APPENDIX L

2023 National Survey of College Graduates QR Code Experiment Report (DRAFT)

Note: The Census Bureau has reviewed this data product to ensure appropriate access, use, and disclosure avoidance protection of the confidential source data used to produce this product (Data Management System (DMS) number: P-7533594, Disclosure Review Board (DRB) approval number: CBDRB-FY25-POP001-0001).

Table of Contents

Table of Tables

Table of Figures

Executive Summary

The 2023 National Survey of College Graduates (NSCG) included an experiment that tested the effect of including quick response (QR) codes in mail materials on response and demographic representation. The control group was only offered a URL, while the treatment group received both a QR code and URL to access the survey instrument in their letters. The experiment was conducted only on the new cohort sample to limit operational complexities.

The addition of a QR code in the mail materials led to an increase in the proportion of mobile respondents and a decrease in survey breakoffs. However, this addition did not influence other key engagement rates or affect the demographic composition of respondents. That is, there was no evidence that the QR code brought in younger respondents or caused any shifts in the demographic distribution. Additionally, there was no evidence to suggest that QR code recipients completed the survey earlier. Overall, our analysis reveals that the inclusion of QR codes had minimal impact. However, given the rise in mobile responses, it is necessary to look into how the mobile push could affect data quality beyond breakoff rates. Therefore, we do not recommend implementing the QR code at full scale until we can confirm that it will not negatively affect data quality.

1. Introduction

The 2023 National Survey of College Graduates (NSCG) included a QR code experiment to test the impact of incorporating quick response (QR) codes in the mail materials. This report documents the results of the 2023 QR code experiment and recommendations for data collection procedures for future cycles.

The NSCG is a repeated cross-sectional survey, conducted every two years, designed to provide data on the number and characteristics of individuals with a college degree living in the United States. The U.S. Census Bureau implements the survey on behalf of the National Center for Science and Engineering Statistics (NCSES) within the National Science Foundation (NSF). The 2023 NSCG sample consisted of approximately 161,000 new and returning cases that had previously responded to the American Community Survey (ACS). Data collection spanned 26 weeks and used a multi-mode approach of self-administered web and paper questionnaires and Computer-Assisted Telephone Interviewing (CATI).

The NSCG typically sees low response rates among the population aged 25-34 (U.S. Census Bureau, 2021). In the 2021 NSCG, as a last-ditch effort to boost response rates, QR codes were used in the week 25 mailing for all remaining sampled cases. While the overall gain in response was low, as is expected at the end of the data collection, there were more young people (i.e., ages 25-34) who responded to the QR code mailing than the standard mailing sent two weeks earlier (U.S. Census Bureau, 2022). This suggests QR codes may provide a new way to reach these cases.

While early QR code research suggested they had either no impact or a negative impact (Lugtig & Luiten, 2021; Marlar, 2018; Smith, 2017) on response rates, there is good reason for these less-than-positive results. Android phones did not have automatic QR code readers through the camera application, so users had to download an application to scan the code. Additionally, their overall use in day-to-day life was rare. However, both Android[1] and Apple[2] phones now have automatic QR code readers, and the COVID-19 pandemic made the use of QR codes much more ubiquitous as restaurants and other businesses went touchless (Gostin, 2021). The normalization of the QR code has opened the door to revisit their impact on survey recruitment.

Lugtig & Luiten (2021) did not find that QR codes had a significant effect on response rates but found that they pushed survey respondents to use smartphones. Additionally, they found that

[1] Android 9 (Pie) or later.
[2] iOS 11 or later.

those who used the QR code were younger and no more likely to break off than those who accessed the survey with a URL. Endres et al. (2023) found a positive impact on response rates when a QR code was offered alongside a URL to access the survey. These studies suggest that the QR code likely will not depress response and may increase it or bring in younger respondents.

This experiment tested the theory that QR codes will increase response among younger respondents, decrease the time to respond, and result in equivalent or better response rates. We also evaluated whether there was a higher survey breakoff rate due to the anticipated increase in mobile device use.

2. Methodology

This section details the experimental design, research questions and the methods that were used to answer them. The main goal was to measure the impact of including the QR code on response rates, the timing of response, the effect on mobile device use, whether it increased response from younger people, and whether survey breakoffs increased.

The NSCG uses Successive Difference Replication (SDR) methods to construct replicate weights and calculate variance estimates. Like previous analyses, we used a jackknife variance estimator with a jackknife coefficient of 0.05 because of its similarities to the SDR method and because SDR is not supported using SAS software (Opsomer, Breidt, White, & Li, 2016). Jackknife replicates include 80 replicates for the new cohort. Experimental base and replicate weights were provided by Survey Statistics for Poverty, Health, Expenditures, and Redesign (SSPHER) staff in DSMD and used for most analyses, including weighted response rates. When possible, recommendations for future NSCG cycles are based on weighted estimates and statistical tests because they provide inferences about the NSCG population. We used a significance level of 0.1 for all analyses in this report.

2.1 Experimental Design

A systematic random sample of approximately 7,500 cases were selected for the treatment group and 47,000 cases were selected for the control group. NSCG sampling sort variables were used to ensure the population within both groups was similar.[3] Table 1 summarizes the treatment and control groups with their respective sample sizes.

Table 1: 2023 NSCG QR code experimental groups

Experimental Group	Treatment	Estimated Sample Size

[3] See the 2023 NSCG Sampling Specifications for details (U.S. Census Bureau, 2023).

Control	URL only	47,000
Treatment	URL and QR Code	7,500

Source(s):
U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

2.2 Research Questions

We will answer the following research questions to determine the effects of offering QR codes:

1. How does including a QR code affect the response rates?
2. Does including a QR code decrease the time to response?
3. Does including a QR code increase mobile device responses?
4. Does including a QR code increase response rates of younger people?
    a. Does including a QR code affect response rates of other demographic groups?
5. Does including a QR code increase breakoffs?

2.3 Data Analysis

The following section outlines the methods that we used to answer each research question. We used experimental base weights and replicate weights for each estimate to account for the small treatment group sample size compared to the control, as well as to make inferences about the NSCG new cohort population. The experimental weights took the sampling base weights and applied an expansion factor that adjusts both experimental groups to weight up to the population eligible for the experiment. We verified the output using double programming, a verification process in which multiple staff develop program code independently to produce results. This practice helps ensure the quality of deliverables.[4]

2.3.1 Response Rates

To determine whether adding a QR code affected the response rate, we calculated the overall weighted response rate for each experimental group using Equation 1 in Appendix A. This equation is the same as the final response rate calculated for NSCG in production.

Before data collection, we calculated a minimum detectable difference (MDD) of approximately four percentage points for comparisons of response rates.[5] We compared the overall response rates between the control and treatment groups using statistical t-tests with an alpha of 0.10.

[4] For disclosure purposes, the SAS code used for programming and verifying results will be saved on the addp-app1 server under the DSMD Survey Methodology area folder.

[5] The MDD calculation assumes a 60 percent response rate in each group and use an alpha value of 0.10. Appendix H provides the MDD equation and definitions.

2.3.2 Timing of Response

We also measured whether offering QR codes led to an earlier response which could reduce the number of follow-up contacts. Among those who responded online, we compared the number of days it took for cases in both experimental groups to respond. We used a one-sided t-test to evaluate whether it took the treatment group fewer days (Equation 2 in Appendix A) to respond compared to the control group with an alpha of 0.10.

