

Coverage and Nonresponse Bias in the 2016 American Community Survey Content Follow-Up Reinterview

Samantha Spiers¹

¹U.S. Census Bureau, 4600 Silver Hill Rd, Suitland, MD 20746

Abstract

In 2016, the U.S. Census Bureau conducted the 2016 American Community Survey (ACS) Content Test to improve the content of the ACS questionnaire. To measure response reliability, the Census Bureau administered a follow-up telephone reinterview, called the Content Follow-Up (CFU), to respondents of the 2016 Content Test. The CFU cost more and had a lower response rate than expected due to operational difficulties and design constraints. To help improve the 2022 ACS Content Test, we examine potential coverage error and nonresponse bias in the CFU reinterview. Specifically, we examine differences in those 2016 Content Test respondents who were eligible for the CFU reinterview and those who were not. For those who were eligible for the CFU, we examine differences between CFU respondents and nonrespondents. We also discuss potential modifications and alternatives to the reinterview.

Key Words: Nonresponse Bias, Coverage Error, Reinterview

1. Introduction

The American Community Survey (ACS) is an ongoing survey that provides detail population and housing information about the United States and Puerto Rico. The Census Bureau regularly assesses if ACS data quality can be improved through a Content Test. The purpose of the Content Test is to test revising the ACS questionnaire through changing question wording, response categories, or adding new questions. Historically, to aid in the decision process, we administer a follow-up telephone reinterview called the Content Follow-Up (CFU). The purpose of the CFU is to measure response error and response reliability by comparing responses to both the original Content Test interview and CFU reinterview.

The most recent Content Test was in 2016, and we are currently planning another Content Test in 2022. Part of the planning process is determining if we want a follow-up reinterview for the 2022 Content Test. The 2016 CFU had a lower response rate than wanted due to operational difficulties and design constraints, so we are concerned the difficulties of another follow-up reinterview may outweigh the benefits. Thus, the purpose of this analysis was to examine potential coverage and nonresponse bias in the 2016 CFU reinterview to aid that decision. Specifically, the purpose was to determine if any biases existed between those eligible and ineligible for the 2016 CFU and of those who were eligible, if any biases existed between those who responded and did not respond to the 2016 CFU.

2. Methodology

2.1 Sample Design

The sample for the 2016 Content Test was 70,000 residential addresses in the United States divided equally into two groups: a control and a test group. The data collection protocol was similar to the 2016 production ACS: data was collected by self-response (internet and mail) for the first month, Computer-Assisted Telephone Interviewing (CATI) for nonrespondents in the second month, and Computer-Assisted Personal Interviewing (CAPI) for a subsample of nonrespondents in the third month. The Census Bureau attempted a CFU telephone reinterview two to five weeks after the original Content Test interview. The reinterview included all the ACS questions being tested along with some production questions for context.

For this analysis, an address was considered eligible for the 2016 CFU reinterview if there were sufficient responses to the Content Test specific questions and if a phone number was available. An address was considered a response if they were eligible for the CFU and we received a complete or sufficient partial response to the CFU reinterview. These requirements resulted in using about 17,500 addresses in both the control and test groups for this analysis.

2.2 Analysis

For both eligibility and response universes, we examined response distributions and created separate logistic regression models. The following sections further describe the analysis performed including the variables examined and the weighting and variance.

2.2.1 Variables Examined

The following table lists the variables examined in this analysis. We chose variables correlated with the questions in the 2016 Content Test such that they were either specific to the test or examined for data quality during the 2016 Content Test analyses. We could not examine some variables related to response such as race and Hispanic origin because they were part of the 2016 Content Test.

Table 1: Variables Examined in Analysis

Categories	Survey-Specific	Geography	Household-Level	Person-Level
Variables	<ul style="list-style-type: none"> • Group (Control vs Test) • Mode of original interview (Internet, Mail, CATI, or CAPI) 	<ul style="list-style-type: none"> • Designated high or low response area • Urban or rural area 	<ul style="list-style-type: none"> • Tenure • Household income • Building type • Household size • Limited English-speaking household 	<ul style="list-style-type: none"> • Age • Sex • Educational attainment • Marital status • Work status

Limited English-speaking households are households where all residents living in the household, age 14 and over, speak a language other than English and report that they speak English less than very well. All auxiliary data on 2016 CFU ineligible and nonrespondents were from the original Content Test interview. Also, all person-level data were from the

household respondent, which is the person who provides data for all members of a household or is listed as Person 1 on the questionnaire.

2.2.2 Response Distributions

To assess eligibility and response differences, we compared response distributions for each variable listed in Section 2.2.1. Comparing response distributions helps us know if there are differences between those who were eligible for the 2016 CFU and those who were not, or between those who responded to the 2016 CFU and those who did not, which could lead to biases and incorrect conclusions about the data.

We calculated proportion estimates for categorical responses using the following formula:

$$\text{Category Proportion} = \frac{\text{Weighted count of non-blank, valid responses in category}}{\text{Weighted count of all non-blank, valid responses}}$$

We did not include items with missing data in the calculations.

We tested differences within each item using the Rao-Scott chi-square test (Rao and Scott, 1987). Because average household size is a continuous measure, we tested differences using a two-tailed t-test. We used a significance level of $\alpha=0.1$ when determining significant differences, and we adjusted the p-values from testing response distributions for multiple comparisons using the Hochberg method (Hochberg, 1988).

