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Response Analyses of Disability, Sexual Orientation, and Gender Identity Questions

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Introduction

The Farm Producer Study (FPS) was motivated by Executive Order E.O. 13985, issued on January 20, 2021, titled "Advancing Racial Equity and Support for Underserved Communities Through the Federal Government." The study was conducted to test the feasibility of adding questions about disabilities, sexual orientation (SO), and gender identity (GI) to the quinquennial Census of Agriculture. Data from the FPS were not published but were summarized and analyzed to assess the impact of the questions on response rates. Young and Rater (2022) released an initial report in July 2022 that presented overall unit and item level nonresponse findings and analyses (Young & Rater, 2022). This report expands on that initial report by providing unit and item nonresponse rates by mode, analyzing response by age, and reviewing respondent entries for open ended, write-in answer options.

Background

The FPS was conducted from December 2021 through February 2022. The target population for the Farm Producer Study was all U.S. agricultural producers, while the sampling frame consisted of producers from most of the active farms on NASS's list of farms, with the exception of very few operations. The sampled population consisted of previously confirmed operations on NASS's list frame. A sample of approximately 75,000 farm and ranch operations was selected to receive one of six versions of the questionnaire. This study emphasized PASI/mail (Paper Aided Self Interview) and CASI/web responses (Computer Aided Self Interview) first, then used CATI/phone (Computer Aided Telephone Interview) as a follow-up method for nonresponse to maximize response rates and minimize data collection costs (Dillman et al., 2014).

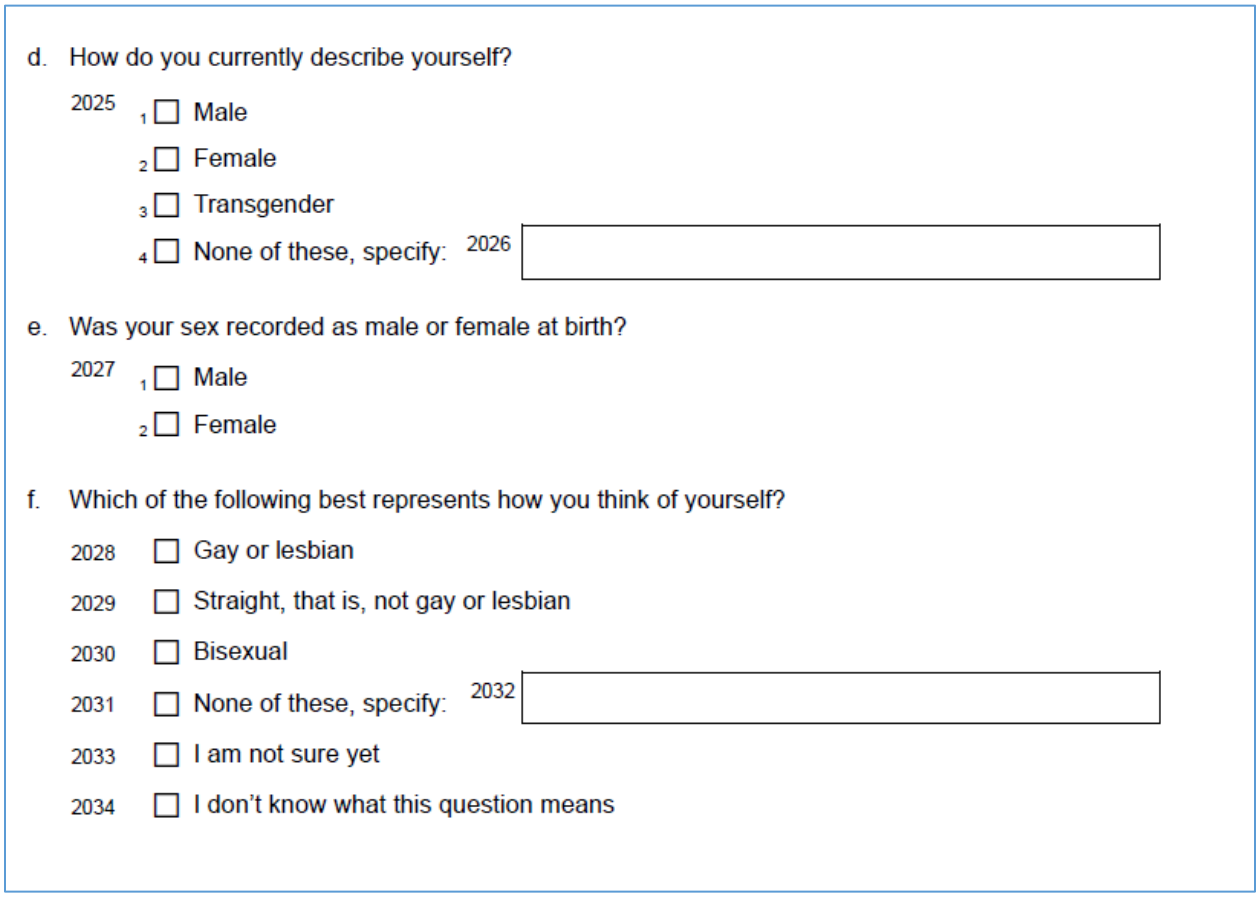
Farm Producer Study Questions

The FPS contained basic whole farm acreage information, some demographic questions, and some producer characteristic questions that have been asked on previous surveys, including the quinquennial Census of Agriculture. In addition, three *sexual orientation* and *gender identity* (SOGI) questions and a series of six disability questions were included that had not been asked on previous NASS surveys. These questions are the focus of this research. The three SOGI questions were based on questions from the Williams Institute at the University of California at Los Angeles School of Law (Williams Institute, UCLA, 2020), and the six disability questions were based on questions from The Washington Group on Disability Statistics (Washington Group, 2022) (See Figure 3). NASS conducted cognitive testing on the paper questionnaire for both sets of questions before fielding the FPS (Ridolfo et al., 2021). No modifications were made to the disability questions, but some modifications were made to the SOGI questions based on that testing. The main change involved the ordering of the *sex at birth* and *gender identity* questions. Generally, the *sex at birth* question is asked first in a two-part gender identity series; however, Ridolfo et al. (2021) found that transgender respondents believed their gender identity to be more important and preferred that the *gender identity* question to be asked first, prompting a swap in the order of the questions for the FPS.

