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**Results of Usability Testing of the 2014 American Community Survey
on Smartphones and Tablets Phase I: Before Optimization for Mobile Devices**

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Abstract

The mandatory American Community Survey (ACS) takes 40 minutes to complete on average and is often answered using the ACS online instrument on a desktop or laptop computer. However, recent analysis has indicated that there is a small but growing segment of respondents who answer the ACS using their mobile devices (Horwitz, 2015). While the current ACS instrument can be completed using a mobile device, at the time of this study, it had not been optimized for viewing on a small screen. While ACS had plans in development to make the screens more mobile friendly, the team wanted to test it prior to the mobile optimization changes in order to have a baseline to compare the optimized version against. Given these developments, members of the Center for Survey Measurement (CSM) and the Decennial Statistical Studies Division (DSSD) collaborated to investigate how respondents interact with the ACS online instrument, prior to the screens being optimized for a smartphone or tablet. The goal of the usability evaluation was to identify how the online ACS performed for respondents who answered while using their own mobile device (e.g., smartphone or tablet) as well as to identify screens which were more challenging to complete on a mobile device. Usability findings indicated that for most small devices, it was very difficult to complete the survey without a lot of extra manipulation, such as zooming in to read the survey question and response options. This was time consuming and frustrating to the user. Recommendations for improvement are to optimize the ACS for mobile devices. This includes implementing design changes that were already made for the Decennial 2015 census online questionnaire, based on a style guide created by an inter-departmental Census Team (see Nichols et al., 2015). The guide suggests:

- Reduce the use of white space and increase the font size so that the screen is filled primarily with just the question and the response options
- Allow more space between response options
- Reduce the amount of text on the screen, (e.g., login page, instructional texts, etc.)
- Minimize the size of the banner

Not in the guide, but for ACS specifically, we recommend removing the right-hand navigation menu.

Keywords: American Community Survey, mobile forms, un-optimized for mobile, web surveys, usability

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1. Introduction

The American Community Survey (ACS) is a continuous monthly survey conducted by the U.S. Census Bureau to collect demographic, housing, social, and economic data from the American public through an annual nationwide sample of approximately 3.5 million addresses. The ACS employs a multi-mode sequential data collection operation for each monthly panel: self response (Internet and mail), telephone interviews with non-respondents, and in-person interviews with a sample of the remaining non-respondents. During the self-response phase of data collection the first two mail invitations encourage respondents to go online to complete the survey; a paper questionnaire is mailed later with continued opportunity respond online (American Community Survey, 2014).

Although the ACS can be completed on a smartphone or tablet, at the time of this study, the design and layout had not yet been optimized for smaller screens. However, research shows there is a small but growing segment of users who answer the ACS using their mobile devices (Horwitz, 2015). In preparation for optimizing the ACS for mobile devices, the team decided to first evaluate the un-optimized version. Members of the Center for Survey Measurement (CSM) and the Decennial Statistical Studies Division (DSSD) collaborated to investigate how respondents interact with the ACS online instrument when answering using their own smartphone or tablet as well as to identify screens which were more challenging to answer with a mobile device when un-optimized.

The study presented in this report is the first of two phases of research. The first phase aimed to evaluate the un-optimized mobile design for the internet self response phase of the ACS. Results from this test would then be integrated with the look-and-feel of the mobile-friendly screens that were developed for the Decennial 2015 online census test, which was undergoing optimization for mobile devices. In the second phase (report forthcoming), we repeat the same testing methods used in the first phase but apply the methods to the newly optimized ACS screens. The intention of this report is to establish a baseline of how the ACS performed prior to optimization and from which comparisons to a mobile-friendly design could be made.

2. Methods

The American Community Survey is divided into three main sections. In the first part, a respondent answers the “Basic Info” section that gathers the basic demographic information of everyone who lives or stays in the household, such as age, race, sex, etc. Then there is a section of “Housing Questions” with questions about the housing structure that includes such information as whether someone in the household rents or owns the property, cost of the rent or mortgage, when the housing structure was built, etc. Finally there is a section labeled “Person Info” that gets into the details of each household member, including whether the household member works, where they work, what their annual salary is, etc. Under normal data collection procedures, the household respondent would answer this “Person Info” module for each household member. For our usability studies, due to time constraints, the test participant is asked to answer the “Person Info” module for themselves alone. The display of the questions on smaller devices included the following features: The question and response options only took up half the screen with white space was devoted to the other half. The answer categories were close

together, whether it was the standard Yes / No options or whether there were multiple answer options to choose from. The right-hand side of the screen had a navigation section that on the desktop version served to orient users' to where they were in the survey. For examples of how the survey rendered on small screens, see Figure 1, 2, 3, and 4. In Figure 1 we see a typical "Yes/ No" question where the "Yes" and "No" options are located close together and where there is white space on half of the screen. On the right-hand side of the screen is a navigation menu with the sections "Basic Info," "Housing Questions" and "Person Info." Under "Person Info" are where the names of all the people in the household are listed out. This example is a made-up household with fake names: Jane and John Doe. In Figure 2 we see an example of a screen with a longer question stem and instruction text along with many response categories. Typical of all the screens, there is white space occupying the bottom half of the screen, radio buttons located close together, and the right-hand navigation menu. Figure 3 is an example of how the ACS appears when displayed in a grid format. There are approximately four questions in the survey that are displayed in a grid format. The question stem is at the top and the "Yes" "No" options are laid out in a horizontal format at the top of the page. The white space for half of the screen and the right-hand navigation menu is still apparent. Finally, Figure 4 shows an example of how once a user taps into an answer field the device zooms in and the question stem disappears off the screen. Respondents can also manually zoom in and lose the question context as well.

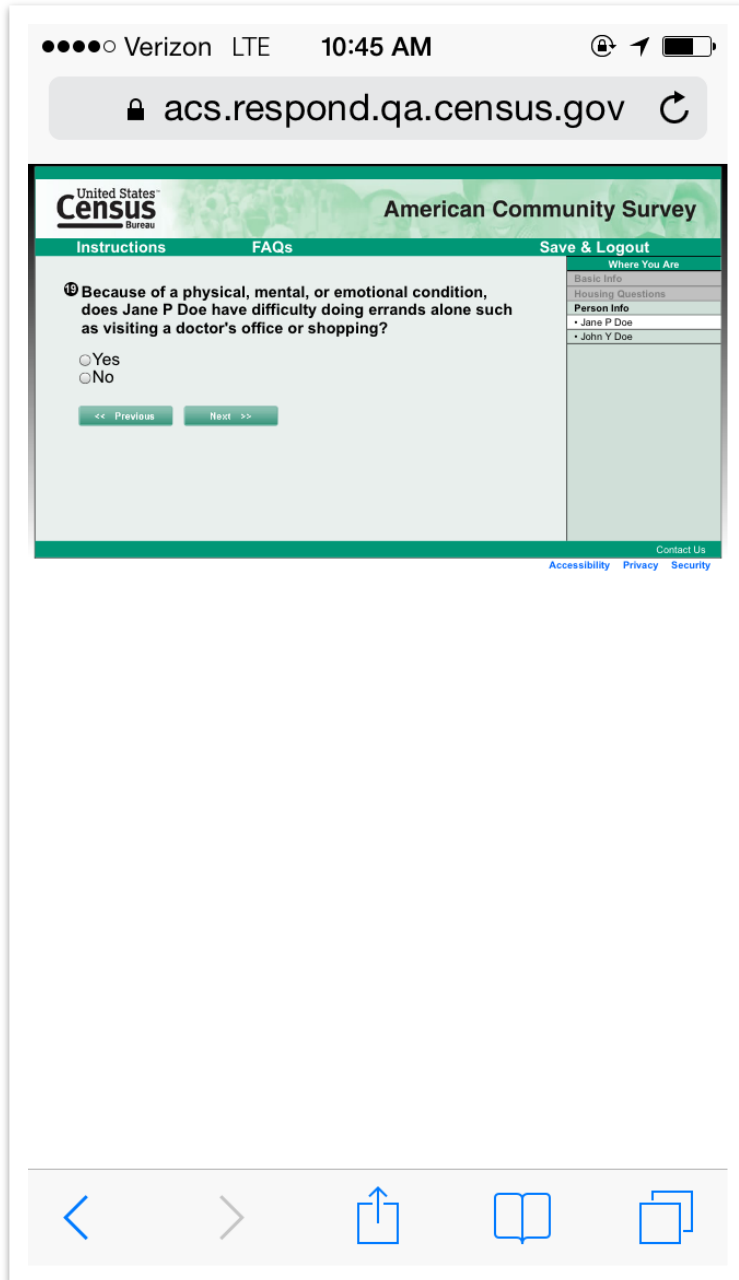


Figure 1. Screen shot of an example “Yes No” question.

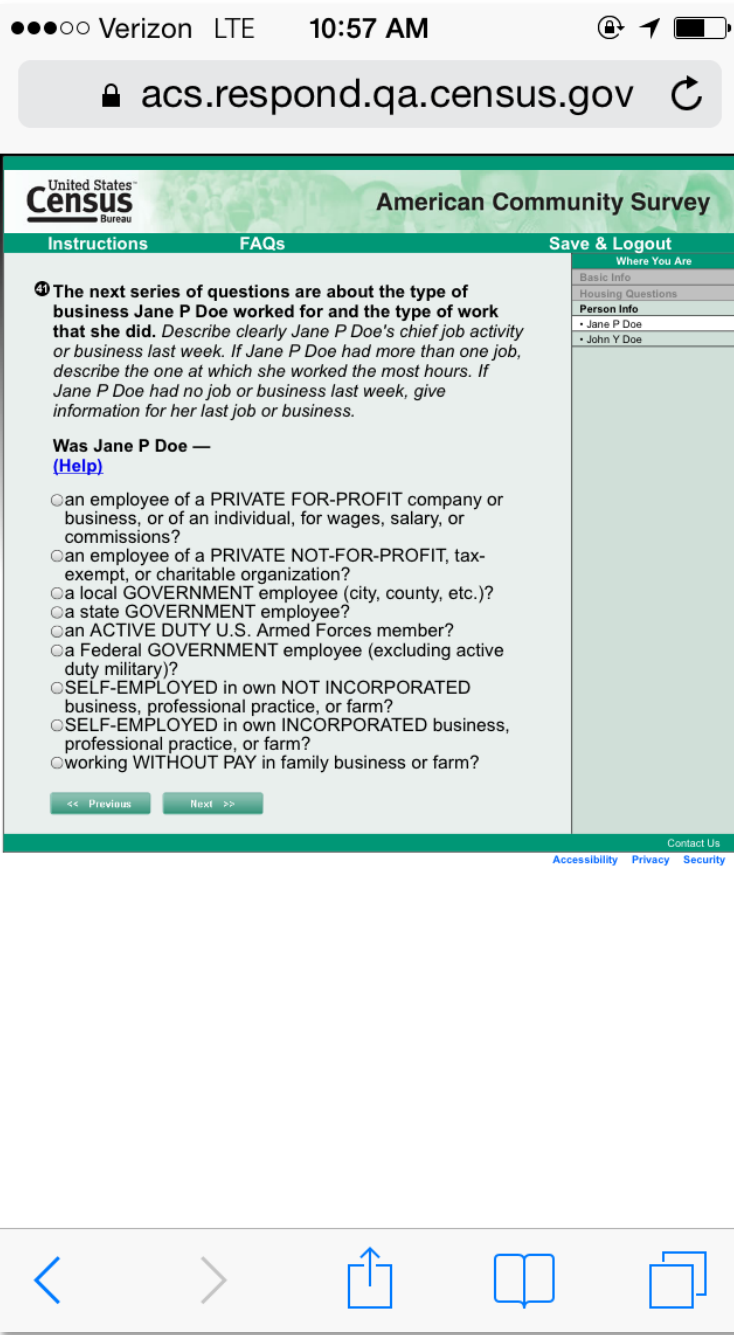


Figure 2 Screen shot of “Type of Business” question.

