Reinterview In An Automated Environment
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1. INTRODUCTION

The Current Population Survey (CPS) is a monthly survey of about 60,000 households and is the primary source of information on labor force characteristics of the U.S. population. Beginning in January 1994 several significant changes went into effect.

1.1 First Change - New Questionnaire

The CPS began using a new survey questionnaire. It was the result of many years of research and is designed to give a clearer picture of the labor force than the pre-January 1994 questionnaire.

1.2 Second Change - Computer Assisted Interviewing

The CPS questionnaire is no longer administered using paper and pencil. The CPS now uses computer assisted interviewing (CAI) which eliminates the need for paper. When the new questionnaire is used to interview persons in the field (by telephone or personal visit) it is called computer assisted personal interviewing (CAPI) and when it is used to interview persons from one of the telephone centers (TCs) it is called computer assisted telephone interviewing (CATI).

1.3 Third Change - Computer Assisted Reinterviewing

At the same time that the regular CPS questionnaire switched to CAI, the reinterview also switched to CAI. The reinterview instrument asks the same questions as the interview instrument and uses the same skip patterns. If the original interview is performed using CAPI (or CATI) the reinterview also uses CAPI (or CATI).

1.4 Purpose of this Analysis

This analysis evaluates how these changes affect the reliability of the CPS. We do this by using results from the reinterview program to compute response variance measures.

2. CPS REINTERVIEW PROGRAM

A reinterview is a second interview of a previously interviewed sample unit, with the purpose of evaluating some aspect of the original interview. It re-asks questions from the original interview and refers to the same time frame as the original. There are two types of reinterview, quality control (QC) and response error (RE). We perform both types of reinterview for the CPS. Both QC and RE reinterviews are performed independently of the original interview, the reinterviewer has no knowledge of the respondents original answers.

CPS reinterview may be performed between one and ten days after the original interview.

2.1 Quality Control Reinterview

Quality control reinterview programs:

• provide one way to monitor interviewer performance, to give feedback, and to decide when an interviewer needs additional training.

• identify individual interviewers who may need help, a reinterview program can detect system-wide problems. We have not detected any system-wide problems with the post-January 1994 CPS.

• represent the best method we've developed to deter and detect falsification. Falsification rarely occurs in the Census Bureau's surveys, partly because it is Census Bureau policy to reinterview field work in most surveys. We find that only about one field interviewer in two hundred falsifies survey data (this figure is based on pre-1994 data).

The QC reinterview cases are sampled separately from the RE cases. This is done by first selecting the field representatives (CAPI only) that will fall into QC reinterview and then sample their assignment. If a case in a field representative's assignment has already been selected for RE reinterview, it is not eligible for QC reinterview. On average we assign about 1,371 households for QC reinterview each month. We are able to complete the reinterviews of approximately 77.6% of these assigned cases using the telephone, personal visits, and mailouts. In QC reinterview the reinterviewer attempts to complete the reinterview by telephone or personal visit. The reinterviewer is encouraged to talk to the original interview respondent

this is not required. If these attempts are unsuccessful, a mailout is sent to the household which asks the respondent if they were visited by an interviewer. The mailout is a quick falsification check and does not reask any of the original survey instrument questions.

At this time we have no detailed results to report for the CPS QC reinterview. Responses between the original and reinterview questionnaires have been very consistent across interviewers. We plan on performing additional research.

2.2 Response Error Reinterview

Reinterview programs can measure two types of response error -- simple response variance or bias. The purpose of the CPS RE reinterview is to measure response variance. Since the CPS reinterview instrument does not allow the reinterviewer to reconcile differences between original and reinterview responses, we cannot use it to measure bias. However, we do plan on conducting reconciled reinterview in the future.

Several factors can contribute to response error:

- survey instrument,
- respondent,
- interviewer,
- survey conditions.

The RE reinterview cases are sampled separately from the QC cases. The RE cases are sampled using a systematic random sample across all cases (CATI and CAPI). On average we assign about 549 households for RE reinterview each month. We are able to complete the reinterviews of approximately 70.6% of these assigned cases using a telephone reinterview only. This is lower than the completion rate for QC reinterview. We believe the reason for the lower completion rate is the requirement, in RE reinterview only, that the reinterviewer must reinterview the original respondent.

