

# Improving the Labor Force Questions in the American Community Survey: The Results of the 2006 ACS Content Test<sup>1</sup>

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## Introduction

In January through March of 2006, the American Community Survey (ACS) conducted the 2006 ACS Content Test, the first test of new and modified content since the ACS reached full implementation levels of data collection. The purpose of the test was to produce improvements to the ACS questionnaire to be implemented in January 2008.<sup>2</sup> This test consisted of testing new versions of some questions as well as testing questions on new topics. A new version of the employment status series of questions was included in the test, and that testing is the topic of this paper.

Through the Office of Management and Budget (OMB) Interagency Committee on the ACS, the Census Bureau included subject matter experts and key data users from other federal agencies in identifying questions for inclusion in the 2006 ACS Content Test. Analysis of employment data from Census 2000, which used the same employment status questions as ACS, reveals that employment levels are underestimated and unemployment levels are overestimated relative to benchmark data from the Current Population Survey (CPS) (Palumbo, Siegel, and Weismantle, 2004).<sup>3</sup> Comparisons of ACS and CPS data by Census Bureau subject matter experts found the same problems with the ACS employment and unemployment estimates. Extensive analysis of the nature and probable causes of the CPS to Census 2000 differences revealed areas where changes to the questions or approach might reduce the gaps. The results of the exact-match study of the CPS to Census 2000 were useful in guiding the Content Test question wording changes (Palumbo, Siegel, and Weismantle, 2004).

Research into the improvement of the ACS battery of questions also included expert review of the existing questions by survey methodologists from the Census Bureau, Bureau of Labor Statistics, and the Justice Department; ACS interviewer debriefings; behavior coding of computer-assisted telephone interviews (CATI); and 40 cognitive interviews (Rothgeb, 2007).

Three of the six ACS employment status questions were modified for the test treatment. The *at work last week* and *temporarily absent* questions are key components in the measurement of employed people and people who are not in the labor force, while the *looking for work* question is a component in the measurement of unemployed people. The test versions of these ACS questions were designed to improve the measurement of employment status by addressing several deficiencies that the research mentioned above suggested are present in the current question wording.

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<sup>1</sup> This report is released to inform interested parties of research and to encourage discussion. Any views expressed on statistical, methodological, technical, or operational issues are those of the authors and not necessarily those of the U.S. Census Bureau.

<sup>2</sup> The Census Bureau submitted the results of the Content Test, and proposed questions to be included on the 2008 ACS questionnaire based on the test results, to the Office of Management and Budget in Spring 2007. The Office of Management and Budget used these findings, along with input from Federal agencies and other sources, to choose the final set of questions that will be on the 2008 ACS.

<sup>3</sup> There are three possibilities for employment status: employed, unemployed, and not in the labor force. A person who has a job but was not working during the week he or she was surveyed is considered employed. A person is unemployed if he or she was actively looking for a job or was on layoff from a job with a reasonable expectation of recall to that job. If those factors are not present, the person is not in the labor force. Only people 15 years of age or older are in scope for employment status.

## **Research Questions**

1. Do the changes to the employment series questions increase the percentage of employed people and decrease the percentage of unemployed people?
2. Do the changes to the employment series questions reduce the estimate of the civilian unemployment rate?
3. Do the changes to the employment series questions reduce response error (bias) in the individual categories of the employment status estimates?
4. Do the changes to the employment series questions reduce the response variability in the individual categories of the employment status estimates?
5. Is there a difference in the employment status item nonresponse rates between the control version and the test version?

## **Methodology**

### **The 2006 ACS Content Test Design**

The 2006 ACS Content Test consisted of a national sample of approximately 62,900 residential addresses in the contiguous United States (the sample universe did not include Puerto Rico, Alaska and Hawaii). To meet the primary test objective of evaluating question wording changes, approximately half of the sample addresses were assigned to a test group which received the test version of the questions (31,450) and the other half to a control group which got the current questions (31,450).