For a visual comparison of response timing, we graphed the weekly, cumulative, unweighted completion rates,[6] calculated by Survey Statistics for Poverty, Health, Expenditures, and Redesign (SSPHER), for the experimental groups. Graphing the unweighted rates provided insight into how the experimental groups behaved alone and in relation to each other throughout the data collection period.

2.3.3 Device Use

Online users may use a computer, smartphone, or a tablet to access the survey. Due to the small percentage of tablet users, we collapsed smartphone and tablet users to a mobile device category. We used a one-sided t-test to evaluate whether there was more mobile device usage among the treatment group compared to the control group. We investigated whether mobile devices were used more frequently to first access the survey instrument (Equation 3 in Appendix B) and whether mobile devices were used the longest to engage with the instrument (Equation 4 in Appendix B).

2.3.4 Characteristics of Respondents

With lower response rates among young sample cases in the previous cycles, we are especially interested to see if offering QR codes resulted in more younger people (i.e., less than 40 years old) responding. We used a one-sided t-test to evaluate whether there were more younger respondents in the treatment group compared to the control group.

We also evaluated the effect of QR codes on other demographic groups listed in Appendix C. To determine if QR codes impacted response rates for the subpopulations of interest, we calculated chi-square tests of response distributions using the demographic characteristics listed in Appendix C. If any significantly different distributions were found in the subpopulations, pairwise t-tests were calculated between the treatment and control groups with a Bonferroni adjustment for multiple comparisons.

[6] The weekly, unweighted response rates are calculated differently than the equation provided for the weighted response rate and can be viewed as a "completion rate". These rates measure the number of completed and partially completed interviews compared to the full sample.

2.3.5 Breakoff Rate

We defined a breakoff as any web instrument user who successfully logged into the survey but did not complete the survey. Users who began the survey, logged off at some point, but then returned to the survey and finished it are not considered breakoffs. We used a one-sided t-test to evaluate whether the overall breakoff rate for the treatment group was higher than the overall breakoff rate for the control group (Equation 5 in Appendix D).

3. Assumptions and Limitations

We had to consider the policy and privacy constraints when designing the experiment; while it would be ideal to have the QR code embed both ID and password to take sample members directly into the survey, this was not secure. Therefore, the QR code included in the mailing took sample members to the login page. The login page used the same URL, ID and password for those using a QR code to access the survey and for those who manually typed the URL into a web browser. Thus, there is no direct way to measure which method a respondent used to log in to the survey. Since we cannot directly identify respondents that accessed the instrument via the QR code, we compared the experimental groups overall.

The NSCG contacted sample members through different types of mailings at different points in time (Appendix E). Due to the operational complexities[7] of embedding multiple experiments in 2023, the QR code experiment was only conducted among new cohort cases with a mailable address (n=54,500). While the planned difference between the control and treatment groups was only the inclusion of QR codes in the letter, only mailings in week 1 and week 12 strictly adhered to this (Appendix F). Other mailings had minor wording differences between the control and treatment groups (Appendix G).[8] For example, in week 5, the control group used the language, "To respond online, go to: https://respond.census.gov/nscg" while the treatment group used the language, "Please respond within two weeks at https://respond.census.gov/nscg." We believe that this did not impact the experiment because the differences were only on some letters and were innocuous.

4. Results

This section presents the results of the experiment.

[7] For example, there were eight different variations of the week 1 mailout sent to sample members.
[8] These differences appear to have been inadvertent.

4.1 Response Rates

First, we evaluated whether the QR code affected the overall response rates. Table 2 shows that the overall response rates between the treatment and control groups are not statistically different (p=0.66) from each other.

Table 2: Response rates

Experimental Group	Number of Respondents	Response Rate (Standard Error)	P-value
URL only	22,000	57.1 (0.8)	0.66
URL and QR code	3,400	57.9 (1.7)	

*Statistically significant at alpha 0.10

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

4.2 Timing of Response

Next, we looked at how many days it took people in the control and treatment groups to complete the survey online (Table 3). We did not see evidence that the treatment group completed the survey in fewer days (p=0.34). The unweighted weekly collection rates, graphed in Appendix A, Figure 1, are very similar between the two groups.

Table 3: Mean days to complete online

Experimental Group	Number of Web Respondents	Mean days to complete (standard error)	P-value
URL only	19,500	36.5 (1.2)	0.34
URL and QR code	3,100	37.6 (2.5)	

*Statistically significant at alpha 0.10

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

4.3 Device Use

We then reviewed whether incorporating QR codes increased mobile device usage. Our analysis revealed a statistically significant higher percentage of mobile device users in the treatment group than in the control group (Table 4). Consequently, this implied a lower percentage of computer responses in the treatment group than the control group. We also found that more users in the treatment group spent a majority of their time in the instrument using a mobile device compared to the control group (Appendix B, Table 8).

Table 4: Mobile device as the first device use rate

Experimental Group	Number of Users	Mobile Use Rate (Standard Error)	P-value
URL only	23,500	25.5 (1.1)	<.0001*
URL and QR code	3,800	53.8 (2.7)	

*Statistically significant at alpha 0.10

Note(s):

The number of users include those who accessed the survey online and either completed or broke off from the survey.

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

4.4 Characteristics of Respondents

We performed chi-square tests on the distributions of all sample members, regardless of response status, to assess any baseline differences between the groups prior to the start of data collection. At the start of the data collection, no differences were found.[9] We then moved on to see whether the respondents in the treatment and control groups differed with the introduction of QR codes.

Using a one-sided t-test, we did not find more younger respondents (i.e., less than 40 years old) within the treatment group (Table 5). We then investigated in general whether other demographic differences in the distribution of respondents exist. Using chi-square tests, our analysis revealed no statistically significant differences among any of the demographic groups (Appendix C, Tables 10- 19). This indicates that the presence of the QR code did not alter the overall demographic composition.

[9] There was a significant difference initially within the race groups before data collection due the small sample sizes and how weights were applied for the American Indians and Alaska Natives, and Native Hawaiian and Other Pacific Islander groups. To correct for this, we collapsed the categories American Indians and Alaska Natives, Native Hawaiian and Other Pacific Islander, and Other race groups for the analysis.

Table 5: Percent of respondents that in the younger category

Experimental Group	Number of Respondents	Younger Respondent Rate (Standard Error)	P-value
URL only	22,000	31.8 (1.3)	0.35
URL and QR code	3,400	33.0 (2.7)	

*Statistically significant at alpha 0.10

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

4.5 Breakoff Rate

Finally, we looked at whether introducing QR codes caused more breakoffs. Table 6 shows that contrary to our hypothesis, the treatment group had fewer breakoffs compared to the control group.

Table 6: Breakoff rate

Experimental Group	Number of Users	Breakoff Rate (Standard Error)	P-value
URL only	23,500	8.8 (0.5)	0.09*
URL and QR code	3,800	7.4 (0.9)	

*Statistically significant at alpha 0.10

Note(s):

The number of users include those who accessed the survey online and either completed or broke off from the survey.

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

5. Conclusion

Our findings indicate that the inclusion of QR codes in the 2023 NSCG increased the number of mobile respondents, which is consistent with existing literature. Contrary to existing literature regarding concerns with mobile device response, we found that those who received a QR code in their invitation were less likely to breakoff. No significant effects were observed regarding other engagement activities or demographic differences. Specifically, the QR code intervention did not attract a younger demographic or expedite completion times.