In addition to the three SOGI questions that were used, a confirmation question was included for some FPS experimental groups for some modes. The confirmation question was asked on CATI and web if the respondent's answer to the *sex at birth* question differed from their answer to the *gender identity* question.

Figure 1 shows the three SOGI questions that were included in the FPS. Included are the *gender identity* question first, the *sex recorded at birth* question second, and the *sexual orientation* question last. Note the response options, including the 'None of these, specify' response option with write-in response abilities for both the *gender identity* and *sexual orientation* questions.

Figure 1: Sexual Orientation and Gender Identity Questions asked on the paper questionnaire for the Farm Producer Study



d. How do you currently describe yourself?

2025
1 ☐ Male
2 ☐ Female
3 ☐ Transgender
4 ☐ None of these, specify: 2026 [ ]

e. Was your sex recorded as male or female at birth?

2027
1 ☐ Male
2 ☐ Female

f. Which of the following best represents how you think of yourself?

2028 ☐ Gay or lesbian
2029 ☐ Straight, that is, not gay or lesbian
2030 ☐ Bisexual
2031 ☐ None of these, specify: 2032 [ ]
2033 ☐ I am not sure yet
2034 ☐ I don't know what this question means

Figure 2 shows an example of a confirmation question, as scripted for the CATI interview. This question was only asked in CATI and the web, and only for some experimental groups.

Figure 2: Confirmation question on CATI script

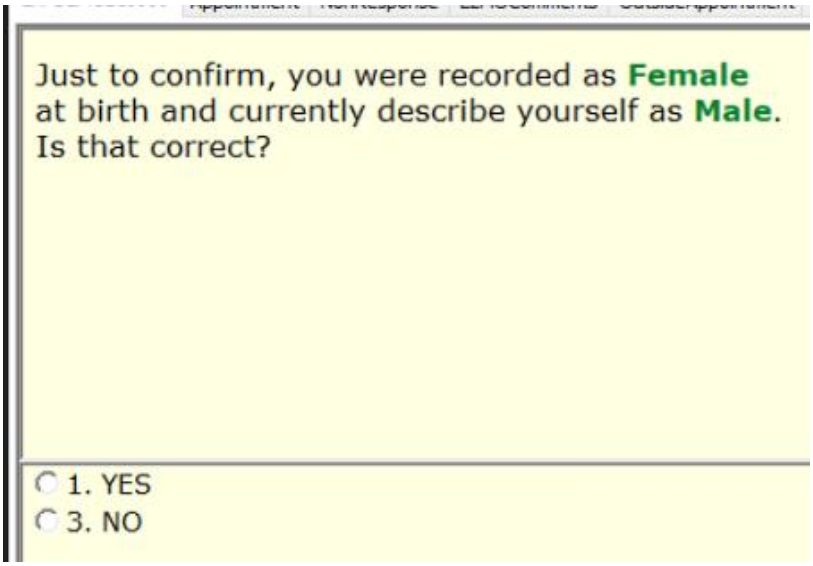
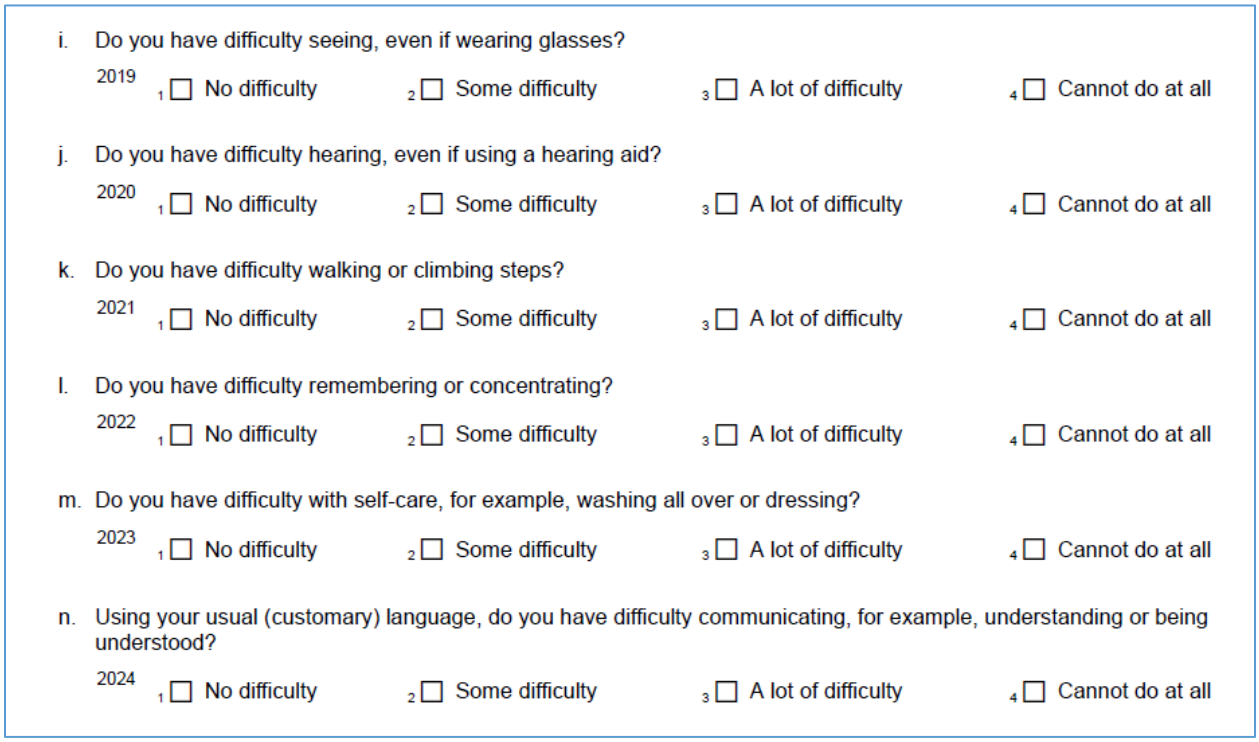