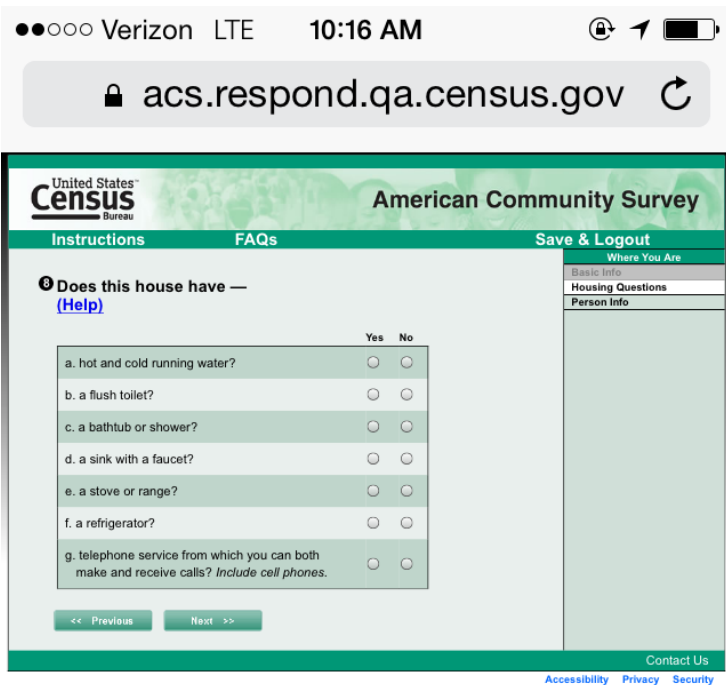


Figure 3. Screenshot of an example “Grid” layout question on mobile device.

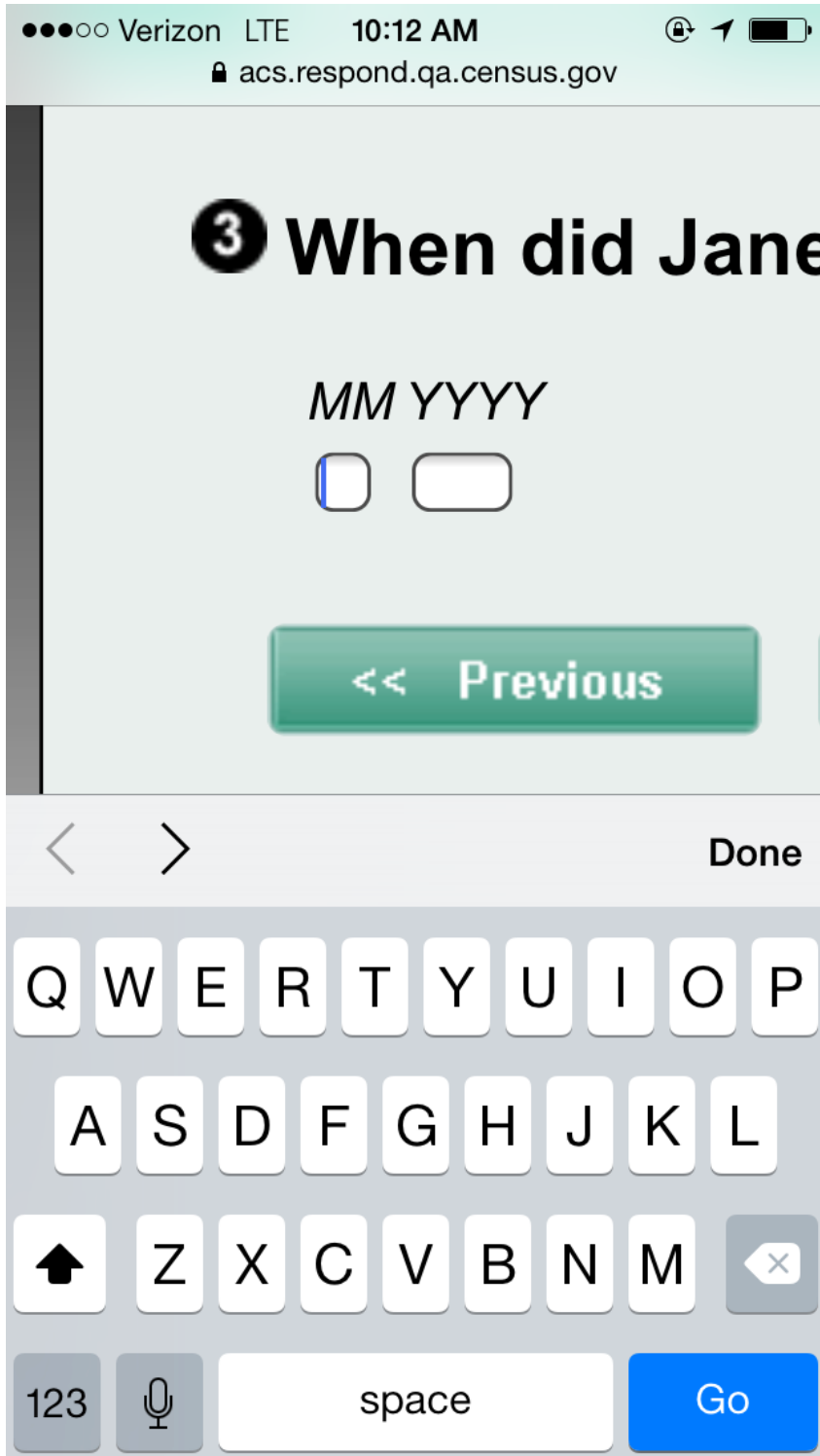


Figure 4. Screenshot of how question stem disappears when user taps into the field to answer the question

Between December 18, 2014 and February 3, 2015, 20 participants took part in the online ACS usability evaluation using their mobile device. Participants were recruited from Craigslist ads, a paper flier posted at the Wheaton Library in Silver Spring, Maryland, and from the usability lab recruitment database containing people recruited from the metropolitan DC area. See

Table 1 for details about the participant demographic characteristics.

Table 1. Participant characteristics

Participants	n=20
Gender	
Female	12
Male	8
Average age	45
Education	
≤ Some college	7
Bachelor's degree	7
Post Bachelor's degree	5
Non response	1
Race	
White	9
Black	10
Non response	1
Hispanic origin	
Yes	3
No	17
Household size	
1	5
2	3
3+	12

See Table 2 for details about device usage and types of devices used by the participants. Seven participants completed the survey using a large-sized tablets (e.g., 7 inches or greater), 11 used smartphones, and two used large sized smartphones (also referred to as “phablets”), e.g., the Samsung Galaxy Grand Duos & the Samsung Galaxy Note 4.

Table 2. Details on devices & usage

Devices & Ownership	n=20
Smartphone	
iPhone 5	4
iPhone 3	2
Android (included Moto X, Ebo Htc, Galaxy, Galaxy 3, Galaxy Grand Duos, Galaxy Note 4 and an unknown Android Samsung phone)	7
Tablet	
iPad 2 (10 inch)	3
iPad 4 (held horizontally)	1
Microsoft surface pro	1
Samsung Tablet 10.5 inch (used stylus)	1
Android Tablet 7 inch (held vertically)	1
Mobile ownership	
Smartphone	20 ¹
Tablet	7
Years owned smartphone or tablet (Mean (Std.Dev.))	5 (2)
Number of hours per week using the Internet on mobile device, range (and Mean)	1-80 (4.25)

As noted above in an actual ACS survey, a single person answers questions for everyone in the household. First there is a set of basic demographic questions about each household member. Then there's a set of questions about characteristics of the house they live in. Then finally there is a more detailed set of person-level questions about each individual household member. For this test, the usability session consisted of the participant being observed while completing the basic demographic questions for all household members, then answering the questions about their specific housing characteristics, and finally answering the detailed set of person level questions only about him/herself. Sessions were one-on-one; that is, one test administrator (TA) working with one participant. When schedules permitted there was also one note-taker from Census in attendance and occasionally an observer from the study sponsor area. The note-taker and the observer did not interact with the test participant. Sessions lasted approximately 90 minutes and were conducted in the usability lab at Census Bureau headquarters or at the Wheaton Library in Wheaton, MD. All tablet sessions were conducted at the library with the participants' own tablet, using the library's Wi-Fi. We are not able to run Wi-Fi sessions within the Census Bureau and most people do not have data plans on their tablets. Sessions using smartphones were conducted at the Census Bureau usability lab and at the Wheaton library, typically with participants using their own data plans². We began each session by giving each participant a slip of paper that contained the user ID needed to log on to the survey. In actual data collection, a mailing is sent to respondents with the user ID, and this slip of paper was meant to simulate that

¹ Note: All tablet participants also reported owning smartphones

² At least one smartphone participant said she didn't want to use her data plan minutes and instead used the library Wi-Fi. It is possible that a few other participants' also used the library Wi-Fi. We did not verify if smartphone users were using their own data plan or the library Wi-Fi.

so that we could evaluate the task of identifying the URL and the logon process. Each participant was instructed to answer the survey questions using his or her real-life information, with the exception of the mock address information that was tied to the user ID we provided. Participants were instructed to pretend that the mock address associated with the user ID was their address. We attempted to capture eye-tracking data, but this was largely unsuccessful on the mobile devices due to the inability of closely calibrating the participant eyes, and the participants' movement out of the range of the eye-tracking device as it sat on the mobile eye-tracking stand. All recordings were reviewed and coded based on the number of single-finger and multi-finger gestures on the screen in excess of the optimal number of gestures that should be made to enter a correct response. For example, touching the "yes" radio button multiple times before it engaged the button, or touching the "no" button but then re-touching the screen and changing the answer because the user had intended to touch the "yes" button. More details on the coding procedures are provided in the analysis section below. For coding results, see [Appendix A](#).

Upon arriving at the testing room where the session would take place, the participant was asked to complete a number of tasks before the actual test with the ACS instrument began. First was to sign a consent form that referenced the OMB approval for this study, the confidentiality of the session, the voluntary nature of the study and what would be recorded during the session. Once the consent form was signed, the audio/video recorder was started. Then the TA read the testing protocol to the participant and asked the participant to complete the questionnaires on their demographics (gender, age, etc.) and computer and Internet experience. Once that was complete, the TA asked the respondent to take out their mobile device and calibrated the participants' eyes (for the eye tracking component of the study) with respect to where their eyes and their devices (phone or tablet) were located.

To begin the actual study, all participants were provided with a user ID and the URL (<https://acs.respond.qa.census.gov/acs/login>) (hand written on a piece of paper) to access the survey. Initially some of the participants (approximately the first 5 participants) were sent a text that contained the URL, and were able to click on the link within the message to access the ACS. As the survey will not be sent to respondents in text messages, the researchers decided to stop texting the URL to the participants. This decision was made as a way to more accurately simulate the way respondents would have to access the survey on their device (that is typing out by hand the URL into their browser). The rest of the participants were thus required to read the paper and type the URL into their mobile device browser window. Once participants were successfully logged in to the survey, they were asked to answer the questions and "think aloud" during the session in order to capture spontaneous comments and any cognitive difficulty with the interface, question wording, or question sequence. At a pre-selected point, roughly halfway through the survey, participants were asked what they would do if they had to leave the survey temporarily. This was done in order to evaluate the logging out/in functionality of the survey using a mobile device. Participants then finished filling out the online ACS. After the survey portion was complete, participants answered a satisfaction questionnaire about their experience completing the ACS, which was loosely based on the Questionnaire for User Interaction Satisfaction (Chin et al., 1988). In the debriefing portion of the session, participants were shown printed screenshots of some of the more complicated screens on the ACS (e.g., screens that had a lot of text, long examples or explanatory text), and asked for feedback on them. Participants

were then asked to choose up to five screens they felt were the most difficult to complete on their mobile device. After this point, participants were asked for any final comments, given their cash honorarium and the session concluded.