3. MEASURES OF RESPONSE VARIANCE (RESPONSE ERROR REINTERVIEW)

The index of inconsistency and the gross difference rate (GDR) are the principal measures of response variance for a particular response category. Random errors of measurement in the survey process (non-sampling error) add variability to the data we collect from respondents. When the errors are not correlated with the answers or with each other, we call this variability, "simple response variance."

3.1 Index of Inconsistency

The **index of inconsistency** estimates the ratio of response variance to total variance for a question answer. It is a relative measure of response variance.

The **L-fold index** is similar to the index of inconsistency but applies to the entire question rather than a specific answer category of the question. It is an average index of inconsistency across all categories for the question. In 2 X 2 tables, the index of inconsistency and the L-fold index are equal.

Use this rule-of-thumb to interpret the index of inconsistency and the L-fold index.

If the estimate of the index is:

- less than 20, response variance is low.
- between 20 and 50, response variance is moderate.
- greater than 50, response variance is high.

Any of these factors may cause high response variance:

- The methods used to collect the data need improvements. For example, the question may be unclear.
- The concept itself may not be measurable.
- Respondents may not provide reliable information to the level of detail asked.

3.2 Gross Difference Rate

The **gross difference rate** (GDR) is the proportion of respondents who changed their answers in reinterview. For a single response category one-half the GDR equals the simple response variance.

The GDR is more difficult to interpret than the index of inconsistency. Large GDRs indicate serious response variance in the data. Unfortunately, a small GDR is no guarantee of good consistency. In a low frequency category even a small GDR can represent high response variance relative to total variance.

4. RESULTS FOR CPS RESPONSE ERROR REINTERVIEW

This section provides results for the Major Labor Force Categories as well as three individual questions. The Major Labor Force Categories are for the period of August 1994 through February 1995. Since reinterview industry and occupation (I&O) codes are not available

before August 1994 we are not able to provide the Major Labor Force Categories before then.

We are able to analyze individual questions beginning with January 1994. Since January 1994 is the first month of the automated survey, we left it out of this analysis. There was no opportunity to test the reinterview instrument before January 1994 and we consider it to be a test month.

4.1 Major Labor Force Categories

The Major Labor Force Categories are the most important results we get from the CPS. The unemployment rate in the U.S. is calculated based on them. They are not created from a single question but from a combination (recode) of the responses to several questions.

Table I shows the ranges of the index of inconsistency for the six Major Labor Force Categories from 1979 through 1988 (these are the last years we have this information for). Table I also shows the same six indices for August 1994 through February 1995 for the CATI and CAPI cases combined[2].

Four of the six August 1994 - February 1995 indices of inconsistency fell within the range of the indices for the 1979 through 1988 period. The "Working, Nonagr. Part Time" and "Not in the Labor Force" categories were actually below the range established in the 1980s (not statistically significant). Only the "With a Nonagriculture Job Not at Work" category was close to the upper end of the 1980s range.

4.2 INDIVIDUAL QUESTIONS

In addition to the Major Labor Force Categories, we analyzed a subset of questions from the CPS questionnaire. This section provides the analysis for three of the most interesting questions. None of the three questions have much of an impact on the Major Labor Force Categories. We used a full 13 months of data (February 1994 through February 1995).

4.2.1. *LAST WEEK, did you do ANY work for (either) pay (or profit)?* (L-Fold = 24.9)(GDR = 14.0)

- *Yes*
- *No*
- *Retired*
- *Disabled*
- *Unable to work*

- *Don't know*[*]
- *Refused*[*]

[*] too few sample cases in category to compute reliable estimate of response variance

This question has a moderate L-Fold. However, three of this question's answer categories ("Retired," "Disabled" and "Unable") have indices of inconsistency in the high range.