2.2.3 Logistic Regression Models

To further assess coverage (eligibility) and nonresponse bias, we created separate logistic regression models for each variable listed in Section 2.2.1, controlling for the variables that were used for nonresponse adjustment in the 2016 Content Test analyses: group, mode of original interview, and designated response area. The goal of the regression models was to determine if there were potential coverage and nonresponse differences even after controlling for variables we already knew would have an impact.

We did not adjust the odds ratio estimates from the logistic regressions for multiple comparisons.

2.2.4 Weighting and Variance

We weighted values using the ACS base sampling weight (the inverse of the probability of selection) adjusted for original interview CAPI subsampling and original interview nonresponse. We did not include an adjustment for CFU nonresponse (which was part of the 2016 CFU final weights) because that adjustment would interfere with the analysis.

We estimated all variances using the Successive Difference Replication (SDR) method with 80 replicate weights – the standard method used in the ACS (see U.S. Census Bureau, 2014, Chapter 12). We calculated the variances using the following formula:

$$\text{Var}(RR_0) = \frac{4}{80} \sum_{r=1}^{80} (RR_r - RR_0)^2$$

where:

- RR_0 = estimate calculated using the full sample base weights,
- RR_r = estimate calculated for replicate r .

The standard error of an estimate is the square root of the variance.

3. Results

The following sections give the coverage and nonresponse results.

3.1 Coverage (Eligibility) Results

Table 2 shows the response distributions for the variables that were used for nonresponse adjustment in the 2016 Content Test analyses among those eligible and ineligible for the 2016 CFU.

Table 2: Response Distributions for Nonresponse Adjustment Variables among 2016 CFU Eligible and Ineligible Households

Item	Eligible Percent	Ineligible Percent	P-Value
Group	(n=34,000)	(n=1,100)	0.01*
Test	50.4 (0.3)	43.3 (2.1)	
Control	49.6 (0.3)	56.7 (2.1)	
Mode of Original Interview	(n=34,000)	(n=1,100)	<0.01*
Internet	41.1 (0.3)	20.7 (1.6)	
Mail	22.3 (0.3)	17.3 (1.2)	
CATI [^]	3.0 (0.1)	11.9 (1.2)	
CAPI ⁺	33.6 (0.3)	50.1 (2.1)	
Designated Response Area	(n=34,000)	(n=1,100)	<0.01*
High Response Area	77.2 (0.2)	66.6 (1.9)	
Low Response Area	22.8 (0.2)	33.4 (1.9)	

Source: U.S. Census Bureau, 2016 American Community Survey Content Test. DRB Approval Number: CBDRB-FY21-ACSO003-B0037.

[^] Computer Assisted Telephone Interviewing

⁺ Computer Assisted Personal Interviewing

Note: Minor additive discrepancies are due to rounding. Standard errors are in parentheses. An asterisk (*) indicates a statistically significant result. Significance was tested based on a Rao-Scott chi-square test at the $\alpha=0.1$ level. P-values were adjusted for multiple comparisons using the Hochberg method.

Among households eligible for the 2016 CFU, 50.4 percent were in the test group and 49.6 percent were in the control group, compared to ineligible households where 43.3 percent were in the test group and 56.7 percent were in the control group. These response distributions were significantly different among eligible and ineligible households. Also, as expected, the response distributions for mode of original interview and designated response area were significantly different among eligible and ineligible households for the 2016 CFU.

Table 3 shows the response distributions for household-level and geography variables among those eligible and ineligible for the 2016 CFU. The response distributions for all except urban or rural area were significantly different among eligible and ineligible households.

Table 3: Response Distributions for Household-Level and Geography Variables among 2016 CFU Eligible and Ineligible Households

Item	Eligible Percent	Ineligible Percent	P-Value
Tenure	(n=33,500)	(n=950)	<0.01*
Owned with a mortgage	43.6 (0.4)	26.5 (2.1)	
Owned free and clear	21.3 (0.3)	14.5 (1.4)	
Rented	33.3 (0.4)	56.7 (2.3)	
Occupied without payment of rent	1.8 (0.1)	2.4 (0.8)	
Household Income	(n=29,500)	(n=600)	<0.01*
Less than \$10,000	12.0 (0.3)	30.1 (3.0)	
\$10,000 to \$14,999	4.7 (0.2)	8.7 (1.8)	
\$15,000 to \$24,999	9.0 (0.2)	17.1 (2.4)	
\$25,000 to \$34,999	9.0 (0.3)	8.2 (1.6)	
\$35,000 to \$49,999	12.1 (0.3)	8.9 (1.5)	
\$50,000 to \$74,999	16.3 (0.3)	9.7 (1.8)	
\$75,000 to \$99,999	11.6 (0.3)	6.7 (1.5)	
\$100,000 to \$149,999	13.4 (0.3)	4.6 (1.0)	
\$150,000 to \$199,999	5.7 (0.2)	3.2 (1.3)	
\$200,000 or more	6.2 (0.2)	2.9 (1.2)	
Building Type	(n=33,500)	(n=1,000)	<0.01*
Mobile home	5.4 (0.2)	6.0 (1.1)	
One-family house	70.8 (0.3)	50.3 (2.3)	
Apartment	23.7 (0.3)	43.4 (2.4)	
Other	0.1 (0.0)	0.2 (0.2)	
Limited English-Speaking Household	(n=33,000)	(n=900)	<0.01*
Yes	10.2 (0.2)	25.7 (2.5)	
No	89.8 (0.2)	74.3 (2.5)	
Urban or Rural Area	(n=32,500)	(n=1,100)	0.86
Urban	84.0 (0.3)	83.2 (1.9)	
Rural	16.1 (0.3)	16.8 (1.9)	

Source: U.S. Census Bureau, 2016 American Community Survey Content Test. DRB Approval Number: CBDRB-FY21-ACSO003-B0037.

