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MEMORANDUM FOR Mary Hyde
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Subject: Evaluating Nonresponse Bias in the 2021 Civic Engagement and
Volunteering Supplement to the Current Population Survey -
Revision

The purpose of this memorandum is to report on analysis of various nonresponse estimates computed for the 2021 Civic Engagement and Volunteering Supplement to the Current Population Survey and to provide nonresponse bias analysis tables for those estimates. The revision reflects a sponsor requested supplement name change from “Volunteering and Civic Life (VCL)” to “Civic Engagement and Volunteering (CEV)” and corrects educational attainment estimates provided in Tables 4 and 7.

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The U.S. Census Bureau reviewed this data product for unauthorized disclosure of confidential information and approved the disclosure avoidance practices applied to this release. CBDRB-FY22-POP001-0150.

Attachment: Evaluating Nonresponse Bias in the 2021 Civic Engagement and Volunteering Supplement to the Current Population Survey

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Evaluating Nonresponse Bias in the 2021 Civic Engagement and Volunteering Supplement to the Current Population Survey

December 22, 2022

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Executive Summary

This report presents results of an analysis of various nonresponse estimates computed for the 2021 Civic Engagement and Volunteering Supplement (CEV) to the Current Population Survey (CPS). The sample included all households who completed a CPS interview. A nonresponse bias analysis was conducted to determine whether nonresponse among different demographic groups may have biased estimates. Overall response rates, demographic subgroup response rates, and demographic respondent and nonrespondent distributions were investigated.

Key findings for the 2021 CEV:

- The CPS household weighted response rate was 75.22 percent. The CEV person weighted response rate was 65.63 percent. Since the basic CPS nonresponse rate is a household-level rate and the CEV nonresponse rate is a person-level rate, they cannot be combined to derive an overall nonresponse rate.
- For the CPS household estimates, excluding blanks (no responses), there are significant differences in the response rates and respondent distributions for each of the variables investigated. Excluding the blanks and missing values, the largest difference in response rates is seen for region and age of reference person (there is no significant difference between their ranges of response rates). The largest difference between respondent and nonrespondent distributions is also within region and age of reference person.
- For the CEV person estimates, excluding blanks, there are significant differences in the response rates and respondent distributions for each of the variables that were investigated except type of living quarters and urban/rural status. The age of respondent has the largest difference in response rates. The largest difference between respondent and nonrespondent distributions is also within age of respondent.
- For CEV person estimates for characteristics only available for CPS respondents, there are significant differences in the response rates and respondent distributions for each of the variables investigated. Excluding blanks, the largest difference in response rates as well as respondent and nonrespondent distributions is seen within household type.

1. Introduction

The Office of Management and Budget (OMB) provides guidelines for conducting a nonresponse bias study when the expected unit response rate of a survey is below 80 percent (OMB, 2006). The Current Population Survey (CPS) household response rates have historically been above 80 percent,¹ but the response rates for the Civic Engagement and Volunteering Supplement (CEV)² are below this threshold.

This document provides results from our evaluation of nonresponse in the 2021 CEV to the CPS. Its purpose is to determine the existence of potential nonresponse bias in the 2021 CEV.

1.1 Overview of the CPS

The monthly CPS collects primarily labor force data about the civilian noninstitutional population living in the United States. The institutional population, which is excluded from the population universe, is composed primarily of the population in correctional institutions and nursing homes (98 percent of the 4.0 million institutionalized people in Census 2010). Interviewers ask questions concerning labor force participation about each member 15 years old and over in sample households. Typically, the week containing the nineteenth of the month is the interview week. The week containing the twelfth is the reference week (i.e., the week about which the labor force questions are asked).

The CPS uses a multistage probability sample based on the results of the decennial census, with coverage in all 50 states and the District of Columbia. The sample is continually updated to account for new residential construction. When files from the most recent decennial census become available, the Census Bureau gradually introduces a new sample design for the CPS.

Every ten years, the CPS first-stage sample is redesigned³ reflecting changes based on the most recent decennial census. In the first stage of the sampling process, primary sampling units (PSUs)⁴ were selected for sample. In the 2010 sample design, the United States was divided into 1,987 PSUs. These PSUs were then grouped into 852 strata. Within each stratum, a single PSU was chosen for

¹ Starting in 2020, data collection faced extraordinary circumstances due to the onset of the COVID-19 pandemic as the Census Bureau suspended in-person interviews and closed both telephone contact centers.

² This supplement was previously known as the Volunteering and Civic Life Supplement. It was changed to better reflect the supplement's focus on civic engagement and the sponsoring agency's (AmeriCorps) website content.

³ For detailed information on the 2010 sample redesign, please reference Bureau of Labor Statistics (2014).

⁴ The PSUs correspond to substate areas (i.e., counties or groups of counties) that are geographically contiguous.

the sample, with its probability of selection proportional to its population as of the most recent decennial census. In the case of strata consisting of only one PSU, the PSU was chosen with certainty.

1.2 Overview of the 2021 Civic Engagement and Volunteering Supplement to the Current Population Survey

In September 2021, in addition to the basic CPS questions, interviewers asked supplementary questions of randomly selected household member(s) 16 years and older on being civically active. The universe for this supplement is persons in households eligible for the basic CPS. Depending on the number of persons found within an eligible household, one, two, or three respondents are randomly selected for the CEV (U.S. Census Bureau, 2019b). This supplement allows for proxy response.

The key estimates include:

- Number and percentage of persons 16 and over who volunteered in the past year.
- Percentage of volunteers by range of hours spent volunteering in the past year.
- Percentage of volunteers by number of organizations involved with.
- Number and percentage of persons aged 18 and over who voted in the last local election (such as mayor or school board).