A total of 9,788 persons answered this question in both the original interview and reinterview. Table II shows that only 46.8% of persons that originally responded "Retired" and only 37.9% of persons that originally responded "Disabled" and only 4.1% of persons that originally responded "Unable" gave the same responses in the reinterview. Many of the respondents are switching between the categories "No" and "Retired," "No" and "Disabled," and between "No" and "Unable." Only persons that responded "Yes" originally seem to be consistent in their answers. This is probably due to the fact that the respondents never see a list of possible responses. The interviewers, and reinterviewers, must choose a category based on the respondents response.

4.2.2. *Do you currently want a job, either full or part time?* (L-Fold = 54.7, GDR = 15.6)

- *Yes or Maybe, it depends*
- *No*
- *Retired*[*]
- *Disabled*[*]
- *Unable*[*]
- *Don't know*[*]
- *Refused*[*]

[*] too few sample cases in category to compute reliable estimate of response variance

Only two of this question's seven categories have a non-suppressed index of inconsistency. The "Yes" category has an index of 52.5 and the "No" category has an index of 53.6.

This question is asked of all persons who are not in the labor force. A total of 1,160 persons answered this question in both the original interview and reinterview. Table III shows that only 53.3% of persons that originally responded "Yes or Maybe, it depends" gave the same response in the reinterview. Apparently, interviewers are having difficulty knowing when they should select "Yes or Maybe, it depends" to this

question. This is probably also due to the fact that the respondents never see a list of possible responses. The interviewers, and reinterviewers, must choose a category based on the respondents response.

4.2.3. (ASK IF NECESSARY)
Is this business or organization mainly manufacturing, retail trade, wholesale trade, or something else? (L-Fold = 29.1, GDR = 13.7)

- ○ *Manufacturing*
- ○ *Retail Trade*
- ○ *Wholesale Trade*
- ○ *Something else*
- ○ *Don't know**
- ○ *Refused**

* too few sample cases in category to compute reliable estimate of response variance

Four of this question's six categories have a non-suppressed index of inconsistency. This question has a moderate L-Fold but the "Wholesale Trade" category has a high index of inconsistency of 56.3.

A total of 2,728 answered this question in both the original interview and reinterview. This question is "ask if necessary," meaning that the interviewer should ask the respondent only if they don't know the answer. Table IV shows that only 48.0% of persons that have the original response "Wholesale Trade" have the same response in the reinterview. In general the only category that had much consistency between original interview and reinterview is the "Something Else" category. This is probably due to the fact that this is an "ASK IF NECESSARY" question. The interviewer, or reinterviewer, only asks this question if they don't know how to answer it themselves. It is much more likely that the reinterviewer will ask this question than the interviewer since the reinterviewer isn't as familiar with the area as the interviewer.

5. LIMITATIONS

While reading this report it is important to understand the following:

- The results listed here are initial results and based on seven months of data for the Major Labor Force Categories and thirteen months of data for the individual questions. The historical results shown in Table I cover a ten year period (a total of twenty six-month periods).

Using the old paper questionnaire there was a fair amount of period to period variation and this may also be the case with the new questionnaire.

- The CPS switched from the old Paper and pencil questionnaire to the new CATI/CAPI questionnaire in January 1994. Any respondents who were interviewed in 1993 and 1994 were interviewed with two different questionnaires. This may have a confounding effect on the response variance estimates.

- All the response variance indices were computed using unweighted counts. In the future we may modify our measures to use weights.

- All response error reinterviews were done by telephone only. If a household didn't have a "good" telephone number, it wasn't eligible for RE reinterview.

6. CONCLUSIONS

When we compare the current response variance measures for the Major Labor Force Categories (Working Full-time, Working Part-time, With a Job Not at Work, Unemployed, Not in the Labor Force) to similar Major Labor Force Categories from 1979 through 1988, the current Major Labor Force Categories appear to perform as well as, or possibly better than, the ones for 1979 through 1988.

The question in section 4.2.1 ("LAST WEEK, did you do any work for (either) pay (or profit)?") seems to be having a problem with respondents not being able to distinguish between "No" and the categories of "Retired," "Disabled," and "Unable to Work." This is probably due to the fact that they are never given a list of possible answers to choose from.