Figure 3 shows the six disability questions asked on the paper questionnaire of the FPS, as recommended by the Washington Group.

Figure 3: Disability Questions asked on the Paper Questionnaire for the Farm Producer Study



The survey only collected information about the person answering the survey, and did not request any proxy information about other persons involved with the operation.

Farm Producer Study Design

To assess the effect of adding these SOGI and disability questions, five treatment groups and one control group were created. Together, these represent six experimental groups, each having its own questionnaire version as shown in Table 1. With this design, it was possible to assess whether each set of new questions (disability or SOGI) was associated with a change in response rates and whether an interaction between the two sets of questions was present.

Table 1: Experimental Group Descriptions and Approximate Sample Size

Experimental Group	Approximate Sample Size (n)
1. Control (no test questions included)	12,500
2. Only received only disability questions	12,500
3. Only received only SOGI questions	12,500
4. Received both disability and SOGI questions	12,500
5. Received only SOGI questions, with follow-up confirmation question if sex at birth different from gender identity (select respondents in CATI/CASI modes only)	12,500
6. Received SOGI and disability questions, with follow-up confirmation question if sex at birth different from gender identity (select respondents in CATI/CASI modes only)	12,500
Total	75,000

As noted in Table 1, questions used for groups with SOGI questions (groups 3 and 4) were duplicated into groups 5 and groups 6, respectively. For both experimental groups 5 and 6, respondents in the CATI and CASI modes received a confirmation question if their recorded sex at birth differed from their current reported gender identity. This was done to help determine whether reported differences in sex at birth and gender identity were due to the respondent reporting correctly or a form of measurement error.

Seven sampling strata were defined for groups with historical response rates lower than the overall Census of Agriculture response rate. Their descriptions are shown in Table 2. These strata were used in the initial analyses conducted by Young and Rater (Young & Rater, 2022) but were not used for the analyses described in this paper.

Table 2: Strata Descriptions

Stratum	Description
1	LGBTQ+
2	American Indians/Alaska Natives
3	Asians/Native Hawaiians and Pacific Islanders
4	Blacks
5	Hispanics
6	Females
7	Other

Analysis Topics

As described above, the initial FPS report was released in July 2022 (Young & Rater, 2022) and focused on overall unit and item response rates. In that report, all analyses were conducted on unweighted data, citing the loss in statistical power that comes with using weights.

The main findings from that report were:

1. The presence of SOGI questions led to lower unit response rates.
2. The effect of including disability questions and all two- and three-factor interactions were not significant on unit response rates.
3. Item response rates for the *sexual orientation* question were significantly lower than the item response rates for the *gender identity* and *sex recorded at birth* questions.
4. The presence of disability or SOGI questions did not have any main statistically significant effect on response rates within any of the demographic strata.

Since the initial report, by Young and Rater (Young & Rater, 2022), additional research questions have arisen regarding the data. This paper aims to answer the following research questions:

1. Were there statistically different *unit* response rates *across modes* that drove overall response rates? (Unit Mode Effects)
2. Were there different *item* response rates *across modes* that drove overall item response rates? (Item Mode Effects)
3. Were different age groups more or less likely to refuse the survey? (Responses by Age)
4. Were there additional response options that should have been included in the *sexual orientation* and *gender identity* questions? ('None of these, specify' responses)

Each of the following sections will explore one of the above analysis topics. It should be noted that very basic consistency edits were done on the FPS data but no automated editing was conducted.

Research Question #1: Were there statistically different *unit* response rates *across modes* that drove overall response rates? (Unit Mode Effects)

The analyses for this research question include unit response rates by mode and were compared between experimental groups 2 through 6 versus the control group. The tests for the unit mode effects were completed using the "N-1" Chi-squared test of independence as recommended by Campbell (Campbell, 2007) and Richardson (Richardson, 2011).

Table 3 shows the unweighted proportion of unit responses by mode and experimental group.

Table 3: Unweighted Proportion of Unit Responses Across Experimental Group and Mode [1/ 2/]

Mode	Experimental Group 1 (Control)	Experimental Group 2	Experimental Group 3	Experimental Group 4	Experimental Group 5	Experimental Group 6	Total by Mode
	(percent)						
1 – Paper	6.11	6.09	5.61 [3/]	5.55 [3/]	5.72 [3/]	5.57 [3/]	34.64
4 – CATI/Phone	1.26	1.26	1.36	1.42 [3/]	1.32	1.40	8.02
5 – CASI (Web)	0.96	0.90	0.88	0.82 [3/]	0.88	0.87	5.31
Overall	8.33	8.25	7.85 [3/]	7.79 [3/]	7.92 [3/]	7.84 [3/]	47.97

1/ Proportion of responses are defined as the number of responses in each category divided by the overall sample size.
2/ Totals may not sum due to rounding
3/ This value was significantly different from the control group value at the $p < 0.05$ level.