Key domains, or characteristics for which the key estimates are created, include:

- Sex
- Race / ethnicity
- Age
- Education levels

1.3 Discussion of Nonresponse in the 2021 Civic Engagement and Volunteering Supplement to the Current Population Survey

Some degree of nonresponse bias and variance is a normal feature of almost all statistical surveys. The CEV produces civic engagement and volunteering estimates using the answers from responding persons. These civic engagement and volunteering estimates will be biased if answers from respondents differ from the potential answers of nonrespondents. The magnitude of the bias is a function of the response rate and differences between respondents and nonrespondents.

There were two ways that a person could be a nonrespondent to the CEV:

- The entire household did not respond to CPS (the occupants were not found at home after repeated calls or are unavailable for some other reason).
- The household responded to CPS but did not respond to the CEV interview.

Because the CEV response rate is directly linked to the CPS response rate, the CPS and CEV attempt to minimize nonresponse bias by increasing response rates and adjusting weights for potential differences between respondents and nonrespondents. We try to increase response rates within CPS by conducting personal visit interviews for new and returning sample units, mailing advance letters for all sample units, providing a Spanish language questionnaire for potential respondents who do not speak English, allowing interpreters for potential respondents who do not speak English or Spanish, training field representatives to gain respondent cooperation, allowing proxy respondents in special circumstances, and mailing follow-up letters to nonresponding households. We also help minimize nonresponse bias by reducing respondent burden for the CEV by limiting the length of the survey.

We reduce the effects of respondent/nonrespondent differences through noninterview weighting adjustments. These adjustments group respondents and nonrespondents into adjustment cells, and the weights of the nonrespondents are reallocated to the respondents within the adjustment cells.

CPS noninterview adjustment cells are formed by noninterview cluster (NICL) and central city status. The NICLs are created based on sample PSUs that are similar in metropolitan status and population size within the same state (U.S. Census Bureau, 2006). Metropolitan status is defined as metropolitan or nonmetropolitan. Within metropolitan PSUs, a further breakdown into “central city” and “not central city” is defined. This results in 127 NICLs and 214 adjustment cells. These variables were chosen for the noninterview adjustment cells because they are thought to be correlated with the CPS variables of interest.

CEV noninterview adjustment cells are defined using a special logistic regression process. We use a logistic regression to group respondents and nonrespondents into noninterview cells by like characteristics to calculate the nonresponse adjustment.

Despite the measures taken to reduce nonresponse bias, there is likely still some amount of nonresponse bias that we cannot correct without knowing the civic engagement and volunteering activity of the nonrespondents.

2. Methodology

2.1 Data

The data for this nonresponse bias analysis are from the September 2021 CEV to the CPS and the September 2021 CPS. The U.S. Census Bureau conducts the CPS every month, although this file has only September data. The September survey uses two sets of questions, the basic CPS and a set of supplemental questions. The CPS, sponsored jointly by the Census Bureau and the U.S. Bureau of Labor Statistics, is the country's primary source of labor force statistics for the entire population. The Corporation for National and Community Service sponsors the supplemental questions for September.

For a small number of variables, we had complete household information for all sample households, including respondents and nonrespondents. These variables were primarily limited to geographic and sampling data. There are also some variables with partial information for the nonrespondents. Normal CPS processing uses previous responses to demographic questions (when available) and does not re-ask those that are unlikely to change from interview to interview. Any variables that have never been answered are imputed using the hot deck imputation method. Hot deck imputation assigns a value collected for a person with similar characteristics to the missing value. Where possible, nonrespondent actual values were used as opposed to edited or imputed values in the comparison to respondents. The two exceptions are for tenure and presence of children, because these characteristics were only available for CPS respondents.

2.2 Weights

In the detailed weighting process for the CPS, base weights were adjusted with the weighting control factor (WCF), which accounts for subsampling in the field but does not include any nonresponse/noninterview or population coverage adjustments. This subsampling-adjusted base weight is the weight used throughout this report for household calculations for CPS.

When computing rates and distributions in this report for CEV persons, the CEV adjusted base weights, which are the noninterview-adjusted weights from CPS, were used. These weights do not take into account any adjustment for CEV subsampling within the household, and they do not adjust for CEV nonresponse using logistic regression. Note that CEV weights are person level, not household level, and include the CPS noninterview adjustment, which inflates weights back up to the eligible weighted CPS sample.

The CEV also created weights based on self- or proxy-response, but these were not considered to be in the scope of this analysis.

All numbers presented in the report are weighted unless otherwise noted. All estimates in this report are rounded according to Census Bureau Disclosure Review Board policies.

2.3 Universe for the Estimates

We analyzed nonresponse for persons aged 16 years and older in households. Our analysis focused on person nonresponse within respondent demographics, housing unit (HU) characteristics, and geography.

3. Limitations

There are some limitations to this analysis which may affect the results. In particular:

1. Using past data to assign subgroup variables to nonrespondents is not necessarily accurate for persons. Due to in-movers and out-movers, it is possible for demographic variables that we get from past data to be out of date. However, we do not believe our results need to be 100 percent accurate to show major differences between respondents and nonrespondents. This assumes that the demographics of neighborhoods do not change much in one and a half years.
2. Nonrespondents for CPS are never given the opportunity to respond to the CEV.

4. Response Rates

The response rates tell us the percentage of eligible sample cases that responded to the CPS and the CEV. It is useful to compare response rates for different subgroups to understand the magnitude of potential biases.