Note: Minor additive discrepancies are due to rounding. Standard errors are in parentheses. An asterisk (*) indicates a statistically significant result. Significance was tested based on a Rao-Scott chi-square test at the $\alpha=0.1$ level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 4 shows the average household size among those eligible and ineligible for the 2016 CFU, which was not significantly different.

Table 4: Average Household Size among 2016 CFU Eligible and Ineligible Households

Average Household Size	Eligible	Ineligible	Eligible Minus Ineligible	P-Value
	(n=34,000)	(n=1,100)		
Average Household Size (Number of People)	2.5 (<0.1)	2.4 (0.1)	0.1 (0.1)	0.23

Source: U.S. Census Bureau, 2016 American Community Survey Content Test. DRB Approval Number: CBDRB-FY21-ACSO003-B0037.

Note: Minor additive discrepancies are due to rounding. Standard errors are in parentheses. An asterisk (*) indicates a statistically significant result. Significance was tested based on a two-tailed t-test at the $\alpha=0.1$ level. P-value was adjusted for multiple comparisons using the Hochberg method.

Table 5: Response Distributions for Person-Level Variables among 2016 CFU Eligible and Ineligible Households

Item	Eligible Percent	Ineligible Percent	P-Value
Age	(n=34,000)	(n=1,000)	0.86
15 to 17	0.2 (0.0)	0.1 (0.1)	
18 to 24	4.9 (0.2)	6.3 (1.2)	
25 to 44	32.0 (0.4)	31.9 (1.9)	
45 to 64	37.8 (0.4)	39.3 (2.0)	
65 or older	25.0 (0.3)	22.3 (2.0)	
Sex	(n=34,000)	(n=1,100)	0.86
Male	49.2 (0.3)	48.8 (2.3)	
Female	50.8 (0.3)	51.2 (2.3)	
Educational Attainment[^]	(n=31,500)	(n=750)	<0.01*
No schooling completed	0.9 (0.1)	2.7 (0.8)	
Nursery to 11th grade	7.3 (0.3)	15.5 (2.1)	
12th grade (no diploma)	1.4 (0.1)	2.3 (1.0)	
High school diploma	19.6 (0.4)	26.4 (2.8)	
GED [†] or alternative credential	3.2 (0.1)	4.2 (0.8)	
Some college	21.7 (0.4)	18.2 (2.4)	
Associate's degree	9.3 (0.2)	6.9 (1.3)	
Bachelor's degree	21.7 (0.3)	13.8 (1.9)	
Advanced degree	14.9 (0.3)	10.0 (1.8)	
Marital Status	(n=28,000)	(n=850)	0.39
Married	44.7 (0.4)	47.0 (2.8)	
Widowed	9.9 (0.2)	9.6 (1.5)	
Divorced	18.0 (0.3)	13.1 (1.8)	
Separated	2.8 (0.1)	2.1 (0.4)	
Never Married	24.5 (0.4)	28.2 (2.4)	
Work Status⁺	(n=24,000)	(n=550)	<0.01*
Worked full-time, year-round	62.0 (0.5)	49.8 (3.5)	
Worked less than full-time, year-round	20.6 (0.4)	22.9 (2.8)	
Did not work	17.3 (0.3)	27.3 (3.3)	

Source: U.S. Census Bureau, 2016 American Community Survey Content Test. DRB Approval Number: CBDRB-FY21-ACSO003-B0037.

[^]For ages 25 and older

[†]General Educational Development

⁺For the past 12 months, for ages 16 and older

Note: Minor additive discrepancies are due to rounding. Standard errors are in parentheses. An asterisk (*) indicates a statistically significant result. Significance was tested based on a Rao-Scott chi-square test at the $\alpha=0.1$ level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 5 shows the response distributions for the person-level variables among those eligible and ineligible for the 2016 CFU. The response distributions for educational attainment and work status were significantly different among eligible and ineligible households.

After investigating the eligibility differences through response distributions, we created logistic regression models controlling for the variables used for nonresponse adjustment in the 2016 Content Test analyses. The following figure shows the odds ratio estimates along with its 95 percent confidence interval (95% CI) for the household-level and geography variables among those eligible and ineligible for the 2016 CFU. Though presented together in the same figure, we ran separate logistic regression models for each variable. For example, the odds ratio estimates for household income are from a logistic regression

model including household income, group, mode of original interview, and designated response area. The significant odds ratio estimates are outlined.