After each session was completed, the video was reviewed and coded in order to produce a count of the number of single-finger and multi-finger gestures that users made on the screen³ including:

- Extra screen taps made for response selection or to navigate among and between screens.
- Excessive pinch-to-zooms⁴ (excessive included any pinch to zoom action after an initial pinch-to-zoom).
- Unintentionally tapping incorrect answers
- Failing to scroll horizontally (when it was necessary to view initially hidden text).

The video was reviewed along with the verbal comments to determine correct responses, incorrect responses that were self-corrected, and incorrect responses that were not self-corrected. We used verbal comments, observational data, and the coded counts in our analysis.

3. Results and Recommendations

This section focuses on the results that are directly related to the use of a mobile device to answer the online ACS. As is often the case during usability testing, issues arise that are unrelated to usability per se and have more to do with content, for example interpreting the roster question as only asking about adults in the household, not children. We document these issues in Appendix B for future work on content, and report the usability-specific findings below.

3.1 Positive Findings

In general, participants who used a larger (e.g., 9+ inch screens) tablet had fewer difficulties than those who used smaller tablets (e.g., > 6 inch screens). Even though the ACS was not optimized for mobile devices, on tablets⁵ we noticed fewer instances of the pinch-to-zoom action and minimal data entry errors that needed correction. One participant, who answered via her smartphone said, “I would enjoy this on an iPad because it’s a lot larger.”

Drop-down lists on Android screens appeared to be easy to use for most participants⁶. Due to the way most Android operating systems automatically rendered the drop-downs as pick lists, they were already adapted for the mobile device. For example, the “Date of Birth” screen used drop-downs and these worked well for Android users. See Figure 5.

³ The numbers presented on extra taps are the sum of extra taps for all participants and reflect the pure number of extra taps that occurred on each screen across all participants, including the “Next” button.

⁴ This includes all pinch gestures both zooming in and zooming back out.

⁵ This was not true for the Microsoft Surface Pro, which had many problems related to the keyboard obscuring the answer fields, and the smaller 7-inch tablet.

⁶ iPhone users may experience more issues with this because iPhone uses a wheel for the drop down and the wheel is located in the bottom third of the screen, somewhat out of the line of sight. Androids use a drop-down, like an online survey on a desktop. The drop-downs pop up in a very visible and obvious location.

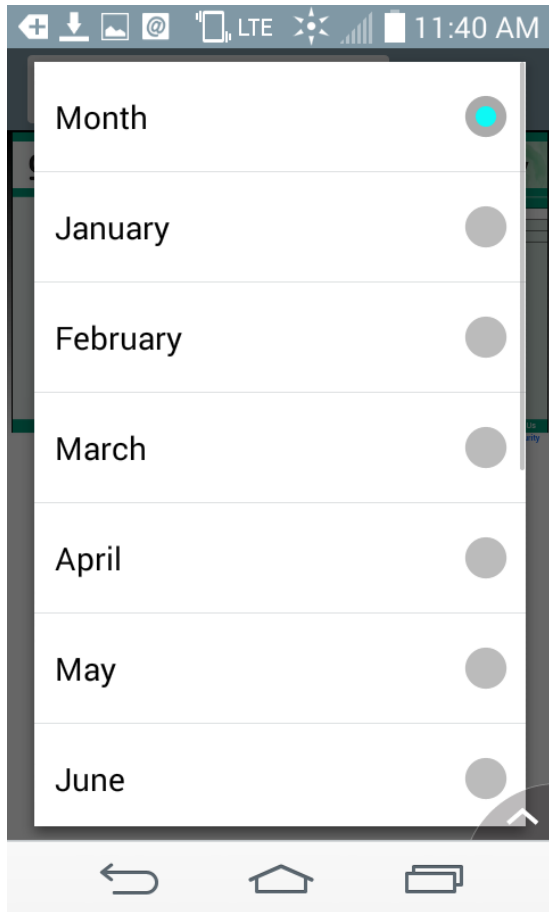


Figure 5. Screen shot of the Month drop down in the Date of Birth Question on an Android device.

One user said during the debriefing about the Android drop-downs which appears as a pick list, “I prefer those, they were pretty good.” This user also had a device that had on the virtual keyboard⁷ the words “Prev” and “Next” (see Figure 6) that he was able to use to navigate the input fields which allowed him to tab around within a screen, and which made for a better user experience. Note: This “Prev”/“Next” feature was inherent to the phone, not something that the developers have any control over. We describe it here because of the potential for the different devices to aid respondents as they fill out the survey.

⁷ The virtual keyboard pops open on the mobile device when a user touches a field that requires character entry, such as when needing to enter their name.

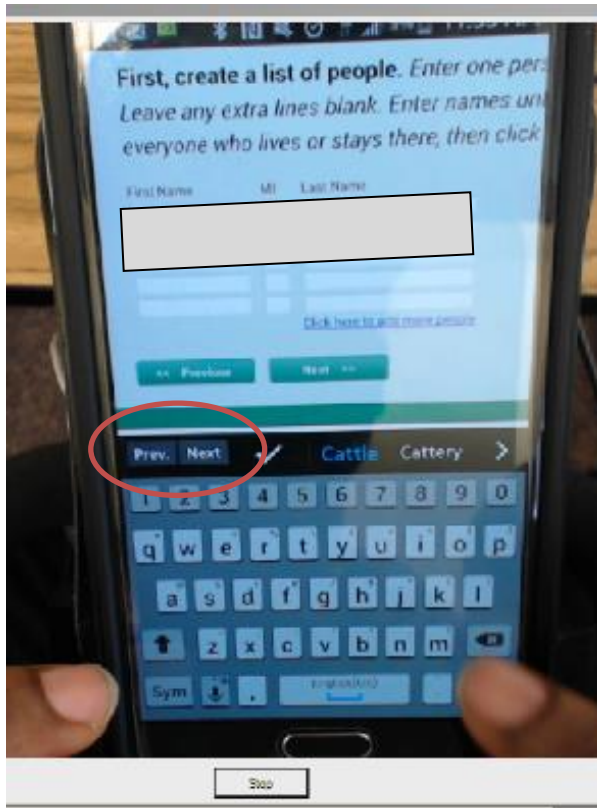


Figure 6. Screen shot of the Galaxy Note 4 keyboard with “Prev” and “Next” buttons circled on screen shot above. Names are blocked out for confidentiality purposes.

3.2 Usability Issues

The following usability issues are those that are specifically associated with the instrument being un-optimized for mobile devices:

1. *Several users had difficulty entering the correct survey URL: <https://acs.respond.qa.census.gov/acs/login>.*⁸ There were some difficulties associated with the long and URL. One user initially forgot to type in the ‘s’ for https. Another user had difficulty finding the location of the backslash on her digital keyboard. The TA also had to correct the spelling of “respind” for one participant, telling them to change the “i” to an “o.” In a few cases, the TA had to text the URL to the participant because of the spelling errors they made while typing it into the browser window or the search box. While this type of usability problem can also occur on the desktop, it is exacerbated by the small display and even smaller keyboard that participants use when answering with their mobile phones, particularly when the respondent needs to change the keyboard to special characters or numbers.

- **Recommendation:** Have the link to the survey in a short easy to type URL (e.g., something like <https://respond.acs.gov>). Have a link to the online ACS on the main survey landing page (see Figure 7). Have Google searches on the “ACS survey” take respondents to a link into the starting page of the online survey.

⁸ We understand that the usability test URL is different from the production URL.



Figure 7. Screen shot of the main survey landing page that appears when users’ google ACS survey. The landing page does not currently allow access to the specific Census surveys. Links to each survey could be included here on this page.

2. *Un-optimized screens on smartphones caused errors, extra time, and frustrations for participants.* Every screen was rendered initially with half the screen filled with white space and the other half with the question and answer options, which appeared in small font close together. This is the default way survey screens are rendered when un-optimized for the small screen. This rendering caused problems across the board.

It was difficult for users to select answers because the answer choices were too close together, such as the frequently seen vertical layout of the “Yes” / “No” answer options. See an example of this in Figure 1 and Figure 11, left. One user said when attempting to answer a yes/no question, “I get frustrated when I don’t make this thing bigger.” In addition, for some devices (some Androids), if a participant tried to select an answer (e.g. a yes/no answer) without zooming in, it wouldn’t register and would actually automatically zoom into the screen as demonstrated in Figure 11, right. This then required the user to make an extra tap on the screen. Across all vertical yes/no questions (there were approximately 46 vertical yes/no questions in the survey) participants made 97 additional taps. Fourteen of those 97 additional taps were to self-correct an incorrect initial selection. The other additional taps were to make the selection. We noted that there were seven instances where a user made a known error and did not self-correct. Known errors include such things as selecting the “yes” response when asked if they (themselves) were blind, or verbalizing that they were married when marking divorced, etc. Users suggested adding space between the vertical yes/no response options, or displaying them horizontally, as they appear in the grid.

Part of the problem with answer options being so close together was that when the answer options were similar, it was difficult for participants to quickly distinguish between the answer options. See an example of this in Figure 8. One user said about Figure 8, “It is confusing, all the questions – so similar, so close.” Thus, the layout and wording of the response choices appeared so similar and so close together—and this added to the difficulties that users had with this

question. Out of 20 participants, Figure 8 had five instances of excessive pinch-to-zooms and six instances where participants had to select the answer more than one time.

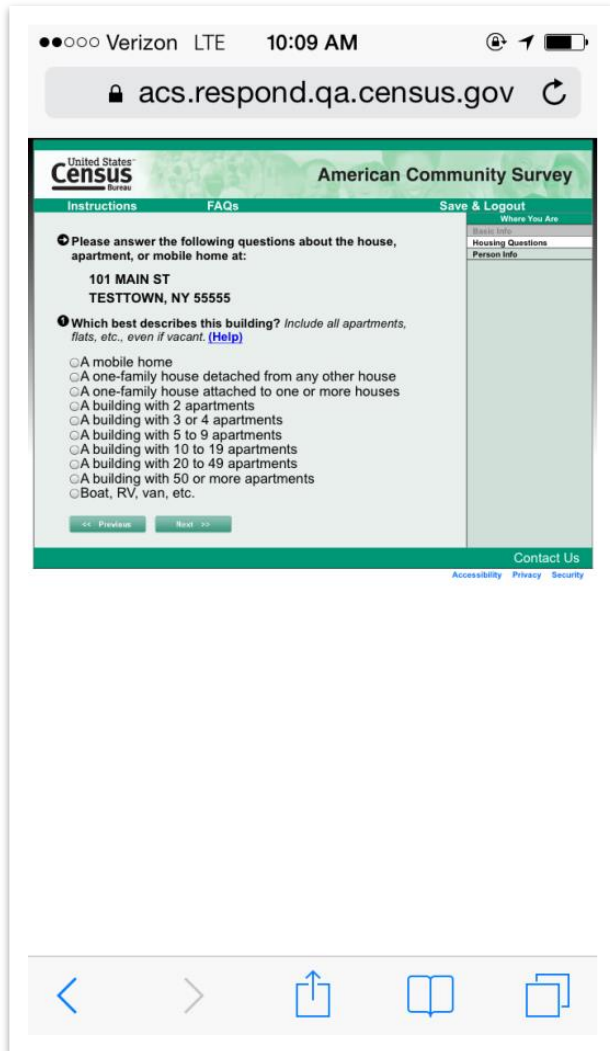


Figure 8. Screen shot of the “Type of Unit” screen. Radio buttons close together and answer options look similar.