The ACS Content Test used a similar data collection methodology as the current ACS, though cost and time constraints resulted in some deviations. The Content Test implemented the same mail methodology as in ACS production (i.e., a pre-notice letter, an initial questionnaire packet, a reminder postcard, and a replacement questionnaire packet), mailing each piece on the same dates as the corresponding production sample in the ACS. However, there were a few differences from production ACS. First, we did not provide a phone number for assistance on the questionnaire and cases that provided incomplete information on a mail form were not subjected to the Failed Edit Followup operation. Also, while in ACS production, the mail phase is followed by CATI and CAPI (computer-assisted personal interview) phases, the Content Test did not have the CATI phase due to competing time and resource constraints for the field data collection staff. While skipping the CATI phase changes the data collection methods as compared to the ACS, eliminating CATI allowed us to meet the field data collection constraints while also maintaining the entire mail nonrespondent universe for possible CAPI follow-up. Using CATI alone for follow-up would have excluded households for whom we do not have a phone number.

The Content Test mailed questionnaires to sampled households on December 27, 2005, coinciding with the mailing for the ACS January 2006 regular production panel. The Content Test used an English-only mail form but the CAPI instrument included both English and Spanish versions. Beginning February 2006, a sample of households that did not respond by mail was visited by Census Bureau field representatives in attempt to collect the data. The CAPI operations ended March 2, 2006.

### **Content Follow-up Reinterview**

The other operation in the Content Test was a CATI-based reinterview of responding households called the Content Follow-up (CFU). The CFU reinterview, conducted by the Census Bureau's three telephone centers, provided a method for measuring response error. About two weeks after receiving the returned questionnaire or completed CAPI interview, the responding unit entered the CFU operation. Telephone staff completed the CFU interviews between January 17 and March 17, 2006. At the first contact with a household, interviewers asked to speak with the original respondent. If that person was not available, interviewers scheduled a callback at a time when the household member was expected to be home. If, at the second contact, we could not reach the original respondent, interviewers completed the interview with another adult household member.

We asked a series of 28 labor force questions from the Current Population Survey in the CFU. We considered the CPS questions our "gold standard" for two reasons: first, one reason we were looking at this series was the difference in the numbers between the CPS and the ACS, and second, the CPS is able to ask many more detailed questions about employment status than the ACS. By having questions in the CFU that we felt would get us closer to the truth, we could look for response error or bias in the control and test versions of the ACS questions.

## Sample Design

The sample design for the ACS Content Test consisted of a multi-stage design, with the first stage following the Census 2000 Supplementary Survey (C2SS) design for the selection of Primary Selection Units (PSUs) defined as counties or groups of counties. The result was 413 PSUs or approximately 900 counties being selected into the Content Test.

Within sampled PSUs, households were stratified into high and low response strata based on tract-level mail response rates to the Census 2000 long form and a stratified systematic sample of households was selected. The strata were defined such that the high response stratum contained 75 percent of the housing units that reside in tracts with the highest mail response rate. The balance of the tracts was assigned to the low response stratum. To achieve similar expected number of mail returns for the high and low response strata, 55 percent of the sample was allocated to the low response strata and 45 percent to the high response strata. To contain field costs for CAPI data collection, only a subset of 151 PSUs were eligible for CAPI. The 20 PSUs with the highest percentage of foreign-born population were included with certainty into CAPI and the remaining PSUs were sampled at a rate of 1 in 3. Mail nonresponding households were sampled at a rate of 1 in 2 within the top 20 PSUs and at a sampling rate of 2 in 3 within the remaining CAPI PSUs.

It is important to note that, unlike the production ACS operation, these data were neither edited nor was imputation performed for missing data, and no adjustments were made for unit nonresponse. Because of the design of the test, the production edit and imputation methodology, and the design of the production nonresponse methodology, there was no way to duplicate those operations for the test without raising concerns that those procedures, rather than the responses, were causing differences between the two versions.

Control and test treatments groups obtained equivalent response rates overall, and for each mode of collection. Overall, the unit response rate for the control treatment was 95.8 percent and 95.5 percent for the test treatment (difference: 0.3 percent, standard error: 0.5 percent, not significant at the 90 percent confidence level). The CFU rates were 75.9 for control cases and 76.4 percent for test cases (difference: 0.5 percent, standard error: 1.0 percent, not significant at the 90 percent confidence level).