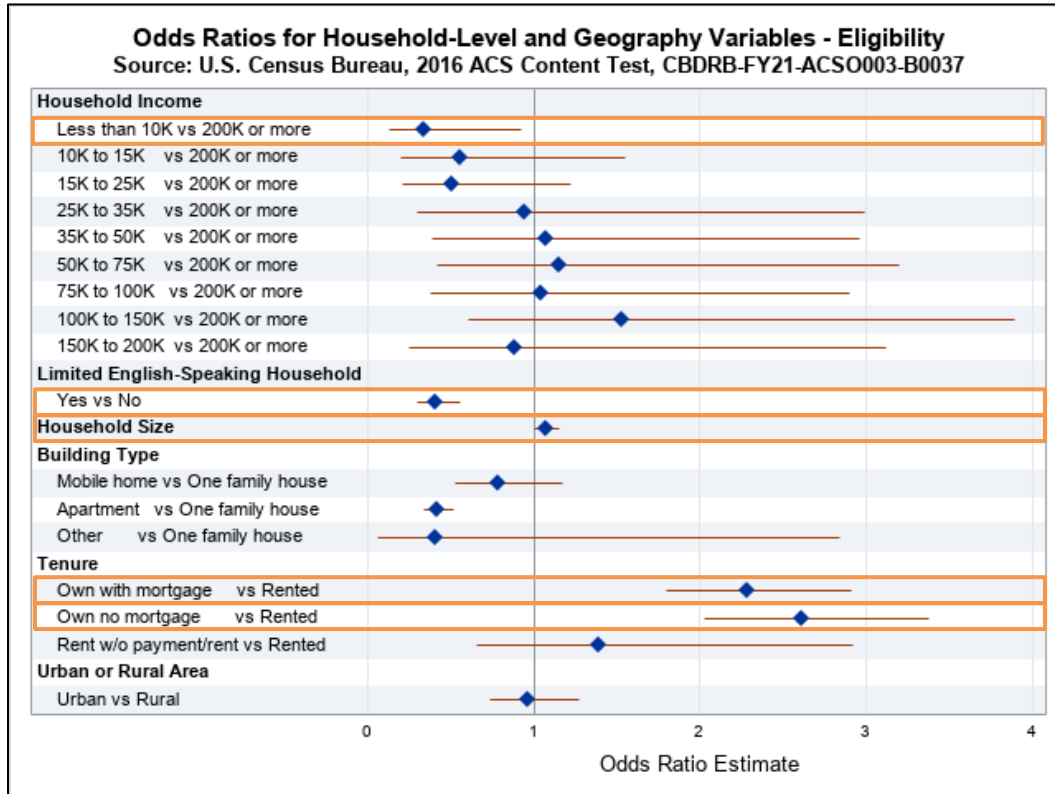


Figure 1: Odds Ratio Estimates for Household-Level and Geography Variables among 2016 CFU Eligible and Ineligible Households

When we compared response distributions in Table 3, we found that the response distributions for household income, limited English-speaking households, building type, and tenure were significant. Some of the odds ratios from the logistic regression models including these variables were also significant. Household respondents with household incomes less than \$10,000 had 0.3 (95% CI: 0.1-0.9) times the odds of being eligible for the 2016 CFU than those with household incomes of \$200,000 or more. Household respondents from limited English-speaking households had 0.4 (95% CI: 0.3-0.6) times the odds of being eligible than those not from limited English-speaking households. Households living in apartments had 0.4 (95% CI: 0.3-0.5) times the odds of being eligible than those living in a one-family house. And for tenure, households who own a home with a mortgage had 2.3 (95% CI: 1.8-2.9) times the odds and households who own a home without a mortgage had 2.6 (95% CI: 2.0-3.4) times the odds of being eligible than those renting.

When we compared average household size in Table 4, the difference was not significant. However, the odds ratio from the logistic regression model is, where for every increase in additional person for household size, the odds of a household being eligible for the 2016 CFU increased by a factor of 1.1 (95% CI: 1.0-1.2).

Figure 2 shows the odds ratio estimates along with its 95% CI for the person-level variables among those eligible and ineligible for the 2016 CFU, with the significant ones outlined.

Like with the response distributions, educational attainment and work status were the only person-level variables with significant odds ratios. Household respondents with no schooling completed had 0.3 (95% CI: 0.1-0.6) times the odds of being eligible than those with advanced degrees. And household respondents who did not work had 0.7 (95% CI: 0.5-1.0) times the odds of being eligible than those who worked full-time.