Recall that the only difference between the questionnaires used for experimental groups 5 and 6 and the questionnaires used for experimental groups 3 and 4 was the inclusion of a confirmation question in CATI and web, when the *sex recorded at birth* response was different than the *gender identity* response. The confirmation question was NOT asked on the paper questionnaire.

Experimental groups 3, 5, and 6 all had an overall response rate that was significantly lower, statistically (alpha = 0.05), from the control group. However, Table 3 shows that when broken out by mode, the paper/mail mode was the only mode that had significantly lower proportions of responses, statistically, than the control group. The other two modes (CASI/web and CATI/phone), had rates that were not significantly different from the control group, indicating that the paper data collection mode contributed to lowering the overall response rate. Experimental group 4 was the only group which had CATI/phone and CASI/web rates that were statistically different from the control group (alpha = 0.05). The CATI/phone rates were 1.42% for experimental group 4 and 0.82% for the control group, while the CASI/web mode had rates of 1.26% for experimental group 4 and 0.96% for the control group. However, the CATI/phone's rate for experimental group 4 was higher than the control group. This is true for all groups that include SOGI questions, but is only statistically significant in experimental group 4.

Statistical significances, at the alpha level of 0.05, across experimental group proportions, were consistent with Young and Rater, (Young & Rater, 2022) who did similar tests across all modes, showing that disability questions alone did not significantly reduce unit response rates. Further, all experimental groups that contained SOGI questions had significantly (alpha = 0.05) lower response rates than the control group. The differences in response proportions for the phone and web modes between the control group and experimental groups 3, 5, and 6 were not statistically significant.

For this research question, weighted proportions were also calculated, in addition to the unweighted proportions shown in Table 3. Incorporating sampling weights as well as design effects into the calculation of response rates allows for inference of estimating population proportions such as response rates, rather than solely making inferences on the data collected within the sample. Valliant and Dever outline a step-by-step guide for evaluating the significance on weighting in producing population estimates through using an unweighted logit model (Valliant & Dever, 2018). Weights that are significant in producing population proportions are referred to as being informative about a treatment effect. If the weights are uninformative about a treatment effect, then the coefficients of the logit model with and without the weights will be very similar, and the use of weights will only increase the standard error of the treatment effect. However, if the weights are informative, the estimate of the effect will shift significantly while the standard error will remain similar. Computing a Wald Chi-Squared Test on the unweighted model will determine if the weights included in the model are informative. If the test is significant, the weights are significantly changing the estimate of one of those coefficients and are informative.

Figure 4 shows the SAS output of the unweighted logit model with the weight variable included as a predictor. The figure shows the p-value for the Wald Statistic is highly significant, indicating the weights are informative for this survey. Therefore, weights will also be used for unit level analyses in this paper. Table 4 shows the response rates when sampling weights and design were taken into account. All rates that were statistically significant in Table 3 remain statistically significant in Table 4, as well as all modes in experimental groups 3 through 6, compared to the control group.

Figure 4: Wald Chi-Squared Test of Unweighted Logit Model

Testing Global Null Hypothesis: BETA=0			
Test	Chi-Square	DF	Pr > ChiSq
Likelihood Ratio	157.1527	11	<.0001
Score	157.0387	11	<.0001
Wald	155.9318	11	<.0001

Table 4: Weighted Proportion of Unit Responses Across Experimental Group and Mode [1/ 2/]

Mode	Experimental Group 1 (Control)	Experimental Group 2	Experimental Group 3	Experimental Group 4	Experimental Group 5	Experimental Group 6	Total by Mode
	(percent)						
1 – Paper	6.70	6.74 [3/]	5.97 [3/]	6.02 [3/]	6.16 [3/]	6.17 [3/]	37.77
4 – CATI/Phone	1.23	1.23	1.34 [3/]	1.43 [3/]	1.31 [3/]	1.38 [3/]	7.91
5 – CASI (Web)	0.91	0.81 [3/]	0.82 [3/]	0.85 [3/]	0.84 [3/]	0.78 [3/]	5.01
Overall	8.85	8.78 [3/]	8.13 [3/]	8.30 [3/]	8.31 [3/]	8.33 [3/]	50.70

1/ Proportion of responses are defined as the number of responses in each category divided by the overall sample size.
2/ Totals may not sum due to rounding
3/ This value was significantly different from the control group value at the $p < 0.05$ level.

When incorporating weights for inferences about the population of interest, proportions across all modes for all experimental groups in the paper and CASI/web modes were significantly lower (alpha = 0.05) than the control group. Further, all proportions for all modes and experimental groups were significantly different from the control group except for the CATI/Phone mode for experimental group 2, which remained unchanged. This implies that response rates for a census of the population of interest would have more statistically significant differences in response rates than the sample that was implemented in the FPS. Although some individual mode/experimental group rates for the CATI/phone mode are higher than the control group, all aggregate experimental group rates are lower at rates that are statistically significant at the alpha level of 0.05. This is again mostly driven by the lower paper proportions of returns across all experimental groups. Despite being significant, rates are closer to the control group for the paper/mail mode. This is most likely due to the original strata design that was implemented to oversample types of operations that have historically low response rates. The use of weights meant to make inferences about the general population, not just the sample gathered also likely contributed to these closer rates. CATI/phone proportions by experimental group are the main ones that have higher rates than the control group. This may be due to interviewers entering data for respondents by making assumptions about them instead of asking the questions, as noted by Van Horn, et al., (Van Horn, et al., 2023)

Research Question #2: Were there statistically different *item* response rates *across modes* that drove overall item response rates? (Item Mode Effects)

The analysis of this research question includes mode. Unweighted item level response rates were analyzed by mode and experimental group for each SOGI and disability question. In addition, the three typical NASS demographic questions of *sex*, *age*, and *ethnicity* were analyzed by mode for comparative purposes.