We produced weighted and unweighted response rates for the 2021 CEV by key domains and variables. Since the basic CPS nonresponse rate is a household-level rate and the CEV supplement nonresponse rate is a person-level rate, we cannot combine these rates to derive an overall nonresponse rate. Nonresponding households may have more or fewer persons than interviewed ones, so combining these rates may lead to an under- or overestimate of the true overall nonresponse rate for persons for the CEV supplement.

Response rates are defined as:

$$RR = \frac{\sum_{i \in S} w_i R_i D_i}{\sum_{i \in S} w_i D_i}$$

where:

w_i = the appropriate weight (1 if unweighted) for the response rate calculation

R_i = the response indicator (1 for respondents, 0 for nonrespondents)

D_i = the domain indicator (1 if within domain of interest, 0 otherwise)

s = the set of all eligible households

Eligible households are all sample housing units (HUs) that did not receive Type B or Type C (out-of-scope) outcome codes. Persons within group quarters (GQs) are treated as individual HUs. The CPS interview data contains all eligible and non-eligible HUs, and the CEV interview data contains only persons in eligible HUs to the CPS.

For the September 2021 CPS, there were approximately 58,500 occupied HUs eligible for the household analysis. Of the 58,500 occupied households, 43,500 were interviewed. Within the 43,500 households that were interviewed for CPS, 83,500 persons were eligible for the CEV. Due to subsampling within households, 73,000 persons were selected for interview and 48,000 responded to the CEV.

Table 1 shows that the weighted percentage of households where at least one person responded to CPS is 75.22 percent. Out of all persons eligible and selected in those responding households, 65.63 percent (weighted) responded to the CEV.

Table 1: 2021 Civic Engagement and Volunteering Unit Response Rates

Response Category	Count	Weighted Sum*	Unweighted Response Rates	Weighted Response Rates
Sampled CPS ^A Households	67,500	139,000,000		
Eligible CPS ^A Households	58,500	121,000,000		
CPS ^A Household Response	43,500	91,010,000	74.97%	75.22%
CEV ^B Eligible Households	43,500			
CEV ^B Eligible Persons	83,500	234,200,000		
CEV ^B Selected Persons ^C	73,000	202,900,000		
CEV ^B Person Response	48,000	133,200,000	65.79%	65.63%

Source: U.S. Census Bureau internal data from September 2021 Current Population Survey interviews.

^A CPS: Current Population Survey

^B CEV: Civic Engagement and Volunteering Supplement

^C The CEV Supplement subsamples within eligible households when three or more respondents are eligible. Response rates are calculated out of selected eligible persons.

* May not sum to totals due to rounding. For Current Population Survey (CPS) households, CPS household weights prior to noninterview adjustments were used. For Civic Engagement and Volunteering Supplement (CEV) households, the CEV base weights, which are the noninterview-adjusted weights from CPS, were used.

Table 2 shows weighted response rates for all CPS households by domain. The standard error column shows the standard error of the response rate. Standard errors are conditional on the sample and represent expected variability in the response process, rather than traditional sampling error. Replicate weights were used to calculate the standard errors to account for the sample design. The CPS uses the successive difference replication method to calculate replicate weights. For detailed information on variance estimation, please reference U.S. Census Bureau (2019a).

Table 2: Response Rates for September 2021 Current Population Survey Households

Characteristic	Unweighted Households*	Weighted Households*	Weighted Response Rate (%)	Standard Error (%)	Significance Grouping*
Type of Living Quarters					
Housing Unit	55,500	116,200,000	75.10%	0.2615%	B
Non-Housing Unit ^A	2,500	4,591,000	80.80%	0.9003%	A
Blank ^B	80	174,400	8.935%	3.472%	C
Principal City Status					
Principal City within CBSA/MSA ^C	19,000	39,780,000	72.51%	0.4202%	C
Residual within CBSA/MSA ^C	28,000	64,320,000	76.08%	0.3315%	B
Outside of a CBSA/MSA ^C	11,000	16,890,000	78.32%	0.8082%	A
Region					
Northeast	10,000	21,230,000	67.85%	0.6528%	C
Midwest	11,500	26,740,000	77.27%	0.5006%	A, B
South	22,000	46,050,000	75.71%	0.4176%	B
West	15,000	26,970,000	78.16%	0.4491%	A
Urban/Rural Status					
Urban	44,500	96,660,000	74.49%	0.2830%	B, C
Rural	13,000	23,520,000	78.30%	0.5586%	A, C
Missing	400	811,900	72.90%	2.694%	C
Race of Reference Person					
White Only	38,000	77,470,000	89.08%	0.2088%	A
Black Only	5,500	12,220,000	84.84%	0.5197%	C
Asian Only	2,300	5,370,000	88.27%	0.7121%	A, B
Other Race/Two or More Races	1,400	2,357,000	86.64%	1.085%	A, B, C
Blank	11,000	23,570,000	20.58%	0.5452%	D
Gender of Reference Person					
Male	24,500	50,880,000	87.71%	0.2338%	A
Female	26,000	53,370,000	86.90%	0.2570%	B
Blank	8,100	16,750,000	0.06620%	0.03190%	C
Hispanic Origin of Reference Person					
Hispanic	5,800	14,060,000	86.06%	0.5547%	B
Non-Hispanic	43,500	88,210,000	88.58%	0.1935%	A
Blank	9,000	18,730,000	4.139%	0.2925%	C
Age of Reference Person					
15-29	5,300	10,630,000	84.74%	0.5962%	E
30-39	8,000	16,690,000	85.60%	0.4498%	D, E
40-49	7,700	16,250,000	86.68%	0.4530%	C, D, E
50-59	8,300	17,500,000	87.90%	0.4027%	C
60-69	9,000	18,340,000	89.86%	0.3603%	B
70+	9,500	19,420,000	93.67%	0.3185%	A
Blank or Less than 15	10,500	22,170,000	16.17%	0.4301%	F
Overall	58,500	121,000,000	75.22%	0.2586%	

Source: U.S. Census Bureau internal data from September 2021 Current Population Survey interviews.