Because of the increase in mobile responses brought in by the QR code inclusion in mailing materials, it is crucial to understand how that shift could affect data quality beyond breakoffs. In the literature, there exist some concerns with the quality of data collected on mobile devices. Specifically, we found concerns regarding response fatigue and attention span of mobile

respondents (Guidry, 2012; Mavletova, 2013; Struminskaya, Weyandt, & Bosnjak, 2015). Al Ghamdi et. al (2016) also found that information presented on mobile devices affect clarity of information organization, reading time, and user's ability to recall information.

Alternatively, other studies show no significant difference between data quality for mobile respondents versus computer respondents (Antoun, 2015; Sommer, Diedenhofen, & Much, 2017). Antoun, Couper, and Conrad (2017) found that while the smartphone context can be distracting, respondents are still able to provide high quality responses as long as usability is taken into consideration during survey design.

Given the varying literature and potential implications of mobile device on data quality, we do not recommend implementing the use of QR codes in production until we can confirm that the push to mobile device use is not likely to cause a decrease in data quality.

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Appendix A: Response Rates

We calculated the overall weighted response rates[10] using Equation 1.

Equation 1: Response Rate

$$\text{Response Rate} = \frac{ER}{(ER+ENR)+e(UE)}$$ where,

ER: Eligible Respondent
ENR: Eligible Nonrespondent
e: Estimated proportion of cases with unknown eligibility (UE) expected to be eligible.

The proportion of cases with unknown eligibility expected to be eligible (*e*) was estimated using the following equation:

$$e(UE) = \frac{ER+ENR}{ER+ENR+IE}$$

where, IE is Ineligible cases that were eligible for initial NSCG mailing but, after responding, were deemed ineligible for the survey.

This weighted response rate used eligible respondents in the numerator (final disposition codes between 50 and 54 in Table 7). The denominator also included eligible respondents as well as eligible nonrespondents (final disposition greater than or equal to 94 in Error: Reference source not found7) and an estimate of the proportion of unknown eligibility cases expected to be eligible (cases classified with unknown eligibility are final disposition codes between 80 and 89 in Error: Reference source not found7). This proportion was estimated using the sum of respondents and nonrespondents divided by the sum of all sampled persons (including those deemed ineligible with final disposition codes between 60 and 79 in Error: Reference source not found7) then multiplied by the sum of unknown eligibility.

Table 7: Disposition codes for eligible and ineligible respondents

Status	Disposition Code	Description
Eligible Respondents	50	Eligible complete – mail
	51	Eligible complete – CATI
	52	Eligible complete – web
	54	Eligible complete – TQA incoming call interview via CATI
	60	Emigrant – mail

[10] This equation used base weights from the NSCG Master File.

Status	Disposition Code	Description
Ineligibles	61	Emigrant – CATI
	62	Emigrant – web
	64	Emigrant – incomplete (TQA / locating / correspondence)
	65	Temporarily institutionalized
	67	Terminally ill / permanently institutionalized
	68	Over 75 years old
	69	Deceased
	70	Degree ineligible – no baccalaureate or higher degree earned
	71	Frame ineligible – earliest degree earned after ACS interview year
	78	Duplicate
	79	Other confirmed ineligible
Unknown Eligibility	80	Unable to locate
	81	SPV failure – wrong sampled person (FINAL)
	82	Language / hearing barrier
	83	Noncontact – eligibility unknown
	84	Temporarily ill / absent and unable to confirm eligibility
	85	Final refusal and unable to confirm eligibility
	86	Congressional refusal and unable to confirm eligibility
	87	Unable to confirm eligibility and/or confirm reached correct SP - Mail
	88	Unable to confirm eligibility and/or confirm reached correct SP - Web
	89	Other nonresponse and unable to confirm eligibility
Eligible Nonrespondents	94	Eligible and temporarily ill / absent
	95	Eligible and final refusal -- CATI
	96	Eligible and congressional refusal
	97	Eligible and missing critical complete items - Mail
	98	Eligible and missing critical complete items - Web
	99	Other confirmed eligible nonresponse

Source(s):

U.S. Census Bureau, 2021 National Survey of College Graduates Prenotice Experiment

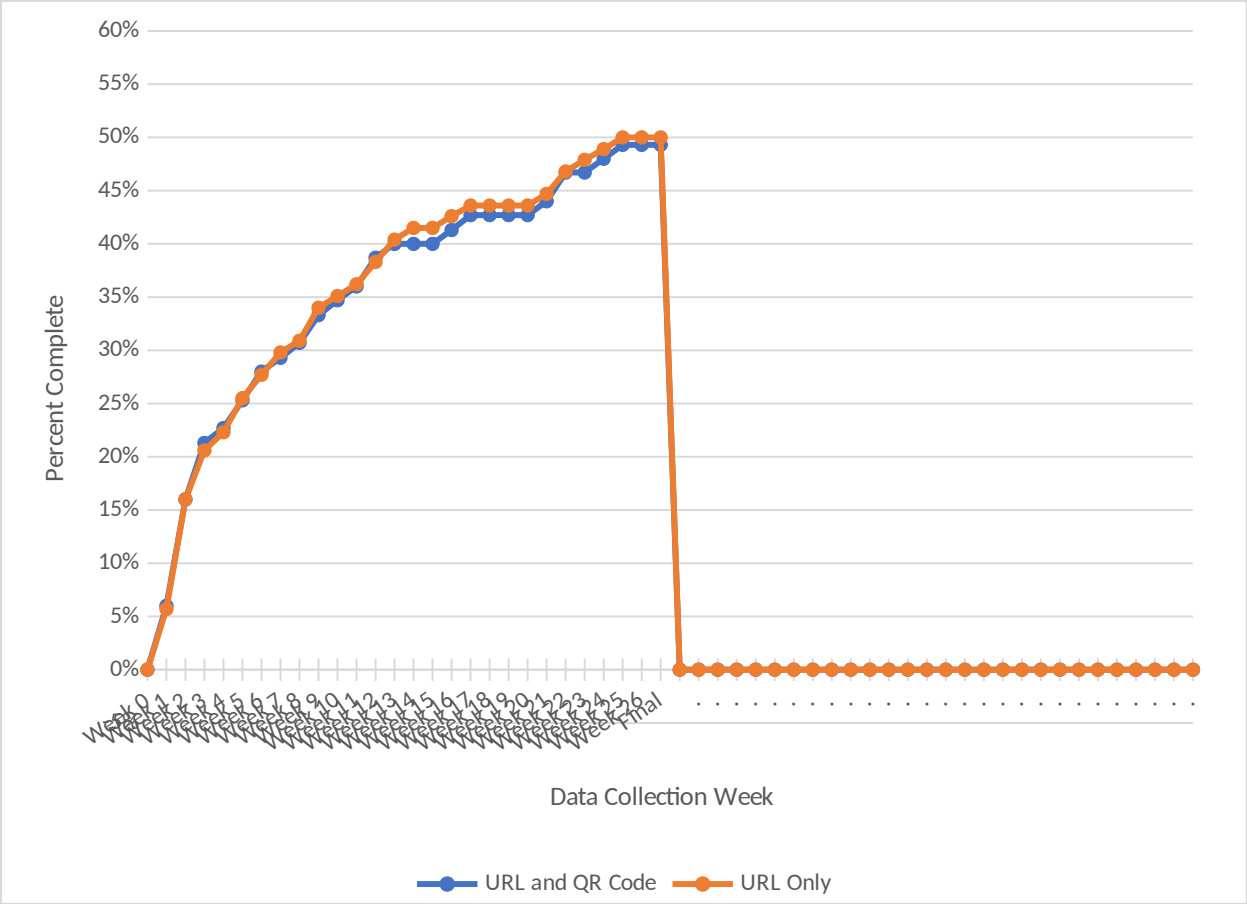
We calculated the average number of days it took cases to complete online using Equation 2.