In Table 5, the question referred to as *Sex* was "What is your sex?" and had binary response options (Male/Female). This question was only asked in the non-SOGI questionnaire versions, version 1 (control) and version 3 (disability only version), and was replaced by the three SOGI questions in other questionnaire versions. The *age* question was asked on

all questionnaire versions and read "What was your age on December 31, 2021?" The *ethnicity* question read "Are you of Hispanic Latino, or Spanish origin?" and had response options of "yes" or "no."

Tables 5 through 10 show the item response rates by mode and experimental group for each group. Only questions asked in each questionnaire version are present in the corresponding table. The question order in each table matches the question order that existed in each Experimental Group. No statistical tests were computed here, but statistical tests were conducted across all experimental groups (regardless of mode) by Young & Rater, 2022. As shown in the following tables, trends of diminishing item response rates for questions that are closer towards the end of the survey are similar across modes, indicating no major trend differences from one mode to another; however, question item response rates do differ across modes.

Table 5: Unweighted Item Response Rates by Mode and Question, Control Group (Experimental Group 1) [1/]

Question	PASI/Mail	CATI/Phone	CASI/Web
	(percent)		
Sex	95.00	94.16	95.69
Age [2/]	93.74	93.47	95.83
Ethnicity	92.28	94.16	94.58

1/ The control group contained typical NASS demographic questions, with no sexual orientation, gender identity or disability questions.
2/ For paper mode, reported ages that were less than 16 were considered to be reporting or processing errors and were considered missing for this report.

Table 6: Unweighted Item Response Rates by Mode and Question, Experimental Group 2 [1/]

Question	PASI/Mail	CATI/Phone	CASI/Web
	(percent)		
Age [2/]	94.30	93.17	95.74
Ethnicity	92.93	93.17	95.88
Sex	95.38	95.05	95.88
Disabilities:			
Seeing	95.59	92.66	95.88
Hearing	95.63	91.81	95.43
Walking/Climbing	95.75	91.64	95.58
Concentrating	95.66	91.81	95.43
Self-Care/Dressing	95.77	91.48	94.99
Communicating	95.73	91.30	95.14

1/ Experimental group 2 was the first treatment group. It contained some typical NASS demographic questions as well as disability questions. No sexual orientation or gender identity questions were asked.
2/ For paper mode, reported ages that were less than 16 were considered to be reporting or processing errors and were considered missing for this report.

Table 7: Unweighted Item Response Rates by Mode and Question, Experimental Group 3 [1/]

Question	PASI/Mail	CATI/Phone	CASI/Web
	(percent)		
Age [2/]	94.20	94.88	96.37
Ethnicity	92.22	94.55	95.17
Gender Identity	94.23	95.04	95.62
Sex Recorded at Birth	93.62	99.01	95.17
Sexual Orientation	88.58	88.76	91.69

1/ Experimental group 3 was the second treatment group. It contained some typical NASS demographic questions as well as sexual orientation and gender identity questions. No disability questions were asked.
2/ For paper mode, reported ages that were less than 16 were considered to be reporting or processing errors and were considered missing for this report.

Table 8: Unweighted Item Response Rates by Mode and Question, Experimental Group 4 [1/]

Question	PASI/Mail	CATI/Phone	CASI/Web
	(percent)		
Age[2/]	92.70	94.40	95.14
Ethnicity	91.40	95.65	94.98
Gender Identity	93.75	95.50	95.79
Sex Recorded at Birth	92.81	94.10	94.66
Sexual Orientation	88.89	87.11	93.53
Disabilities:			
Seeing	93.45	90.84	94.66
Hearing	93.50	91.30	94.82
Walking/Climbing	93.50	91.15	94.17
Concentrating	93.37	90.68	94.17
Self-Care/Dressing	93.37	90.37	93.69
Communicating	93.47	90.22	94.82

1/ Experimental group 4 was the third treatment group. It contained some typical NASS demographic questions as well as all test questions including sexual orientation, gender identity questions, and disability questions. This is the first questionnaire version to incorporate *both* SOGI and disability questions.
2/ For paper mode, reported ages that were less than 16 were considered to be reporting or processing errors and were considered missing for this report.

Table 9: Unweighted Item Response Rates by Mode and Question, Experimental Group 5 [1/]

Question	PASI/Mail	CATI/Phone	CASI/Web
	(percent)		
Age[2/]	93.19	94.67	95.18
Ethnicity	91.60	94.32	94.13
Gender Identity	93.36	93.61	94.58
Sex Recorded at Birth	92.74	92.18	94.13
Sexual Orientation	88.21	87.57	90.51

1/ Experimental group 5 was the fourth treatment group. The questionnaire used for this group was identical to the questionnaire for group 3 for paper, testing only SOGI questions, but for CATI and web modes also included a confirmation question when *Sex Recorded at Birth* varied from the *Gender Identity*.
2/ For paper mode, reported ages that were less than 16 were considered to be reporting or processing errors and were considered missing for this report.