^A Non-Housing Units include quarters within rooming or boarding homes; non-permanent units in transient hotels, motels, etc.; unoccupied sites for mobile homes, trailers, or tents; group quarters in school dormitories; and other units that are not defined to be housing units.

^B Blank indicates that the living quarters type was either not identified or was identified with an invalid code.

^C CBSA/MSA: Core-Based Statistical Area/Metropolitan Statistical Area

* May not sum to totals due to rounding. For weighted percent of total sample, reference

Table 5.

× Within each characteristic, response rates identified with the same letter are not significantly different at the $\alpha=0.10$ level. A indicates the highest response rates, B indicates the next highest rates, etc. P-values were adjusted for multiple comparisons within each demographic characteristic using the Tukey-Kramer method (NIST/SEMATECH, 2013).

Excluding the blanks and missing values, one of the largest differences in response rates for the CPS subgroups is 10.31 percent, seen for region, where the West has a response rate of 78.16 percent versus 67.85 percent for the Northeast.⁵ Also having a large spread in response rates (8.93 percent)⁶ are the age groups, having a range of 93.67 percent for reference persons aged 70+ to 84.74 percent for reference persons aged 15-29.⁷

Additionally, households in living quarters that are non-HUs have a higher response rate than households in HU living quarters. Households outside of a core-based statistical area/metropolitan statistical area (CBSA/MSA) have the highest response rate within principal city status, rural has a higher response rate than urban, White only has a higher response rate than Black only,⁸ and non-Hispanic has a higher response rate than Hispanic.

The response rate for blanks within the demographic subgroups is low because these demographic items are collected during the interview, resulting in a large portion of the household nonrespondents falling within these blank categories instead of the categories where they belong. Any household with a blank value within the demographic subgroups above indicates that the household has not previously responded to the CPS or never provided responses to those demographic questions in previous interviews. The nonresponse in the non-blank demographic categories is from households which had previously responded to the CPS and provided a valid response (non-blank) within the demographic category.

⁵ The response rates for the Midwest and the West are not significantly different and the response rates for the Midwest and the South are not significantly different.

⁶ The response rate ranges for region and age of reference person are not significantly different.

⁷ The response rate for reference persons aged 15-29 is not significantly different than the response rates for reference persons aged 30-39 and reference persons aged 40-49. The response rates for reference persons aged 30-39 and reference persons aged 40-49 are not significantly different. The response rates for reference persons aged 40-49 and reference persons aged 50-59 are not significantly different.

⁸ The response rate for other race/two or more races is not significantly different than the response rates for White only, Black only, and Asian only.

Table 2 shows standard errors which facilitate hypothesis testing of differential response rates. However, the practical significance of response rate differences is usually driven more by the magnitude of the difference. Therefore, excluding blanks, if the nonrespondents are different from respondents, region and age of reference person have the most potential for bias.

Table 3 shows weighted response rates for all CEV selected persons by domain.

Table 3: Response Rates for 2021 Civic Engagement and Volunteering Supplement Selected Persons

Characteristic	Unweighted Persons*	Weighted Persons*	Weighted Response Rate (%)	Standard Error (%)	Significance Grouping ^x
Type of Living Quarters					
Housing Unit	70,000	195,300,000	65.60%	0.3657%	A
Non-Housing Unit ^A	3,200	7,603,000	66.60%	1.425%	A
Blank ^B	<15	3,1830	37.65%	19.56%	A ⁺
Principal City Status					
Principal City within CBSA/MSA ^C	22,000	64,580,000	66.59%	0.5749%	A
Residual within CBSA/MSA ^C	36,500	110,400,000	64.66%	0.4748%	B
Outside of a CBSA/MSA ^C	14,500	27,940,000	67.26%	1.141%	A, B
Region					
Northeast	11,500	35,520,000	63.39%	0.8040%	C
Midwest	15,000	44,440,000	70.17%	0.7036%	A
South	27,000	76,620,000	63.56%	0.5713%	C
West	19,500	46,340,000	66.43%	0.6178%	B
Urban/Rural Status					
Urban	55,000	160,800,000	65.44%	0.3761%	A
Rural	17,500	40,830,000	66.54%	0.7840%	A
Missing	500	1,321,000	61.18%	3.516%	A
Race of Respondent					
White Only	56,000	152,700,000	67.34%	0.4273%	A
Black Only	7,200	21,930,000	61.86%	0.7494%	B
Asian Only	3,800	11,780,000	61.42%	1.048%	B
Other Race/Two or More Races	2,100	4,766,000	65.92%	1.470%	A, B
Blank	3,700	11,790,000	54.67%	1.180%	C
Gender of Respondent					
Male	35,000	96,710,000	65.02%	0.4052%	B
Female	38,000	106,100,000	66.25%	0.3864%	A
Blank	50	92,060	5.401%	3.709%	C ⁺
Hispanic Origin of Respondent					
Hispanic	9,000	29,440,000	62.21%	0.7065%	B
Non-Hispanic	63,500	171,800,000	66.71%	0.3822%	A
Blank	600	1,682,000	15.30%	2.312%	C
Age of Respondent					
16-19	3,000	8,379,000	50.52%	1.107%	E
20-24	4,100	11,390,000	58.70%	0.9970%	D
25-34	11,000	30,240,000	67.08%	0.6025%	C
35-44	11,500	32,390,000	67.30%	0.6075%	C
45-54	9,900	28,160,000	66.93%	0.6155%	C
55-64	12,000	32,830,000	70.42%	0.5864%	B
65-74	11,000	29,990,000	74.53%	0.5648%	A
75+	7,700	21,200,000	74.81%	0.7041%	A
Blank or Less than 16	2,900	8,347,000	0.09620%	0.06830%	F
Overall	73,000	202,900,000	65.63%	0.3627%	

Source: U.S. Census Bureau internal data from September 2021 Current Population Survey interviews.