Similarly, though here with respect to the question stem, participants had difficulties with understanding a new page had loaded when the question stem did not appear to change. For instance, participants thought that the “Next” button had failed to move them forward in the survey. This was most noticeable towards the beginning of the survey when the survey questions seemed similar. See an example of two different questions on two different screens that are very similar in Figure 9. One user spontaneously verbalized that she didn’t think it had advanced. She said, “Now what happened? It didn’t advance.... Oh wait... yes it did.” She realized that it actually had advanced after she stopped and re-read the entire question. While this also appears to be a content related issue – we noticed that the small screen exacerbates the issue.

☛ The following questions are to make sure this list is as complete as possible.

Other than the people listed below, does ANYONE ELSE live or stay there? ([Help](#))

For example, roommates, foster children, boarders, or live-in employees.

Jane P Doe
John Y Doe
Janey Q Doe

Yes
 No

☛ Other than the people listed below, is there ANYONE ELSE staying there even for a short time? ([Help](#))

For example, a friend or relative. Do not include overnight or weekend guests who have a residence somewhere else.

Jane P Doe
John Y Doe
Janey Q Doe

Yes
 No

Figure 9. Screenshot of similar question stems that appear on two different screens.

Because it was difficult to read the words on the screen, and to touch their correct answer, participants had to zoom in for most of the screens, and some participants pinched to zoom on every screen. This was particularly true for those with smartphones, or smaller tablets (e.g., screen size of 7-inch or smaller). Often when the participants zoomed in, they could then see the answer choices, but could no longer see the original question, as demonstrated in Figure 10, left where the question is as it originally appears and on right after a user has zoomed in. This issue has been described in other empirical studies, see for example, Callegaro, 2010. Using pinch-to-zoom has other unintended consequences. For instance, when one participant enlarged the screen using the pinch-to-zoom finger gesture, she accidentally pressed the previous button which took her back a screen. With the current design, respondents may inadvertently click on an unintended response if they don't zoom in and sometimes even if they do zoom in. Out of the 20 participants, only two users – both of whom used a large size tablet – did not pinch-to-zoom at least once.

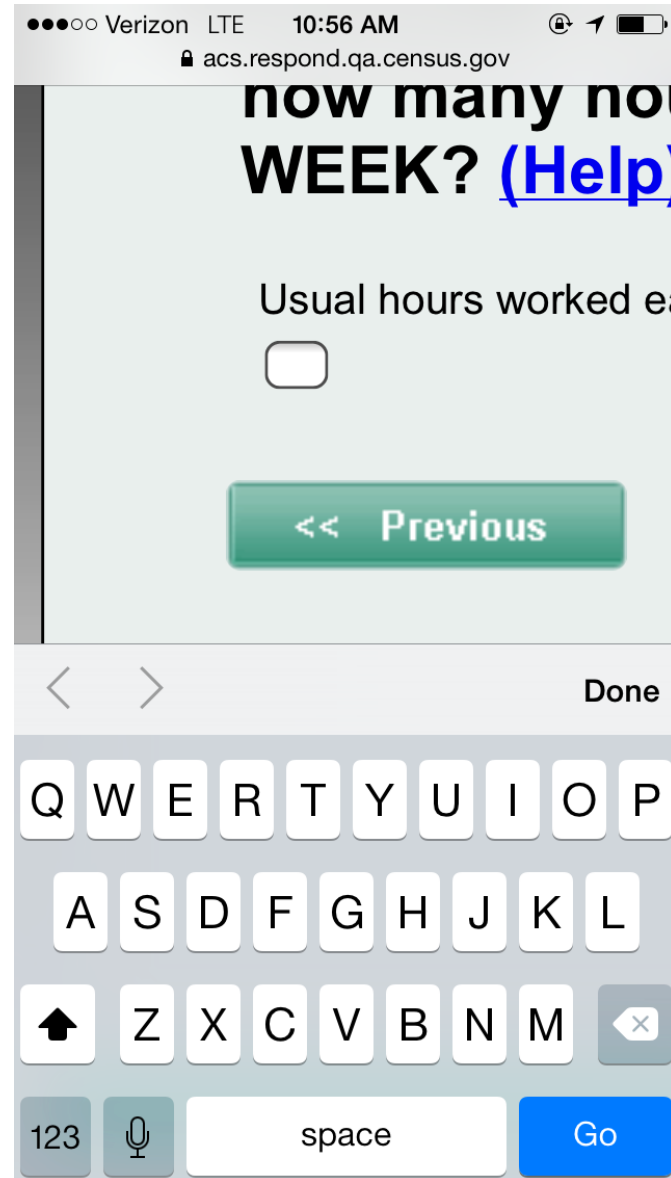
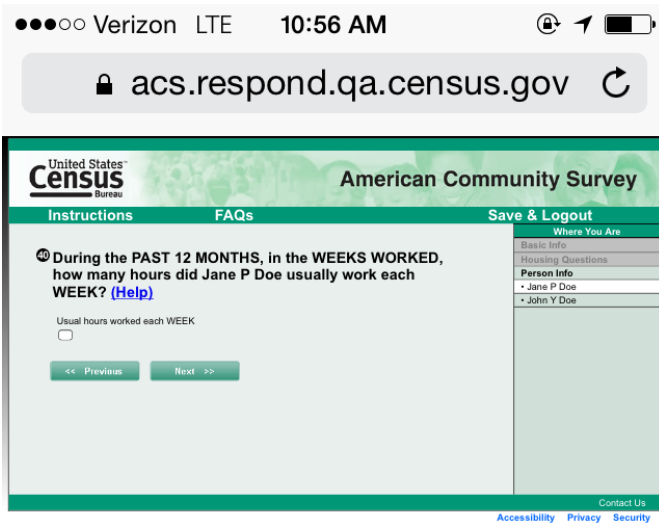


Figure 10. Screen shot of the “Hours Worked” question, on left, on right, screenshot after a user has zoomed in to answer. Notice how the question stem is obscured.

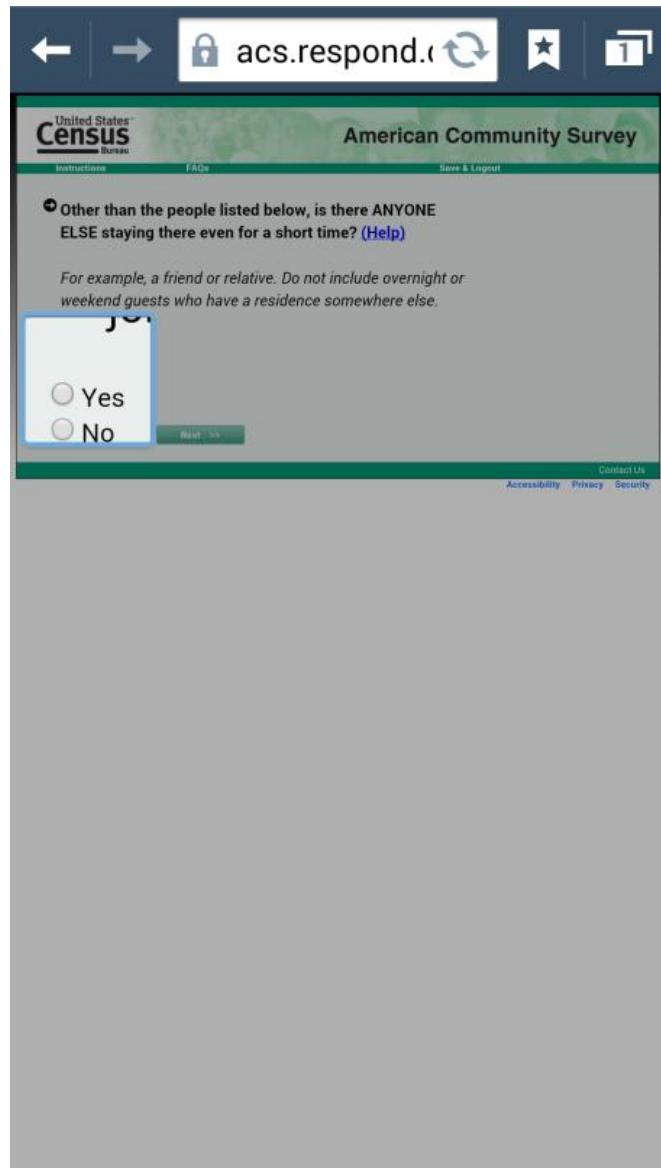
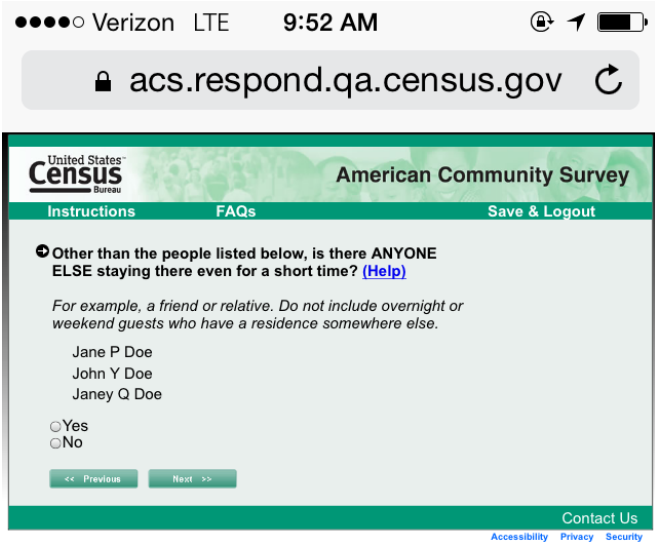


Figure 11. Left “Add 1” screen before a user attempts to answer the question. Right, “Add 1” screen automatically zoomed in after a user taps on the answer field.

Thus, with the current layout and design, most participants could not read the question text and select the correct response choice without zooming in as these user comments demonstrate:

- “The print is so small I was trying to see if it got the “I” in “IT” (for ‘type of work’ question).
- “It is hard to hit the button – again cause it is so small.” Same comment during debriefing, “hard to read, a lot of text, all in one block.” (For ‘type of unit’ question -see Figure 8).)
- “People would get tired doing this on their phones! This is cumbersome!”
- During debriefing, about the problem with pinching and zooming, “If it's a long question, by the time you finish you forget what it is asking then you have to [check the question and] answer again.”
- Participant used an iPad - during the session he spontaneously commented, “The boxes are very small... as is the print.”
- One user spontaneously commented, “It kind of bothers me. It [the text] is so small when half the page isn’t filled up.”
- On the Race screen, one user selected White then she clicked Black and finally unchecked White. When asked about this during debriefing, she said “I accidentally clicked White because my fingers are big.”

The amount of text on the screen and the fact that participants had to zoom led to respondent fatigue and other usability issues. Generally, screens with more text were more difficult for users. One participant let out a big sigh at the health insurance question, which is laid out in a grid format. (See Figure 12 for a screen shot of the question). The sigh could be indicative of the participant anticipating that the question was going to be difficult to complete due to its format. This same user had to zoom in and out many times to answer the question.

