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MEMORANDUM FOR	Donna M. Daily Chief, American Community Survey Office
From:	Patrick J. Cantwell *P. Cantwell* Chief, Decennial Statistical Studies Division
Prepared by:	Samantha Spiers *SS* Decennial Statistical Studies Division
	Stephanie Baumgardner *SB* American Community Survey Office
	Andres Mojica *AM* Population Division
Subject:	2022 American Community Survey Content Test Evaluation Report: Unit-Level Response

Attached is the 2022 American Community Survey (ACS) Content Test report for the unit-level response analysis. This report presents the methods and results that apply to the entire Content Test.

If you have any questions about this report, please contact Samantha Spiers at 301-763-8398.

Attachment

cc:
acso.re.workgroup.list@census.gov   Peter Massarone   Hyon Shin   SEHSD
Lauren Contard   DSSD   Broderick Oliver   Sharon Stern
Lindsay Longsine   Michael Risley

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2022 American Community Survey Content Test Evaluation Report: Unit-Level Response

FINAL REPORT

Samantha Spiers
Decennial Statistical Studies Division
Stephanie Baumgardner
American Community Survey Office
Andres Mojica
Population Division

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EXECUTIVE SUMMARY

Overview

From September to December of 2022, the U.S. Census Bureau conducted the 2022 American Community Survey (ACS) Content Test, a field test of new and revised content. The 2022 ACS Content Test tested the wording, format, and placement of both new and revised questions for potential inclusion in the ACS data collection instruments. This report presents the results of the unit-level response analysis.

In preparation for the 2022 ACS Content Test, the Census Bureau, in consultation with the Office of Management and Budget (OMB) and the Interagency Council on Statistical Policy Subcommittee on the ACS, determined which proposals solicited from over 25 federal agencies would be tested in 2022. Approved proposals for new content or changes to existing content were tested according to the ACS content change process, which includes cognitive testing and field testing.

The 2022 ACS Content Test consisted of a nationally representative sample of 120,000 housing unit addresses, excluding Puerto Rico, Alaska, and Hawaii. The sample, which was independent of production ACS, was divided evenly among three treatments, a Control treatment and two test treatments (referred to as Test and Roster).

Like production ACS, the data collection for the 2022 ACS Content Test was conducted in two phases: a self-response phase, which lasted up to nine weeks, followed by a nonresponse followup phase, conducted via Computer-Assisted Personal Interviewing (CAPI). The CAPI operation lasted about one month. For households where we received a response in the original Content Test interview, a Content Follow-Up (CFU) telephone reinterview was conducted to measure response error.

Unit-Level Response

We assessed the quality of the 2022 ACS Content Test response data by examining unit-level response among the treatments. Similar unit-level response allows us to conclude that any topic-level differences are due to the question changes instead of differences in the populations sampled for each treatment.

For the original interview, the overall unit response rates were not significantly different between treatments, nor were the response rate portions by mode. Additionally, when examining demographic and socioeconomic distributions, none of the response distributions were significantly different between treatments. When looking at distributions among self-responses and CAPI responses, only the distributions for race among CAPI responses for the Control and Test treatments were significantly different.

For the CFU reinterview, the CFU response rates were not significantly different between the Control and Test treatments or the Control and Roster treatments. However, there were CFU response rate differences between the Test and Roster treatments overall and within some original interview modes. When examining demographic and socioeconomic distributions, none of the overall response distributions were significantly different between the Control and Test treatments. However, the distributions for tenure were significantly different between the Control and Roster treatments, and the distributions for language of response were significantly different between the Test and Roster treatments. We also examined CFU response distributions among original interview self-responses and CAPI responses, where the distributions for tenure and language of response were significantly different among some treatment and mode comparisons.

Conclusions

The results suggest there are no underlying response rate concerns that would impact topic-specific comparisons between treatments for the original interview. Interpretations of topic-level analyses between the Control and Test treatments among CAPI responses only should consider any topic impacts of racial differences between the responding populations. However, among all original interview modes combined, the results suggest there are no underlying demographic and socioeconomic distribution differences that would impact topic-specific comparisons between treatments.

The results also suggest there are no underlying response rate concerns that would impact topic-specific CFU reinterview comparisons between the Control and Test treatments or the Control and Roster treatments. However, response rate differences between the Test and Roster treatments may affect some of the response error analyses for the topics involving those treatments: Health Insurance Coverage and Income. Additionally, interpretations of topic-level response error analyses should consider any topic impacts of characteristic differences for tenure and language of response since there were response distribution differences for those characteristics among some treatment and mode comparisons.

1. INTRODUCTION

From September to December of 2022, the Census Bureau conducted the 2022 American Community Survey (ACS) Content Test, a field test of new and revised content. The goal of the test was to improve the content of the ACS data collection instruments by testing the wording, format, and placement of both new and revised questions. The results will help determine future ACS content and assess the expected data quality of revised questions and new questions added to the ACS.

The 2022 ACS Content Test included the following topics:

- Household Roster
- Sewer
- Electric Vehicles
- Solar Panels
- Supplemental Nutrition Assistance Program (SNAP)
- Educational Attainment
- Health Insurance Coverage
- Disability
- Labor Force
- Income

This report discusses the results of the unit-level response analysis. Separate reports discuss the individual question topics included in the Content Test.

2. BACKGROUND

2.1 Proposals for New and Revised ACS Questions

In June 2018, the Census Bureau solicited proposals for new or revised ACS content from over 25 federal agencies. For revisions to existing questions, the proposals contained a justification for each change and described previous testing of question wording, the expected impact of revisions to ACS estimates, and the estimated net impact on respondent burden.

For new questions, the proposals provided an explanation of the need for the new data, why other data sources that provide similar information are not sufficient, how policy or data needs would be addressed through the new questions, and an explanation of why the data were needed with the geographic precision and frequency provided by the ACS. Proposals for new content were reviewed to ensure that the requests met a statutory or regulatory need for data at small geographic levels or for small populations.

The Census Bureau, in consultation with the Office of Management and Budget (OMB) and the Interagency Council on Statistical Policy Subcommittee on the ACS, determined which proposals moved forward. Approved proposals for new content or changes to existing content were tested via the ACS content change process. This process includes cognitive testing and field testing. An interagency team consisting of Census Bureau staff and representatives from other federal agencies participated in development and testing activities.

2.2   Cognitive Testing

In accordance with OMB's Standards and Guidelines for Statistical Surveys (OMB, 2006) and the Census Bureau's Statistical Quality Standards (U.S. Census Bureau, 2022a), the Census Bureau conducts cognitive interviewing to pretest survey questions prior to field testing or implementing the questions in production. For the 2022 ACS Content Test, the Census Bureau contracted with Research Triangle Institute (RTI) International to conduct three rounds of cognitive testing.[1]

The results of the first two rounds of cognitive testing informed decisions on specific revisions to the proposed content for the Content Test field test. Cognitive interviews were conducted virtually, in English and Spanish.[2] In the first round of cognitive testing, each topic tested one or two versions of the question. Based on the results of the first round, wording modifications to the questions were made and one or two versions per topic were tested in the second round. For more information on the cognitive testing procedures and results from rounds one and two, see RTI International (2022a).

A third round of cognitive testing was conducted in Puerto Rico and in Group Quarters (GQ), as the 2022 ACS Content Test did not include field testing in these areas. Cognitive interviews in Puerto Rico were conducted in Spanish; GQ cognitive interviews were conducted in English. The results helped identify any issues with the question wording unique to Puerto Rico and GQ populations. For more information on the cognitive testing procedures and results from round three, see RTI International (2022b).

The topic subcommittees used the results of the first two rounds of cognitive testing to recommend question content for the field test. After review by the Census Bureau and the Interagency Council on Statistical Policy Subcommittee on the ACS, the OMB provided final overall approval of the proposed wording for field testing.

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[1] For each test topic, subcommittees were formed to develop question wording and research requirements for cognitive testing. The subcommittees included representation from the Census Bureau and other federal agencies.

[2] Cognitive testing interviews were conducted virtually due to the COVID-19 pandemic. Interviews were attempted by videoconferencing first and were moved to phone interviews if there were technical problems with Skype or Microsoft Teams.

Three topics included in the cognitive testing were not included in the field test: Homeowners Association or Condominium Fees, Home Heating Fuel, and Means of Transportation to Work. For the most part, the changes to these questions are expected to either impact a small population or result in a small change in the data that would not be detectable in the Content Test. The subject matter experts recommended that cognitive testing was sufficient for these questions and that field testing was not necessary; the Interagency Council on Statistical Policy Subcommittee on the ACS agreed with this recommendation. Content changes for these topics will be implemented in production ACS in 2024.

2.3   Motivation for Unit-Level Response Analysis

The analyses for the individual question topics rely on comparing responses between the different treatment versions of the survey questionnaire. Therefore, examining unit-level response is necessary for assessing the quality of the response data. High unit response rates are important in mitigating potential nonresponse bias, which would impact the topic-level analyses. Similar unit-level response also allows us to conclude that any topic-level differences are due to the question changes instead of differences in the populations sampled for each treatment.

2.4   Research Questions

The research questions for this analysis were as follows:

1. *What are the overall unit response rates for the original Content Test interview in the Control and two test treatments? How do they compare?*

2. *What are the unit response rates by data collection mode for the original Content Test interview in the Control and two test treatments? How do they compare?*

3. *What are the unit response rates by high and low response areas for the original Content Test interview in the Control and two test treatments? How do they compare?*

4. *What are the response rates for the CFU reinterview in the Control and two test treatments? How do they compare overall and by mode?*

5. *How are responding units in the original Content Test interview distributed by socioeconomic and demographic characteristics? How do these distributions compare between the treatments? How do these distributions compare by mode?*

6. *How are responding units in the CFU reinterview distributed by socioeconomic and demographic characteristics? How do these distributions compare between the treatments? How do these distributions compare by mode of original interview?*

3. METHODOLOGY

3.1 Experimental Design

The 2022 ACS Content Test had three treatments: a Control treatment, a Test treatment, and a Roster Test treatment. Table 1 shows which question version was in each treatment for all the Content Test topics.

The Control treatment contained production questions and questions from the three new topics: Solar Panels, Electric Vehicles, and Sewer. The Test treatment contained a test version question for all topics except Household Roster. Two of the new topics, Solar Panels and Sewer, only had one version of the test question; therefore, the same question was asked in the Control and test treatments. The other new topic, Electric Vehicles, had two versions; one was asked in the Control treatment and Roster Test treatment and the other in the Test treatment.

The primary purpose of the Roster Test treatment was to test the Household Roster test question separately since changes in the number and types of people included in the household could impact the results of person-level topics. Three topics – Health Insurance Coverage, Labor Force, and Income – had two test versions in addition to the Control.[3] Therefore, the analyses for Test Version 2 of these questions could have been impacted by changes in the Household Roster questions. However, it was determined that the additional information gained from testing an additional version of the topics in the Roster Test treatment was worth the risk.[4]

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[3] Health Insurance Coverage had a second test version because cognitive testing indicated a potential need for a "no coverage" option. Labor Force and Income had a second test version that included a reference period change but not wording changes to isolate the effects of the reference period change.