## Design of the Test Version of the Employment Series Questions

The test version of the employment series questions was designed based on the results of the CPS-Census 2000 match (Palumbo, Siegel, and Weismantle, 2004) and cognitive interviewing conducted by the Census Bureau's Center for Survey Methods Research (Rothgeb, 2007). Figure 1 shows the mail versions of the control and test questions. The CATI/CAPI versions were virtually identical. Changes for the test were made to three parts of the series:

- At work last week question(s) (questions 28 on control and 28a and 28b on test)
- Temporarily absent question (question 34b)
- Looking for work question (question 35)

**At Work Last Week (Control-Question 28, Test-Questions 28a and 28b)** – The purpose of the *at work last week* question is to ascertain whether a person performed any work at all for pay or profit during the reference period. For the *at work last week* question, the following items were addressed:

- The phrase “either pay or profit” at the end of the question may lead to confusion about the nature of the work being asked about in the question.
- The question may incorrectly suggest to people who work only a few hours or who do not have a “regular” job, such as contingent, temporary, marginal, or casual workers, or people who are self-employed, that only formal, employer-employee, types of work arrangements are being considered.
- The emphasis on ‘ANY work’ may incorrectly suggest to people who have regular jobs that the question is only asking about work outside of their normal jobs.
- The lengthy italicized statement after the question may be more confusing than enlightening.
- The intent of the question may be difficult for retired people to grasp, particularly if they are doing a minimal amount of part-time work.

The *at work last week* question was split into two questions for the test treatment. In question 28a, the word ‘job’ was added to identify people with regular jobs, while the parenthetical “(or business)” was intended to capture business owners. The phrase “either for pay or profit” in the existing ACS question was removed and the lengthy italicized statement that follows was incorporated into question 28b. The intent of question 28b was to capture people who worked only a few hours or who did not have “regular” jobs, such as contingent, marginal, temporary, or casual workers, or people who are self-employed.

**Temporarily Absent (Question 34b)** – The purpose of the *temporarily absent* question is to obtain a measure of individuals who have a job that they did not work at last week. For the *temporarily absent* question the following items were addressed:

- The question may not be clear that people who are on maternity or paternity leave are considered to be temporarily absent from their jobs.
- People may mistakenly think that they should answer ‘yes’ only if they are absent for one of the reasons explicitly enumerated in the list of examples.
- The list of examples does not explicitly contain reasons, such as bad weather, that an individual could be absent from work because the job itself is temporarily unavailable.
- Question wording for this item varies among the modes of ACS data collection (self-administered paper form, CATI, and CAPI).

**Figure 1: Control and Test Versions of the Labor Force Questions, 2006 ACS Content Test, Paper Version**

**Control Version**

**28** LAST WEEK, did this person do ANY work for either pay or profit? Mark (X) the "Yes" box even if the person worked only 1 hour, or helped without pay in a family business or farm for 15 hours or more, or was on active duty in the Armed Forces.

Yes  
 No → SKIP to question 34

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**34** a. LAST WEEK, was this person on layoff from a job?  
 Yes → SKIP to question 34c  
 No

b. LAST WEEK, was this person TEMPORARILY absent from a job or business?  
 Yes, on vacation, temporary illness, labor dispute, etc. → SKIP to question 37  
 No → SKIP to question 35

c. Has this person been informed that he or she will be recalled to work within the next 6 months OR been given a date to return to work?  
 Yes → SKIP to question 36  
 No

**35** Has this person been looking for work during the last 4 weeks?  
 Yes  
 No → SKIP to question 37

**36** LAST WEEK, could this person have started a job if offered one, or returned to work if recalled?  
 Yes, could have gone to work  
 No, because of own temporary illness  
 No, because of all other reasons (in school, etc.)

**Test Version**

**28** a. LAST WEEK, did this person work for pay at a job (or business)?  
 Yes → SKIP to question 29  
 No – Did not work (or retired)

b. LAST WEEK, did this person do ANY work for pay, even for as little as one hour?  
 Yes  
 No → SKIP to question 34a

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**34** a. LAST WEEK, was this person on layoff from a job?  
 Yes → SKIP to question 34c  
 No

b. LAST WEEK, was this person TEMPORARILY absent from a job or business?  
 Yes, on vacation, temporary illness, maternity leave, other family/personal reasons, bad weather, etc. → SKIP to question 37  
 No → SKIP to question 35

c. Has this person been informed that he or she will be recalled to work within the next 6 months OR been given a date to return to work?  
 Yes → SKIP to question 36  
 No

**35** During the LAST 4 WEEKS, has this person been ACTIVELY looking for work?  
 Yes  
 No → SKIP to question 37

**36** LAST WEEK, could this person have started a job if offered one, or returned to work if recalled?  
 Yes, could have gone to work  
 No, because of own temporary illness  
 No, because of all other reasons (in school, etc.)