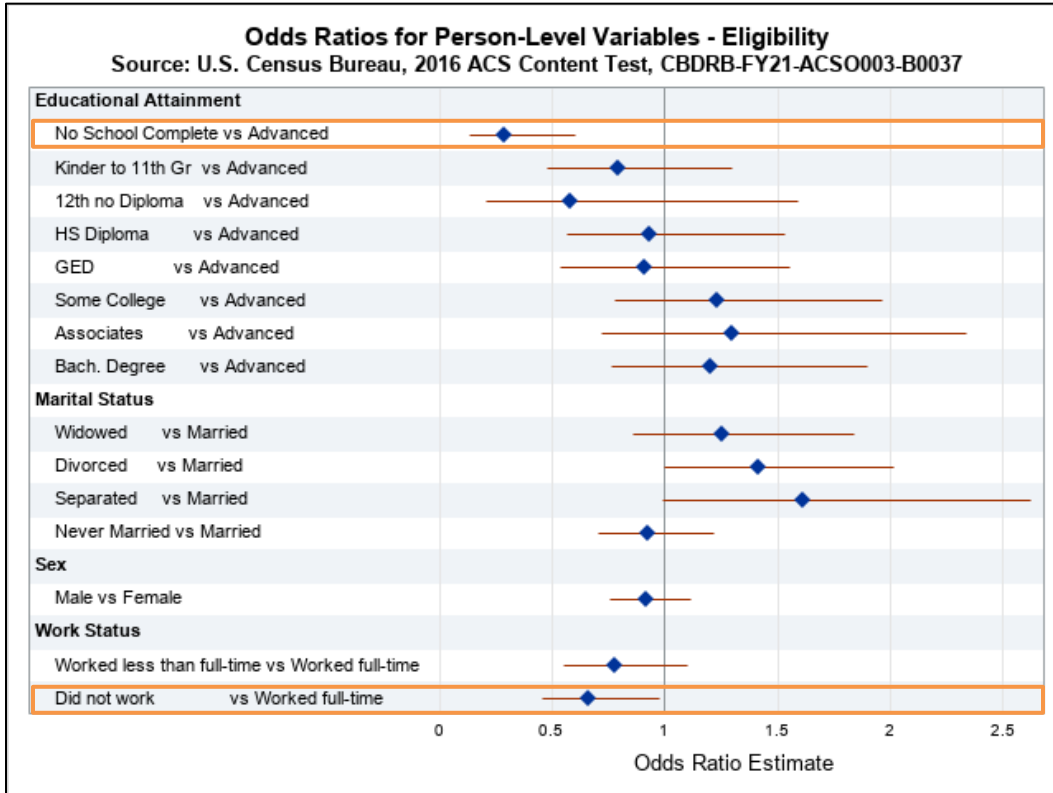


Figure 2: Odds Ratio Estimates for Person-Level Variables among 2016 CFU Eligible and Ineligible Households

Figure 3 shows the odds ratio estimates along with its 95% CI for age among those eligible and ineligible for the 2016 CFU. None of the odds ratio estimates for age were significant.

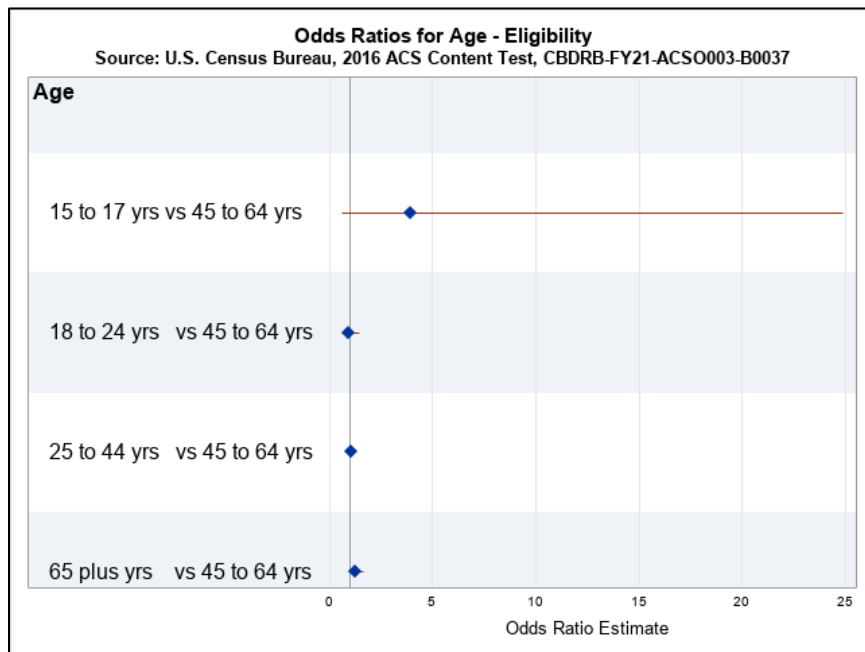


Figure 3: Odds Ratio Estimates for Age among 2016 CFU Eligible and Ineligible Households

3.2 Nonresponse Results

The following table shows the response distributions for the variables that were used for nonresponse adjustment in the 2016 Content Test analyses among 2016 CFU respondents and nonrespondents.

Table 6: Response Distributions for Nonresponse Adjustment Variables among 2016 CFU Respondent and Nonrespondent Households

Item	Respondent Percent	Nonrespondent Percent	P-Value
Group	(n=16,000)	(n=18,500)	0.86
Test	49.9 (0.5)	50.8 (0.5)	
Control	50.1 (0.5)	49.2 (0.5)	
Mode of Original Interview	(n=16,000)	(n=18,500)	<0.01*
Internet	47.4 (0.5)	35.8 (0.5)	
Mail	22.3 (0.3)	22.3 (0.3)	
CATI [^]	3.4 (0.2)	2.8 (0.1)	
CAPI ⁺	26.9 (0.5)	39.1 (0.5)	
Designated Response Area	(n=16,000)	(n=18,500)	<0.01*
High Response Area	79.3 (0.3)	75.3 (0.3)	
Low Response Area	20.7 (0.3)	24.6 (0.3)	

Source: U.S. Census Bureau, 2016 American Community Survey Content Test. DRB Approval Number: CBDRB-FY21-ACSO003-B0037.

[^] Computer Assisted Telephone Interviewing

⁺ Computer Assisted Personal Interviewing

Note: Minor additive discrepancies are due to rounding. Standard errors are in parentheses. An asterisk (*) indicates a statistically significant result. Significance was tested based on a Rao-Scott chi-square test at the $\alpha=0.1$ level. P-values were adjusted for multiple comparisons using the Hochberg method.

Among respondent households, 49.9 percent were in the test group and 50.1 percent were in the control group. Comparatively, among nonrespondent households, 50.8 percent were in the test group and 49.2 percent were in the control group. These response distributions were not significantly different among respondents and nonrespondents. Also, as expected, the response distributions for mode of original interview and designated response area were significantly different among 2016 CFU respondents and nonrespondents.