The question in section 4.2.2 ("Do you currently want a job, either full or part time?") has a high L-fold. This means that some respondents are having a difficult time choosing whether or not to respond if they want a job.

The question in section 4.2.3 ("Is this business or organization mainly manufacturing, retail trade, wholesale trade, or something else?") has a problem with the "Retail Trade" category. This is probably due to the fact that the interviewers and reinterviewers are supposed to supply the answer themselves if possible. It's more likely that the reinterviewer will have to ask

this question which means that the reinterview isn't a perfect replication of the original interview.

7. FOOTNOTES

[1] This paper reports the general results of research undertaken by Census Bureau staff. The views expressed are attributable to the authors and do not necessarily reflect those of the Census Bureau.

[2] Since there are no industry and occupation codes available for CPS reinterview before August 1994 we can't produce these indices.

8. SUPPORTING MATERIAL

Forsman, Gösta, and Schreiner, Irwin (1991), "The Design and Analysis of reinterview: An Overview," Chapter 15, Measurement Errors in Surveys, Edited by Biemer et al, New York: John Wiley and Sons.

U.S. Bureau of the Census (1985), Statistical Training Document ISP-TR-5

U.S. Bureau of the Census (1994), "The 1994 Current Population Survey Response Variance Report," memorandum from Preston Jay Waite to Sherry L. Courtland, December 5, 1994.

Table I Section 4.1 Indices of Inconsistency for Six CPS Major Labor Force Categories

Major Labor Force Category	1979-1988 Range of the Index of Inconsistency		August 1994 - February 1995 Index of Inconsistency
	Low	High	
Working in Agriculture	12.6	20.9	16.5
Working, Nonagr. Full Time	11.0	13.9	11.2
Working, Nonagr. Part Time	23.8	30.9	21.7
With a Job Not at Work, Nonagriculture	24.5	42.8	41.3
Unemployed	23.3	38.9	29.5

Table II Question in Section 4.2.1 "LAST WEEK, did you do any work for (either) pay (or profit)?"

Category	Number of Original Responses	Number of Reinterview Responses (% of original responses)				
		Yes	No	Retired	Disabled	Unable
Yes	5686	5507 (96.9%)	140 (2.5%)	12 (0.2%)	3 (<0.1%)	1 (<0.1%)
No	2756	150 (5.4%)	2314 (84.0%)	226 (8.2%)	44 (1.6%)	8 (0.2%)
Retired	1110	9 (0.8%)	555 (50.0%)	520 (46.8%)	18 (1.6%)	5 (0.4%)
Disabled	182	6 (3.3%)	93 (51.1%)	10 (5.5%)	69 (37.9%)	3 (1.6%)
Unable	49	2 (4.1%)	32 (65.3%)	7 (14.3%)	6 (12.2%)	2 (4.1%)
Note: Row percentages do not sum to 100%. Rare categories were left out of this table.						

Table III Question in Section 4.2.2 "Do you currently want a job, either full or part time?"

Category	Number of Original Responses	Number of Reinterview Responses (% of original category)	
		Yes, etc.	No
Yes or Maybe, it depends	182	97 (53.3%)	81 (44.5%)
No	962	68 (7.1%)	878 (91.3%)
Note:	Row percentages do not sum to 100%. Rare categories were left out of this table.		

Table IV Question in Section 4.2.3 "Is this business or organization mainly manufacturing, retail trade, wholesale trade, or something else?"

Category	Number of Original Responses	Number of Reinterview Responses (% of original category)			
		Manufacturing	Retail Trade	Wholesale Trade	Something Else
Manufacturing	834	645 (77.3%)	20 (2.4%)	25 (3.0%)	140 (16.8%)
Retail Trade	848	21 (2.5%)	613 (72.3%)	28 (3.3%)	184 (21.7%)
Wholesale Trade	152	10 (6.6%)	20 (13.2%)	73 (48.0%)	48 (31.6%)
Something Else	4254	177 (4.2%)	177 (4.2%)	45 (1.1%)	3926 (92.3%)
Note:	Row percentages do not sum to 100%. Rare categories were left out of this table.				

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