Table 10: Unweighted Item Response Rates by Mode and Question, Experimental Group 6 [1/]

Question	PASI/Mail	CATI/Phone	CASI/Web
		(percent)	
Age[2/]	93.55	92.69	95.40
Ethnicity	91.76	93.00	95.40
Gender Identity	94.67	92.54	95.71
Sex Recorded at Birth	94.10	92.22	94.48
Sexual Orientation	88.38	86.16	91.87
Disabilities:			
Seeing	94.69	90.05	94.02
Hearing	94.41	90.20	94.02
Walking/Climbing	94.54	90.20	93.87
Concentrating	94.39	90.20	93.56
Self-Care/Dressing	94.51	89.89	92.79
Communicating	94.21	89.42	93.40

1/ Experimental group 6 was the last treatment group. The questionnaire used for this group was identical to the questionnaire for group 4 for paper, including all experimental questions, but for CATI and web modes also included a confirmation question when *Sex Recorded at Birth* varied from the *Gender Identity*.

2/ For paper mode, reported ages that were less than 16 were considered to be reporting or processing errors and were considered missing for this report.

In reviewing Tables 5 through 10, besides the CATI/phone rates for Self-Care/Dressing and Communicating in experimental group 6, the only question with item response rates by mode regularly below 90% is the *sexual orientation* question. The item response rate for the *gender identity* question is more similar to item response rates for the disability questions than the *sexual orientation* question. In some cases, item response rates for the *gender identity* question is comparable to, or higher than, standard NASS demographic questions like age or ethnicity. This suggests the *sexual orientation* question was more problematic for respondents across all modes than the gender identity questions (*sex recorded at birth* and *gender identity*), which seem to be performing at rates similar to existing demographic questions. In addition, in a review of a sample of phone recordings, researchers found that while no observed respondents refused the gender identity questions, 6.3% of respondents did refuse the question on sexual orientation (Van Horn et al., 2023).

The ordering of the questions may have also contributed to lower item response rates for the *sexual orientation* question. Questions in Tables 5 through 10 are listed in the same order as they were included in the corresponding experimental group questionnaires. In the FPS, the *sexual orientation* question always came last in the series of SOGI questions, while the *gender identity* question came first in the series. Note that the item response rates declined with questions that were towards the end of the survey, across all experimental groups and question categories (SOGI, disability, and typical NASS demographic questions). Respondent and/or interviewer fatigue may have contributed to the decline in *sexual orientation* item response rates, since that question was last in the SOGI series (Ben-Nun, 2008).

Within an experimental group, all disability questions generally had similar item response rates; however, there is again a consistent pattern of downward item response rates with questions that were towards the end of the survey. This is most prominent in the CATI/phone mode. This may be due to multiple reasons. There is evidence of enumerator shortcutting, or not asking the second half of some of the disability questions (Van Horn, et.al., 2023). In addition, interviewers were more likely to verify answers by the respondent for the later disability questions.

The CASI/web mode consistently had higher item response rates across most questions and experimental groups versus the CATI/phone mode. This is consistent with self-administered modes soliciting better response for sensitive questions (Tourangeau & Smith, 1996).

Research Question #3: Were different age groups more or less likely to refuse the survey? (Responses by Age)

The analysis for this research question looks at the impact of age on unit response to the FPS. As stated in research question #1, Figure 4 output of the unweighted logit model with the weight variable included as a predictor, where the p-value for the Wald Statistic is strongly significant. This indicates that the weights are informative for this survey for unit level analysis. Therefore, a weighted logit model was used to model unit level response based on the producer's age. Each producer's age was used as a proxy for the respondent's age because in almost all cases, the respondent was the producer. The producer's age was determined by using the sampled producer's birth year from the sampling frame. The calculated age for the producer from the sampling frame for respondents was compared to the age reported on the questionnaire. When compared, the two age values were within a couple of years over 90% of the time.

Table 11 shows the change in odds ratio of responding for every year increase in age of the sampled producer, by experimental group as well as across all groups.

Table 11: Change in odds ratio of responding by experimental group as age increases by one year

Experimental Group	Change in odds ratio (percent)
1 – Control Group	+2.32
2 – Disability only Group	+2.01
3 – SOGI only Group	+2.29
4 – Both Disability & SOGI	+1.94
5 – SOGI only with CATI confirmation Question	+2.03
6 – Both sets of questions with CATI confirmation	+1.92
Across All Groups	+2.08

Table 11 shows that, in general, older people had higher unit propensity to respond across all questionnaire versions, with the highest propensity for the control group questionnaire. In addition, the more potentially sensitive questions being asked (questionnaires for experimental groups 4 and 6 had both SOGI and disability questions), the less likely older producers were to respond. That is, with a positive change in odds ratios, older people are more likely to respond than younger people overall; however, they are not as likely to respond to the questionnaire versions that had the potentially sensitive questions as they are on other versions of the questionnaire. For example, a 60 year old would have a 22.9% increase in the odds ratio of responding in the experimental group 3- SOGI only group than a 50 year old; however, a 60 year old would have only a 19.4% increase in the odds ratio of responding in the experimental group 4 with both SOGI and disability questions than a 50 year old.

There is not much research for age and response propensity in establishment surveys; however, there is some for social surveys as well as medical surveys. Medical survey research seems to indicate a negative relationship with response and age (Herzog, et al., 1988), while there is a Swedish university study showing an indication that there could be a positive relationship between the age and the level of interaction whilst filling out a survey regarding intelligence (Sandberg, 2016). One medical article investigates the potential causes of response burdens with elderly, suggesting potential barriers to response (Wagner M, et al., 2018).