Equation 2: Mean Days to Complete Online

$$\frac{\Sigma\ Number\ of\ eligible\ response\ days\ until\ a\ web\ completion}{Number\ of\ web\ respondents}$$

Error: Reference source not found graphs the unweighted weekly collection rates for the new cohort over the data collection period.

Figure 1: New cohort unweighted weekly collection rates for 2023 NSCG data collection



Source(s):

U.S. Census Bureau 2023 National Survey of College Graduates QR Code Experiment Final Report

Appendix B: Device Use Rates

Equation 3: Percentage of Users who used a Mobile Device for their First Login

$$\frac{Number\ of\ users\ who\ first\ logged\ on\ with\ a\ mobile\ device}{Number\ of\ users\ with\ a\ defined\ device} \times 100$$

Equation 4: Percentage of Users with a Mobile Device as their Longest Device Used

$$\frac{Number\ of\ users\ who\ spent\ the\ most\ time\ using\ a\ mobile\ device}{Number\ of\ users\ with\ a\ defined\ device} \times 100$$

Table 8 shows the percentage of users with a mobile device as their longest device used for each experimental group.

Table 8: Mobile device as the longest device use rate

Experimental Group	Number of Users	Mobile Use Rate (Standard Error)	P-value
URL only	23,500	25.2 (1.1)	<.0001*
URL and QR code	3,800	52.6 (2.8)	

*Statistically significant at alpha 0.10

Note(s):

The number of users include those who accessed the survey online and either completed or broke off from the survey.

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Appendix C: Demographic Variables

Table 9: Demographic variables

Variable	Range	Type	Description
Race	1-6	Categorical, nominal	1=White 4=AIAN 2=Black 5=NHPI 3=Asian 6=Others
Highest Degree	1-3	Categorical, ordinal	1= Bachelor's or professional degree 2= Master's degree 3= Doctorate degree
Science and engineering (S&E) Occupation	1, 2	Categorical, binary	1 = S&E occupation 2 = Non-S&E related occupation
Citizen status at birth flag	1,2	Categorical, binary	1=U.S. citizen at birth 2=Not a U.S. citizen at birth
Disability status	1,2	Categorical, binary	1 = With disability 2 = No disability
Hispanic origin flag	1,2	Categorical, binary	1= Hispanic 2= Not Hispanic
Broad occupation group	18 categ.	Categorical, nominal	11 = mathematical scientists 12 = computer and information scientists 20 = life scientists 30 = physical scientists 40 = social scientists, except psychologists 41 = psychologists 50 = engineers 61 = S&E-related health occupations 62 = S&E-related non-health occupations 71 = postsecondary teacher in an S&E field 72 = postsecondary teacher in a non-S&E field 73 = secondary teacher in an S&E field 74 = secondary teacher in a non-S&E field 81 = non-S&E high interest occupation, S&E FOD 82 = non-S&E low interest occupation, non-S&E FOD 83 = non-S&E occupation, non-S&E FOD 91 = not working, S&E FOD or S&E previous occupation 92= not working, non-S&E FOD and non-

Table 9: Demographic variables			
Variable	**Range**	**Type**	**Description**
			S&E previous occupation or never worked
Young graduate oversample group eligibility indicator	1,2	Categorical, binary	1 = S&E case that has earned a bachelor's or master's degree in the last five years 2 = non-S&E case or S&E case that has not earned a bachelor's or master's degree in the last five years
Sex	1,2	Categorical, binary	1=Male 2=Female
Work status	1,2,3	Categorical, nominal	1=Employed 2=Unemployed 3=Not in the labor force

Tables 10-19 show the weighted demographic respondent distributions along with their respective Rao-Scott Chi-square p-values.

Table 10: Weighted respondent distributions for race

Race	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
White	11,500	74.0 (0.8)	1,800	75.5 (2.1)
Black	3,100	6.9 (0.3)	450	6.4 (0.8)
Asian	3,700	9.9 (0.4)	600	9.8 (1.0)
AIAN/ NHPI/ Other	3,600	9.2 (0.7)	600	8.3 (1.2)

Chi-square p-value = 0.86

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 11: Weighted respondent distributions for highest degree

Highest Degree	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
Bachelor's or professional degree	12,000	66.0 (0.7)	1,900	68.1 (2.2)
Master's degree	7,800	29.3 (0.6)	1,200	27.5 (2.1)
Doctorate degree	2,300	4.8 (0.1)	350	4.4 (0.4)

Chi-square p-value = 0.57

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 12: Weighted respondent distributions for science and engineering occupation

S&E Occupation	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
S&E occupation	13,000	26.8 (0.5)	2,000	25.2 (1.8)
Non-S&E occupation	9,100	73.2 (0.5)	1,500	74.8 (1.8)

Chi-square p-value = 0.43

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 13: Weighted respondent distributions for citizenship status

Citizenship Status	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
U.S. citizen at birth	17,000	85.9 (0.3)	2,600	85.7 (1.2)
Not a citizen at birth	5,000	14.1 (0.3)	800	14.3 (1.2)

Chi-square p-value = 0.89

Source(s):
U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 14: Weighted respondent distributions for disability status

Disability Status	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
With disability	2,000	6.3 (0.2)	300	6.1 (0.8)
No disability	20,000	93.7 (0.2)	3,100	93.9 (0.8)

Chi-square p-value = 0.82

Source(s):
U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 15: Weighted respondent distributions for Hispanic origin

Hispanic Origin	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
Hispanic	4,600	8.3 (0.3)	750	8.6 (1.0)
Not Hispanic	17,500	91.7 (0.3)	2,700	91.4 (1.0)

Chi-square p-value = 0.78

Source(s):
U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 16: Weighted respondent distributions for broad occupation category

Broad Occupation Category	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
Mathematical scientists	400	0.6 (0.1)	80	0.7 (0.1)
Computer and information	2,600	5.1 (0.2)	400	5.1 (0.4)

Broad Occupation Category	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
sciences				
Life scientists	550	0.5 (<0.1)	90	0.5 (0.1)
Physical scientists	850	0.8 (<0.1)	150	0.8 (0.1)
Social scientists, except psychologists	200	0.2 (<0.1)	40	0.2 (0.0)
Psychologists	350	0.4 (<0.1)	40	0.3 (0.1)
Engineers	1,700	2.8 (0.1)	250	2.8 (0.4)
S&E-related health occupations	3,600	9.2 (0.2)	550	8.7 (0.7)
S&E-related non-health occupations	1,000	2.7 (0.1)	150	1.9 (0.3)
Postsecondary teacher in an S&E field	1,100	1.2 (0.1)	(D)	(D)
Postsecondary teacher in a non-S&E field	100	1.0 (0.3)	(D)	(D)
Secondary teacher in an S&E field	250	0.8 (0.1)	(D)	(D)
Secondary teacher in a non-S&E field	40	1.4 (0.4)	(D)	(D)
Non-S&E high interest occupation,	3,100	12.2 (0.3)	500	12.6 (1.0)