Table 7 shows the response distributions for the household-level and geography variables among 2016 CFU respondents and nonrespondents. The response distributions for all except building type were significantly different among respondents and nonrespondents.

Table 7: Response Distributions for Household-Level and Geography Variables among 2016 CFU Respondent and Nonrespondent Households

Item	Respondent Percent	Nonrespondent Percent	P-Value
Tenure	(n=15,500)	(n=18,000)	<0.01*
Owned with a mortgage	43.3 (0.6)	43.9 (0.6)	
Owned free and clear	24.6 (0.4)	18.6 (0.4)	
Rented	30.3 (0.6)	35.9 (0.5)	
Occupied without payment of rent	1.9 (0.1)	1.7 (0.1)	
Household Income	(n=14,000)	(n=15,000)	<0.01*
Less than \$10,000	10.1 (0.4)	13.7 (0.5)	
\$10,000 to \$14,999	4.3 (0.2)	5.0 (0.3)	
\$15,000 to \$24,999	9.0 (0.3)	9.1 (0.4)	
\$25,000 to \$34,999	9.0 (0.3)	9.0 (0.3)	
\$35,000 to \$49,999	12.2 (0.4)	12.0 (0.4)	
\$50,000 to \$74,999	16.9 (0.5)	15.8 (0.5)	
\$75,000 to \$99,999	11.9 (0.4)	11.3 (0.4)	
\$100,000 to \$149,999	14.4 (0.4)	12.6 (0.4)	
\$150,000 to \$199,999	6.0 (0.2)	5.3 (0.3)	
\$200,000 or more	6.2 (0.2)	6.2 (0.3)	
Building Type	(n=15,500)	(n=18,000)	0.86
Mobile home	5.4 (0.3)	5.4 (0.3)	
One-family house	71.1 (0.5)	70.5 (0.5)	
Apartment	23.3 (0.5)	24.0 (0.4)	
Other	0.1 (0.0)	0.1 (0.0)	
Limited English-Speaking Household	(n=15,500)	(n=17,500)	<0.01*
Yes	8.5 (0.3)	11.6 (0.3)	
No	91.5 (0.3)	88.4 (0.3)	
Urban or Rural Area	(n=15,000)	(n=17,500)	<0.01*
Urban	82.5 (0.4)	85.2 (0.4)	
Rural	17.5 (0.4)	14.9 (0.4)	

Source: U.S. Census Bureau, 2016 American Community Survey Content Test. DRB Approval Number: CBDRB-FY21-ACSO003-B0037.

Note: Minor additive discrepancies are due to rounding. Standard errors are in parentheses. An asterisk (*) indicates a statistically significant result. Significance was tested based on a Rao-Scott chi-square test at the $\alpha=0.1$ level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 8 shows the average household size among 2016 CFU respondents and nonrespondents. Nonrespondents had a significantly larger average household size than respondents.

Table 8: Average Household Size among 2016 CFU Respondent and Nonrespondent Households

Average Household Size	Respondent (n=16,000)	Nonrespondent (n=18,500)	Respondent Minus Nonrespondent	P-Value
Average Household Size (Number of People)	2.4 (<0.1)	2.7 (<0.1)	-0.3 (<0.1)	<0.01*

Source: U.S. Census Bureau, 2016 American Community Survey Content Test. DRB Approval Number: CBDRB-FY21-ACSO003-B0037.

Note: Minor additive discrepancies are due to rounding. Standard errors are in parentheses. An asterisk (*) indicates a statistically significant result. Significance was tested based on a two-tailed t-test at the $\alpha=0.1$ level. P-value was adjusted for multiple comparisons using the Hochberg method.

Table 9: Response Distributions for Person-Level Variables among 2016 CFU Respondent and Nonrespondent Households

Item	Respondent Percent	Nonrespondent Percent	P-Value
Age	(n=15,500)	(n=18,500)	<0.01*
15 to 17	0.1 (0.1)	0.3 (0.1)	
18 to 24	4.2 (0.3)	5.5 (0.3)	
25 to 44	28.3 (0.5)	35.0 (0.5)	
45 to 64	37.1 (0.5)	38.5 (0.5)	
65 or older	30.3 (0.5)	20.7 (0.4)	
Sex	(n=15,500)	(n=18,500)	<0.01*
Male	51.0 (0.5)	47.7 (0.5)	
Female	49.0 (0.5)	52.3 (0.6)	
Educational Attainment[^]	(n=14,500)	(n=16,500)	<0.01*
No schooling completed	0.8 (0.1)	1.0 (0.1)	
Nursery to 11th grade	6.9 (0.4)	7.7 (0.3)	
12th grade (no diploma)	1.3 (0.1)	1.4 (0.1)	
High school diploma	18.7 (0.5)	20.4 (0.6)	
GED [†] or alternative credential	3.0 (0.2)	3.4 (0.2)	
Some college	21.3 (0.4)	22.1 (0.5)	
Associate's degree	9.4 (0.3)	9.2 (0.3)	
Bachelor's degree	22.1 (0.5)	21.2 (0.4)	
Advanced degree	16.4 (0.5)	13.5 (0.4)	
Marital Status	(n=13,000)	(n=15,500)	<0.01*
Married	43.7 (0.6)	45.6 (0.6)	
Widowed	12.0 (0.3)	8.3 (0.3)	
Divorced	19.0 (0.4)	17.3 (0.4)	
Separated	2.3 (0.2)	3.1 (0.2)	
Never Married	23.0 (0.5)	25.7 (0.5)	
Work Status[‡]	(n=10,500)	(n=13,500)	0.41
Worked full-time, year-round	61.8 (0.7)	62.2 (0.6)	
Worked less than full-time, year-round	20.1 (0.5)	21.0 (0.5)	
Did not work	18.1 (0.4)	16.8 (0.4)	

Source: U.S. Census Bureau, 2016 American Community Survey Content Test. DRB Approval Number: CBDRB-FY21-ACSO003-B0037.