Research Question #4: Were there additional response options that should have been included in the sexual orientation and gender identity questions? ('None of these, specify' responses)

The analysis for this research question includes analysis of the write-in answer options for the *sexual orientation* and *gender identity* questions. Producers had the ability to leave comments in any area of the form, but not all were captured in the survey dataset, depending on the mode of data collection and where the producer left the comment. The only comments that are included in the analysis in this paper are those written in the write-in answer options for the *gender identity* and the *sexual orientation* questions. These two questions had, a 'None of these, specify' response option where respondents could provide an open-ended response. These write-in responses were analyzed both for the potential to add additional items to the response options, and to check for respondent sentiment. The keying systems for paper questionnaire allowed for capturing of text entered in the response box without the respondent selecting the 'None of these, specify' response option associated with the box. The CASI/web and CATI/phone questionnaire instruments only showed the text boxes if the respondent selected the 'None of these, specify' answer option. The CASI/web system allowed for a general comment box at the end of the survey. Additionally, the CATI system allows interviewers to enter "comments" at any point in the interview, using a "comment" button. This analysis only includes the write-in responses that were entered in the text boxes associated with the *sexual orientation* and *gender identity* boxes. The analysis does not include comments the producer wrote elsewhere on a paper form or entered elsewhere in the CASI/web form, such as the general comments at the end of the CASI instrument or comments that CATI interviewer entered in any other location in the CATI instrument. These general comments were briefly reviewed but rarely provided anything informative to the research questions.

Gender Identity

The *gender identity* question had a 'None of these, specify' option, with a text box available for respondents to report something not listed.

There were 139 specify responses recorded for the *gender identity* question. Table 12 below breaks out these write-in responses received by mode. The 'None of these, specify' selection need not have been selected to record a comment in the specify box for the paper/mail mode, which may explain why there is a significantly larger proportion of 'None of these, specify' box responses recorded in that mode. One hundred twenty-nine came via the paper/mail mode, with five responses from the CASI/web mode. No CATI/phone respondents utitilized the *gender identity* question's specify field. It could be that none of the CATI respondents reported their answer as 'None of these, specify' but this may also be due to interviewer behaviors for CATI/phone interviews. For example, in their CATI interview behavior coding work, Van Horn, et al. (2023) found evidence of interviewers shortcutting and assuming responses from producers.

Table 12: Breakout of Gender Identity Write-in Responses for 'None of these, specify' by Mode

Mode	Count	Percent
Paper/mail	129	96.3
CATI/phone	0	0.0
CASI/web	5	3.7

Of the 139 write-in responses for the *gender identity* text box, only 32 marked the 'None of these, specify' checkbox.

Table 13 shows the breakout of specify responses by the *gender identity* reported on the FPS.

Table 13: Breakout of Response Option Selections to the FPS Gender Identity Question When a 'Specify' Write-in Response was Given

Response Option	Frequency
1 – Male	56
2 – Female	11
3 – Transgender	0

4 – None of these, specify	32
None – No Response Checked	40
Total	139

Most of the specify box write-in responses were left by individuals who identified as male, followed by respondents who did not answer the question. No respondent who selected '3 – Transgender' left a comment in the specify box.

There were a couple responses such as 'Mr' that could still fit an existing response option; however, most could be interpreted as a form of refusal or item nonresponse to the question. Of the 139 remarks left in the specify box for the *gender identity* question, 47 (33.8%) can be classified as a response typically associated with a refusal to answer the question, despite the fact that they may still have answered the question. These include responses such as "none of your business," "this has nothing to do with farming," and "stupid question."

Of the 32 respondents who selected the box for 'None of these, specify' to the *gender identity* question, four left a response that could be interpreted as the question was intended. These included the term 'Pansexual' twice and the terms 'Nongender' and 'They' once each.

Sexual Orientation

Similar to the *gender identity* question, the *sexual orientation* question had a 'None of these, specify' option, with a specify box available for respondents to report something not listed.

There were 567 responses left in the specify box for the *sexual orientation* question, over four times as many for the *gender identity* question.

Similar to the *gender identity* specify box, the *sexual orientation* responses were largely gathered via the mail/paper mode. Table 15 shows the modes breakouts for the *sexual orientation* specify box responses.

Table 15: Breakout of Gender Identity Write-in Responses for 'None of these, specify' Responses by Mode

Mode	Count	Percent
Paper/mail	552	97.35
CATI/phone	3	0.53
CASI/web	12	2.12

Table 16 shows the response option selected for all 567 responses that were left in the specify box by the *sexual orientation* reported on the FPS.

Table 16: Breakout of Response Option Selections to the FPS Sexual Orientation Question When a 'Specify' Write-in Response Was Given

Response Option	Frequency
Gay/Lesbian	6
Straight, that is, not gay or lesbian	157
Bisexual	6
None of these, specify	224
I am not sure yet	9
I don't know what this question means	51
None/Item Nonresponse	114
Total	567

Less than half, 224 out of 567, of the total responses left by respondents selected the 'None of these, specify' check box. Of these 224 records, only seven left a response that could be interpreted as the question was intended. These seven included Asexual, Queen, Nonbinary, Pansexual, Polyamorous, and Postsexual. Each of these seven responses had a frequency of one, except Polyamorous, which had a two reports. While some of these are not typically meant to describe someone's sexual orientation, the question wording leaves it open to allow the respondent to describe themselves.

Slightly over 39%, 224 of 567 records, of write-in responses across all response option choices above were write-in responses typically associated with refusals to answer a question. These write-in responses included instances where there was no response option selected as well as when one or more response options were selected. Examples of these include responses such as "none of your business," "what does this have to do with ag?" and "This is unnecessary!" As shown in Table 17, of these responses, less than one-third marked the 'None of these, specify' check box, over a third selected the 'straight, that is not gay or lesbian' option and just under three percent had both of these options selected (multiple options were allowed). Less than one-quarter of these 'refusal type comments' marked no response option box, indicating a true refusal of the question.