^A Non-Housing Units include quarters within rooming or boarding homes; non-permanent units in transient hotels, motels, etc.; unoccupied sites for mobile homes, trailers, or tents; group quarters in school dormitories; and other units that are not defined to be housing units.

^B Blank indicates that the living quarters type was either not identified or was identified with an invalid code.

^C CBSA/MSA: Core-Based Statistical Area/Metropolitan Statistical Area

* May not sum to totals due to rounding. For weighted percent of total sample, reference

Table 6.

- + Exercise caution: The sample size is extremely small, leading to unreliable estimates.
- × Within each characteristic, response rates identified with the same letter are not significantly different at the $\alpha=0.10$ level. A indicates the highest response rates, B indicates the next highest rates, etc. P-values were adjusted for multiple comparisons within each demographic characteristic using the Tukey-Kramer method (NIST/SEMATECH, 2013).

For the CEV person estimates, there is no significant differences among the urban/rural status response rates or the type of living quarters response rates. Excluding the blanks and missing values, the largest difference in response rates for the CEV subgroups is 25.29 percent, seen for the age of respondent, where ages 75+ has a response rate of 74.81⁹ percent versus 50.52 percent for ages 16-19. This large difference may be attributed to the greater number of subgroups within the age category compared to the other characteristics. Comparatively, the next largest difference in response rates is 6.78¹⁰ percent for region, between the Midwest at 70.17 percent and the Northeast at 63.39¹¹ percent.

Additionally, persons living in a principal city have a higher response rate than persons living in the residual of the city (although both groups were not significantly different from those living outside of principal city area), White only respondents have a higher response rate than Black only and Asian only respondents¹², female respondents have a higher response rate than male respondents, and non-Hispanic has a higher response rate than Hispanic.

Again, although

⁹ The response rate for ages 75+ is not significantly different than the response rate for ages 65 to 74.

¹⁰ The response rate ranges for region and race of respondent are not significantly different.

¹¹ The response rate for the Northeast is not significantly different than the response rate for the South.

¹² The response rate for other race/two or more races is not significantly different than the response rate for White only, Black only, and Asian only.

Table 3 shows standard errors which facilitate hypothesis testing, the practical significance of response rate differences is driven more by the magnitude of the difference than the sample size. Therefore, excluding blanks, if the nonrespondents are different from respondents, age of respondent has the most potential for bias.

Table 4 shows weighted response rates for all CEV households by domain for characteristics that were only available for CPS respondents.

Table 4: Response Rates for 2021 Civic Engagement and Volunteering Supplement Persons for Characteristics Only Available for Responding Current Population Survey Households

Characteristic	Unweighted Persons*	Weighted Persons*	Weighted Response Rate (%)	Standard Error (%)	Significance Grouping ^x
Tenure (Edited)					
Owned or Mortgage	52,000	142,100,000	66.19%	0.4313%	A
Rented for Cash	20,500	58,800,000	64.31%	0.5284%	B
No Cash Rent	800	1,996,000	65.14%	2.517%	A, B
Family Income					
Less than \$30,000	10,500	28,340,000	75.40%	0.6055%	A
\$30,000-\$74,999.99	20,000	53,810,000	72.77%	0.5185%	B
\$75,000-\$149,999.99	15,500	43,240,000	71.89%	0.5879%	B, C
\$150,000+	9,000	26,450,000	69.97%	0.7584%	C
Blank or Don't Know	3,400	9,751,000	42.76%	1.565%	D
Refused	15,000	41,330,000	45.72%	0.6542%	D
Household Type					
Husband/Wife Primary Family	41,500	114,500,000	64.47%	0.4424%	B
Unmarried Householder Primary Family	12,500	36,440,000	60.60%	0.6223%	C
Primary Individual	19,000	51,890,000	71.77%	0.4816%	A
Group Quarters	50	125,700	53.49%	11.68%	A, B, C ⁺
Child(ren) Present (Edited)					
No	54,000	149,800,000	66.81%	0.4039%	A
Yes	19,000	53,130,000	62.32%	0.5259%	B
Educational Attainment of Respondent (ages 25+, excludes blank ages)					
Less than High School	4,900	14,370,000	65.72%	0.8231%	B
High School Graduate	17,500	48,310,000	66.06%	0.5359%	B
Some College	9,800	26,140,000	71.63%	0.6537%	A
College Degree	30,500	85,980,000	72.31%	0.4339%	A
Nativity and Citizenship of Respondent					
Native Citizen	64,000	172,500,000	66.23%	0.3715%	A
Foreign-Born Citizen	4,900	16,440,000	63.12%	0.9359%	B
Foreign-Born Non-Citizen	4,300	14,030,000	61.23%	1.031%	B
Measure of Labor Force Participation of Respondent					
Employed	44,000	123,000,000	64.17%	0.4404%	B
Unemployed	1,500	5,014	67.02%	1.518%	A, B
Not in Labor Force	27,000	74,380,000	68.39%	0.4330%	A
Blank	150	500,800	2.567%	1.313%	C
Overall	73,000	202,900,000	65.63%	0.3627%	

Source: U.S. Census Bureau internal data from September 2021 Current Population Survey interviews.