[4] In addition to the demographic analysis (see Section 5.3), we examined differences in key household and person characteristics among the Control and Roster Test treatments to explore any indication of bias in the Health Insurance Coverage, Labor Force, and Income analyses. The household characteristics included household size, building type, persons per household, and limited English-speaking household. The person characteristics included educational attainment and marital status. We did not find any significant differences in these variables between the treatments based on Rao-Scott chi-square tests of independence (Rao & Scott, 1987).

Table 1. Questions by Treatment

Topic	Control Treatment	Test Treatment	Roster Test Treatment
Household Roster	Production	Production	Test Version
Solar Panels	Test Version	Test Version	Test Version
Electric Vehicles	Test Version 1	Test Version 2	Test Version 1
Sewer	Test Version	Test Version	Test Version
Educational Attainment	Production	Test Version	Production
Health Insurance Coverage	Production	Test Version 1	Test Version 2
Disability	Production	Test Version	Production
SNAP	Production	Test Version	Test Version[†]
Labor Force	Production	Test Version 1	Test Version 2
Income	Production	Test Version 1	Test Version 2

† The SNAP Test Version was used in both test treatments to align with Labor Force and Income that also have a reference
  period change to the previous calendar year.

3.2   Sample Design

The 2022 ACS Content Test consisted of a national sample of roughly 120,000 housing unit addresses, excluding Puerto Rico, Alaska, and Hawaii (due to cost constraints, only stateside housing units were included). The sample was independent of the ACS production sample; however, the sample design for the Content Test was largely based on the ACS production sample design, with some modifications to meet the test objectives. The ACS production sample design is described in Chapter 4 of the ACS and Puerto Rico Community Survey (PRCS) Design and Methodology report (U.S. Census Bureau, 2022b).

The sample design modifications included stratifying addresses into high and low self-response areas, oversampling addresses from the low self-response areas to ensure equal response from both strata, and selecting an initial sample of addresses, followed by a nearest neighbor method for selecting the remaining addresses for the sample. The nearest neighbor method has been used in previous Content Tests; the method's purpose is for sampled housing units to be as similar as possible between treatments since members of housing unit addresses that are geographical "neighbors" are likely to have similar socioeconomic characteristics, and therefore are more likely to respond similarly to the ACS questions. The high and low self-response strata

were defined based on ACS self-response rates from the 2018 and 2019 panels at the tract level.[5]

In the sample selection process, we selected an initial sample of 40,000 addresses, then selected the two nearest eligible addresses for each initially selected address. If possible, we selected nearest addresses that were in both the same Content Test sampling stratum as well as the same state, county, and sub-county area as the initially selected address. We randomly assigned each housing unit address in the nearest neighbor triplet to one of the three treatments. The Content Test sample size was chosen to provide enough statistical power (0.80) to detect a difference in the gross difference rates (measuring differences in adds and deletes from the household roster) of at least two percentage points between the Control and Roster Test groups for the Household Roster questions.[6]

3.3   Data Collection

The 2022 ACS Content Test occurred in parallel with data collection activities for the September 2022 ACS production panel. Data collection for production ACS data consists of two main phases: an approximately two-month self-response data collection phase and a one-month follow-up phase.

During the self-response phase, addresses in sample are asked to self-respond by internet or mail. The Census Bureau sends addresses in sample up to five mailings to encourage self-response. This operation is followed by a one-month Computer-Assisted Personal Interviewing (CAPI) operation, where Census Bureau field representatives attempt to complete a survey for a sub-sample of the remaining nonresponding addresses.

The following data collection protocols for the 2022 ACS Content Test remained the same as production ACS:

- Data were collected using the self-response modes of internet (in English and Spanish) and paper questionnaires for the first and second month of data collection.
- In the third month of data collection, a sub-sample of nonresponding addresses were selected for CAPI.
- During CAPI, Census Bureau field representatives conducted interviews in person and over the phone.
- Self-response via internet or paper was accepted throughout the three-month data collection period.

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[5] For more information on the 2022 Content Test sample design, see Risley and Oliver (2022) and Keathley (2022).
[6] The Content Test sample size was based on the Household Roster topic because the estimated changes in a household roster was the smallest universe among the topics being tested. Therefore, statistical testing on the other topics with larger universes were able to detect smaller differences in gross difference rates.

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The following data collection protocols for the 2022 ACS Content Test differed from production ACS:

- There were no paper versions of the 2022 ACS Content Test questionnaires in Spanish.[7]
- If respondents called Telephone Questionnaire Assistance (TQA) and opted to complete the survey over the phone, the interviewers conducted the survey using the production ACS questionnaire.[8] Since the TQA interviews did not include test questions, they were excluded from the analysis of the 2022 ACS Content Test.
- The 2022 ACS Content Test did not include the Telephone Failed-Edit Follow-Up (FEFU) operation. In production, this operation follows up on households that provided incomplete information on the form or reported more than five people on the roster of a paper questionnaire.[9]
- The 2022 ACS Content Test used a telephone reinterview component to measure response reliability or response bias (depending upon the ACS topic). This telephone reinterview operation is discussed in Section 3.4 below.

For detailed information about ACS data collection procedures, consult the ACS and PRCS Design and Methodology Report (U.S. Census Bureau, 2022b).

3.4   Content Follow-Up

To measure response reliability or response bias, a Content Follow-Up (CFU) reinterview was attempted with every household with an original Content Test interview that met the CFU eligibility requirements. Among the requirements were that the household must be occupied, and the household must have a valid telephone number. See the CFU requirements document for the complete list of eligibility requirements (Spiers, 2021).

As in previous ACS Content Tests, a case was sent to the CFU operation no sooner than two weeks (14 calendar days) after the original interview and had to be completed within three weeks after being sent to the CFU. This timing attempted to balance two competing needs: (1) to minimize the possibility of real changes in answers due to a change in life circumstances between the two interviews; (2) to minimize the possibility of the respondent repeating their

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[7] In 2019, 412 Spanish questionnaires were mailed back out of all mailable cases in the production ACS. Based upon this rate, we projected that only 8 Spanish questionnaires would be mailed back in the 2022 ACS Content Test, which would not be cost-effective.

[8] The interviewer did not know which treatment the caller was in and therefore administered the production questionnaire. In 2019, less than one percent (0.6%) of cases responded by TQA and had no other response in a different mode. Based upon this rate, we projected about 744 TQA-only responses would be excluded from the 2022 ACS Content Test analysis.

[9] The information obtained from the FEFU improves accuracy in a production environment but confounds the evaluation of respondent behavior in the Content Test environment. For paper questionnaires where the household size is six or more (up to 12), we only collected name, age, and sex of these additional persons, but not detailed information as we do in the FEFU operation for ACS production.

previous answer based on their recollection of the original interview response, rather than considering the most appropriate answer.

All CFU reinterviews were conducted by telephone. 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 original respondent was expected to be available. If this respondent could not be reached at the time of the second contact, the interviewer requested to speak with any other eligible household member (a household member who is 15 years or older). CFU reinterviews for the Content Test were conducted in either English or Spanish.

The CFU data collection instrument included the questions being tested for the 2022 ACS Content Test and some production ACS questions for context. It also included questions on public assistance from the 2022 Current Population Survey Annual Social and Economic Supplement (CPS ASEC) to measure response bias in the income from the public assistance question.

The CFU collected an independent household roster by re-asking the Household Roster questions along with Relationship, Sex, Age, and Date of Birth. The remaining CFU questions were only asked of the original household roster members. Only the Control and Roster Test treatments collected an independent household roster. The Test treatment used the original household roster to ask housing and detailed person questions.[10]

3.5   Response Data

The 2022 ACS Content Test response data included questionnaire responses from the original interview and CFU reinterview, as well as some variables related to data processing. Because there are three response modes for the original interview, a sample address could have multiple returns. We selected which return to use for analysis using a Primary Selection Algorithm (PSA). The PSA chose which returns to keep using the following steps:

1. If a sample address has only one return, keep that return.
2. If there was a CFU reinterview attempted, select the original Content Test return that triggered the CFU attempt.
3. If there was no CFU reinterview attempted, select the return with the earliest return date. If two returns have the same return date, select the one with the mode that occurs first in this list: (1) internet, (2) mail, and (3) CAPI.

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[10] The Test panel did not need to collect an independent household roster. The independent roster was needed to calculate the response reliability metrics for the Household Roster topic, which only used data from the Control and Roster Test treatments.

The result of the process was analysis files with data from at most one return per sample address.

We did not alter response data using typical production ACS edits because the primary concern of this test was how changes to existing questions and additions of new questions affected the unaltered responses provided directly by respondents. For this reason, responses were not imputed either. We applied a few edits to the non-topic data, such as calculating a person's age based on their date of birth, but such edits were minimal.[11]

3.6   Analysis Metrics

The purpose of the 2022 ACS Content Test was to field test new and revised questions in the ACS data collection instruments. As described in Section 3.2, sample addresses for the three treatments were selected in a manner so that their response propensities were similar. We tested this assumption for the original interview and the CFU reinterview using various unit-level response metrics. Examining unit-level response metrics provides an indication of the quality of the survey data.

3.6.1   Unit Response Rates

The unit response rate is generally defined as the weighted proportion of sample addresses eligible to respond that provided a complete or sufficient partial response.[12] For each treatment, we calculated the overall unit response rate (all modes of data collection combined) and how the unit response rates were distributed by mode (internet, mail, and CAPI) to determine how each mode contributed to the overall response. We also calculated the total self-response rate by combining internet and mail modes together.

We calculated overall unit response rates for each treatment as follows:

$$\text{Final Response Rate} = \frac{\text{Number of sample addresses that provided a response by mail, internet, or CAPI}}{\text{Total number of sample addresses that were eligible to respond to the survey}} \times 100$$

We calculated how the unit response rates were distributed by mode for each treatment as follows:

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[11] This only refers to edits made to the data sets before analysis. During the analysis phase, additional edits, such as collapsing categories, were made based on the needs of the individual question.

[12] In general, a sufficient partial response is one that has at least minimal information, which indicates an attempt to respond. The specific definition of a sufficient partial response is sensitive and for Census Bureau internal use only.

$$\text{Mail Portion of the Final Response Rate} = \frac{\text{Number of sample addresses that provided a response by mail}}{\text{Total number of sample addresses that were eligible to respond to the survey}} \times 100$$

$$\text{Internet Portion of the Final Response Rate} = \frac{\text{Number of sample addresses that provided a response by internet}}{\text{Total number of sample addresses that were eligible to respond to the survey}} \times 100$$

$$\text{Self-Response Portion of the Final Response Rate} = \frac{\text{Number of sample addresses that provided a response by mail or internet}}{\text{Total number of sample addresses that were eligible to respond to the survey}} \times 100$$

$$\text{CAPI Portion of the Final Response Rate} = \frac{\text{Number of sample addresses that provided a response by CAPI (phone or in person)}}{\text{Total number of sample addresses that were eligible to respond to the survey}} \times 100$$

The universe for the unit response rates consists of all addresses in the initial sample that are eligible to respond to the survey. Any nonresponding addresses that were sampled out of CAPI were not included in any of the response rate calculations.