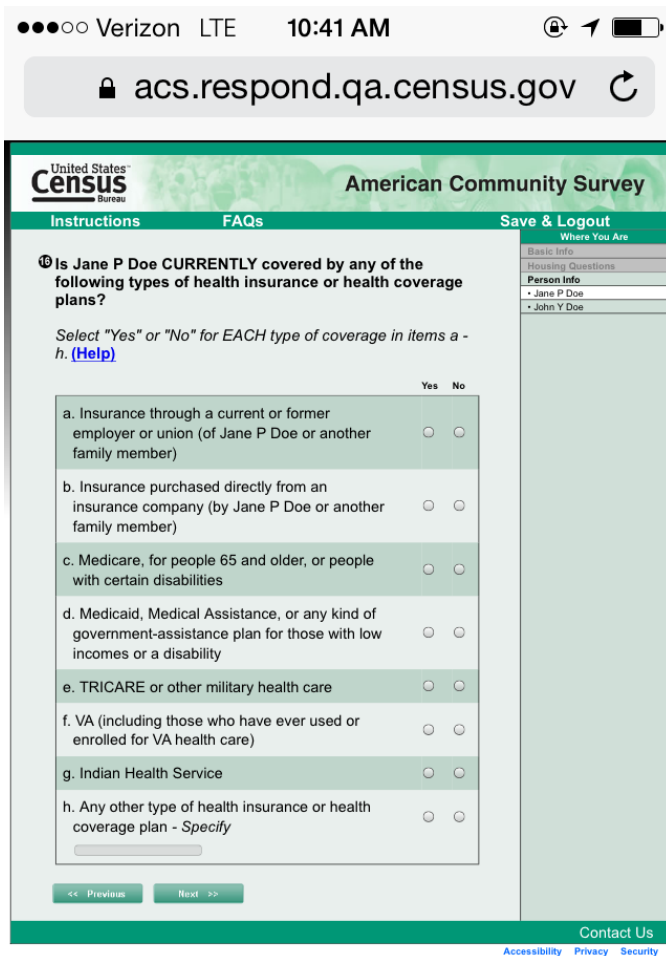


Figure 12. Screen shot of the health insurance question grid on mobile screen

And finally, as a side issue, participants appeared to modify their behavior to better deal with the difficulties of entering the information on the small screen. For instance, when typing in the names of the people in her household, one user decided to type all in lower case because, she said, it was easier. While this may not be an issue in terms of data analysis, it simply highlights that due to difficulties inherent in entering information on an un-optimized display, participants may opt to take shortcuts that they would not ordinarily do.

- **Recommendation:** Optimize all the ACS screens for mobile devices. Follow with what has already been implemented for the Decennial 2015 online census test which was based on best practices and a Census team created style guide (Nichols, et al, 2016). These include:
 - Fill the screen with the question and the response options (e.g., reduce the use of white space)

- Allow more space between response options
- Reduce the amount of text on the screen
- Minimize the banner
- For ACS specifically: Remove the right-hand navigation – it was not used by participants during mobile sessions
 - Optimize the screen to allow larger font and greater distance between answer options. For screens where text is very similar and hard to distinguish the differences in a quick skim, consider alternative ways to distinguish what the differences are in the answer options, for example, bolding the words “detached” or “attached,” using dropdown pick lists for number of apartment selections, etc. See Figure 13.
 - Vertical Yes/No screens: When optimizing for mobile, allow sufficient space between the yes/no answer choices as has been done in the 2015 Census Test online instrument.

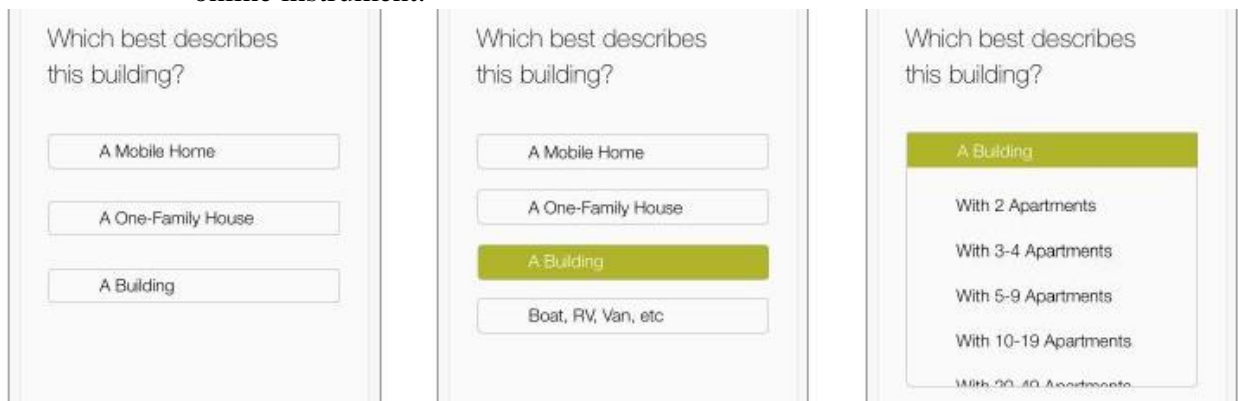


Figure 13. Screenshot of a mock up of an alternate way to design an ACS question using dropdown/picklist functionality to highlight important components of the response options. Design drafted by Lauren Russell.

3. *Usability issues related to keyboard obscuring “Next”/“Previous” buttons, or data input fields.* This issue was most noticeable with the one participant who used a Microsoft Surface Pro⁹. She had to tap on the keyboard icon each time before it would open. Once opened, the keyboard covered the data entry fields. So when inputting the answer, all the user saw was the keyboard, not the data itself filling in on the input fields as shown in Figure 14. The repeated tapping was time-consuming and could lead to user frustrations. Although we did not notice any data entry errors with this user, it is possible other Microsoft Surface Pro users may experience errors. This same user said during debriefing, “The technical problems were intense! Forward navigation was difficult. Completing the survey was difficult. Clicking on the radio buttons was difficult.”

In addition to the Microsoft Surface Pro user, however, the issue of fields being obscured occurred to a lesser extent on some of the other devices that users brought in with them.

⁹ This participant did not use the attached keyboard but had detached the keyboard and used the virtual keyboard for the purposes of the study.

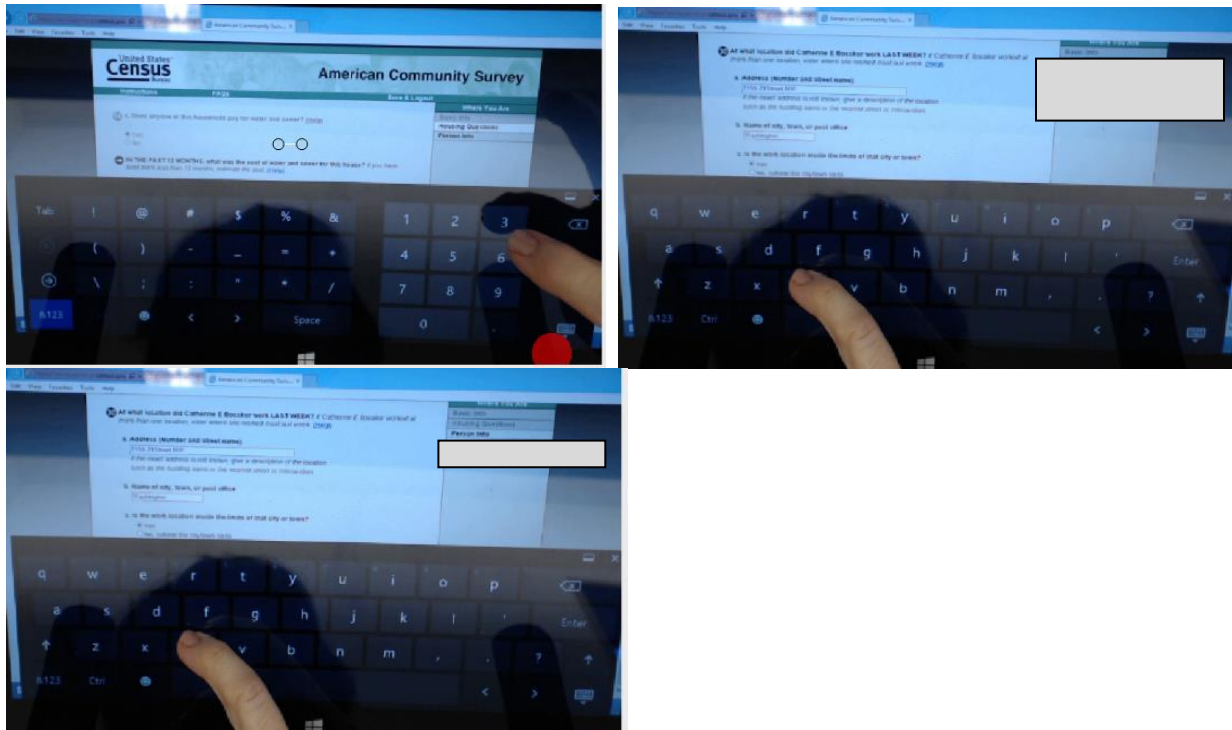


Figure 14. Screen shot of the Microsoft Surface Pro where keyboard obscures the data entry field. Names are blocked out for confidentiality purposes.

- **Recommendation:** Conduct User Acceptance Testing (UAT) testing with a Microsoft Surface Pro.
- Ensure that the data entry fields or navigation options will not be obscured by virtual keyboards on mobile devices.

4. *Horizontal grids with yes/no appeared easier for users to make a selection than the vertical placement of yes/no but the horizontal grids resulted in more required taps.* Participants did not always have to pinch to zoom to select the correct choice with the horizontal placement of the yes/no response choices, as they did with the vertical yes/no placement. However, when we look at the count of screen taps for the horizontal grid screens we can see that there were many additional taps to select responses on the horizontal grids compared to the screens with the vertical placement of yes/no¹⁰. Additional taps included tapping on the yes or no multiple times before it registered as being selected. See the grid in Figure 3 (facilities grid) or Figure 12 (insurance grid) for an example of how the grids looked. Details on tapping on the grid screens across all users follow:

- “Facilities” grid—50 percent of participants made extra taps, with 22 additional taps; Average of 2.2 extra taps per screen.
- “Computer use” grid—35 percent of participants made extra taps, with 12 additional taps; Average of 1.9 extra taps per screen.
- “Net sub” grid—35 percent of participants made extra taps, with 18 additional taps; Average of 2.25 extra taps per screen.
- “Insurance” grid—50 percent of participants made extra taps, with 41 additional taps; Average of 4.1 extra taps per screen.

¹⁰ The horizontal yes/no layout had many more questions on the screen than the vertical yes/no layout.

These multiple taps are possibly due to a participant going through the grid quickly, e.g. a person wanted to answer yes to each question, but the instrument/browser was not keeping up with them¹¹.

Recommendation: Horizontal Yes/No Grids: Optimize the horizontal grids for mobile devices. This may be as simple as adding space between the horizontal questions. For grids and radio buttons, there is a slight delay that can sometimes be programmed out of the code—consider doing this for the grids. Alternately, the literature has shown that designing grids for mobile devices includes splitting grids into individual questions whenever possible and presenting the grid items beneath each other on a single long screen. (See examples of this in Figure 15 below.)