Broad Occupation Category	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
S&E FOD				
Non-S&E low interest occupation, non-S&E FOD	2,800	8.0 (0.2)	450	7.5 (0.8)
Non-S&E occupation, non-S&E FOD	1,200	35.1 (0.9)	200	37.7 (3.7)
Not working, S&E FOD or S&E previous occupation	1,300	8.8 (0.3)	200	9.4 (1.0)
Not working, non-S&E FOD and non-S&E previous occupation or never worked	650	9.2 (0.5)	90	8.5 (1.6)

Chi-square p-value = 0.79

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 17: Weighted respondent distributions for oversample indicator

Oversample Indicator	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
S&E case that has earned a bachelor's or master's degree in the last five years	7,300	7.7 (0.2)	1,100	7.6 (0.6)

Oversample Indicator	Experimental Groups			
	URL only		URL + QR code	
Non-S&E case, or S&E case that has not earned a bachelor's or master's degree in the last five years	14,500	92.3 (0.2)	2,300	92.4 (0.6)

Chi-square p-value = 0.90

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 18: Weighted respondent distributions for sex

Sex	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
Male	10,500	44.7 (0.9)	1,700	44.9 (3.0)
Female	11,000	55.3 (0.9)	1,800	55.1 (3.0)

Chi-square p-value = 0.96

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Table 19: Weighted respondent distributions for work status

Work Status	Experimental Groups			
	URL only		URL + QR code	
	Number of Respondents	Percent (SE)	Number of Respondents	Percent (SE)
Employed	19,000	77.4 (0.6)	3,000	78.1 (1.9)
Unemployed	500	2.6 (0.3)	70	2.4 (0.7)
Not in the labor force	2,200	20.0 (0.6)	350	19.5 (1.8)

Chi-square p-value = 0.92

Source(s):

U.S. Census Bureau, 2023 National Survey of College Graduates QR code Experiment

Appendix D: Breakoff Rates

Equation 5: Breakoff Rate

$$\frac{Number\ of\ users\ with\ a\ breakoff}{Number\ of\ users} \times 100$$

Appendix E: NSCG Mailing Schedule and Mailing Materials

Table 20 below shows the dates, weeks, and types of mailing for 2023.

Table 20: 2023 NSCG mailing schedule

Date	Week	Description
5/18/2023	0	Prenotice
5/25/2023	1	Web Invite, New Sample with QR code
		Web Invite, New Sample without QR code
		Incentive Web Invite, New Sample with QR code
		Incentive Web invite, New Sample without QR code
		Web Invite, BP no QR code
		Incentive BP, no QR code
		Web Invite, Returning Sample
		Incentive Web Invite, Returning Sample
6/1/2023	2	Perforated, no incentive language, older demographic, both cohorts, no QR code
		Perforated, incentive language, older demographic, both cohorts, no QR code
		Perforated, no incentive language, younger demographic, both cohorts, no QR code
		Perforated, incentive language, + younger demographic, both cohorts, no QR code
		Perforated no incentive language older demographic, new cohort, QR code
		Perforated no incentive language older demographic, BP
		Perforated, incentive language, older demographic, new cohort, QR code
		Perforated incentive language older demographic, BP
		Perforated, no incentive language, younger demographic, new cohort, QR code
		Perforated, no incentive language, younger demographic, BP
		Perforated, incentive language, younger demographic, new cohort, QR code
		Perforated incentive language, younger demographic BP
6/22/2023	5	Web invite, ACS style envelope, old cohort and new cohort without QR code
		Web invite, ACS style envelope, new cohort, QR code
		Web invite, ACS style envelope, BP, no QR code
		Questionnaire (22 only), and web invite

Date	Week	Description
6/29/2023	6	Reminder Postcard
7/13/2023	8	Questionnaire and Web Invite (22, 23), old cohort
		Questionnaire and Web invite (21), new cohort, QR code
		Questionnaire and Web invite (21), new cohort, no QR code
		BP perforated, no Q
8/10/2023	12	Perforated, Web Invite, old cohort and new cohort (no QR code)
		Perforated, Web Invite, new cohort, QR code
		Perforated, Web invite, BP
9/7/2023	16	Web invite, new cohort, no QR code
		Web invite, new cohort, QR code
		Web invite, BP
9/21/2023	18	Web Invite, returning sample **(22 and 23)**
10/5/2023	20	Web Invite, new sample, Priority envelope, questionnaire **(21),** no QR code
		Web Invite, new sample, Pseudo Certified envelope, questionnaire (21), no QR code
		Web Invite, new sample, Priority cardboard envelope, questionnaire (21), no QR code
		Web Invite, new sample, Priority envelope, questionnaire, **(21),** QR code
		Web Invite, new sample, Pseudo Certified envelope, questionnaire (21), QR code
		Web Invite, new sample, Priority cardboard envelope, questionnaire (21), QR code
		Web Invite, BP, no Q
10/26/2023	23	Web Invite, older demographic, old cohort and new cohort (no QR code)
		Web invite, younger demographic, old cohort and new cohort (no QR code)
		Web invite, older demographic, new cohort, QR code
		Web invite, older demographic, BP, no QR code
		Web invite, younger demographic, new cohort QR code
		Web invite, younger demographic, BP, no QR code

Source(s):

U.S. Census Bureau 2023 National Survey of College Graduates QR Code Experiment

Appendix F: Mailings from Week One and Twelve where difference was only the inclusion of the QR code image

Week 1, Web Invite, New Sample with QR code

CG-1W-NQR
(12-01-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

The U.S. Census Bureau and the National Science Foundation are dedicated to providing policy-makers, you, and your community with the most comprehensive data available on U.S. college graduates. To accomplish this, **we need your help**. Please complete the **2023 National Survey of College Graduates**, an important ongoing survey that has been conducted since the 1970s.

Please respond within two weeks at https://respond.census.gov/nscg **OR**

Login ID:

Password:

By participating, college graduates like you can help:

- Inform education and workforce initiatives, such as the America COMPETES Act, to improve our nation's standing in today's global economy;
- Improve support for scholarship and fellowship opportunities, like the Graduate Research Fellowship Program.

The success of this survey depends on your participation. We cannot substitute another college graduate for you. For more information, see the back of this letter for answers to frequently asked questions, email nscg@census.gov, or call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time.

Thank you in advance for responding to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 1, Web Invite, New Sample without QR code

CG-1W-N
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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Thank you in advance for responding to this important national survey.

Sincerely,

Robert L Santos

Robert L. Santos
Director
U.S. Census Bureau

United States® Census Bureau

census.gov

Week 1, Incentive Web Invite, New Sample with QR code

CG-1W-NIQR
(12-01-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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In appreciation of your participation, we have **enclosed a $30 debit card** for you to use upon completion of the survey. Instructions for using the debit card are enclosed.

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Thank you in advance for responding to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 1, Incentive Web invite, New Sample without QR code

CG-1W-NI
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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Thank you in advance for responding to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 12, perforated, Web Invite, new cohort, QR code

CG-12W-QR(7491)
(03-22-2023)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Fifth Reminder
Your response is critical

About four weeks ago, we asked you to complete the 2023 National Survey of College Graduates. **Your response is critical** and helps the U.S. government allocate resources to research and education programs for advancement opportunities for you and others in the U.S. If you have already responded, please accept our thanks.

Respond by August 17th at https://respond.census.gov/nscg **OR**

Login ID:

Password:

Your response can help determine how U.S. graduation rates in various fields compare to other countries. It can also help identify areas for improvement in K-12 education to make our country more competitive.