Because the CAPI portion of the unit response rate is among the total eligible addresses, and not just the addresses in the CAPI operation, we also calculated the CAPI response rate as follows:

$$\text{CAPI Response Rate} = \frac{\text{Number of sample addresses that provided a response by CAPI (phone or in person)}}{\text{Total number of sample addresses in the CAPI operation that were eligible to respond to the survey}} \times 100$$

We calculated all of the response rates for high and low response areas. High and low response strata were defined based on historical ACS response rates from the 2018 and 2019 panels.

All response rates were weighted using replicate base weights adjusted for CAPI sub-sampling. We tested for differences in response rates using two-tailed t-tests, adjusted for multiple comparisons using the Hochberg method (Hochberg, 1988).

3.6.2   CFU Reinterview Response Rates

We defined the CFU response rate as the weighted proportion of sample addresses eligible to respond to the CFU reinterview that provided a response. We expected the CFU response rates to be similar between treatments; however, we calculated the rates to verify that assumption.

We calculated overall CFU response rates for each treatment as follows:

$$
\text{Final CFU Response Rate} = \frac{\text{Number of sample addresses that provided a CFU response}}{\text{Total number of sample addresses that were eligible for the CFU operation}} \times 100
$$

We calculated CFU response rates by mode of original interview for each treatment as follows:

$$
\text{CFU Response Rate for Original Self-Response Interviews} = \frac{\text{Number of sample addresses that provided a CFU response}}{\text{Total number of sample addresses that provided an original self-response interview and were eligible for the CFU operation}} \times 100
$$

$$
\text{CFU Response Rate for Original CAPI Interviews} = \frac{\text{Number of sample addresses that provided a CFU response}}{\text{Total number of sample addresses that provided an original CAPI interview and were eligible for the CFU operation}} \times 100
$$

All CFU response rates were weighted using replicate base weights adjusted for original interview CAPI sub-sampling (but not adjusted for CFU nonresponse). We tested for differences in CFU response rates using two-tailed t-tests, adjusted for multiple comparisons using the Hochberg method (Hochberg, 1988).

3.6.3   Demographic Characteristics of Respondents

The 2022 ACS Content Test sample was designed so that respondents in each treatment exhibit similar distributions of socioeconomic and demographic characteristics. Similar distributions allow us to compare the treatments and conclude that any differences are due to the experimental treatment instead of underlying demographic differences.

We calculated distributions by treatment as the proportion of valid responses in a category to all valid responses. We compared the distributions for the treatments on the following demographic and household-level characteristics:

- Hispanic origin
- Race
- Age
- Sex
- Tenure
- Language of response[13]

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[13] Language of response analysis excludes paper questionnaire returns because there was only an English questionnaire.

While education and household size are also generally used as indicators of response propensity, the Educational Attainment and Household Roster topics vary by treatment as part of the Content Test. Therefore, these topics may yield different distributions due to question design, and would not be appropriate to include in this analysis.[14]

We calculated distributions for the original interview by mode, and for the CFU reinterview by mode of original interview. All original interview distributions were weighted using replicate base weights adjusted for CAPI sub-sampling. All CFU reinterview distributions were weighted using replicate base weights adjusted for original interview CAPI sub-sampling (but not adjusted for CFU nonresponse). We used Rao-Scott chi-square tests of independence (Rao & Scott, 1987) to test for differences in the distributions of each demographic characteristic separately for treatment pairs (e.g., comparing the distribution of Hispanic Origin in the Control treatment with that in the Test treatment). If the chi-square test indicated a significant difference between distributions, then we tested for significant differences in the individual category proportions using two-tailed t-tests, adjusted for multiple comparisons using the Hochberg method (Hochberg, 1988).

3.7 Weighting and Standard Error Calculations

We estimated the variances of the estimates using the Successive Differences Replication (SDR) method with replicate weights, the standard method used in the ACS (see U.S. Census Bureau, 2022b, Chapter 12). We calculated the variance for each rate and difference using the formula below. The standard error of an estimate (X_0) is the square root of the variance:

$$Var(X_0) = \frac{4}{80} \sum_{r=1}^{80} (X_r - X_0)^2$$

where:
X_0 = the estimate calculated using the full sample,
X_r = the estimate calculated for replicate r.

The final 2022 ACS Content Test weights account for the initial probability of selection (the base weight) and CAPI sub-sampling. There is also an adjustment for CFU nonresponse for the CFU analysis for the individual question topics.[15] All unit-level response metrics use the final weights without the adjustment for CFU nonresponse.

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[14] Educational attainment and household size were compared between the Control and Roster Test treatments to explore any indication of bias in the Health Insurance Coverage, Labor Force, and Income analyses. See Section 3.1 for more information.

[15] The Content Test weight creation process does not include all the steps followed in the ACS, including the noninterview adjustment for the original interview and calibration to housing unit and population controls (see U.S. Census Bureau, 2022b, Chapter 11). For more information on the 2022 Content Test weighting procedure, see Risley and Oliver (2022) and Keathley (2022).

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4. ASSUMPTIONS AND LIMITATIONS

4.1 Assumptions

1. There was no difference between treatments in mail delivery timing or subsequent response time. The treatments had the same sample size and used the same postal sort and mailout procedures. Previous research indicated that postal procedures alone could cause a difference in response rates at a given point in time between experimental treatments of different sizes, with response for the smaller treatments lagging (Heimel, 2016).

2. We assume that the frequency of real changes in answers due to a change in life circumstances between the original interview and CFU reinterview were similar between treatments.

4.2 Limitations

1. GQs were not included in the sample for the 2022 ACS Content Test. The results of the test may not extend to GQ populations.

2. Housing unit addresses from Alaska, Hawaii, and Puerto Rico were not included in the sample for the test. The results may not extend to the housing unit population in these areas.

3. The paper questionnaire was only available in English and was not available in Spanish, like in production. The Content Test results related to the English paper questionnaire may not extend to the Spanish paper questionnaire.

4. For paper questionnaires, where the household size is six or more (up to 12), we only collected name, age, and sex of these additional persons. Detailed information for these persons in ACS production are collected in the FEFU operation. We did not include the FEFU operation because the information collected from it improves accuracy and could confound respondent behavior in the Content Test environment.

5. We did not have response data for some partial internet responses (179 cases) due to a server issue. These cases were excluded from the topic-level analyses but included in the original interview response rates. Including them in response rate comparisons shows whether or not there are response differences by treatment without any limitations from the server error.

6. TQA responses were excluded from the analysis of the 2022 ACS Content Test response data because survey responses completed via the TQA operation were only conducted using the ACS production data collection instrument.

7. CAPI interviewers were assigned 2022 ACS Content Test cases as well as regular production cases. The potential risk of this approach is the introduction of a cross-

contamination or carry-over effect among Control and test treatments and production due to the same interviewer administering multiple versions of the same question item (despite their training to read questions verbatim).

8. Due to budget constraints, the CAPI workload could not exceed 28,000 housing units. This workload was less than what was subsampled originally because we oversampled addresses in low response areas. Limiting the CAPI workload caused an increase in the variances for the analysis metrics used.

9. The CFU reinterviews were conducted by phone only, whereas the original interviews were completed online, by mail, by phone in CAPI, or in person in CAPI. Hence, some of the differences observed between the original interviews and the CFU interviews may be the result of mode effect.

10. The 2022 ACS Content Test did not include the production weighting adjustments for unit nonresponse or population controls which are designed to minimize nonresponse and under-coverage bias. As a result, any estimates derived from the Content Test data do not provide the same level of inference as the production ACS and cannot be compared to production estimates.

5. RESEARCH QUESTIONS AND RESULTS

This section presents the results from the unit-level response analyses of the 2022 ACS Content Test field test.

5.1   Unit Response Rates for the Original Content Test Interview

What are the overall unit response rates for the original Content Test interview in the Control and two test treatments? How do they compare? What are the unit response rates by data collection mode for the original Content Test interview in the Control and two test treatments? How do they compare?

In general, the unit response rate is the weighted proportion of sample addresses eligible to respond that provided a complete or sufficient partial response. The samples for each treatment were designed to have similar response propensities on the unit-level (i.e., address level). Therefore, we do not expect their unit response rates to be different. We tested this assumption by comparing the unit response rate overall and by mode for each treatment.

Table 2 shows the original interview unit response rates for the Control and Test treatments. The response rates are distributed by each mode of data collection (internet, mail, and CAPI), both self-response modes (internet and mail combined), and all modes combined. Table 3 and Table 4 show the same information but for comparing the Control and Roster Test (Roster)

treatments and the Test and Roster treatments, respectively. The tables also include rounded interview counts, overall and for each mode.

Table 2. Original Interview Unit Response Rates for Control and Test Treatments, Overall and Distributed by Mode

Mode	Test Interviews	Test Percent	Control Interviews	Control Percent	Difference	Adjusted P-Value
Overall	19,000	83.3 (0.4)	19,000	83.6 (0.4)	-0.2 (0.5)	0.66
Self-Response	15,000	59.2 (0.4)	15,000	59.6 (0.4)	-0.3 (0.6)	0.66
Internet	12,000	48.4 (0.4)	11,500	47.7 (0.4)	0.7 (0.6)	0.66
Mail	3,500	12.3 (0.3)	3,700	13.1 (0.3)	-0.8 (0.4)	0.35
CAPI	4,200	24.4 (0.4)	4,100	24.2 (0.4)	0.2 (0.5)	0.66

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 3. Original Interview Unit Response Rates for Control and Roster Treatments, Overall and Distributed by Mode

Mode	Roster Interviews	Roster Percent	Control Interviews	Control Percent	Difference	Adjusted P-Value
Overall	19,000	83.4 (0.4)	19,000	83.6 (0.4)	-0.2 (0.5)	0.75
Self-Response	15,000	58.3 (0.5)	15,000	59.6 (0.4)	-1.2 (0.6)	0.15
Internet	11,500	47.2 (0.5)	11,500	47.7 (0.4)	-0.5 (0.6)	0.75
Mail	3,600	12.5 (0.3)	3,700	13.1 (0.3)	-0.5 (0.4)	0.48
CAPI	4,200	25.2 (0.4)	4,100	24.2 (0.4)	1.0 (0.5)	0.24

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 4. Original Interview Unit Response Rates for Test and Roster Treatments, Overall and Distributed by Mode

Mode	Test Interviews	Test Percent	Roster Interviews	Roster Percent	Difference	Adjusted P-Value
Overall	19,000	83.3 (0.4)	19,000	83.4 (0.4)	-0.1 (0.6)	0.89
Self-Response	15,000	59.2 (0.4)	15,000	58.3 (0.5)	0.9 (0.6)	0.60
Internet	12,000	48.4 (0.4)	11,500	47.2 (0.5)	1.2 (0.7)	0.35
Mail	3,500	12.3 (0.3)	3,600	12.5 (0.3)	-0.3 (0.4)	0.89
CAPI	4,200	24.4 (0.4)	4,200	25.2 (0.4)	-0.8 (0.6)	0.60

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
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-values were adjusted for multiple comparisons using the Hochberg method.

The overall unit response rates were 83.6 percent for Control, 83.3 percent for Test, and 83.4 percent for Roster. These response rates were not significantly different from each other. Also, none of the response rate comparisons by mode were significantly different between treatments.