* May not sum to totals due to rounding. For weighted percent of total sample, reference

Table 7.

- + Exercise caution: The sample size is small, leading to unreliable estimates.
- × Within each characteristic, response rates identified with the same letter are not significantly different at the $\alpha=0.10$ level. A indicates the highest response rates, B indicates the next highest rates, etc. P-values were adjusted for multiple comparisons within each demographic characteristic using the Tukey-Kramer method (NIST/SEMATECH, 2013).

For the CEV person estimates of characteristics only available for CPS respondents, excluding the blanks, refusals, and GQs, there were significant differences in response rates within all of the characteristics. The largest difference in response rates for the subgroups is 11.2 percent, seen for the household type variable, where the rates range from 60.60 percent for unmarried household, primary individuals to 71.77 percent for primary individuals.

For the tenure category, owned or mortgage has a response rate higher than rented for cash, but both rates are not significantly different than the response rate for no cash rent. Additionally, persons with a family income less than \$30,000 have a higher response rate than persons with other family incomes, persons with no children present in their household have a higher response rate than when children are present. The response rates for persons with a college degree and persons with some college are not significantly different, but both are higher than the other education groups¹³. Native citizens have a higher response rate than those who are foreign-born, whether or not they are a citizen¹⁴. Persons not in the labor force have a higher response rate than employed persons, but both of these groups are not significantly different from unemployed persons.

Again, although

¹³ The response rate for persons with less than high school education is not significantly different from the response rate for persons who have graduated from high school.

¹⁴ The response rate for foreign-born citizen is not significantly different from the response rate for foreign-born non-citizens.

Table 4 shows standard errors which facilitate hypothesis testing, the practical significance of response rate differences is driven more by the magnitude of the difference than the sample size. Therefore, excluding blanks, if the nonrespondents are different from respondents, among the categories in

Table 4, household type has the most potential for bias.

5. Respondent Distributions

Respondent and nonrespondent distributions show the relative percent of members of a domain subset within respondents and nonrespondents separately. This is different than the response rates, which are the relative percent of respondents within the different domain subsets. We used chi-square tests to determine if the respondent and nonrespondent distributions differed.

Respondent distributions are defined as:

$$RD = \frac{\sum_{i \in S} w_i R_i D_i}{\sum_{i \in S} w_i R_i}$$

This definition assumes the same eligibility criteria, weights, and indicators as the response rate calculations in the previous section. Nonrespondent distributions use the same formula, but with the R_i variable indicating nonrespondents instead of respondents. The chi-square test statistics were calculated using replicate weights to account for the sample design.

Table 5 shows the percent of total sample distribution as well as comparisons of respondent and nonrespondent distributions for CPS households within the different domain subgroups.

**Table 5: Respondent and Nonrespondent Distributions for September 2021
Current Population Survey Households**

Characteristic	Percentage of Total Sample*	Household Respondent Percentage*	Household Nonrespondent Percentage*	Chi-Square Statistic (df)	P-value
Type of Living Quarters					
Housing Unit	96.06%	95.91%	96.53%	201.7 (2) [32.21.(1)	< 0.0001
Non-Housing Unit ^A	3.795%	4.760%	2.940%		
Blank ^B	0.1441%	0.01712%	0.5296%		
Principal City Status					
Principal City within CBSA/MSA ^C	32.88%	31.70%	36.47%	56.41 (2)	< 0.0001
Residual within CBSA/MSA ^C	53.16%	53.77%	51.31%		
Outside of a CBSA/MSA ^C	13.96%	14.54%	12.22%		
Region					
Northeast	17.55%	15.83%	22.77%	217.2 (3)	< 0.0001
Midwest	22.10%	22.70%	20.27%		
South	38.06%	38.31%	37.31%		
West	22.29%	23.16%	19.65%		
Urban/Rural Status					
Urban	79.89%	79.12%	82.24%	42.81 (2) [35.86 (1)	< 0.0001
Rural	19.44%	20.23%	17.02%		
Missing	0.6710%	0.6503%	0.7338%		
Race of Reference Person					
White Only	64.03%	75.83%	28.23%	17,110 (4) [76.41 (3)	< 0.0001
Black Only	10.10%	11.39%	6.179%		
Asian Only	4.438%	5.209%	2.101%		
Other Race/Two or More Races	1.948%	2.244%	1.051%		
Blank	19.48%	5.329%	62.44%		
Gender of Reference Person					
Male	42.05%	49.03%	20.86%	30,180 (2) [6.188 (1)	< 0.0001
Female	44.11%	50.96%	23.33%		
Blank	13.84%	0.01218%	55.82%		
Hispanic Origin of Reference Person					
Hispanic	11.62%	13.29%	6.535%	18,330 (2) [21.20 (1)	< 0.0001
Non-Hispanic	72.90%	85.85%	33.59%		
Blank	15.48%	0.8517%	59.88%		
Age of Reference Person					
15-29	8.785%	9.900%	5.411%	19,410 (6) [321.9 (5)	< 0.0001
30-39	13.80%	15.70%	8.017%		
40-49	13.43%	15.47%	7.221%		
50-59	14.47%	16.90%	7.067%		
60-69	15.16%	18.12%	6.203%		
70+	16.05%	19.98%	4.100%		
Blank or Less than 15	18.32%	3.938%	61.98%		
Overall	100%	100%	100%		

Source: U.S. Census Bureau internal data from September 2021 Current Population Survey interviews.