If we do not receive your response in by **August 17th**, a Census Bureau representative may contact you.

The success of this national survey depends on your participation. We cannot substitute another college graduate for you. This survey helps policy makers and the public understand and quantify how people use their education as they age.

For additional information:
- email nscg@census.gov.
- call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time.

Thank you in advance for your response.

Sincerely,

Robert L. Santos

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 12, perforated, Web Invite, old cohort and new cohort (no QR code)

CG-12W(7491)
(03-22-2023)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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Sincerely,

Robert L. Santos

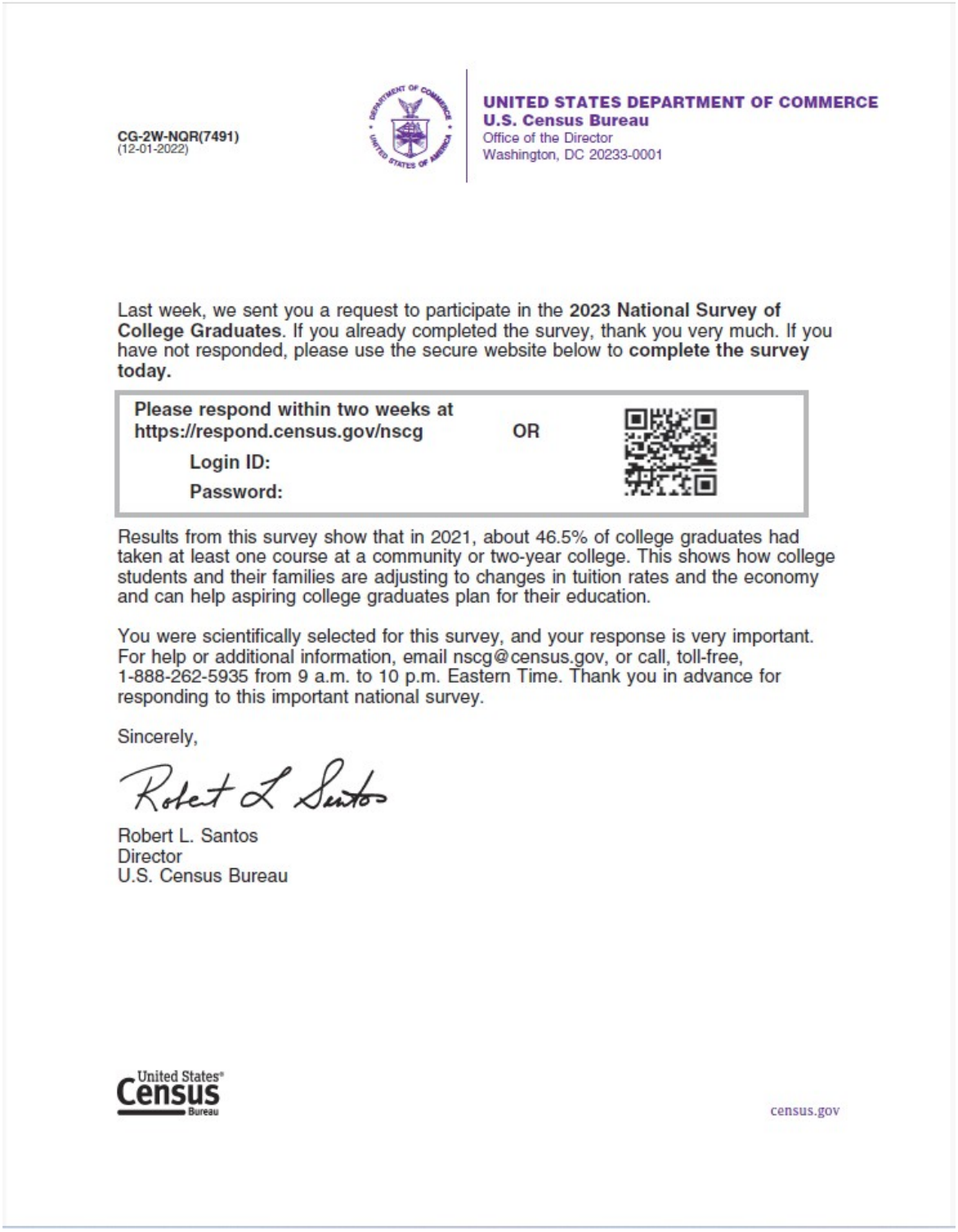
Robert L. Santos
Director
U.S. Census Bureau

United States® Census Bureau

census.gov

Appendix G: Mailings from Other Weeks that Included Additional Differences than just the QR code

Week 2, perforated no incentive language older demographic, new cohort, QR code



CG-2W-NQR(7491)
(12-01-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Last week, we sent you a request to participate in the **2023 National Survey of College Graduates**. If you already completed the survey, thank you very much. If you have not responded, please use the secure website below to **complete the survey today.**

Please respond within two weeks at
https://respond.census.gov/nscg **OR**

Login ID:

Password:

Results from this survey show that in 2021, about 46.5% of college graduates had taken at least one course at a community or two-year college. This shows how college students and their families are adjusting to changes in tuition rates and the economy and can help aspiring college graduates plan for their education.

You were scientifically selected for this survey, and your response is very important. For help or additional information, email nscg@census.gov, or call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time. Thank you in advance for responding to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 2, perforated, no incentive language, older demographic, both cohorts, no QR code

CG-2W(7491)
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Last week, we sent you a request to participate in the **2023 National Survey of College Graduates**. If you already completed the survey, thank you very much. If you have not responded, please use the secure website below to **complete the survey today.**

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Robert L Santos

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 2, perforated, incentive language, older demographic, new cohort, QR code

CG-2W-NIQR(7491)
(12-01-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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https://respond.census.gov/nscg **OR**

Login ID:

Password:

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Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 2, perforated, incentive language, older demographic, both cohorts, no QR code

CG-2W-I(7491)
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 2, perforated, no incentive language, younger demographic, new cohort, QR code

CG-2W-NYQR(7491)
(12-01-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Recently, we asked you to complete the **2023 National Survey of College Graduates (NSCG)**. Your response is valuable, whether or not you're working in your field of study. You were selected to represent thousands of other college graduates, and we cannot replace you with someone else. **Your participation is important** and ensures survey results that reflect our diverse nation.

If you have already responded, thank you. If you have not, please do so now.

Please respond within two weeks at
https://respond.census.gov/nscg **OR**

Login ID:

Password:

The NSCG is a unique source of information on trends in education and employment for college graduates. The survey results are used to:

- Identify occupations that are growing
- Measure student loan debt among college graduates
- Determine job satisfaction by field
- Calculate graduates' incomes in various fields

Please help us to continue providing accurate and timely data for this valuable national resource. If you have questions or would like additional information:

- Email nscg@census.gov
- Call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time.

Thank you in advance for your response.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 2 perforated, no incentive language, younger demographic, both cohorts, no QR code

CG-2W-Y(7491)
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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Thank you in advance for your response.

Sincerely,

Robert L Santos

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 2, perforated, incentive language, younger demographic, new cohort, QR code

CG-2W-NIYQR(7491)
(12-01-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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Thank you in advance for your response.