[^]For ages 25 and older

[†]General Educational Development

[‡]For the past 12 months, for ages 16 and older

Note: Minor additive discrepancies are due to rounding. Standard errors are in parentheses. An asterisk (*) indicates a statistically significant result. Significance was tested based on a Rao-Scott chi-square test at the $\alpha=0.1$ level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 9 shows the response distributions for the person-level variables among 2016 CFU respondents and nonrespondents. The response distributions for all except work status were significantly different among respondents and nonrespondents.

Much like for eligibility, we investigated response differences further by creating logistic regression models controlling for the variables used for nonresponse adjustment in the 2016 Content Test analyses. The following figure shows the odds ratio estimates along with its 95% CI for the household-level and geography variables among 2016 CFU respondents and nonrespondents. Though presented together in the same figure, we ran separate logistic regression models for each variable. For example, the odds ratio estimates for tenure are from a logistic regression model including tenure, group, mode of original interview, and designated response area. The significant odds ratio estimates are outlined.

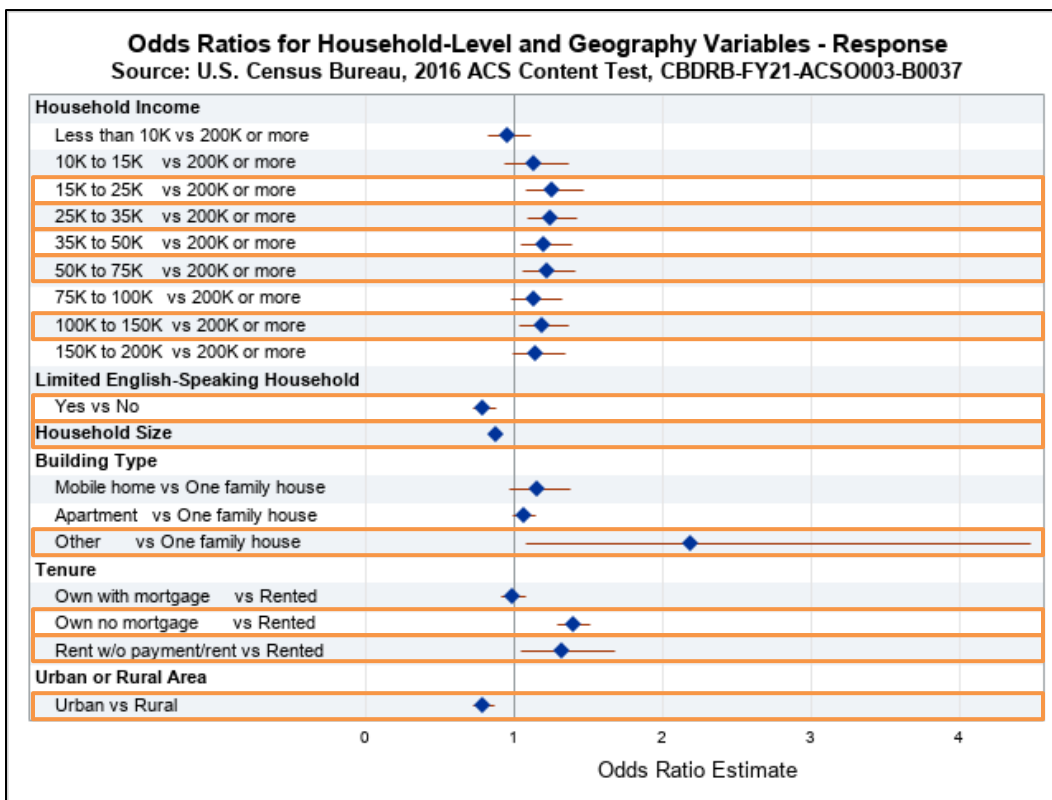


Figure 4: Odds Ratio Estimates for Household-Level and Geography Variables among 2016 CFU Respondent and Nonrespondent Households

When we compared response distributions in Table 7, we found that the response distributions for household income, limited English-speaking households, tenure, and urban or rural area were significant. Similar to eligibility, some of the odds ratios from the logistic regression models including these variables were also significant. Most of the income categories had higher odds of responding than the reference category. For example, household respondents with household incomes between \$15,000 and \$25,000 had 1.3 (95% CI: 1.1-1.5) times the odds of responding to the 2016 CFU than those with household incomes of \$200,000 or more. Household respondents from limited English-speaking households had 0.8 (95% CI: 0.7-0.9) times the odds of responding than those not from limited English-speaking households. For tenure, households who own a home without a mortgage had 1.4 (95% CI: 1.3-1.5) times the odds and households who rent without

payment had 1.3 (95% CI: 1.0-1.7) times the odds of responding than those renting. And households in urban areas had 0.8 (95% CI: 0.7-0.9) times the odds of responding than those in rural areas.

The response distributions for building type were not significantly different between respondents and nonrespondents, but the odds ratio of one of the comparisons was significant. Households living in other building types (e.g., RV, boat) had 2.2 (95% CI: 1.1-4.5) times the odds of responding than those living in a one-family house.