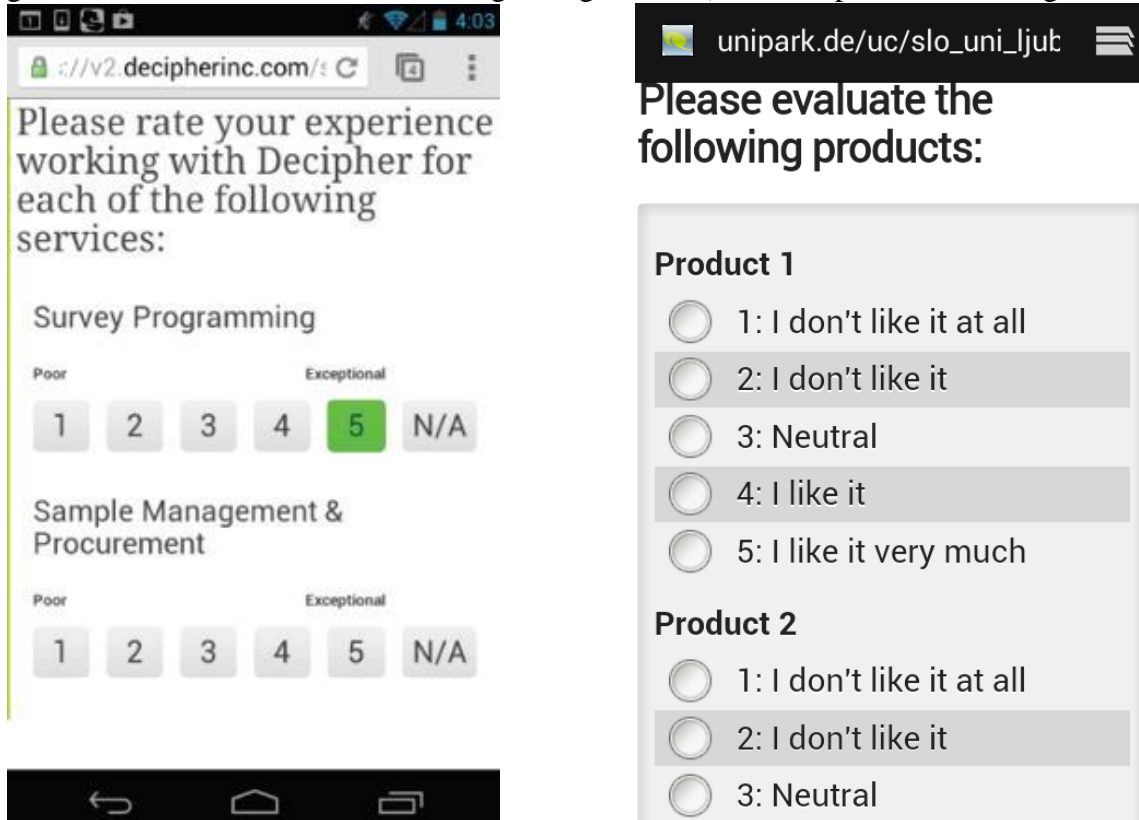


Figure 15. Screen shot of how to display grids on mobile, left from Decipher white paper, Jue, 2015; right from Čehovin and Vehovar, 2013.

5. *Slower connectivity caused user problems.* For example, when working on a library Wi-Fi connection, one participant clicked “Next” for the Age and Date of Birth (DOB) screen three times because it did not appear to load the next screen. This delay caused him to miss the name changing at the top of the screen when it actually did load and he said,

¹¹ We also noted that many participants, using their smaller device, answered all of the listed yes/no questions in the horizontal grid which is actually the preferred behavior. That is not always the case with the desktop screens. Some participants on the desktop screens just answered the one question that was a “yes” and moved forward (Olmsted-Hawala et al., 2015). We did not notice this behavior (of hitting the one yes that applied to the participant and then moving on) as often in the mobile display.

“I don’t know what happened. I need to verify my age? Do I have to type in my age? How do I verify my age?”

His spontaneous verbalizations indicated he thought the page was still asking about himself, when it had actually moved forward to ask about his wife’s DOB. He re-entered his DOB and was confused why it didn’t move forward and/or why it didn’t retain his DOB information. The user only realized that it was asking for his wife’s DOB when he attempted to progress to the next screen and received an error message (because he had left his wife’s DOB empty as he thought it was still asking about his own DOB).

- **Recommendation:** Optimize the screens so that “Next” immediately moves the participant forward to the next screen. Draw more attention to the names so that they are more distinguished/noticed in the text.
- Priority: High

6. *The instruction text appeared to be more noticeable/read/attended-to on the small screen devices than what we have noticed in earlier usability testing conducted on desktop or laptop.* When conducting usability studies of the ACS on a desktop or laptop sized screen, the question stem rather than the instruction text was what the users focused on when answering the question. However we noticed that in some instances on the mobile and tablet sized screens, the instruction text was more attended to and became more of a focus than the question stem. This ended up confusing some of the participants more than it helped. It is likely that the instruction text was getting more attention on the smaller screens because the instruction text is long and takes up more visual space, such that the question stem is forgotten when the user is zoomed into the screen.

For example, one participant was answering the “Type of Business” question where the question asks “What kind of business or industry was this?” and instead of giving a description of her business, she focused in on the gray instruction text that said she should “Describe the activity at the location where employed.” This participant works out of her home but the main business is off-site with different activities than her business activities that occur at her home (she runs a translation service). However the business activities she does in her home includes filing, paying bills, etc. which is not what the question intended to ask. She said, “we are a company that provides (things) but we don't do (the things) at the location. We run the business at the location. So how do I describe the activity?” In the end, this participant answered “filing & paying bills.” While at first this may sound like a content related problem, it is likely because of the small screen size and the way that the italic instruction text becomes amplified (zoomed in and taking up more physical space on the mobile device) when on a smaller screen that this issue appeared.

- **Recommendation:** Re-evaluate this issue after the screen is optimized for mobile. Research how formatting of text can impact reading on small devices (currently underway in the census usability lab). Consider alternate designs of putting extensive instruction text behind a link. Consider also cognitively testing to remove the potentially ambiguous/misleading instruction “describe the activity at the location where employed.”

7. *Telephone number field labeling is confusing.* The field asking for area code and number confused some users who attempted to enter their zip code and not their phone number. One user didn’t realize it wanted the phone number until after a few moments. Then she said “oh they want the phone!” in a surprised tone of voice. When in the desktop view, the words “area code”

are more visible as they appear directly over the field. While the confusion with the word “code” may also be a problem on desktop, it is exacerbated on a smaller screen design where a user can zoom in and may only then be able to read the word “code” rather than “area code.”

- **Recommendation:** Change “Area Code Number” to “Telephone Number”; see an example of this (Figure 16, right) taken from screenshots of the Decennial 2015 census usability test results round 2.

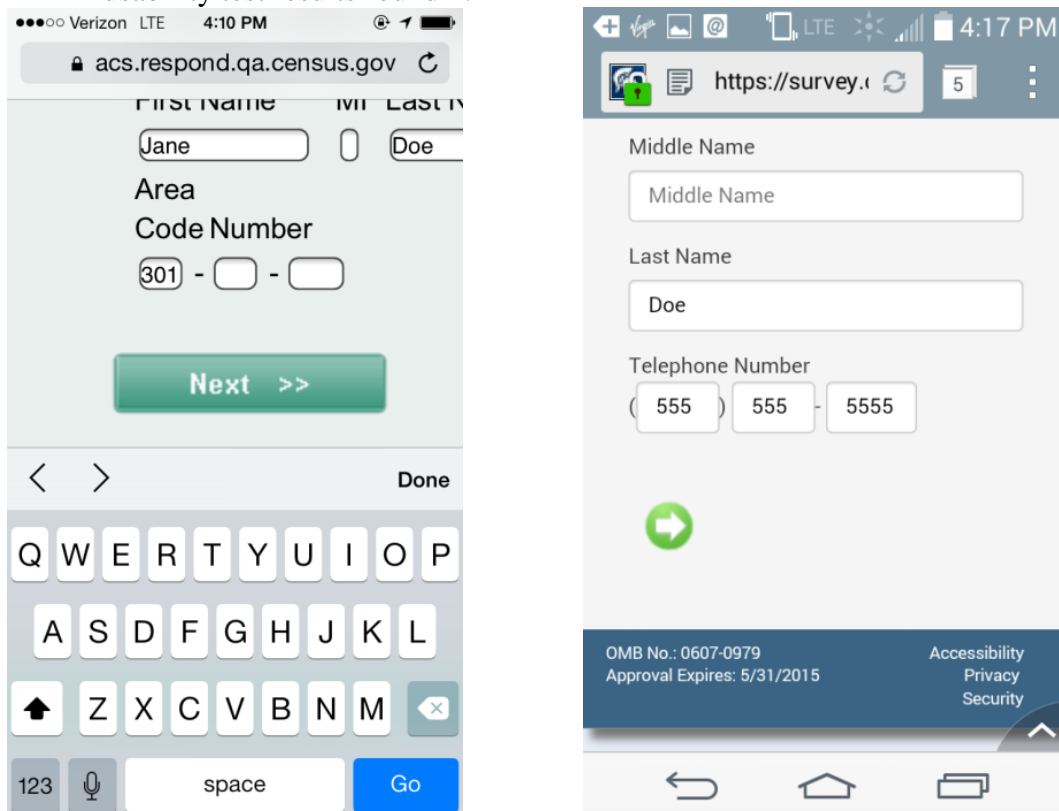


Figure 16. Left: Screen-shot of ACS telephone number field, zoomed in, asking for the respondent’s area code number; Right: Screen-shot of Decennial Census 2015 usability results, round 2. The label “telephone number” worked better than “area code number” for participants.

8. *Roster B question (Figure 17) caused confusion for some participants:* In the Roster B question, the participant is asked to review the list of names of people in the household and answer “yes” if there is someone missing from the list. However due to the layout of the question on a smaller screen, participants misinterpreted what they were being asked to do. Instead of answering whether the list was missing anyone, participants interpreted the question as one of confirming that the list was complete. So a number of users answered “Yes” to the question when in fact they should have answered “No.”

The screen opens with the following statement “The following question is to make sure the list is as complete as possible.” Some of the participants selected “Yes” to this—because participants read the initial statement and clicked “Yes” as in, “Yes this list is complete.”

Participants were then surprised when the survey asked them to provide additional names. One participant summarized it as, “this is a weird question.” This issue of users wanting to say “yes”

to the question may be due to the small screen size and a user not reading the entire question, whereas on desktop it may be easier to read the entire question.

In addition, the “Roster B” screen had one of the more excessive pinch-to-zoom counts at 6 pinch-to-zoom instances. “Roster B” had 5 instances where participants had to select the answer more than one time (e.g., extra taps on the screen), and 4 instances of where the participant tapped the incorrect answer and moved forward without correcting the error. We think these manipulations on the screen are due in part to the cognitive confusion of the question when it appears on a small screen.