Sincerely,

Robert L. Santos

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 2 perforated, incentive language, + younger demographic, both cohorts, no QR code

CG-2W-YI(7491)
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Last week, we sent you a $30 debit card along with our request to participate in the **2023 National Survey of College Graduates (NSCG)**. Your response is valuable, whether or not you're working in your field of study. You were selected to represent thousands of other college graduates, and we cannot replace you with someone else. **Your participation is important** and ensures survey results that reflect our diverse nation.

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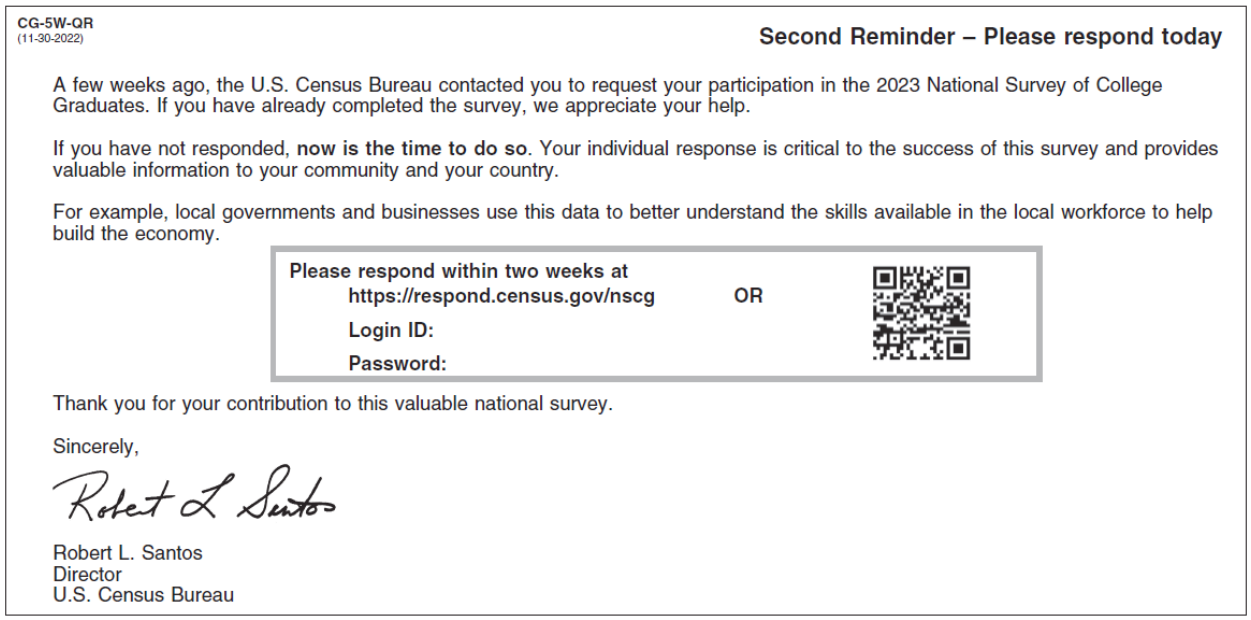
U.S. Census Bureau

United States Census Bureau

census.gov

Week 5, Web invite, ACS style envelope, new cohort, QR code



CG-5W-QR
(11-30-2022)

Second Reminder – Please respond today

A few weeks ago, the U.S. Census Bureau contacted you to request your participation in the 2023 National Survey of College Graduates. If you have already completed the survey, we appreciate your help.

If you have not responded, **now is the time to do so**. Your individual response is critical to the success of this survey and provides valuable information to your community and your country.

For example, local governments and businesses use this data to better understand the skills available in the local workforce to help build the economy.

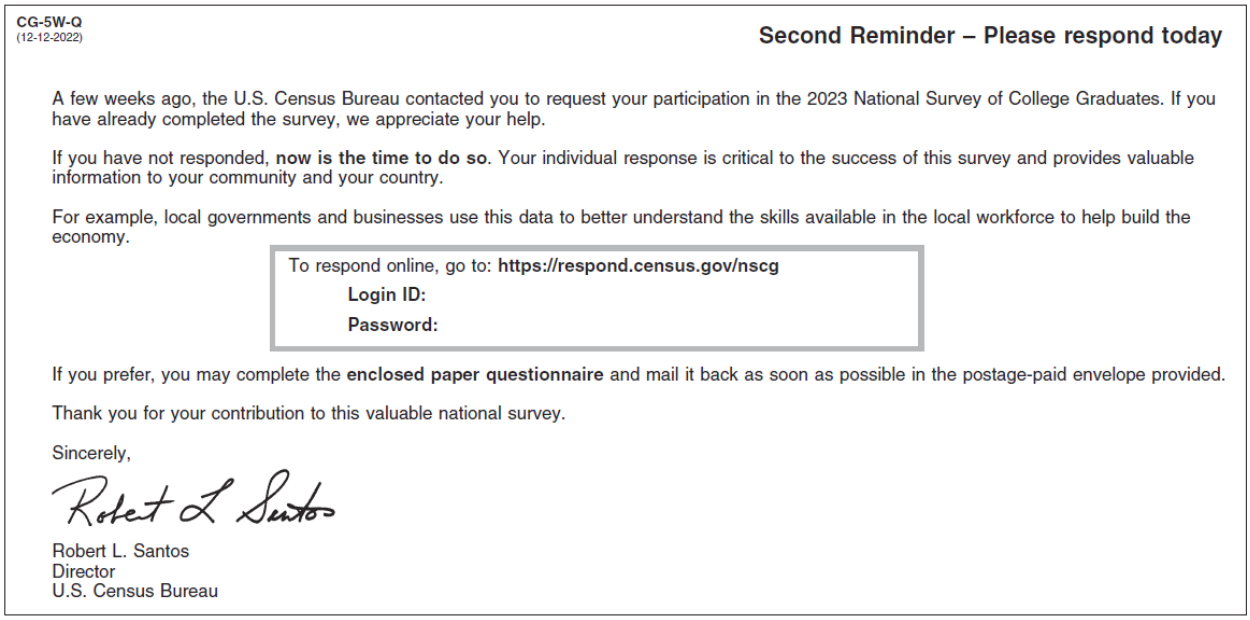
Please respond within two weeks at
https://respond.census.gov/nscg **OR**
Login ID:
Password:

Thank you for your contribution to this valuable national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

Week 5, Web invite, ACS style envelope, old cohort and new cohort without QR code



CG-5W-Q
(12-12-2022)

Second Reminder – Please respond today

A few weeks ago, the U.S. Census Bureau contacted you to request your participation in the 2023 National Survey of College Graduates. If you have already completed the survey, we appreciate your help.

If you have not responded, **now is the time to do so**. Your individual response is critical to the success of this survey and provides valuable information to your community and your country.

For example, local governments and businesses use this data to better understand the skills available in the local workforce to help build the economy.

To respond online, go to: **https://respond.census.gov/nscg**
Login ID:
Password:

If you prefer, you may complete the **enclosed paper questionnaire** and mail it back as soon as possible in the postage-paid envelope provided.

Thank you for your contribution to this valuable national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

Week 8, Questionnaire and Web invite (21), new cohort, QR code

CG-8W-QQR
(11-30-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Fourth Reminder
Please respond now

Recently, we sent you several requests for your participation in the 2023 National Survey of College Graduates. **Your response is needed.** We are asking that you complete this survey because your participation is critical to its success. If you have already responded, thank you.

National results from this survey are publicly available, providing information such as average salaries in over 28 fields and how they have changed over time. This can help inform the field of study for college students or career changes for professionals.