Much like the difference in average household size, the odds ratio for household size was significant, where for every increase in additional person for household size, the odds of a household responding to the 2016 CFU increased by a factor of 0.9 (95% CI: 0.9-0.9), or alternatively, decreased by 10 percent.

Figure 5 shows the odds ratio estimates along with its 95% CI for the person-level variables among 2016 CFU respondents and nonrespondents, with the significant ones outlined. When we compared response distributions in Table 9, we found that the response distributions for age, educational attainment, marital status, and sex were significant. As expected, some of the odds ratio estimates from the logistic regression models including these variables were also significant.

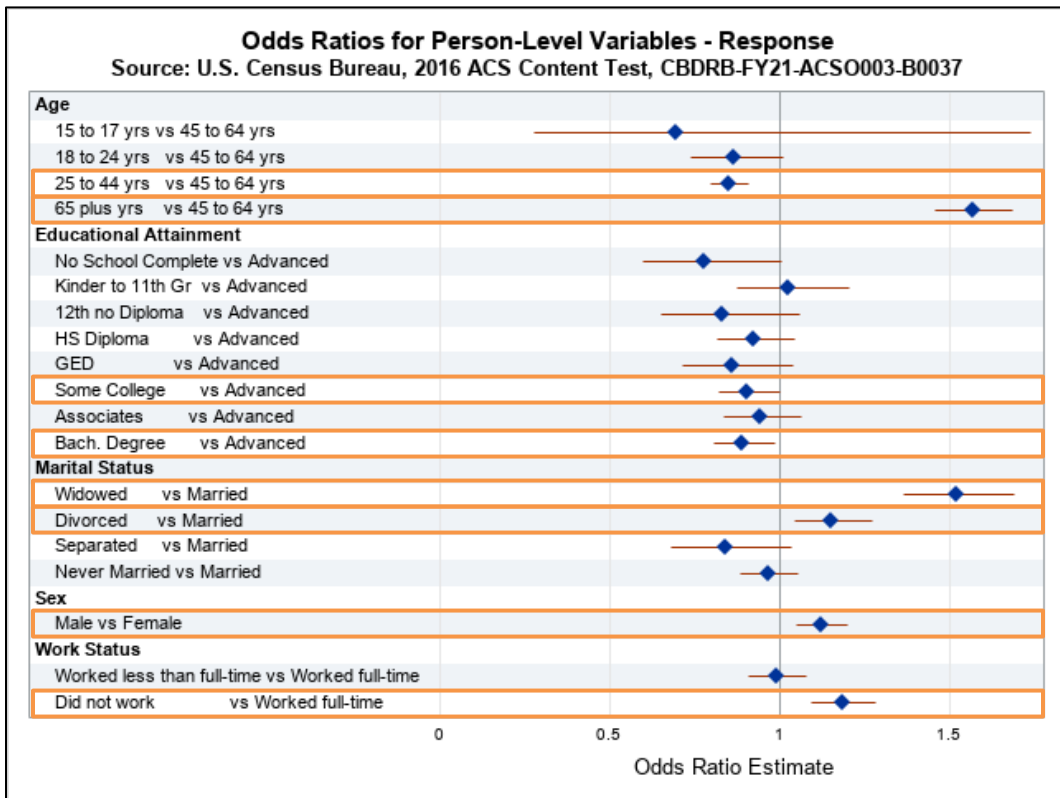


Figure 5: Odds Ratio Estimates for Person-Level Variables among 2016 CFU Respondents and Nonrespondents Households

Household respondents between 25 and 44 years old had 0.9 (95% CI: 0.8-0.9) times the odds of responding than household respondents between 45 and 64 years old. Conversely, household respondents age 65 and older had 1.6 (95% CI: 1.5-1.7) times the odds of

responding than those between 45 and 64 years old. For educational attainment, household respondents with some college had 0.9 (95% CI: 0.8-1.0) times the odds and household respondents with bachelor degrees had 0.9 (95% CI: 0.8-1.0) times the odds of responding than those with advanced degrees. For marital status, widowed household respondents had 1.5 (95% CI: 1.4-1.7) times the odds and divorced household respondents had 1.2 (95% CI: 1.0-1.3) times the odds of responding than married household respondents. And male household respondents had 1.1 (95% CI: 1.1-1.2) times the odds of responding than female household respondents.

The response distributions for work status were not significantly different between respondents and nonrespondents, but the odds ratio of one of the comparisons was significant. Household respondents who did not work had 1.2 (95% CI: 1.1-1.3) times the odds of responding than those who worked full-time.

4. Conclusions

There is evidence of coverage and nonresponse bias in the 2016 CFU reinterview. Our analysis shows some differences both in those eligible and ineligible for the 2016 CFU and in those who responded and did not respond to it. However, we cannot determine the magnitude of this bias in the variables examined. We also do not know the responses from sample addresses who were not eligible for or did not respond to the 2016 CFU, and thus do not know for certain if any differences found mean bias in the 2016 CFU results.

Despite there being differences, the magnitude of those differences still may not outweigh the benefits of a reinterview in 2022, mainly because it is difficult examining response reliability without a reinterview. A potential modification to doing a reinterview would be to rely on other metrics to decide between question versions such as using administrative data or comparing results to other established surveys. Ultimately, whether a reinterview is done for the 2022 Content Test will vary among the question topics being tested.

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