We also calculated and compared the CAPI response rate between treatments. Unlike the previous response rates which were among all eligible sample addresses, the CAPI response rate is only among eligible sample addresses that were in the CAPI operation. Table 5 shows the original interview CAPI response rates for all three treatments. None of the CAPI response rates were significantly different between treatments.

Table 5. Original Interview CAPI Response Rates

Treatment Comparison	Treatment A Percent	Treatment B Percent	Difference	P-Value
Test (A) vs Control (B)	58.5 (0.8)	58.8 (0.8)	-0.3 (1.1)	0.77
Roster (A) vs Control (B)	59.6 (0.8)	58.8 (0.8)	0.7 (1.1)	0.50
Test (A) vs Roster (B)	58.5 (0.8)	59.6 (0.8)	-1.0 (1.2)	0.40

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
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.

What are the unit response rates by high and low response areas for the original Content Test interview in the Control and two test treatments? How do they compare?

We calculated the unit response rates by high and low response areas and compared rates within those areas between treatments since we oversampled addresses from low response areas. High and low response strata were defined based on historical ACS response rates from the 2018 and 2019 panels.

Table 6 shows the original interview unit response rates for the Control and Test treatments by high and low response areas for each mode of data collection. Table 7 and Table 8 show the same information but for comparing the Control and Roster treatments and the Test and Roster treatments, respectively.

Only two response rate comparisons were significantly different between treatments. The percent of mail response in low response areas was significantly lower in the Test treatment than the Control treatment, and the percent of CAPI response in high response areas was significantly higher in the Roster treatment than the Control treatment. However, these differences did not appear in overall comparisons (see Table 2 and Table 3, respectively).

Table 6. Original Interview Unit Response Rates by Designated High (HRA) and Low (LRA) Response Areas for Control and Test Treatments

Mode	Test Interviews	Test Percent	Control Interviews	Control Percent	Difference	Adjusted P-Value
Total Response	19,000		19,000			
HRA	7,900	86.3 (0.5)	7,900	86.3 (0.5)	-0.1 (0.7)	0.94
LRA	11,000	74.9 (0.4)	11,000	75.6 (0.4)	-0.7 (0.5)	0.42
Self-Response	15,000		15,000			
HRA	7,000	66.2 (0.5)	7,000	66.5 (0.6)	-0.2 (0.7)	0.75
LRA	7,900	38.9 (0.4)	8,000	39.4 (0.4)	-0.5 (0.5)	0.64
Internet	12,000		11,500			
HRA	5,800	54.6 (0.5)	5,600	53.6 (0.6)	0.9 (0.8)	0.52
LRA	6,000	30.6 (0.4)	6,000	30.3 (0.3)	0.3 (0.5)	0.58
Mail	3,500		3,700			
HRA	1,500	13.3 (0.4)	1,500	14.1 (0.4)	-0.8 (0.6)	0.17
LRA	2,000	9.2 (0.2)	2,200	10.0 (0.2)	-0.8 (0.2)	<0.01*
CAPI	4,200		4,100			
HRA	850	20.4 (0.5)	850	20.0 (0.5)	0.4 (0.6)	0.77
LRA	3,300	36.3 (0.5)	3,300	36.5 (0.4)	-0.2 (0.6)	0.77

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 7. Original Interview Unit Response Rates by Designated High (HRA) and Low (LRA) Response Areas for Control and Roster Treatments

Mode	Roster Interviews	Roster Percent	Control Interviews	Control Percent	Difference	Adjusted P-Value
Total Response	19,000		19,000			
HRA	7,800	86.3 (0.5)	7,900	86.3 (0.5)	<0.1 (0.7)	0.98
LRA	11,000	74.9 (0.5)	11,000	75.6 (0.4)	-0.8 (0.6)	0.42
Self-Response	15,000		15,000			
HRA	6,900	65.1 (0.6)	7,000	66.5 (0.6)	-1.4 (0.7)	0.12
LRA	7,900	38.8 (0.4)	8,000	39.4 (0.4)	-0.6 (0.5)	0.22
Internet	11,500		11,500			
HRA	5,600	53.1 (0.7)	5,600	53.6 (0.6)	-0.6 (0.8)	0.93
LRA	6,000	30.3 (0.4)	6,000	30.3 (0.3)	0.0 (0.5)	0.93
Mail	3,600		3,700			
HRA	1,500	13.6 (0.3)	1,500	14.1 (0.4)	-0.5 (0.5)	0.29
LRA	2,100	9.5 (0.2)	2,200	10.0 (0.2)	-0.6 (0.3)	0.10
CAPI	4,200		4,100			
HRA	900	21.4 (0.5)	850	20.0 (0.5)	1.4 (0.7)	0.08*
LRA	3,300	36.3 (0.6)	3,300	36.5 (0.4)	-0.2 (0.6)	0.81

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 8. Original Interview Unit Response Rates by Designated High (HRA) and Low (LRA) Response Areas for Test and Roster Treatments

Mode	Test Interviews	Test Percent	Roster Interviews	Roster Percent	Difference	Adjusted P-Value
Total Response	19,000		19,000			
HRA	7,900	86.3 (0.5)	7,800	86.3 (0.5)	-0.1 (0.8)	0.96
LRA	11,000	74.9 (0.4)	11,000	74.9 (0.5)	<0.1 (0.6)	0.96
Self-Response	15,000		15,000			
HRA	7,000	66.2 (0.5)	6,900	65.1 (0.6)	1.1 (0.8)	0.34
LRA	7,900	38.9 (0.4)	7,900	38.8 (0.4)	0.1 (0.6)	0.86
Internet	12,000		11,500			
HRA	5,800	54.6 (0.5)	5,600	53.1 (0.7)	1.5 (0.9)	0.18
LRA	6,000	30.6 (0.4)	6,000	30.3 (0.4)	0.3 (0.6)	0.56
Mail	3,500		3,600			
HRA	1,500	13.3 (0.4)	1,500	13.6 (0.3)	-0.3 (0.5)	0.59
LRA	2,000	9.2 (0.2)	2,100	9.5 (0.2)	-0.2 (0.3)	0.59
CAPI	4,200		4,200			
HRA	850	20.4 (0.5)	900	21.4 (0.5)	-1.0 (0.7)	0.36
LRA	3,300	36.3 (0.5)	3,300	36.3 (0.6)	<0.1 (0.7)	0.98

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

No topic-level analysis was conducted by high and low response areas. Since there were no statistically significant differences between unit response rates overall or by mode (Table 2 to Table 5), the results suggest there are no underlying response rate concerns that would impact topic-specific comparisons between treatments.

5.2 Unit Response Rates for the CFU Reinterview

What are the response rates for the CFU reinterviews in the Control and two test treatments? How do they compare overall and by mode?

We calculated response rates for the CFU reinterview to ensure that the rates were high enough to provide appropriate measures of response error and response reliability. Table 9 shows the unit response rates for the CFU reinterview for the Control and Test treatments. The response rates are overall and by each mode of data collection in the original interview. Table 10 and Table 11 show the same information but for comparing the Control and Roster treatments and the Test and Roster treatments, respectively.

Table 9. CFU Reinterview Unit Response Rates for Control and Test Treatments, Overall and by Mode

Original Interview Mode	Test CFU Interviews	Test Percent	Control CFU Interviews	Control Percent	Difference	Adjusted P-Value
All Modes	5,600	34.2 (0.5)	5,500	32.9 (0.5)	1.3 (0.7)	0.18
Self-Response	4,900	35.0 (0.5)	4,800	33.6 (0.5)	1.4 (0.7)	0.18
Internet	3,700	33.7 (0.5)	3,500	32.2 (0.6)	1.5 (0.8)	0.18
Mail	1,400	40.1 (1.2)	1,300	38.2 (1.1)	1.8 (1.5)	0.44
CAPI	700	31.0 (1.3)	700	30.2 (1.2)	0.8 (1.8)	0.66

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 10. CFU Reinterview Unit Response Rates for Control and Roster Treatments, Overall and by Mode

Original Interview Mode	Roster CFU Interviews	Roster Percent	Control CFU Interviews	Control Percent	Difference	P-Value
All Modes	5,300	32.2 (0.5)	5,500	32.9 (0.5)	-0.7 (0.7)	0.35
Self-Response	4,700	33.3 (0.5)	4,800	33.6 (0.5)	-0.3 (0.7)	0.67
Internet	3,400	31.3 (0.6)	3,500	32.2 (0.6)	-0.9 (0.8)	0.26
Mail	1,300	41.2 (1.3)	1,300	38.2 (1.1)	2.9 (1.8)	0.10
CAPI	650	28.4 (1.4)	700	30.2 (1.2)	-1.8 (1.9)	0.35

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

U.S. Census Bureau

Table 11. CFU Reinterview Unit Response Rates for Test and Roster Treatments, Overall and by Mode

Original Interview Mode	Test CFU Interviews	Test Percent	Roster CFU Interviews	Roster Percent	Difference	Adjusted P-Value
All Modes	5,600	34.2 (0.5)	5,300	32.2 (0.5)	1.9 (0.8)	0.03*
Self-Response	4,900	35.0 (0.5)	4,700	33.3 (0.5)	1.6 (0.7)	0.06*
Internet	3,700	33.7 (0.5)	3,400	31.3 (0.6)	2.4 (0.7)	<0.01*
Mail	1,400	40.1 (1.2)	1,300	41.2 (1.3)	-1.1 (1.8)	0.54
CAPI	700	31.0 (1.3)	650	28.4 (1.4)	1.9 (0.8)	0.03*

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

There were no significant differences in the CFU response rates between the Control and Test treatments and the Control and Roster treatments. For the Test and Roster treatments, however, the CFU response rates overall were significantly different between treatments. This difference was present in all original interview modes except for mail; for self-response, internet, and CAPI, the rates for the Test treatment were significantly higher than those for the Roster treatment.

There is no evidence of underlying CFU response rate issues that would negatively affect topic-level response error analyses comparing the Control and Test treatments or the Control and Roster treatments. The CFU response rate differences between the Test and Roster treatments, however, may affect some of the response error analyses for the topics that compare CFU metrics between those treatments: Health Insurance Coverage and Income. Potential effects on response error analyses between these treatments are further studied in the next section.

5.3 Demographic and Socioeconomic Profile of Responding Households

How are responding units in the original Content Test interview distributed by socioeconomic and demographic characteristics? How do these distributions compare between the treatments? How do these distributions compare by mode?

Because the samples for the treatments were selected using the nearest neighbor method, we expect them to have similar socioeconomic and demographic distributions. We tested this assumption by comparing respondent characteristics for all treatments. Similar distributions allow us to conclude that any differences in the topic-level analysis metrics are attributable to differences in the test questions.

Table 12 shows the response distributions for the original interview for the Control and Test treatments. Table 13 and Table 14 show the same information but for comparing the Control

and Roster treatments and the Test and Roster treatments, respectively. We calculated distributions for the following response categories: *age, sex, Hispanic origin, race, and tenure.* We also compared *language of response*, or the language used to respond to the survey.[16] We did not include responses with missing data in the calculations.

