports, a fuller examination of child reports and child and parent comparisons appear to be fruitful avenues to pursue.

References

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Table 1 *Number of Food Items Reported by Children by Protocol and Age*

	Day <u>One</u>	<u>Open</u>	<u>Meal</u>	Loca- <u>tion</u>	Age <u>6-8</u>	Age <u>9-11</u>
Breakfast	19	8	20	14	32	29
Lunch	22	10	22	27	44	37
Dinner	19	9	31	29	54	34
Snack	17	4	15	4	25	15
Total for Meals Reported	77	31	88	74	155	115
No Meal Named	<u>16</u>	<u>71</u>	<u>17</u>	<u>39</u>	<u>70</u>	<u>73</u>
Total Items	93	102	105	113	225	188
Average per Child n =	10.3 9	11.3 9	11.7 9	12.6 9	11.8 19	11.1 17

Table 2 *Number of Food Items Reported in Day One Versus Open, Meal and Location Protocols by Age of Children*

	Open/Meal/Location Protocols		Day One Protocol	
	<u>Age 6-8</u>	<u>Age 9-11</u>	<u>Age 6-8</u>	<u>Age 9-11</u>
Breakfast	20	22	12	7
Lunch	34	25	10	12
Dinner	45	24	9	10
Snack	17	6	8	9
Total for Meals Reported	116	77	39	38
No Meal Named	<u>58</u>	<u>69</u>	<u>12</u>	<u>4</u>
Total Items	174	146	51	42
Average per Child	12.4 n=14	11.2 n=13	10.2 n=5	10.5 n=4

Table 3 *Comparison of Reported Food Items to Observer's Recorded Food Items for the Meal Observed*

	Total Items <u>Reported/Recorded</u>	<u>Matches</u>	Percent of <u>Items</u>
<u>Matched</u>			
<i>Day One n = 6</i>			
Child	12		
Observer	14	7	50%
<i>Open n = 7</i>			
Child	6		
Observer	23	13	57%
<i>Meal n = 7</i>			
Child	13		
Observer	20	20	30%
<i>Location n = 7</i>			
Child	13		
Observer	19	11	58%
<i>Age 6-8 n = 15</i>			
Child	30		
Observer	48	21	44%
<i>Age 9-11 n = 12</i>			
Child	14		
Observer	31	17	55%

Table 4 *Comparison of Food Items Reported by Parents and Children (n = 9)*

	Day <u>One</u>	<u>Open</u>	<u>Meal</u>	Loca- <u>tion</u>	Age <u>6-8</u>	Age <u>9-11</u>
<u>Total Items</u>						
Child	25	23	18	29	45	50
Parent	36	18	18	21	49	44
<u>Average Items</u>						
Child	8.3	11.5	9.0	14.5	11.3	10.0
Parent	12.0	9.0	9.0	10.5	12.3	8.8
Child Said						
Parent						
Didn't	14	10	5	20	27	22
Parent Said						
Child						
Didn't	25	5	5	12	31	16
Matches	11	13	13	9	18	28
Percentage of Items Matched						
Child	31	72	72	43	37	63