The test version of the *temporarily absent* question was informed, in part, by cognitive testing that found the existing question did not make clear who should be considered temporarily absent from their jobs (Rothgeb, 2007). It was found that people on maternity or paternity leave, in particular, may not have considered themselves to fit this classification. The test version modified the existing wording to include maternity leave, other family/personal reasons, and bad weather to the list of examples.

**Looking for Work (Question 35)** – The purpose of the *looking for work* question is to determine whether an individual is unemployed by ascertaining whether that individual used any active method to look for work during the reference period of the last four weeks. In the CPS, a screener question determines whether a person has been doing anything to find work during the reference period; a follow-up question asks specifically about all the things the person has done to find work. Job search activities are categorized as ‘active’ or ‘passive’ by CPS and only those respondents who are actively looking for work (e.g., placed or answered job advertisements) are classified as ‘unemployed.’ Passive job searchers (e.g., looked at want ads) are classified as ‘not in the labor force.’

The ACS, on the contrary, does not have a follow-up question about job search activities. As worded, the current ACS *looking for work* question does not effectively communicate the notion of active versus passive job searching. For the *looking for work* question, the following items were addressed:

- There is no distinction between active versus passive job search methods, which could lead to individuals who are not in the labor force being misclassified as unemployed. This is an important distinction that the CPS addresses with specific examples of active versus passive job searching.
- The question may be mistakenly answered in the affirmative by contingent, temporary, marginal, or casual workers who misclassify themselves as not at work in the *at work last week* question and who typically look for new work as an ongoing part of their type of job.

The test version of the question emphasizes the word ‘actively,’ by putting it in all capital letters, as a means of communicating more clearly, without a followup question, the distinction in job-searching activities.

**Design of Reinterview Questions for the CFU**

As mentioned before, the CFU used 28 questions from the CPS battery of employment questions, which allows us to collect great detail about a person’s employment situation. For example, the previous section of this paper noted the test version of the ACS asks whether or not a person was ACTIVELY looking for work and the CPS has a question that asks “what are all of the things [the person has] done to find work during the LAST 4 WEEKS”, with 13 specific possible answers, like “contacted employer directly/had an interview” (considered “active”) and “looked at ads” (not considered “active”). While both the ACS and the CPS ask if a person could have started a job last week if one had been offered, if the answer is “no”, the CPS asks for the reason.

Because the CPS asks so many more questions and we justified the testing in part based on comparisons to CPS, the CPS questions are the closest we get to the “truth.” Therefore, deviations from the CFU responses are in effect considered errors, and the differences in those errors a key test statistic.

**Test Statistics**

Along with the distribution of employment status and the unemployment rate, two key test statistics are used to answer questions 3 and 4. They are the net difference rate (NDR) and the gross difference rate (GDR).

Consider the following 2x2 table:

**Figure 2: Example of Net Difference Rate and Gross Difference Rate Calculations**

		Original ACS Content Test Data Collection		
		Yes	No	Total
CFU	Yes	a	b	a + b
	No	c	d	c + d
Total		a + c	b + d	a + b + c + d = n

The net difference rate is the difference of the percentage of cases in a given answer category in the original ACS data collection and the CFU for a given answer category (Singer and Ennis, 2003). For the “yes” category in Figure 2, the net difference rate is  $((a + b) - (a + c)) / n$ , or  $(b - c) / n$ . (When calculating the net difference rate for employment, for example, consider “employed”

to be “yes” in the table above and “unemployed” and “not in the labor force” to be “no”.) Since we are assuming the CFU answer is closer to the truth, net difference rates can be used to help measure response error or bias, and the closer the net difference rate is to zero in absolute value, the better.

The gross difference rate, on the other hand, is the percentage of discrepant answers between the original ACS data collection and the CFU. For the “yes” category, the gross difference rate is  $(b + c) / n$ . (When calculating the gross difference rate for employment, for example, consider “employed” to be “yes” in the table above and “unemployed” and “not in the labor force” to be “no”.) Gross difference rates are useful to measure response variability between the original and CFU data collections.