^A Non-Housing Units include quarters within rooming or boarding homes; non-permanent units in transient hotels, motels, etc.; unoccupied sites for mobile homes, trailers, or tents; group quarters in school dormitories; and other units that are not defined to be housing units.

^B Blank indicates that the living quarters type was either not identified or was identified with an invalid code.

^C CBSA/MSA: Core-Based Statistical Area/Metropolitan Statistical Area

* May not sum to totals due to rounding.

[] The values within brackets are the chi-square statistic, df, and p-value when the blanks/missings are excluded from the chi-square test.

The chi-square tests for CPS households showed significant differences (at the $\alpha=0.10$ level) between respondent and nonrespondent distributions for all characteristics. Simply looking at the distributions for the race, gender, Hispanic origin, and age of reference person, it is apparent that there are large differences between the respondent and nonrespondent distributions, which correspond to the magnitude of the chi-square test statistics (17,110, 30,180, 18,330, and 19,410, respectively). When blanks are excluded from the chi-square test, the chi-square statistic decreases but the distributions are still significantly different for all characteristics. Note: The chi-square tests only indicate that the distributions of respondents and nonrespondents differ but do not necessarily indicate a nonresponse bias problem. These differences will only cause bias if the respondents and nonrespondents report differing rates of civic engagement and volunteering activity.

Even though there are significant differences between the respondents and nonrespondents, the differences might not be large enough to cause meaningful differences in estimates. Furthermore, weighting adjustments might also minimize the impact of some differences. Because the CPS noninterview adjustments take NICL and central city status into account, the principal city status and region differences may be reduced within those adjustments.

Table 6 shows the percent of total sample distribution as well as comparisons of respondent and nonrespondent distributions for CEV persons within the different domain subgroups.

Table 6: Respondent and Nonrespondent Distributions for 2021 Civic Engagement and Volunteering Supplement Persons

Characteristic	Percentage of Total Sample*	Person Respondent Percentage*	Person Nonrespondent Percentage*	Chi-Square Statistic (df)	P-value
Type of Living Quarters					
Housing Unit	96.24%	96.19%	96.33%	2.502 (2)	0.2862
Non-Housing Unit ^A	3.747%	3.802%	3.641%	[0.4895 (1)]	0.4841]
Blank ^B	0.01568%	0.008997%	0.02845%		
Principal City Status					
Principal City within CBSA/MSA ^C	31.82%	32.29%	30.93%		
Residual within CBSA/MSA ^C	54.41%	53.60%	55.95%	8.753 (2)	0.0126
Outside of a CBSA/MSA ^C	13.77%	14.11%	13.16%		
Region					
Northeast	17.51%	16.91%	18.65%		
Midwest	21.90%	23.41%	19.01%		
South	37.76%	36.57%	40.04%	70.83 (3)	< 0.0001
West	22.84%	23.11%	22.31%		
Urban/Rural Status					
Urban	79.23%	78.99%	79.67%	3.559 (2)	0.1687
Rural	20.12%	20.40%	19.59%	[1.796 (1)]	0.1802]
Missing	0.6511%	0.6070%	0.7355%		
Race of Respondent					
White Only	75.23%	77.19%	71.50%		
Black Only	10.80%	10.18%	11.99%		
Asian Only	5.805%	5.432%	6.516%	185.9 (4)	< 0.0001
Other Race/Two or More Races	2.349%	2.359%	2.329%	[77.84 (3)]	< 0.0001]
Blank	5.811%	4.840%	7.665%		
Gender of Respondent					
Male	47.66%	47.21%	48.51%	80.53 (2)	< 0.0001
Female	52.30%	52.79%	51.63%	[15.28 (1)]	< 0.0001]
Blank	0.04537%	0.003733%	0.1249%		
Hispanic Origin of Respondent					
Hispanic	14.51%	13.75%	15.95%	236.6 (2)	< 0.0001
Non-Hispanic	84.66%	86.05%	82.00%	[36.91 (1)]	<0.0001]
Blank	0.8287%	0.1932%	2.042%		
Age of Respondent					
16-19	4.129%	3.178%	5.945%		
20-24	5.615%	5.022%	6.748%		
25-34	14.90%	15.23%	14.27%		
35-44	15.96%	16.37%	15.19%		
45-54	13.88%	14.15%	13.36%	4,779 (8)	< 0.0001
55-64	16.18%	17.36%	13.93%	[722.3 (7)]	<0.0001]
65-74	14.78%	16.78%	10.95%		
75+	10.45%	11.91%	7.658%		
Blank or Less than 15	4.113%	0.006030%	11.96%		
Overall	100%	100%	100%		

Source: U.S. Census Bureau internal data from September 2021 Current Population Survey interviews.

^A Non-Housing Units include quarters within rooming or boarding homes; non-permanent units in transient hotels, motels, etc.; unoccupied sites for mobile homes, trailers, or tents; group quarters in school dormitories; and other units that are not defined to be housing units.

^B Blank indicates that the living quarters type was either not identified or was identified with an invalid code.

^C CBSA/MSA: Core-Based Statistical Area/Metropolitan Statistical Area

* May not sum to totals due to rounding.

[] The values within brackets are the chi-square statistic, df, and p-value when the blanks/missings are excluded from the chi-square test.

The chi-square tests for CEV persons showed significant differences (at the $\alpha=0.10$ level) for the distributions of all variables except urban/rural status and type of living quarters. Simply looking at the distributions for age of the respondent, it is apparent that there are large differences between the respondent and nonrespondent distributions, which correspond to the magnitude of the chi-square test statistic (4,779).