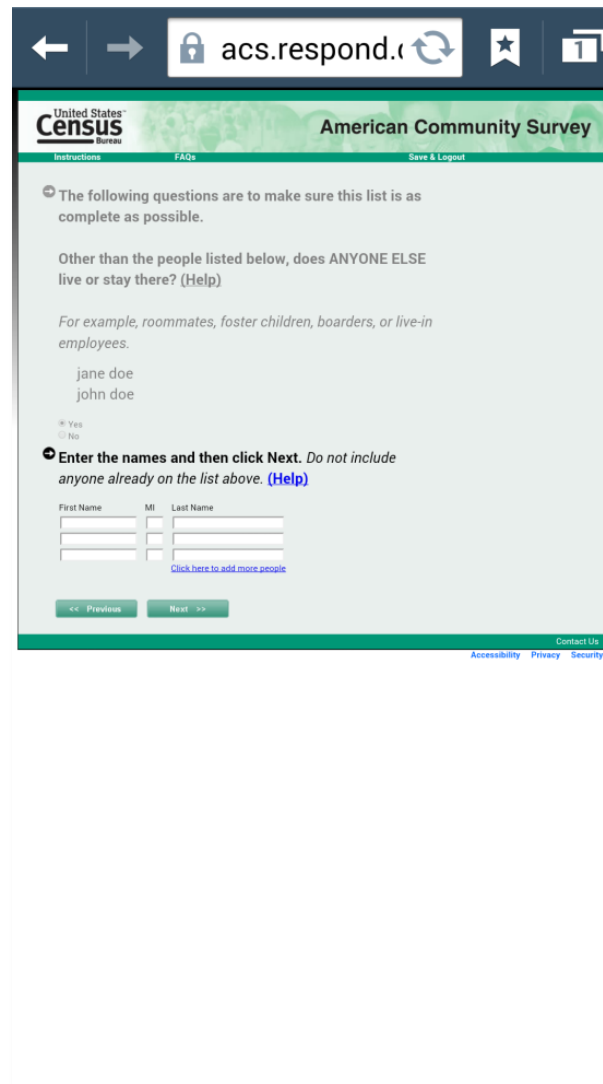
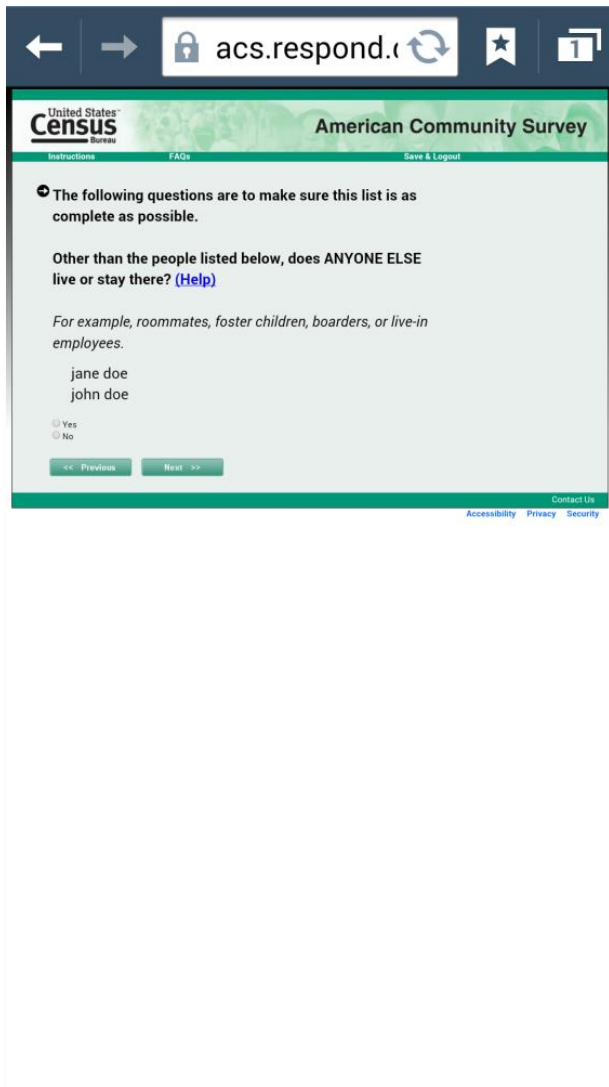


Figure 17. Roster B – (Left) Users experienced cognitive problems with this question. The first statement – that the arrow points to - is interpreted by the user as the Yes/No question. (E.g., Is this list as complete as possible?) Users are inclined to say “Yes” it is. Add_1. (Right) This is the screen that pops up when users click “Yes.”

- **Recommendation:** Conduct additional cognitive testing on ways to reword the question so that it makes sense for all screen sizes. Consider testing the removal of the first sentence “The following questions are to make sure the list is as complete as possible.” Instead start directly with the question, “Other than the people listed below, does ANYONE ELSE live or stay there?” After this point you could turn it into a yes/no question e.g., “Is this list complete?” Yes/No. If the user answers “No” then the “Enter the names and then click Next” instruction would appear.

9. *Automated tabbing between User ID fields and the phone number fields does not work on some devices (typically iPhones/iPad).* For these devices, the cursor did not automatically jump to the next field. Instead, at the end of the field, the keyboard closes. This requires the participant to tap into the next field in order to engage the keyboard again. Depending on the device, the user would then have to change the keyboard to numbers, all of which took time and required extra taps.

- **Recommendation:** Use a numeric keypad for response fields where only numbers are accepted (e.g., phone numbers, ZIP codes, login codes, etc.) to avoid forcing respondents to switch their standard keyboard to numeric mode (Nichols, et al 2015). Use the auto advance feature for all mobile devices. If this is not possible, consider using one field with an imbedded format (also known as masking, (see for example Bush, 2016) so that when the field is activated the field looks like this [() -]. A similar layout could be implemented for the initial login screen.

10. *Difficulty with some of the response field formatting.* A) In numerical entry fields, sometimes when a participant entered a comma, it was not accepted. B) The response field format is inconsistent in questions asking for a year. For example, the number wheel (iPhone) or parent/child pop-open window (Android) is used with the question on birth year but the question for when someone moved into a house requires manual input of numbers.

- **Recommendation:** Fields that accept monetary amounts (e.g., income and utility questions) should allow commas. Additional research on which format works best for number entries is needed. When possible implement coding to over-ride the default wheel iPhone design.

3.3 Satisfaction Findings

A number of the written satisfaction comments related to the difficulties users had when manipulating the survey displayed in the browser in order to see the question, the answer choices, select an answer and move forward. One user wrote:

- “The text is far too small for me and I had to enlarge text. This made it difficult to follow.”
- “Zooming in and out defeats the purpose of the iPhone. A well designed application doesn't require constant zooming to see the whole screen display.”
- “Boxes for answers are too small.”

When asked for participants’ overall reaction to the web survey where 1 was “Terrible” and 9 was “Wonderful,” participants more often rated it towards the lower end of the scale as compared to a similar study conducted on Desktops in 2013, (see Olmsted-Hawala, Nichols, & Holland, forthcoming). The mean score for the Desktop study was 7.5 (with standard deviation

of 1.1) whereas for the un-optimized study on mobile devices, the mean score was 5.7 (with a standard deviation of 1.7). Such ratings indicate participants were slightly less satisfied with their overall experience than they had been when testing the similar survey instrument on Desktops (as tested in 2013).

Darker colors represent a more negative impression of the survey and lighter colors represent a more positive impression. For comparison purposes, the range of possible scale colors is shown in Figure 18.



Figure 18: Range of scale colors for ratings

See Figure 19 for a visualization of the frequency distribution of ratings. The darker shadings represent more frequent ratings on the lower end of the scale while the lighter shadings represent ratings on the higher end of the scale.

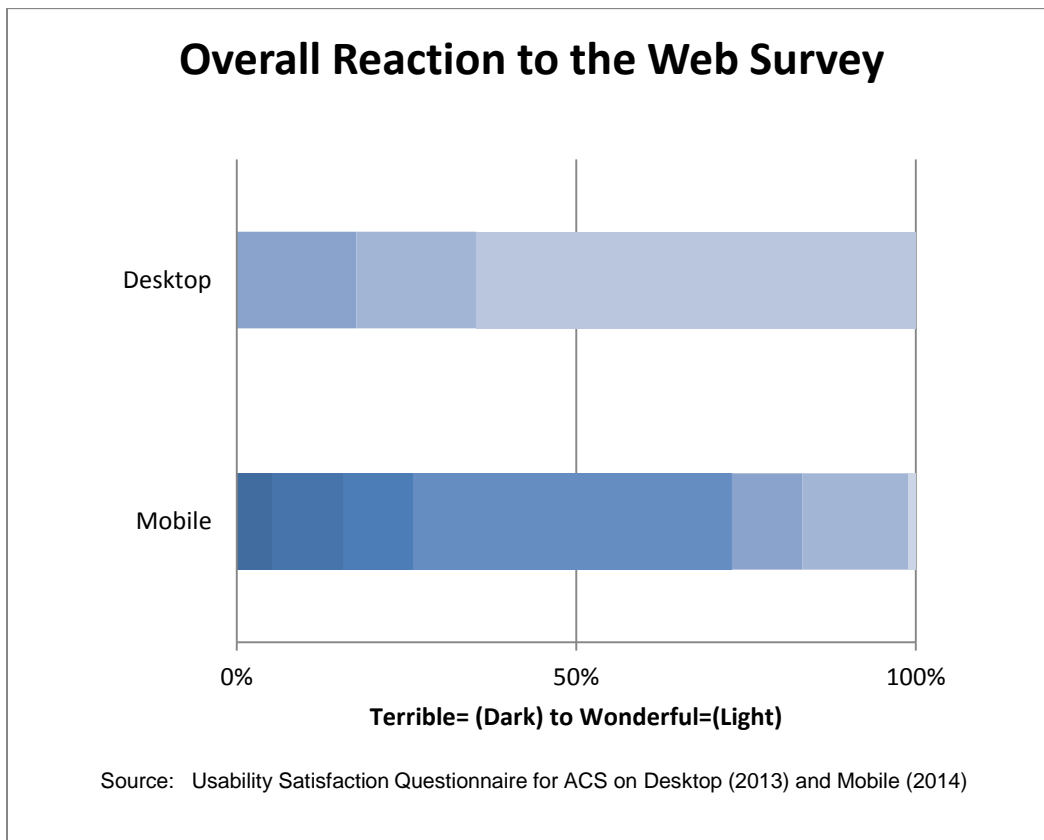


Figure 19. Overall experience of completing survey on scale of “Terrible” (1 – darker shades) to “Wonderful” (9 – lighter shades).

4. Limitations:

Not all participants saw all screens. For example, the screen where the respondent can review all the answers for everyone in the household comes only at the very end of the survey, after all entries have been entered, thus only single-person households' saw this screen. On the other hand, only multi-person households saw the question asking about how the householder is related to others in the household. In addition not all small devices were tested, so it is possible there are other usability issues with the different devices that we did not see – however we feel that the popular smartphone and tablets were brought in by participants during the study. Finally, devices are constantly being upgraded and new features are always coming out, making testing on mobile devices a bit of a moving target. There should be future testing on mobile devices to keep up with the latest advances in technology.

5. Conclusion:

In general, while respondents are currently able to answer the American Community Survey on small electronic devices, not being optimized for the smaller screen caused many user problems. Because the display issues were so severe on all screens, we were unable to identify specific screens to optimize first. That is, the current design made all screens appear problematic. For the smartphones and the smaller tablets, the print was so small that in order to read and answer the questions, most screens had to be zoomed into. Once zoomed in, most question stems were obscured. The optimization that is planned for phase two, following the guidelines developed for the 2015 Decennial census test, will make it easier to identify which questions continue to cause user issues. For phase two, the usability lab will retest in June 2015 on the newly optimized screens.

6. Acknowledgements

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Appendix A: Data coding results

Please see the xls spreadsheet “Findings by Participant-Sponsor” for complete coding results across all participants and screens. On a summary level here we identify notable screens for each of the categories listed below:

- A. Excessive tapping (and tapping over the initial tap required to answer the question)
 - B. Excessive pinch to zoom (any pinch to zoom over one initial pinch to zoom)
 - C. Tapping incorrect answer—was able to self-correct
 - D. Tapping incorrect answer—did not self-correct
 - E. Failing to scroll horizontally
- A. Excessive tapping (more than one time per answer) across 20 users and all screens ~337 (100% of participants). Screens that stand out include:
- Horizontal Grids –participants were tapping real fast but computer didn’t catch up with them (e.g., facilities, computer use, netsub, etc.)
 - Tenure
 - DOB
 - Race
 - Address
- B. Excessive Pinch to zoom (more than once on each screen) across 20 users and all screens ~379 (70% of participants). Screens that stand out include:
- Horizontal Grids
 - Relationship (7)
 - Address (7)
 - Roster (9 for a; 6 for b; 2 for d)
- C. Tapping the incorrect answer and then self-correcting – where the participant tapped the wrong answer and then made a self-correction – across 20 users and all screens ~39 (90% of participants)
- This was pretty spread out across the screens.
 - No single screen had more than two occurrences
- D. Tapping the incorrect answer and failing to self-correct – where the participant tapped the wrong answer and then moved on—across 20 users and all screens ~11 (40% of participants). The test administrator knew the participant had entered a wrong answer because of:
- Verbalizations (e.g., said they were born in April and entered the number 5 for month) or
 - Observations (e.g., when answering about self, said that yes they were blind)
- E. Failing to scroll horizontally -- across 20 users and all screens ~1
- This was not an issue
 - On the whole, it appears that users did scroll horizontally.
 - Typically, when the users were zoomed in with their hands still on the screen they panned to the right and then back to the left.