Please respond now by:

1) Going to https://respond.census.gov/nscg or scanning the QR code and entering your:

Login ID:

Password:

OR

2) Filling out the enclosed paper questionnaire and mailing it back in the postage-paid envelope provided.

Your individual response is important, even if you do not work, are retired, or work in a field that differs from that of your education or training.

For help or additional information, see the back of this letter for frequently asked questions, call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time, or send an email to nscg@census.gov.

Thank you for your contribution to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 8 Questionnaire and Web invite (21), new cohort, no QR code

CG-8W-NQ
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Fourth Reminder
Please respond now

Recently, we sent you several requests for your participation in the 2023 National Survey of College Graduates. **Your response is needed.** We are asking that you complete this survey because your participation is critical to its success. If you have already responded, thank you.

National results from this survey are publicly available, providing information such as average salaries in over 28 fields and how they have changed over time. This can help inform the field of study for college students or career changes for professionals.

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Thank you for your contribution to this important national survey.

Sincerely,

Robert L. Santos

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 16, web invite, new cohort, QR code

CG-16W-QR
(11-30-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Over the past month we sent you several requests to participate in the 2023 National Survey of College Graduates (NSCG). If you completed the survey, thank you very much. If you have not, **please take a moment to do so now**.

Please respond within two weeks at https://respond.census.gov/nscg **OR**

Login ID:

Password:

Your response to the NSCG helps researchers use NSCG data for many reasons, including to understand:

- Why people leave jobs in various fields,
- What percentage of people are employed in the same field that they studied,
- How the participation of males and females in various fields has changed over time.

For help or additional information, email nscg@census.gov or call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time.

Thank you in advance for responding to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 16, web invite, new cohort, no QR code

CG-16W
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Over the past month we sent you several requests to participate in the 2023 National Survey of College Graduates (NSCG). If you completed the survey, thank you very much. If you have not, **please take a moment to do so now**.

Please respond at https://respond.census.gov/nscg

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Thank you in advance for responding to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 20, Web Invite, new sample, Priority cardboard envelope/ Pseudo Certified envelope, questionnaire (21), QR code

CG-20W-QQR
(11-30-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

The success of the 2023 National Survey of College Graduates depends on your help. The U.S. Census Bureau contacted you several times to request your participation in this important national survey that provides critical information on college graduates in the U.S. If you have already completed the survey, we thank you for your cooperation. If you have not responded, please do so immediately.

Please respond now by:

1) Going to https://respond.census.gov/nscg or scanning the QR code and entering your:

Login ID:

Password:

OR

2) Filling out the enclosed paper questionnaire and mailing it back in the postage-paid envelope provided.

If you prefer, you may complete the **enclosed paper questionnaire** and mail it back as soon as possible in the postage-paid envelope provided.

Results from this survey show that in 2021, 31.1% of college graduates earned their highestdegree in a science or engineering field, 14.4% in a health or technology-related field, and 54.5% in a business, education, humanities, or other field.

For help or additional information, email nscg@census.gov or call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time.

Thank you for your contribution to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

Sixth Reminder
We need your response!

United States Census Bureau

census.gov

Week 20, Web Invite, new sample, Priority cardboard envelope/ Pseudo Certified envelope, questionnaire (21), no QR code

CG-20W-Q
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

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For help or additional information, email nscg@census.gov or call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time.

Thank you for your contribution to this important national survey.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

Sixth Reminder
We need your response!

United States Census Bureau

census.gov

Week 23, Web invite, older demographic, new cohort, QR code

CG-23W-NQR
(11-30-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Final Reminder
Survey Closing Soon

The U.S. Census Bureau has sent you several requests, on behalf of the National Science Foundation, to participate in the **2023 National Survey of College Graduates**. We know your time is valuable, and we would greatly appreciate your participation to ensure that the survey results are accurate and representative.

This survey is the primary source of data about the educational outcomes of our nation's college-educated population. You were individually selected from millions of graduates in the United States to represent the college-educated population. We are counting on your help to ensure the highest quality data possible.

Please respond within two weeks at https://respond.census.gov/nscg **OR**

Login ID:

Password:

The survey will be closing soon. **This is your last chance** to help policy makers, researchers, and the public better understand the impact of a college education.

For additional Information:

- Email nscg@census.gov.
- Call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time.
- See the back of this letter for answers to frequently asked questions.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 23, Web Invite, older demographic, old cohort and new cohort (no QR code)

CG-23W
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Final Reminder
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- See the back of this letter for answers to frequently asked questions.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 23, Web invite, younger demographic, new cohort QR code

CG-23W-NYQR
(11-30-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Final Reminder
Survey Closing Soon

The U.S. Census Bureau has sent you several requests to participate in the **2023 National Survey of College Graduates (NSCG)**. We conduct this survey on behalf of the National Science Foundation. We know your time is valuable, and we would greatly appreciate your participation to ensure that the survey results are accurate and representative. You were selected from millions of graduates to give policy makers and researchers insight about the U.S. college graduate experience.

The NSCG is the primary source of data about the impact of having a college degree in the United States. The survey asks about employment, job satisfaction, student loan debt, and other topics.

Please respond within two weeks at
https://respond.census.gov/nscg **OR**
Login ID:
Password:

By surveying college graduates, we can understand how people are using their degrees. For example, in 2021 we learned that 70.31% of college graduates age 35 and under went on to receive a higher degree.

The survey will be closing soon. **This is your last chance** to contribute to what we know about the value of a college education. We need your help to provide the highest quality data possible.

For additional Information:
- Email nscg@census.gov.
- Call, toll-free, 1-888-262-5935 from 9 a.m. to 10 p.m. Eastern Time.
- See the back of this letter for answers to frequently asked questions.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Week 23, Web invite, younger demographic, old cohort and new cohort (no QR code)

CG-23W-Y
(11-22-2022)

UNITED STATES DEPARTMENT OF COMMERCE
U.S. Census Bureau
Office of the Director
Washington, DC 20233-0001

Final Reminder
Survey Closing Soon

The U.S. Census Bureau has sent you several requests to participate in the **2023 National Survey of College Graduates (NSCG)**. We conduct this survey on behalf of the National Science Foundation. We know your time is valuable, and we would greatly appreciate your participation to ensure that the survey results are accurate and representative. You were selected from millions of graduates to give policy makers and researchers insight about the U.S. college graduate experience.

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- See the back of this letter for answers to frequently asked questions.

Sincerely,

Robert L. Santos
Director
U.S. Census Bureau

United States Census Bureau

census.gov

Appendix H: Minimum Detectable Differences Equation and Definitions

To calculate the minimum detectable difference between two response rates with fixed sample sizes, we used the formula from Snedecor and Cochran (1989) for determining the sample size when comparing two proportions.

$$\delta \geq \left(\left(Z_{\alpha^*/2} + Z_{\beta} \right)^2 \left(\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2} \right) D \right)^{1/2}$$

where:

- δ = minimum detectible difference
- α^* = alpha level adjusted for multiple comparisons
- $Z_{\alpha^*/2}$ = critical value for set alpha level assuming a two-sided test
- Z_{β} = critical value for set beta level
- p_1 = proportion for group 1
- p_2 = proportion for group 2
- D = design effect due to unequal weighting
- n_1 = sample size for a single treatment group or control
- n_2 = sample size for a second treatment group or control

The alpha level of 0.10 was used in the calculations. The beta level was included in the formula to inflate the sample size to decrease the probability of committing a type II error. The beta level was set to 0.10.