When calculating net difference rates and gross difference rates, the only people included in the calculations are those for whom we have a valid response for both the original mail or CAPI questionnaire and the CFU. Note that all significance tests in this paper use a 90 percent confidence level as a test of significance, as per Census Bureau standards.

### Limitations

There were two operational limitations that particularly affected the employment series. The self-administered mail forms were sent out December 27, at a time when there are more temporary workers in the labor force. It is also a time when respondents may have been temporarily absent from regular jobs because of holiday vacations. Also, the Content Test asked about work done “last week.” Since the responding units entered the CFU operation about two weeks after the receipt of their questionnaires, this time period reference was different from the original interview (either control or test) to the CFU. In order to reconcile this discrepancy, an additional question was added to the CFU battery that referred respondents back to the week prior to the first interview. We compared their employment status reported in the original interview to the recalled status reported in the CFU. Our analysis found some change in employment status between interviews, however, the difference was not large enough nor consistent enough to indicate that the time period reference affected our results. Also, people in noninstitutionalized group quarters (such as college dorms) are eligible for these questions in ACS but were not included in the Content Test.

### Results

#### Question 1 – Do the changes to the employment series questions increase the percentage of employed people and decrease the percentage of unemployed people?

Table 1 below shows that the test questions produced an increase in the percentage of employed people, but not a statistically significant reduction in the percentage of unemployed people. For the test group, 65.7 percent of people were employed compared to only 62.8 percent for the control group, a difference of 2.9 percentage points. The difference between the estimates of the percentage of unemployed people was not statistically significant.

The table indicates the main category from which those extra employed people came was the “not in labor force” category. This suggests that perhaps people without “regular” 9-to-5 40 hour-a week jobs who got the control version might have been reported as “not in the labor force” but their counterparts in the test version reported the person as “employed”. Analysis of the two-part test question found that 42 percent of the respondents who answered ‘no’ to 28a and ‘yes’ to 28b of the question reported working 20 hours or less. This would indicate the change that mostly captured those people was the additional “worked last week” question, which was designed to capture just such people.

**Table 1: Employment Status, Control Vs. Test**

Employment Status	Control (%)	Test (%)	Diff (%)	Marg of Err of Diff(%)	Significant
Employed	62.8	65.7	2.9	± 1.4	Yes
Unemployed	4.1	3.6	-0.5	± 0.5	No
Not in labor force	33.1	30.7	-2.4	± 1.4	Yes

**Question 2 – Do the changes to the employment series questions decrease the estimate of the civilian unemployment rate?**

While the percentages of people employed, unemployed, and not in the labor force are important, their main use is to calculate the unemployment rate. The formula for the unemployment rate, using the categories above, is (unemployed) / (employed + unemployed)<sup>4</sup>. The test version had a statistically significantly lower unemployment rate, as shown in the first line in Table 2.

**Table 2: Civilian Unemployment Rate, Control Vs. Test**

	Control (%)	Test (%)	Diff (%)	Marg of Err of Diff (%)	Significant
Unemployment Rate	6.1	5.2	-0.9	± 0.8	Yes

That difference is not only statistically significant, it is also a nominally large drop from 6.1 percent to 5.2 percent. It is also in the hypothesized direction, in that Palumbo, Siegel, and Weismantle (2004) had surmised that the Census 2000 and ACS were underestimating employment and overestimating unemployment, therefore overestimating the unemployment rate.

**Question 3 – Do the changes to the employment series questions reduce response error (bias) in the individual categories of the employment status estimates?**

Since the CFU data, collected using the CPS questions, are considered to be more accurate, we can use net difference rates to answer this question. Table 3 shows the net difference rates between the control and CFU data and the test and CFU data, as well as the comparisons between the two.

Let’s look at the “Employed” line. The “Test vs. CFU” column shows the net difference rate for the percentage of employed people is -0.9 percentage points, meaning that the test question estimate was 0.9 percentage points lower than the CFU estimate. For control, the difference was -2.1 percentage points, so the control estimate was much lower than the CFU estimate for the same cases. The absolute difference between the -2.1 and -0.9 (1.2 percentage points) is significant, so that says there is more error or bias in the control estimate for the percentage of employed people than in the test estimate.