None of the response distributions were significantly different between treatments.

Table 12. Original Interview Response Distributions for Test and Control Treatments

Item	Test	Control	P-Value
Age	(n=41,000)	(n=41,000)	0.87
Under 5 years old	5.0 (0.2)	5.1 (0.2)	
5 to 17 years old	15.9 (0.3)	15.8 (0.3)	
18 to 24 years old	7.3 (0.2)	7.2 (0.2)	
25 to 44 years old	26.0 (0.3)	26.2 (0.3)	
45 to 64 years old	26.0 (0.4)	25.5 (0.3)	
65 years old or older	19.8 (0.4)	20.2 (0.4)	
Sex	(n=41,500)	(n=41,000)	0.22
Male	48.5 (0.3)	48.1 (0.3)	
Female	51.5 (0.3)	51.9 (0.3)	
Hispanic Origin	(n=40,500)	(n=40,500)	0.82
Not Hispanic or Latino	82.1 (0.4)	82.3 (0.5)	
Hispanic or Latino	17.9 (0.4)	17.7 (0.5)	
Race	(n=40,500)	(n=40,500)	0.64
White only	71.3 (0.5)	71.1 (0.5)	
Black only	10.0 (0.3)	9.9 (0.3)	
Other race only	14.0 (0.4)	14.6 (0.4)	
Two or more races	4.6 (0.3)	4.4 (0.2)	
Tenure	(n=16,500)	(n=16,500)	0.66
Owned with a mortgage	43.7 (0.5)	44.6 (0.6)	
Owned free and clear	24.2 (0.5)	24.0 (0.4)	
Rented	30.5 (0.5)	29.8 (0.5)	
Occupied without payment of rent	1.5 (0.1)	1.5 (0.1)	
Language of Response	(n=14,000)	(n=14,000)	0.33
English	97.7 (0.1)	97.5 (0.2)	
Spanish	2.0 (0.1)	2.3 (0.2)	
Other	0.3 (0.1)	0.2 (0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the α=0.1 level.

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[16] Language of response analysis excludes paper questionnaire returns because there was only an English questionnaire.

Table 13. Original Interview Response Distributions for Roster and Control Treatments

Item	Roster	Control	P-Value
Age	(n=41,000)	(n=41,000)	0.17
Under 5 years old	5.0 (0.2)	5.1 (0.2)	
5 to 17 years old	15.7 (0.2)	15.8 (0.3)	
18 to 24 years old	8.0 (0.2)	7.2 (0.2)	
25 to 44 years old	25.6 (0.3)	26.2 (0.3)	
45 to 64 years old	25.7 (0.3)	25.5 (0.3)	
65 years old or older	20.0 (0.3)	20.2 (0.4)	
Sex	(n=41,500)	(n=41,000)	0.30
Male	48.4 (0.3)	48.1 (0.3)	
Female	51.5 (0.3)	51.9 (0.3)	
Hispanic Origin	40,500)	(n=40,500)	0.83
Not Hispanic or Latino	82.4 (0.4)	82.3 (0.5)	
Hispanic or Latino	17.6 (0.4)	17.7 (0.5)	
Race	(n=40,500)	(n=40,500)	0.64
White only	71.2 (0.6)	71.1 (0.5)	
Black only	10.2 (0.4)	9.9 (0.3)	
Other race only	14.0 (0.5)	14.6 (0.4)	
Two or more races	4.6 (0.2)	4.4 (0.2)	
Tenure	(n=16,500)	(n=16,500)	0.12
Owned with a mortgage	43.8 (0.5)	44.6 (0.6)	
Owned free and clear	23.7 (0.5)	24.0 (0.4)	
Rented	31.3 (0.5)	29.8 (0.5)	
Occupied without payment of rent	1.3 (0.1)	1.5 (0.1)	
Language of Response	(n=14,000)	(n=14,000)	0.81
English	97.4 (0.2)	97.5 (0.2)	
Spanish	2.3 (0.6)	2.3 (0.2)	
Other	0.3 (0.1)	0.2 (0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the α=0.1 level.

Table 14. Original Interview Response Distributions for Test and Roster Treatments

Item	Test	Roster	P-Value
Age	(n=41,000)	(n=41,000)	0.29
Under 5 years old	5.0 (0.2)	5.0 (0.2)	
5 to 17 years old	15.9 (0.3)	15.7 (0.2)	
18 to 24 years old	7.3 (0.2)	8.0 (0.2)	
25 to 44 years old	26.0 (0.3)	25.6 (0.3)	
45 to 64 years old	26.0 (0.4)	25.7 (0.3)	
65 years old or older	19.8 (0.4)	20.0 (0.3)	
Sex	(n=41,500)	(n=41,500)	0.86
Male	48.5 (0.3)	48.4 (0.3)	
Female	51.5 (0.3)	51.5 (0.3)	
Hispanic Origin	(n=40,500)	(n=40,500)	0.61
Not Hispanic or Latino	82.1 (0.4)	82.4 (0.4)	
Hispanic or Latino	17.9 (0.4)	17.6 (0.4)	
Race	(n=40,500)	(n=40,500)	0.99
White only	71.3 (0.5)	71.2 (0.6)	
Black only	10.0 (0.3)	10.2 (0.4)	
Other race only	14.0 (0.4)	14.0 (0.5)	
Two or more races	4.6 (0.3)	4.6 (0.2)	
Tenure	(n=16,500)	(n=16,500)	0.44
Owned with a mortgage	43.7 (0.5)	43.8 (0.5)	
Owned free and clear	24.2 (0.5)	23.7 (0.5)	
Rented	30.5 (0.5)	31.3 (0.5)	
Occupied without payment of rent	1.5 (0.1)	1.3 (0.1)	
Language of Response	(n=14,000)	(n=14,000)	0.45
English	97.7 (0.1)	97.4 (0.2)	
Spanish	2.0 (0.1)	2.3 (0.6)	
Other	0.3 (0.1)	0.3 (0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
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 of independence at the α=0.1 level.

We also calculated distributions for the same characteristics among self-responses and CAPI responses (Appendix A). Only the distribution for race among CAPI responses for the Control and Test treatments was significantly different (Table 15, p-value=0.02 based on a Rao-Scott chi-square test of independence). When looking at the individual categories, this distribution difference was driven by differences between the Control and Test treatments in the "other race only" category.

Table 15. Original Interview Response Distributions for Race for Test and Control Treatments, CAPI Mode

Race	Test Percent	Control Percent	Difference	Adjusted P-Value^
White only	62.6 (1.4)	58.7 (1.5)	3.9 (2.1)	0.14
Black only	17.5 (1.0)	19.1 (1.1)	-1.6 (1.6)	0.33
Other race only	16.0 (1.1)	19.6 (1.0)	-3.6 (1.6)	0.09*
Two or more races	3.9 (0.6)	2.6 (0.4)	1.2 (0.7)	0.14

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
^ The p-values are not conditional on the significant p-value from the Rao-Scott chi-square test of independence.
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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

How are responding units in the CFU reinterview distributed by socioeconomic and demographic characteristics? How do these distributions compare between the treatments? How do these distributions compare by mode of original interview?

We also examined response distributions for CFU responses.[17] Characteristic data were from the original interview because we did not re-ask all questions on the CFU reinterview.[18]

Table 16 shows the response distributions for the CFU reinterview for the Control and Test treatments. Table 17 and Table 18 show the same information but for comparing the Control and Roster treatments and the Test and Roster treatments, respectively. We calculated distributions for the same characteristics that we examined for the original interview distributions and did not include responses with missing data in the calculations.[19]

None of the response distributions were significantly different between the Control and Test treatments. Between the Control and Roster treatments, only the distribution for tenure was significantly different. And between the Test and Roster treatments, only the distribution for language of response was significantly different. Interpretations of topic-level response error analyses involving those treatment comparisons should consider any topic impacts of those characteristic differences.

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[17] This analysis does not compare socioeconomic and demographic characteristics between CFU respondents and nonrespondents. That additional analysis will be documented separately and is not covered in this report.

[18] Though the Household Roster questions were re-asked to respondents in the Control and Roster treatments, we used the household roster from the original interview when calculating CFU response distributions.

[19] We removed the "other" category from *language of response* for CFU response distributions due to no responses falling into that category. Only original interview responses in English or Spanish were eligible for the CFU operation.

Table 16. CFU Response Distributions for Test and Control Treatments

Item	Test	Control	P-Value
Age	(n=12,500)	(n=11,500)	0.91
Under 5 years old	4.6 (0.3)	4.5 (0.3)	
5 to 17 years old	13.6 (0.5)	13.2 (0.5)	
18 to 24 years old	6.2 (0.3)	6.8 (0.4)	
25 to 44 years old	25.5 (0.6)	25.2 (0.6)	
45 to 64 years old	25.4 (0.7)	25.5 (0.7)	
65 years old or older	24.7 (0.7)	24.7 (0.7)	
Sex	(n=12,500)	(n=11,500)	0.57
Male	49.0 (0.5)	48.6 (0.6)	
Female	51.0 (0.5)	51.4 (0.6)	
Hispanic Origin	(n=12,000)	(n=11,500)	0.92
Not Hispanic or Latino	86.6 (0.7)	86.5 (0.8)	
Hispanic or Latino	13.4 (0.7)	13.5 (0.8)	
Race	(n=12,000)	(n=11,500)	0.93
White only	75.7 (0.9)	75.1 (0.9)	
Black only	9.4 (0.5)	9.3 (0.5)	
Other race only	10.7 (0.7)	11.2 (0.6)	
Two or more races	4.2 (0.4)	4.4 (0.3)	
Tenure	(n=5,500)	(n=5,300)	0.22
Owned with a mortgage	43.6 (0.9)	44.8 (1.0)	
Owned free and clear	27.3 (0.7)	25.5 (0.8)	
Rented	27.9 (0.9)	28.0 (0.9)	
Occupied without payment of rent	1.3 (0.2)	1.7 (0.2)	
Language of Response	(n=4,300)	(n=4,200)	0.66
English	99.8 (0.1)	99.8 (0.1)	
Spanish	0.2 (<0.1)	0.2 (0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the α=0.1 level.

Table 17. CFU Response Distributions for Roster and Control Treatments

Item	Roster	Control	P-Value
Age	(n=11,500)	(n=11,500)	0.91
Under 5 years old	4.5 (0.3)	4.5 (0.3)	
5 to 17 years old	13.0 (0.5)	13.2 (0.5)	
18 to 24 years old	7.5 (0.4)	6.8 (0.4)	
25 to 44 years old	25.6 (0.6)	25.2 (0.6)	
45 to 64 years old	25.0 (0.7)	25.5 (0.7)	
65 years old or older	24.4 (0.7)	24.7 (0.7)	
Sex	(n=11,500)	(n=11,500)	0.93
Male	48.5 (0.5)	48.6 (0.6)	
Female	51.5 (0.5)	51.4 (0.6)	
Hispanic Origin	(n=11,000)	(n=11,500)	0.98
Not Hispanic or Latino	86.5 (0.7)	86.5 (0.8)	
Hispanic or Latino	13.5 (0.7)	13.5 (0.8)	
Race	(n=11,000)	(n=11,500)	0.74
White only	73.8 (0.8)	75.1 (0.9)	
Black only	10.0 (0.7)	9.3 (0.5)	
Other race only	11.7 (0.8)	11.2 (0.6)	
Two or more races	4.6 (0.3)	4.4 (0.3)	
Tenure	(n=5,200)	(n=5,300)	0.06*
Owned with a mortgage	42.5 (0.9)	44.8 (1.0)	
Owned free and clear	27.2 (0.8)	25.5 (0.8)	
Rented	29.2 (0.9)	28.0 (0.9)	
Occupied without payment of rent	1.1 (0.2)	1.7 (0.2)	
Language of Response	(n=4,000)	(n=4,200)	0.12
English	99.5 (0.2)	99.8 (0.1)	
Spanish	0.5 (0.2)	0.2 (0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the $\alpha=0.1$ level.