As mentioned for CPS household respondent distributions, the chi-square tests only indicate that the distributions of respondents and nonrespondents differ but do not necessarily indicate a nonresponse bias problem. Furthermore, weighting adjustments might minimize the impact of some differences. Because the CEV noninterview adjustments take NACL and central city status into account, the principal city status and region differences may be reduced within those adjustments.

Table 7 shows the percent of total sample distribution as well as comparisons of respondent and nonrespondent distributions for CEV persons within the different domain subgroups for characteristics that were only available for CPS respondents.

Table 7: Respondent and Nonrespondent Distributions for 2021 Civic Engagement and Volunteering Supplement Households for Characteristics Only Available for Responding CPS Households

Characteristic	Percentage of Total Sample*	Person Respondent Percentage*	Person Nonrespondent Percentage*	Chi-Square Statistic (df)	P-value
Tenure (Edited)					
Owned or Mortgage	70.04%	70.63%	68.91%	10.39 (2)	0.0056
Rented for Cash	28.98%	28.39%	30.10%		
No Cash Rent	0.9838%	0.9764%	0.9980%		
Family Income					
Less than \$30,000	13.97%	16.05%	9.997%	1,980 (5) [36.60 (3)]	< 0.0001
\$30,000-\$74,999.99	26.52%	29.40%	21.01%		
\$75,000-\$149,999.99	21.31%	23.34%	17.43%		
\$150,000+	13.03%	13.89%	11.39%		
Blank or Don't Know	4.806%	3.131%	8.004%		
Refused	20.37%	14.19%	32.17%		
Household Type					
Husband/Wife Primary Family	56.41%	55.40%	58.32%	244.1 (3)	< 0.0001
Unmarried Householder Primary Family	17.96%	16.58%	20.59%		
Primary Individual	25.57%	27.97%	21.01%		
Group Quarters	0.06185%	0.05048%	0.08384%		
Child(ren) Present (Edited)					
No	73.82%	75.14%	71.29%	64.51 (1)	< 0.0001
Yes	26.18%	24.86%	28.71%		
Educational Attainment of Respondent (ages 25+, excluding blank ages)					
Less than High School	8.221%	7.725%	9.375%	175.5 (3)	< 0.0001
High School Graduate	27.63%	26.10%	31.20%		
Some College	14.96%	15.32%	14.11%		
College Degree	49.19%	50.86%	45.31%		
Nativity and Citizenship of Respondent					
Native Citizen	84.98%	85.76%	83.50%	34.45 (2)	< 0.0001
Foreign-Born Citizen	8.103%	7.793%	8.694%		
Foreign-Born Non-Citizen	6.914%	6.450%	7.801%		
Measure of Labor Force Participation Status of Respondent					
Employed	60.63%	59.28%	63.21%	275.8 (3) [73.25 (2)]	< 0.0001
Unemployed	2.471%	2.523%	2.372%		
Not in Labor Force	36.65%	38.19%	33.717%		
Blank	0.2468%	0.009655%	0.6997%		
Overall	100%	100%	100%		

Source: U.S. Census Bureau internal data from September 2021 Current Population Survey interviews.

* May not sum to totals due to rounding.

[] The values within brackets are the chi-square statistic, df, and p-value when the blanks and refusals are excluded from the chi-square test.

The chi-square tests for CEV person estimates of characteristics only available for CPS respondents showed significant differences (at the $\alpha=0.10$ level) for the distributions of all variables. Simply looking at the distributions for family income, it is apparent that there are large differences between the respondent and nonrespondent distributions, which correspond to the magnitude of the chi-square test statistic (1,980). Even after

excluding the blanks and refusals, there is still a significant difference between the respondent and nonrespondent distributions for family income and measure of labor force participation status of respondent.

As mentioned previously, the chi-square tests only indicate that the distributions of respondents and nonrespondents differ but do not necessarily indicate a nonresponse bias problem. Furthermore, weighting adjustments might minimize the impact of some differences.

6. Conclusions

This analysis found evidence of potential nonresponse bias for both CPS households and CEV persons. For CPS, there is potential nonresponse bias for all investigated characteristics. For CEV, there is potential nonresponse bias for all investigated characteristics except type of living quarters and urban/rural status.

Excluding the blanks and missing values, one of the largest differences in response rates for the CPS subgroups is 10.31 percent, seen for region, where the West has a response rate of 78.16 percent versus 67.85 percent for the Northeast.¹⁵ For respondent and nonrespondent distributions within CPS households, the largest differences are seen within region and age of reference person.

Excluding the blanks and missing values, the largest difference in response rates for the CEV subgroups is 25.29 percent, seen for the age of respondent, where ages 75+ has a response rate of 74.81¹⁶ percent versus 50.52 percent for ages 16-19. For respondent and nonrespondent distributions within CEV persons, the largest difference is also seen within age of respondent.

Among the estimates for the CEV persons for characteristics only available for CPS respondents, one of the largest differences in response rates and between the respondent and nonrespondent distributions are seen within household type.

Using the information learned from this analysis, discussions should be had with the sponsor regarding enhancements to the CEV weighting process. However, nonresponse weighting adjustments are already performed using all of the key domains and are expected to correct for differences between respondents and nonrespondents. Research could be done into the possible inclusion of other characteristics into the logistic regression for the CEV, such as veteran status.

Note: The weighting process for basic CPS does not allow us to expand upon the characteristics used.

¹⁵ The response rate ranges for region and age of reference person are not significantly different.

¹⁶ The response rate for ages 75+ is not significantly different than the response rate for ages 65 to 74.

Another recommendation would be to reevaluate or shorten the CEV questionnaire to potentially allow for more supplement respondents. Specifically, reducing the number of respondents selected per household and reducing the number of callbacks might help.

7. References

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