The next two lines show that the difference in net difference rates is not significant for the percentage of unemployed people, but it is for the percentage of people not in the labor force, indicating less error for the test version than for the control version.

**Table 3: Employment Status Net Difference Rates, Control Vs. Test**

Employment Status	Net Difference Rates				Significant
	Control vs CFU (%)	Test vs CFU (%)	Diff  T-C  (%)	MOE of Diff (%)	
Employed	-2.1	-0.9	1.2	0.7	Yes
Unemployed	0.3	0.1	0.2	0.5	No
Not in labor force	1.8	0.8	1.0	0.8	Yes

**Question 4 – Do the changes to the employment series questions reduce the response variability in the individual categories of the employment status estimates?**

We will use gross difference rates to measure response variability, and compare gross difference rates between control/CFU and test/CFU to measure which version produced less response variability compared to the CFU. Table 4 gives the relevant data.

<sup>4</sup> Active duty military personnel are excluded from the unemployment rate, as are people in institutional group quarters such as prisons and nursing homes. Note that group quarters were not included in the Content Test, so people in military barracks and in institutional group quarters were not part of the test. Questions in the ACS Content Test outside the employment series were used to identify active members of the Armed Forces.

**Table 4: Employment Status Gross Difference Rates, Control Vs. Test**

Employment Status	Gross Difference Rates				Significant
	Control vs CFU (%)	Test vs CFU (%)	Diff T-C (%)	MOE of Diff (%)	
Employed	6.4	5.9	-0.5	± 0.8	No
Unemployed	3.4	3.1	-0.3	± 0.6	No
Not in labor force	6.6	5.9	-0.8	± 0.8	No

None of the differences are significant, so we cannot say that either the control version or the test version of the questions have less variability.

**Question 5 – Is there a difference in the employment status item nonresponse rates between the control version and the test version?**

We calculated an overall item nonresponse rate for employment status, which was based on a combination of all of the employment questions, and the results are in Table 5. The item nonresponse rate was lower for the test battery of questions than for the control battery, so the test data were more complete.

**Table 5: Employment Status Item Nonresponse Rate, Control Vs. Test**

	Control (%)	Test (%)	Diff (%)	Marg of Err of Diff (%)	Significant
Item nonresponse rate	10.0	8.6	-1.4	± 0.7	Yes

**Discussion and Summary**

Research by Palumbo, Siegel, and Weismantle had indicated several problems with the Census 2000/ACS version of the employment series of questions – an underestimate of employed people and a corresponding overestimate of unemployed people and people not in the labor force. Rothgeb (2007) helped develop questions that would lessen those problems, and that version of the questions was tested in the 2006 ACS Content Test.

The results showed that the test questions did, in fact, produce a higher estimate of the percentage of people who were employed and a lower estimate of the percentage not in the labor force. While the test questions did not produce a lower estimate in the percentage of unemployed people, the differences in the other percentages led to a lower estimate for the unemployment rate. The unemployment rate is a very meaningful measure because it is so widely used.

We also demonstrated a decrease for the test version in response error or bias, as measured by the differences in the net difference rates between the control and test versions for two of the three employment status categories, and a nominal but statistically insignificant drop in the third category.

In addition, the item missing data rate for employment status was lower for the test version than for the control version, suggesting the question was easier to understand and complete. We did not find a difference in response variability between the two versions, as measured by the gross difference rates.

Our findings indicate that, based on these criteria, the test version of the questions performed better than the existing ACS questions. These results were forwarded to the Office of Management and Budget (OMB) in early 2007 (Holder and Raglin, 2007). In the summer of 2007, the OMB decided to adopt the test version of the employment series questions for the ACS starting in 2008.

However, while the test questions may have produced more favorable estimates than the control questions, there remains room for improvement. Palumbo, Siegel, and Weismantle (2004) found that both the Census 2000 and CPS version of the employment series of questions had “considerable variability in classifying people to the unemployed category.” We found the same thing for the improved test version of the questions. The gross difference rate of 6.2 percentage points for the test version for “unemployed” is large relative to the estimate of 3.6 percent unemployed. This shows that while we have made progress, we still can improve our estimate of employment status. Any future ACS content tests should consider including the employment series questions, with a focus on the unemployment category.



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