Table 17: Breakout of Response Option Selections to the Sexual Orientation Question Where the Response Indicated a Refusal Type of Comment

Response Option	Percent	n
'Straight, that is not gay or lesbian'	34.1	76
'None of these, specify'	30.9	69
Both 'straight,…' and 'None of these,…'	2.7	6
'I don't know what this question means'	10.3	23
Both 'I don't know….' And 'None of these….'	1.3	3
'I am not sure yet'	1.8	4
Both 'straight,…' and 'I don't know,…'	<0.1	1
No response option selected	22.9	51
Total	100.0	224

Slightly under 39%, 220 of the 567 total records having a write-in response, were not direct indications of the person's *sexual orientation*, including "married," "human," "normal," and "Christian." Although the question was vague, the intention was for the topic to be inferred based on the existing response options. Table 18 outlines the response options selected where the write-in response was an uninformative description of the person's *sexual orientation*. One-fifth of these still marked the 'straight, that is not gay or lesbian' option. Less than half (about 45%) selected the box for 'None of these, specify,' while just over three percent marked both boxes. Just under one-tenth had the response option 'I don't know what this question means' checked, and just over one-third had no response option checked.

Table 18: Breakout of Response Option Selections to the Sexual Orientation Question Where the Write-in Response Indicated Uninformative Descriptions

Response Option	Percent	n
'straight, that is not gay or lesbian'	20.0	44
'None of these, specify'	45.0	99
Both 'straight,…' and 'None of these,…'	3.2	7
'I don't know what this question means'	9.1	20
Both 'I don't know….' And 'None of these….'	2.7	6
Both 'straight,…' and 'I don't know,…'	<0.1	1

No response option selected	25.9	57
Total	100.0	220

Approximately eight to nine percent, or 48 write-in responses, of the total write-in responses for the *sexual orientation* question would reasonably be placed in an existing category, with the most frequently occurring being "straight" or "heterosexual."[1] Of these repeated responses, just under one-third already had the 'straight, that is not gay or lesbian' option checked. Half of these marked the 'None of these, specify' box, and several checked both boxes. Table 19 shows the number and percent of the write-in responses where the response could be place in an existing category by the sexual orientation response provided by the producer.

Table 19: Breakout of Response Option Selections to the Sexual Orientation Question Where the Write-in Response Indicated an Existing Category

Response Option	Percent	n
'Gay or lesbian'	2.1	1
'Straight, that is not gay or lesbian'	31.3	15
'None of these, specify'	50.0	24
Both 'straight,…' and 'None of these,…'	8.3	4
Bisexual	2.1	1
'I don't know what this question means'	4.2	2
Both 'I don't know….' And 'None of these….'	2.1	1
I'm not sure yet	2.1	1
No response option selected	8.3	4
Total	100.0	48

All other write-in responses were not informative in general, such as 'N/A', 'none', or another irrelevant remark for the question.

Discussion

Across the analyses of the last three research questions in this paper, it is clear that the *sexual orientation* question is problematic for respondents, while the *gender identity* question poses less of an issue. The *gender identity* question is shown to fall closer in line with existing NASS demographic questions.

Unweighted proportions for unit response rates were statistically significant for all SOGI versions when aggregated across modes. This showed the same results as the initial analysis by Young and Rater (2022). The additional analyses on mode effects in this paper showed that these experimental group proportion significances against the control group are being driven by the paper data collection mode. The paper mode is the only mode with statistical differences from the control group for experimental groups 3, 5, and 6. This may be due to the respondents' ability to review the content of the survey before deciding to respond in the paper/mail mode. This is more difficult, if not impossible in the CASI/web and CATI/phone modes, due to the questions being presented only as the respondent progresses through the survey.

[1] Response options intentionally did use the term "heterosexual," since previous cognitive work has found this term to be unfamiliar to many who don't identify as lesbian, gay, bisexual, transgender, or queer (LGBTQ) (Williams Institute, 2020).

CATI/phone modes are also associated with a higher general response propensity than the other modes, which most likely further contributed to non-statistically significant differences (Dillman, et al., 2009).

Weighted proportions for unit response rates were statistically significant across all treatment groups (experimental groups 2 through 6) compared to the control group, providing evidence that all questionnaire versions would see statistical differences in the target population. Further, the unit response rate in the CATI/phone mode for experimental group 2, which only included disability questions, was the only mode/experimental group whose rate was not statistically significant when compared to the control group.

Unweighted item response rates for *gender identity* and *sex recorded at birth* questions were similar or better across all experimental groups than the rates for age and ethnicity, two demographic questions currently used by NASS, suggesting that there is no issue among respondents for these questions. However, there is a significant drop in item response rates across experimental group and mode for the *sexual orientation* question. Young and Rater (2022) noted this aggregate drop across all modes as being statistically significant. This paper demonstrates that this holds true across individual data collection modes, unlike the unweighted unit response rates outlined earlier, which were driven by the paper mode.

The pattern of decreasing item response rates across modes for each experimental group is another finding outlined above. This pattern persists across all question types including the typical demographic questions *sex*, *age*, and *ethnicity* SOGI questions (*gender identity, sex at birth*, and *sexual orientation*) and disability questions (se*eing, hearing, walking/climbing, concentrating, self-care/dressing,* and *communicating*). This suggests that the decreased item response rate for the *sexual orientation* question could be at least partially due to the placement of it being last among the SOGI questions.

Older sampled producers had a higher propensity to respond to the survey than younger sampled producers. However, there is evidence that this higher propensity for older respondents diminishes for experimental groups that included both SOGI and disability questions.

Analysis of the 'None of these, specify' write-in responses further indicates that the *sexual orientation* question is more problematic for respondents than the *gender identity* question, both in terms of the volume of responses and the type of responses obtained. As shown, 6.2% more of the write-in responses for the *sexual orientation* question could be considered a refusal, compared to the *gender identity* question (39.3% versus 33.8% respectively).

Contact People

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