Table 18. CFU Response Distributions for Test and Roster Treatments

Item	Test	Roster	P-Value
Age	(n=12,500)	(n=11,500)	0.30
Under 5 years old	4.6 (0.3)	4.5 (0.3)	
5 to 17 years old	13.6 (0.5)	13.0 (0.5)	
18 to 24 years old	6.2 (0.3)	7.5 (0.4)	
25 to 44 years old	25.5 (0.6)	25.6 (0.6)	
45 to 64 years old	25.4 (0.7)	25.0 (0.7)	
65 years old or older	24.7 (0.7)	24.4 (0.7)	
Sex	(n=12,500)	(n=11,500)	0.48
Male	49.0 (0.5)	48.5 (0.5)	
Female	51.0 (0.5)	51.5 (0.5)	
Hispanic Origin	(n=12,000)	(n=11,000)	0.93
Not Hispanic or Latino	86.6 (0.7)	86.5 (0.7)	
Hispanic or Latino	13.4 (0.7)	13.5 (0.7)	
Race	(n=12,000)	(n=11,000)	0.49
White only	75.7 (0.9)	73.8 (0.8)	
Black only	9.4 (0.5)	10.0 (0.7)	
Other race only	10.7 (0.7)	11.7 (0.8)	
Two or more races	4.2 (0.4)	4.6 (0.3)	
Tenure	(n=5,500)	(n=5,200)	0.59
Owned with a mortgage	43.6 (0.9)	42.5 (0.9)	
Owned free and clear	27.3 (0.7)	27.2 (0.8)	
Rented	27.9 (0.9)	29.2 (0.9)	
Occupied without payment of rent	1.3 (0.2)	1.1 (0.2)	
Language of Response	(n=4,300)	(n=4,000)	<0.01*
English	99.8 (0.1)	99.5 (0.2)	
Spanish	0.2 (<0.1)	0.5 (0.2)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the α=0.1 level.

Table 19 shows the differences in response distributions between the Control and Roster treatments for tenure among CFU respondents. Though the overall distribution was significantly different between treatments (Table 17), none of the individual category proportions were significantly different after adjusting for multiple comparisons.

When looking at the distributions for tenure among original interview self-responses (Appendix B, Table 29) and CAPI responses (Appendix B, Table 32), only the self-response distributions were significantly different between treatments (p-value=0.01 based on a Rao-Scott chi-square test of independence), indicating that the overall differences were driven by those who responded originally by mail or internet. Looking at the individual categories, the proportions

for owned free and clear and occupied without payment of rent were significantly different between treatments.

Table 19. CFU Response Distributions for Tenure for Roster and Control Treatments

Tenure	Roster Percent	Control Percent	Difference	Adjusted P-Value^
All modes				
Owned with a mortgage	42.5 (0.9)	44.8 (1.0)	-2.3 (1.4)	0.29
Owned free and clear	27.2 (0.8)	25.5 (0.8)	1.7 (1.2)	0.31
Rented	29.2 (0.9)	28.0 (0.9)	1.3 (1.3)	0.31
Occupied without payment of rent	1.1 (0.2)	1.7 (0.2)	-0.6 (0.3)	0.19
Self-response				
Owned with a mortgage	44.5 (1.1)	46.9 (1.1)	-2.4 (1.6)	0.30
Owned free and clear	28.3 (0.9)	25.1 (0.8)	3.2 (1.3)	0.04*
Rented	26.3 (1.0)	26.4 (1.0)	-0.1 (1.3)	0.93
Occupied without payment of rent	0.9 (0.2)	1.6 (0.2)	-0.7 (0.3)	0.04*

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
^ The p-values are not conditional on the significant p-values from the Rao-Scott chi-square tests of independence.
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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

Table 20 shows the differences in response distributions between the Test and Roster treatments for language of response among CFU respondents. Both the individual category proportions for English and Spanish were significantly different between treatments.

Both the self-response and CAPI distributions were significantly different between treatments when looking at the language of response distributions among original interview self-responses (Appendix B, Table 30, p-value=0.06 based on a Rao-Scott chi-square test of independence) and CAPI responses (Appendix B, Table 33, p-value=0.04 based on a Rao-Scott chi-square test of independence). However, when looking at the individual categories within those modes, the proportions were not significantly different after adjusting for multiple comparisons.

Table 20. CFU Response Distributions for Language of Response for Test and Roster Treatments

Language of Response	Test Percent	Roster Percent	Difference	Adjusted P-Value^
All modes				
English	99.8 (0.1)	99.5 (0.2)	0.3 (0.2)	0.05*
Spanish	0.2 (<0.1)	0.5 (0.2)	-0.3 (0.2)	0.05*
Self-response				
English	99.9 (0.1)	99.8 (0.1)	0.1 (0.1)	0.26
Spanish	0.1 (<0.1)	0.2 (0.1)	-0.1 (0.1)	0.26
CAPI				
English	99.4 (0.2)	98.5 (0.6)	-1.0 (0.6)	0.12
Spanish	0.6 (0.2)	1.5 (0.6)	1.0 (0.6)	0.12

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
^ The p-values are not conditional on the significant p-values from the Rao-Scott chi-square tests of independence.
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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

We also calculated CFU response distributions for the same characteristics in Table 16, Table 17, and Table 18 among self-responses and CAPI responses to the original interview (Appendix B). Besides the distributions discussed in Table 19 and Table 20, one other distribution was significantly different: tenure among self-responses for the Control and Test treatments (Appendix B, Table 28, p-value=0.06 based on a Rao-Scott chi-square test of independence).

Table 21 shows the CFU response distributions for tenure for the Control and Test treatments among original interview self-responses. Looking at the individual categories, the proportions for owned free and clear were significantly different between treatments.

Table 21. CFU Response Distributions for Tenure for Test and Control Treatments, Self-Response Modes of Original Interview

Tenure	Test Percent	Control Percent	Difference	Adjusted P-Value^
Owned with a mortgage	45.7 (1.0)	46.9 (1.1)	-1.2 (1.2)	0.32
Owned free and clear	27.8 (0.8)	25.1 (0.8)	2.7 (1.1)	0.06*
Rented	25.3 (0.9)	26.4 (1.0)	-1.1 (1.0)	0.32
Occupied without payment of rent	1.2 (0.2)	1.6 (0.2)	-0.4 (0.3)	0.32

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
^ The p-values are not conditional on the significant p-value from the Rao-Scott chi-square test of independence.
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 α=0.1 level. P-values were adjusted for multiple comparisons using the Hochberg method.

6. CONCLUSIONS

Original Interview

There is insufficient evidence of underlying response rate concerns that would impact topic-specific original interview comparisons between treatments. The overall unit response rates were not significantly different between treatments, nor were the response rate portions by mode. When looking at response rates within high and low response areas, a couple of modal comparisons were significant, but these results did not appear in the overall comparisons.

Additionally, when examining demographic and socioeconomic distributions, none of the response distributions were significantly different between treatments. When looking at distributions among self-responses and CAPI responses, only the distribution for race among CAPI responses for the Control and Test treatments was significantly different. This distribution difference showed up in the "other race only" category.

Interpretations of topic-level analyses between the Control and Test treatments among CAPI responses only should consider any topic impacts of racial differences. However, among all modes combined, the results suggest there are no underlying demographic and socioeconomic distribution differences that would impact topic-specific original interview comparisons between treatments.

CFU Reinterview

There is no sufficient evidence of underlying CFU response rate issues that would negatively affect topic-level response error analyses comparing the Control and Test treatments or the Control and Roster treatments. However, there were CFU response rate differences between the Test and Roster treatments overall and within some original interview modes. These differences may affect some of the response error analyses for the Health Insurance Coverage and Income topics because they compared CFU metrics between those treatments.

When examining demographic and socioeconomic distributions, none of the overall response distributions were significantly different between the Control and Test treatments. Between the Control and Roster treatments, only the distribution for tenure was significantly different. And between the Test and Roster treatments, only the distribution for language of response was significantly different. We also examined CFU response distributions among original interview self-responses and CAPI responses, where the distributions for tenure and language of response were significantly different among some treatment and mode comparisons. Interpretations of topic-level response error analyses involving the significant treatment and mode comparisons should consider any topic impacts of characteristic differences for tenure and language of response, perhaps by looking at metrics by those characteristics.

U.S. Census Bureau

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Appendix A. Original Interview Response Distributions by Mode

Table 22 shows the response distributions for the original interview for the Control and Test treatments among self-responses. Table 23 and Table 24 show the same information but for comparing the Control and Roster treatments and the Test and Roster treatments, respectively.

Table 22. Response Distributions for Test and Control Treatments, Self-Response Modes

Item	Test	Control	P-Value
Age	(n=34,000)	(n=34,000)	0.55
Under 5 years old	4.7 (0.2)	4.9 (0.2)	
5 to 17 years old	15.3 (0.4)	15.5 (0.4)	
18 to 24 years old	7.0 (0.3)	6.7 (0.2)	
25 to 44 years old	25.7 (0.4)	26.0 (0.3)	
45 to 64 years old	26.5 (0.4)	25.6 (0.4)	
65 years old or older	20.8 (0.4)	21.3 (0.3)	
Sex	(n=34,500)	(n=34,500)	0.17
Male	48.3 (0.3)	47.7 (0.3)	
Female	51.8 (0.3)	52.3 (0.3)	
Hispanic Origin	(n=33,500)	(n=34,000)	0.90
Not Hispanic or Latino	85.5 (0.4)	85.6 (0.5)	
Hispanic or Latino	14.5 (0.4)	14.4 (0.5)	
Race	(n=34,000)	(n=34,000)	0.54
White only	73.9 (0.5)	74.7 (0.6)	
Black only	7.9 (0.3)	7.2 (0.3)	
Other race only	13.4 (0.4)	13.2 (0.5)	
Two or more races	4.8 (0.3)	4.9 (0.2)	
Tenure	(n=14,000)	(n=14,000)	0.77
Owned with a mortgage	47.5 (0.5)	48.2 (0.6)	
Owned free and clear	25.2 (0.5)	25.0 (0.4)	
Rented	26.0 (0.5)	25.4 (0.5)	
Occupied without payment of rent	1.4 (0.1)	1.4 (0.1)	
Language of Response	(n=11,500)	(n=11,500)	0.48
English	99.5 (0.1)	99.6 (0.1)	
Spanish	0.5 (0.1)	0.4 (0.1)	
Other	<0.1 (<0.1)	<0.1 (<0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

<u>Note</u>: 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 of independence at the α=0.1 level.

Table 23. Response Distributions for Roster and Control Treatments, Self-Response Modes

Item	Roster	Control	P-Value
Age	(n=34,000)	(n=34,000)	0.46
Under 5 years old	4.9 (0.2)	4.9 (0.2)	
5 to 17 years old	15.1 (0.3)	15.5 (0.4)	
18 to 24 years old	7.2 (0.2)	6.7 (0.2)	
25 to 44 years old	25.7 (0.4)	26.0 (0.3)	
45 to 64 years old	26.1 (0.4)	25.6 (0.4)	
65 years old or older	21.1 (0.4)	21.3 (0.3)	
Sex	(n=34,500)	(n=34,500)	0.23
Male	48.2 (0.3)	47.7 (0.3)	
Female	51.8 (0.3)	52.3 (0.3)	
Hispanic Origin	(n=33,500)	(n=34,000)	0.27
Not Hispanic or Latino	86.4 (0.4)	85.6 (0.5)	
Hispanic or Latino	13.6 (0.4)	14.4 (0.5)	
Race	(n=34,000)	(n=34,000)	0.42
White only	74.0 (0.5)	74.7 (0.6)	
Black only	7.9 (0.3)	7.2 (0.3)	
Other race only	12.9 (0.5)	13.2 (0.5)	
Two or more races	5.1 (0.3)	4.9 (0.2)	
Tenure	(n=14,000)	(n=14,000)	0.31
Owned with a mortgage	48.1 (0.5)	48.2 (0.6)	
Owned free and clear	24.7 (0.5)	25.0 (0.4)	
Rented	26.1 (0.5)	25.4 (0.5)	
Occupied without payment of rent	1.1 (0.1)	1.4 (0.1)	
Language of Response	(n=11,000)	(n=11,500)	0.83
English	99.6 (0.1)	99.6 (0.1)	
Spanish	0.4 (0.1)	0.4 (0.1)	
Other	<0.1 (<0.1)	<0.1 (<0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
<u>Note</u>: 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 of independence at the α=0.1 level.

Table 24. Response Distributions for Test and Roster Treatments, Self-Response Modes

Item	Test	Roster	P-Value
Age	(n=34,000)	(n=34,000)	0.89
Under 5 years old	4.7 (0.2)	4.9 (0.2)	
5 to 17 years old	15.3 (0.4)	15.1 (0.3)	
18 to 24 years old	7.0 (0.3)	7.2 (0.2)	
25 to 44 years old	25.7 (0.4)	25.7 (0.4)	
45 to 64 years old	26.5 (0.4)	26.1 (0.4)	
65 years old or older	20.8 (0.4)	21.1 (0.4)	
Sex	(n=34,500)	(n=34,500)	0.95
Male	48.3 (0.3)	48.2 (0.3)	
Female	51.8 (0.3)	51.8 (0.3)	
Hispanic Origin	(n=33,500)	(n=33,500)	0.12
Not Hispanic or Latino	85.5 (0.4)	86.4 (0.4)	
Hispanic or Latino	14.5 (0.4)	13.6 (0.4)	
Race	(n=34,000)	(n=34,000)	0.76
White only	73.9 (0.5)	74.0 (0.5)	
Black only	7.9 (0.3)	7.9 (0.3)	
Other race only	13.4 (0.4)	12.9 (0.5)	
Two or more races	4.8 (0.3)	5.1 (0.3)	
Tenure	(n=14,000)	(n=14,000)	0.42
Owned with a mortgage	47.5 (0.5)	48.1 (0.5)	
Owned free and clear	25.2 (0.5)	24.7 (0.5)	
Rented	26.0 (0.5)	26.1 (0.5)	
Occupied without payment of rent	1.4 (0.1)	1.1 (0.1)	
Language of Response	(n=11,500)	(n=11,000)	0.44
English	99.5 (0.1)	99.6 (0.1)	
Spanish	0.5 (0.1)	0.4 (0.1)	
Other	<0.1 (<0.1)	<0.1 (<0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the α=0.1 level.

Table 25 shows the response distributions for the original interview for the Control and Test treatments among CAPI responses. Table 26 and Table 27 show the same information but for comparing the Control and Roster treatments and the Test and Roster treatments, respectively.

Table 25. Response Distributions for Test and Control Treatments, CAPI Mode

Item	Test	Control	P-Value
Age	(n=6,900)	(n=6,800)	0.93
Under 5 years old	5.8 (0.4)	6.0 (0.5)	
5 to 17 years old	17.8 (0.7)	17.1 (0.8)	
18 to 24 years old	8.4 (0.5)	9.2 (0.5)	
25 to 44 years old	27.1 (0.8)	26.5 (0.7)	
45 to 64 years old	24.5 (0.9)	24.9 (0.9)	
65 years old or older	16.3 (0.8)	16.3 (0.8)	
Sex	(n=6,900)	(n=6,800)	0.79
Male	49.6 (0.7)	49.3 (0.8)	
Female	50.4 (0.7)	50.7 (0.7)	
Hispanic Origin	(n=6,900)	(n=6,800)	0.84
Not Hispanic or Latino	70.4 (1.4)	70.8 (1.4)	
Hispanic or Latino	29.6 (1.4)	29.2 (1.4)	
Race	(n=6,800)	(n=6,700)	0.02*
White only	62.6 (1.4)	58.7 (1.5)	
Black only	17.5 (1.0)	19.1 (1.1)	
Other race only	16.0 (1.1)	19.6 (1.0)	
Two or more races	3.9 (0.6)	2.6 (0.4)	
Tenure	(n=2,600)	(n=2,600)	0.92
Owned with a mortgage	30.8 (1.4)	32.1 (1.4)	
Owned free and clear	21.1 (1.1)	20.7 (1.1)	
Rented	46.2 (1.4)	45.1 (1.4)	
Occupied without payment of rent	1.9 (0.4)	2.0 (0.4)	
Language of Response	(n=2,600)	(n=2,600)	0.23
English	92.3 (0.6)	91.3 (0.7)	
Spanish	6.5 (0.4)	7.8 (0.7)	
Other	1.2 (0.3)	0.9 (0.2)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the α=0.1 level.

Table 26. Response Distributions for Roster and Control Treatments, CAPI Mode

Item	Roster	Control	P-Value
Age	(n=6,900)	(n=6,800)	0.57
Under 5 years old	5.4 (0.4)	6.0 (0.5)	
5 to 17 years old	17.5 (0.7)	17.1 (0.8)	
18 to 24 years old	10.4 (0.6)	9.2 (0.5)	
25 to 44 years old	25.5 (0.7)	26.5 (0.7)	
45 to 64 years old	24.6 (1.0)	24.9 (0.9)	
65 years old or older	16.6 (0.7)	16.3 (0.8)	
Sex	(n=7,000)	(n=6,800)	0.97
Male	49.4 (0.7)	49.3 (0.8)	
Female	50.7 (0.7)	50.7 (0.7)	
Hispanic Origin	(n=6,900)	(n=6,800)	0.61
Not Hispanic or Latino	69.8 (1.3)	70.8 (1.4)	
Hispanic or Latino	30.2 (1.4)	29.2 (1.4)	
Race	(n=6,800)	(n=6,700)	0.30
White only	62.0 (1.4)	58.7 (1.5)	
Black only	17.5 (1.3)	19.1 (1.1)	
Other race only	17.5 (1.2)	19.6 (1.0)	
Two or more races	3.0 (0.4)	2.6 (0.4)	
Tenure	(n=2,700)	(n=2,600)	0.46
Owned with a mortgage	29.7 (1.3)	32.1 (1.4)	
Owned free and clear	20.1 (1.1)	20.7 (1.1)	
Rented	48.3 (1.3)	45.1 (1.4)	
Occupied without payment of rent	1.9 (0.3)	2.0 (0.4)	
Language of Response	(n=2,700)	(n=2,600)	0.84
English	91.4 (0.6)	91.3 (0.7)	
Spanish	7.5 (0.5)	7.8 (0.7)	
Other	1.0 (0.3)	0.9 (0.2)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

<u>Note</u>: 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 of independence at the α=0.1 level.

Table 27. Response Distributions for Test and Roster Treatments, CAPI Mode

Item	Test	Roster	P-Value
Age	(n=6,900)	(n=6,900)	0.17
Under 5 years old	5.8 (0.4)	5.4 (0.4)	
5 to 17 years old	17.8 (0.7)	17.5 (0.7)	
18 to 24 years old	8.4 (0.5)	10.4 (0.6)	
25 to 44 years old	27.1 (0.8)	25.5 (0.7)	
45 to 64 years old	24.5 (0.9)	24.6 (1.0)	
65 years old or older	16.3 (0.8)	16.6 (0.7)	
Sex	(n=6,900)	(n=7,000)	0.79
Male	49.6 (0.7)	49.4 (0.7)	
Female	50.4 (0.7)	50.7 (0.7)	
Hispanic Origin	(n=6,900)	(n=6,900)	0.74
Not Hispanic or Latino	70.4 (1.4)	69.8 (1.3)	
Hispanic or Latino	29.6 (1.4)	30.2 (1.4)	
Race	(n=6,800)	(n=6,800)	0.51
White only	62.6 (1.4)	62.0 (1.4)	
Black only	17.5 (1.0)	17.5 (1.3)	
Other race only	16.0 (1.1)	17.5 (1.2)	
Two or more races	3.9 (0.6)	3.0 (0.4)	
Tenure	(n=2,600)	(n=2,700)	0.72
Owned with a mortgage	30.8 (1.4)	29.7 (1.3)	
Owned free and clear	21.1 (1.1)	20.1 (1.1)	
Rented	46.2 (1.4)	48.3 (1.3)	
Occupied without payment of rent	1.9 (0.4)	1.9 (0.3)	
Language of Response	(n=2,600)	(n=2,700)	0.41
English	92.3 (0.6)	91.4 (0.6)	
Spanish	6.5 (0.4)	7.5 (0.5)	
Other	1.2 (0.3)	1.0 (0.3)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
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 of independence at the α=0.1 level.

Appendix B. CFU Reinterview Response Distributions by Mode of Original Interview

Table 28 shows the response distributions for the CFU reinterview for the Control and Test treatments among original interview self-responses. Table 29 and Table 30 show the same information but for comparing the Control and Roster treatments and the Test and Roster treatments, respectively.

Table 28. CFU Response Distributions for Test and Control Treatments, Self-Response Modes of Original Interview

Item	Test	Control	P-Value
Age	(n=11,000)	(n=10,000)	1.00
Under 5 years old	4.6 (0.3)	4.7 (0.3)	
5 to 17 years old	13.4 (0.6)	13.4 (0.6)	
18 to 24 years old	6.4 (0.4)	6.5 (0.4)	
25 to 44 years old	25.6 (0.6)	25.9 (0.6)	
45 to 64 years old	25.1 (0.7)	24.6 (0.7)	
65 years old or older	24.8 (0.8)	24.9 (0.7)	
Sex	(n=11,000)	(n=10,000)	0.48
Male	48.8 (0.5)	48.3 (0.6)	
Female	51.1 (0.5)	51.7 (0.6)	
Hispanic Origin	(n=10,500)	(n=10,000)	0.63
Not Hispanic or Latino	87.5 (0.7)	86.9 (0.9)	
Hispanic or Latino	12.5 (0.7)	13.1 (0.9)	
Race	(n=11,000)	(n=10,000)	0.92
White only	77.1 (0.9)	77.2 (0.8)	
Black only	7.7 (0.5)	7.5 (0.4)	
Other race only	10.7 (0.7)	10.5 (0.7)	
Two or more races	4.5 (0.4)	4.9 (0.4)	
Tenure	(n=4,800)	(n=4,600)	0.06*
Owned with a mortgage	45.7 (1.0)	46.9 (1.1)	
Owned free and clear	27.8 (0.8)	25.1 (0.8)	
Rented	25.3 (0.9)	26.4 (1.0)	
Occupied without payment of rent	1.2 (0.2)	1.6 (0.2)	
Language of Response	(n=3,700)	(n=3,500)	0.28
English	99.9 (0.1)	99.9 (0.1)	
Spanish	0.1 (<0.1)	0.1 (0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the α=0.1 level.

Table 29. CFU Response Distributions for Roster and Control Treatments, Self-Response Modes of Original Interview

Item	Roster	Control	P-Value
Age	(n=9,900)	(n=10,000)	0.55
Under 5 years old	4.5 (0.4)	4.7 (0.3)	
5 to 17 years old	12.5 (0.5)	13.4 (0.6)	
18 to 24 years old	7.5 (0.4)	6.5 (0.4)	
25 to 44 years old	25.3 (0.7)	25.9 (0.6)	
45 to 64 years old	24.8 (0.7)	24.6 (0.7)	
65 years old or older	25.4 (0.8)	24.9 (0.7)	
Sex	(n=9,900)	(n=10,000)	0.88
Male	48.4 (0.5)	48.3 (0.6)	
Female	51.6 (0.5)	51.7 (0.6)	
Hispanic Origin	(n=9,700)	(n=10,000)	0.83
Not Hispanic or Latino	87.2 (0.8)	86.9 (0.9)	
Hispanic or Latino	12.8 (0.8)	13.1 (0.9)	
Race	(n=9,800)	(n=10,000)	0.78
White only	75.9 (0.8)	77.2 (0.8)	
Black only	7.7 (0.6)	7.5 (0.4)	
Other race only	11.2 (0.8)	10.5 (0.7)	
Two or more races	5.2 (0.4)	4.9 (0.4)	
Tenure	(n=4,500)	(n=4,600)	0.01*
Owned with a mortgage	44.5 (1.1)	46.9 (1.1)	
Owned free and clear	28.3 (0.9)	25.1 (0.8)	
Rented	26.3 (1.0)	26.4 (1.0)	
Occupied without payment of rent	0.9 (0.2)	1.6 (0.2)	
Language of Response	(n=3,400)	(n=3,500)	0.56
English	99.8 (0.1)	99.9 (0.1)	
Spanish	0.2 (0.1)	0.1 (0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
<u>Note</u>: 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 of independence at the α=0.1 level.

Table 30. CFU Response Distributions for Test and Roster Treatments, Self-Response Modes of Original Interview

Item	Test	Roster	P-Value
Age	(n=11,000)	(n=9,900)	0.43
Under 5 years old	4.6 (0.3)	4.5 (0.4)	
5 to 17 years old	13.4 (0.6)	12.5 (0.5)	
18 to 24 years old	6.4 (0.4)	7.5 (0.4)	
25 to 44 years old	25.6 (0.6)	25.3 (0.7)	
45 to 64 years old	25.1 (0.7)	24.8 (0.7)	
65 years old or older	24.8 (0.8)	25.4 (0.8)	
Sex	(n=11,000)	(n=9,900)	0.56
Male	48.8 (0.5)	48.4 (0.5)	
Female	51.1 (0.5)	51.6 (0.5)	
Hispanic Origin	(n=10,500)	(n=9,700)	0.80
Not Hispanic or Latino	87.5 (0.7)	87.2 (0.8)	
Hispanic or Latino	12.5 (0.7)	12.8 (0.8)	
Race	(n=11,000)	(n=9,800)	0.65
White only	77.1 (0.9)	75.9 (0.8)	
Black only	7.7 (0.5)	7.7 (0.6)	
Other race only	10.7 (0.7)	11.2 (0.8)	
Two or more races	4.5 (0.4)	5.2 (0.4)	
Tenure	(n=4,800)	(n=4,500)	0.52
Owned with a mortgage	45.7 (1.0)	44.5 (1.1)	
Owned free and clear	27.8 (0.8)	28.3 (0.9)	
Rented	25.3 (0.9)	26.3 (1.0)	
Occupied without payment of rent	1.2 (0.2)	0.9 (0.2)	
Language of Response	(n=3,700)	(n=3,400)	0.06*
English	99.9 (0.1)	99.8 (0.1)	
Spanish	0.1 (<0.1)	0.2 (0.1)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the $\alpha=0.1$ level.

Table 31 shows the response distributions for the CFU reinterview for the Control and Test treatments among original interview CAPI responses. Table 32 and Table 33 show the same information but for comparing the Control and Roster treatments and the Test and Roster treatments, respectively.

Table 31. CFU Response Distributions for Test and Control Treatments, CAPI Mode of Original Interview

Item	Test	Control	P-Value
Age	(n=1,500)	(n=1,500)	0.33
Under 5 years old	4.3 (0.8)	4.0 (0.9)	
5 to 17 years old	14.7 (1.4)	12.6 (1.3)	
18 to 24 years old	5.4 (0.7)	8.2 (1.2)	
25 to 44 years old	24.9 (1.5)	22.3 (1.6)	
45 to 64 years old	26.7 (2.0)	28.9 (2.0)	
65 years old or older	24.0 (1.9)	23.9 (2.1)	
Sex	(n=1,600)	(n=1,500)	0.98
Male	49.9 (1.5)	49.9 (1.6)	
Female	50.2 (1.5)	50.1 (1.6)	
Hispanic Origin	(n=1,600)	(n=1,500)	0.49
Not Hispanic or Latino	82.9 (2.0)	84.7 (2.0)	
Hispanic or Latino	17.2 (2.0)	15.3 (2.0)	
Race	(n=1,500)	(n=1,400)	0.65
White only	69.2 (2.4)	66.8 (2.6)	
Black only	16.8 (1.7)	16.7 (1.8)	
Other race only	11.0 (1.8)	14.1 (2.0)	
Two or more races	2.9 (0.8)	2.5 (0.8)	
Tenure	(n=650)	(n=650)	0.60
Owned with a mortgage	34.9 (2.4)	36.6 (2.6)	
Owned free and clear	24.8 (2.3)	27.1 (2.5)	
Rented	38.6 (2.6)	34.2 (2.6)	
Occupied without payment of rent	1.6 (0.5)	2.1 (0.7)	
Language of Response	(n=650)	(n=650)	0.97
English	99.4 (0.2)	99.4 (0.4)	
Spanish	0.6 (0.2)	0.6 (0.4)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

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 of independence at the α=0.1 level.

Table 32. CFU Response Distributions for Roster and Control Treatments, CAPI Mode of Original Interview

Item	Roster	Control	P-Value
Age	(n=1,400)	(n=1,500)	0.27
Under 5 years old	4.4 (0.9)	4.0 (0.9)	
5 to 17 years old	15.4 (1.4)	12.6 (1.3)	
18 to 24 years old	7.4 (1.0)	8.2 (1.2)	
25 to 44 years old	26.5 (1.8)	22.3 (1.6)	
45 to 64 years old	25.7 (2.1)	28.9 (2.0)	
65 years old or older	20.6 (1.7)	23.9 (2.1)	
Sex	(n=1,400)	(n=1,500)	0.67
Male	49.0 (1.3)	49.9 (1.6)	
Female	51.0 (1.3)	50.1 (1.6)	
Hispanic Origin	(n=1,400)	(n=1,500)	0.72
Not Hispanic or Latino	83.7 (2.2)	84.7 (2.0)	
Hispanic or Latino	16.3 (2.2)	15.3 (2.0)	
Race	(n=1,400)	(n=1,400)	0.77
White only	65.2 (2.5)	66.8 (2.6)	
Black only	19.2 (2.4)	16.7 (1.8)	
Other race only	13.7 (2.5)	14.1 (2.0)	
Two or more races	1.9 (0.5)	2.5 (0.8)	
Tenure	(n=650)	(n=650)	0.26
Owned with a mortgage	34.5 (2.3)	36.6 (2.6)	
Owned free and clear	22.6 (2.2)	27.1 (2.5)	
Rented	41.0 (2.2)	34.2 (2.6)	
Occupied without payment of rent	1.9 (0.6)	2.1 (0.7)	
Language of Response	(n=650)	(n=650)	0.17
English	98.5 (0.6)	99.4 (0.4)	
Spanish	1.5 (0.6)	0.6 (0.4)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058
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 of independence at the α=0.1 level.

Table 33. CFU Response Distributions for Test and Roster Treatments, CAPI Mode of Original Interview

Item	Test	Roster	P-Value
Age	(n=1,500)	(n=1,400)	0.49
Under 5 years old	4.3 (0.8)	4.4 (0.9)	
5 to 17 years old	14.7 (1.4)	15.4 (1.4)	
18 to 24 years old	5.4 (0.7)	7.4 (1.0)	
25 to 44 years old	24.9 (1.5)	26.5 (1.8)	
45 to 64 years old	26.7 (2.0)	25.7 (2.1)	
65 years old or older	24.0 (1.9)	20.6 (1.7)	
Sex	(n=1,600)	(n=1,400)	0.67
Male	49.9 (1.5)	49.0 (1.3)	
Female	50.2 (1.5)	51.0 (1.3)	
Hispanic Origin	(n=1,600)	(n=1,400)	0.74
Not Hispanic or Latino	82.9 (2.0)	83.7 (2.2)	
Hispanic or Latino	17.2 (2.0)	16.3 (2.2)	
Race	(n=1,500)	(n=1,400)	0.40
White only	69.2 (2.4)	65.2 (2.5)	
Black only	16.8 (1.7)	19.2 (2.4)	
Other race only	11.0 (1.8)	13.7 (2.5)	
Two or more races	2.9 (0.8)	1.9 (0.5)	
Tenure	(n=650)	(n=650)	0.82
Owned with a mortgage	34.9 (2.4)	34.5 (2.3)	
Owned free and clear	24.8 (2.3)	22.6 (2.2)	
Rented	38.6 (2.6)	41.0 (2.2)	
Occupied without payment of rent	1.6 (0.5)	1.9 (0.6)	
Language of Response	(n=650)	(n=650)	0.04*
English	99.4 (0.2)	98.5 (0.6)	
Spanish	0.6 (0.2)	1.5 (0.6)	

Source: U.S. Census Bureau, 2022 American Community Survey Content Test. DRB Approval Number: CBDRB-FY23-ACSO003-B0058

<u>Note</u>: 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 of independence at the α=0.1 level.