Appendix B: Other usability findings not specific to mobile devices

Positive findings

1. After logging back into the survey, participants appear to appreciate the message, “You will be taken to where you left off.” More than one user spontaneously verbalized, “great.” We can speculate they were pleased because they realized their information had been saved and they would not have to navigate on their own to where they left off.
2. Ethnic origin/ancestry question: One participant commented that she liked the examples listed under the ethnic origin and ancestry question. She liked that the word ancestry was there because she said if she only read ethnic origin she would think to answer “Caucasian” but when she saw the word ancestry she thought to put in a broader answer like the examples listed.

Usability Issues - Uncovered during usability testing of the ACS on mobile devices, though these findings are less directly related to issues of display on a smaller screen than the issues detailed in the body of the report.

1. Insecure URL via a server warning error – system error. When initially getting to the “Welcome” page the participant had to select “continue” after reading that either:

- Data were not secure,
- URL wasn’t trusted,
- Connection was not private – attackers may be attempting to get your information, or
- Server identity could not be verified. (Figure 20)

Depending on the device/browser, the warning message sounded more dire/extreme. That is, all mobile devices received a server warning error, but the warnings differed by device/browser window. Some users expressed concern that this was not a secure connection – it appeared, based on user verbalizations, to be disconcerting to many users. The test administrator had to tell all participants to hit continue to ignore the warning but still some users said they would not continue if they were at home and had received such a message. At least one participant said she would stop and instead complete the survey on paper after receiving such an error.

This user said, “if the very opening starts with an error message, I think I am already having problems with it, I don’t want to get through some of it and then get stuck. I would quit now [in beginning] and try it later [on paper].”

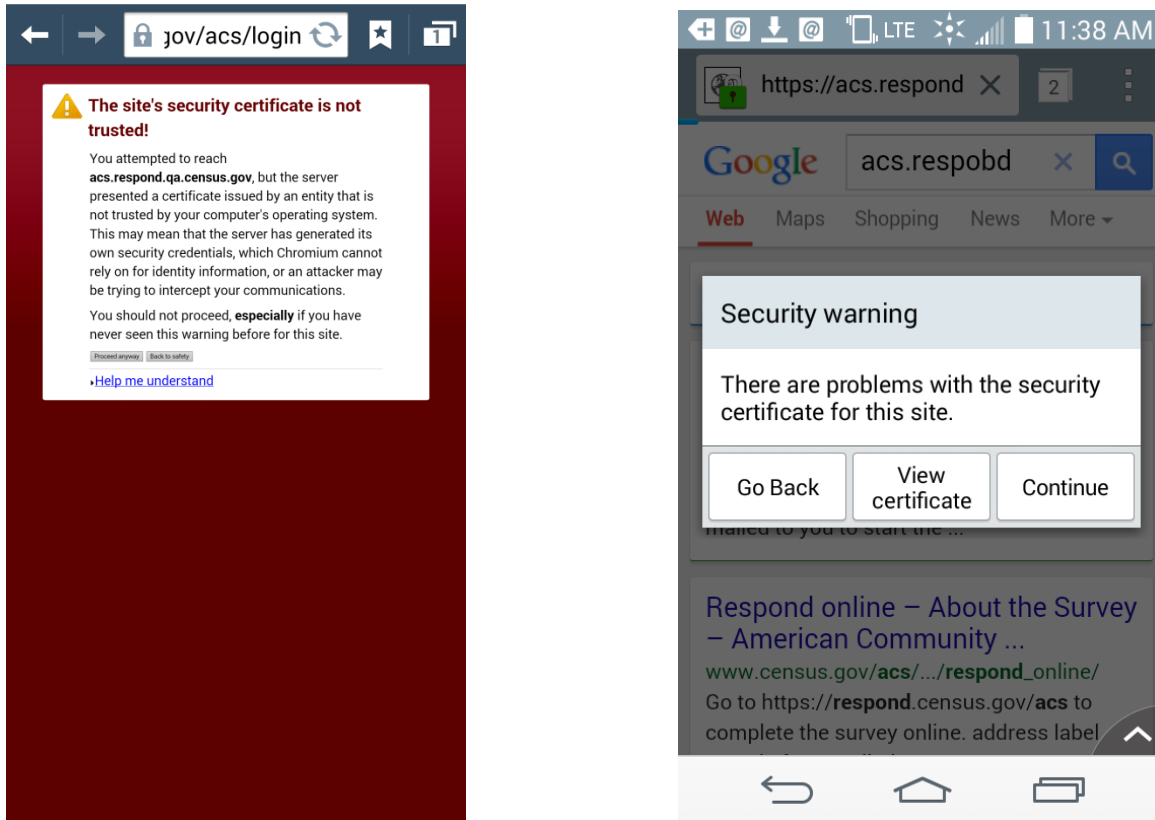


Figure 20. Screen shots of two different Android phone warning message. Instruction (on left) is that the user “should not proceed.” On right, that there are problems with the “security certificate.”

- **Recommendation:** Ensure that no such warning occurs on the production instrument.
- Priority: High

2. *Place of birth response layout issue.* One participant, when working on a cell phone, did not tap the radio button for where she was born. Instead, she went directly to the dropdown and selected her state. When she attempted to move forward she received an error message. She did not see her error and could not figure out how to proceed, because she needed to tap the radio button “Inside the U.S.” She then entered the state of her birth in the write-in field for someone who was born outside the U.S. The next screen asked her what year she moved to the US. She navigated back to the previous screen and inadvertently clicked on the radio button associated with “Inside the U.S.” so was able to move forward (though she spontaneously verbalized that she didn’t know why it was working now). Note: We found something similar in earlier rounds of usability testing the ACS on desktops. A design change was field tested (results forthcoming), but was not implemented on the version of the ACS we were testing. We document that we noticed this layout/functionality problem again.

- **Recommendation:** As found in the 2014 ACS testing, allow the user to go directly to the drop down without first needing to click the radio button
- Priority: High

3. *Log out/Log in using mobile device –must make a note of PIN.* Those who had made a note of their PIN were able to accomplish the task of logging out of the survey after approximately

Question 18, when prompted by the test administrator. Those who had not made a note of the PIN were unable to get back into the survey without test administrator assistance. (Note: The test administrator had made a note of each PIN number.)

- **Recommendation:** As found in the 2013 ACS usability study (Olmsted-Hawala et al., forthcoming), allow the participant to use a security question on the PIN page to get a new PIN generated if they need. Note: This change of adding a security question reset option was field tested in ACS (results forthcoming).
- Priority High:

4. *Job location/address caused some confusion:* A few participants had difficulty with the job location screen. One participant entered the entire job address in the first field, but once she scrolled down, she realized we wanted the address in separate fields. She commented that we should use a standard address field collection design, instead of asking a separate question for each piece of the address. Another participant asked why the question is asking me if the job is in the city limits when he just put in the city. Another participant said after entering “Washington” that “It doesn’t ask for a state. I just leave Washington.” She then said that “DC has no counties.” And then she said “Oh... now we get to the state,” and she wrote “District of Columbia.” These user verbalizations indicate how the nonstandard layout of the address field can cause some confusion as a user attempts to fill it out.

- **Recommendation:** Format the address in a standard way that is more familiar to respondents.
- Priority High:

5. *Visual response field length needs to correspond with amount of text allowed.* For the “Most Important Duties” question, the input field appeared to have more room for typing in information than it actually did. One participant experienced issues with this, as it appeared he had more room to type but it wouldn’t let him add in any more words into the field.

- **Recommendation:** Match the visual field length with the amount of characters allowed.
- Priority Medium:

6. *Unresponsiveness and lack of feedback with online system:* We noticed during testing that the system was often unresponsive and users would attempt to click forward with the navigation tools several times (e.g., “Next”). This seemed to occur more often for participants being tested in the field who were relying on the Wheaton Library Wi-Fi. Not all users noticed the subtle cue that the site was loading (e.g., visualized by the small blue bar in URL or a small icon spinning in the URL area.) To compound the problem, it was not immediately obvious if the initial tap had worked. So sometimes the system did not move forward because the initial tap didn’t register, and other times the system did not move forward because it was simply a slow connection. Participants could not tell the difference. Some participants had to tap many times to get it to register. One user, during debriefing, mentioned the primary problem with the survey to be “the mystery of the radio buttons and why they did not respond to my touch.”

Late in the afternoon at the Wheaton library we saw more system errors of timing out. When this occurred, one user hit the back button and had to re-enter the information before attempting to move forward again. Another user had to reenter her User ID and PIN. The slowness of the page changing prompted one user to mention that since it’s a slow connection she would like to be able to enter all the demographic information about a participant on one screen.

- **Recommendation:** Have a more visible visual cue that something is loading. Work on the speed with which the screens change – as soon as the next is touched, move the instrument forward – or alert the user that the next has registered and the new page will load momentarily.
- Priority: Medium

7. *Issues with “Please Log In” black banner & Log In field:* One user tried to click on the banner to begin the ACS. After clicking on it twice, she self-corrected and entered her User ID and her PIN. Another user attempted to log back into the survey with her PIN and not her User ID. See Figure 21.



One participant clicked on the “Please Log In” black banner thinking it would be the place to log in.

Figure 21. Screen-shot of initial login screen

- **Recommendation:** At this time we recommend more research. Identify if you are receiving clicks on the “Please Log In” black banner. If so, we recommend redesigning this screen to make the “Please Log In” instruction look less like a button and more like an instruction. From the PIN/User ID issue – work on the instruction text that appears on the screen, so that it is clear what piece of information a user needs to log into and log back into the survey.
- Priority: Low

Cognitive Issues - Uncovered during usability testing of the ACS on mobile devices, findings are unrelated to issues of display on a smaller screen.

The next set of issues pertains to comprehension and reporting issues uncovered likely because of the think-aloud protocol. These issues might have been exacerbated because the instrument was not optimized for mobile, but we believe these issues exist regardless of the mode the respondent is using.

8. *Roster:* One user did not enter her sister’s child who lives at the same address. She paused while on the foster children screen but then continued without adding him in. When asked about

it in debriefing, she said the reason she didn't add him in was because she was thinking "they just wanted adults."

9. *College question (away_now)*: One participant who had a child living at college a few miles away answered "No" to this question. She said she sees him every week so he is not away for 2 months.

10. *Race*: One participant verbalized that she was looking for a Middle Eastern race category for her husband. She did not find it and eventually marked him as "Other." Another participant was looking for Asian for her husband's race. She said, "I am looking for Asian, just plain Asian. I don't know which Asian he is." She clicked "Asian other" and then after getting the error message said "I am not going to bother" [filling it out].

11. *Age / DOB question*: The instruction for verify the age was confusing for one participant. He said he didn't know what he had to do to verify that his age was correct. He questioned whether he had to do something like click into the age box to verify that it was correct.

12. *Highest level of education question*: One participant negatively commented on the green text within the response categories. He said the options should be in green and then we should use a drop down under each of the high-level categories.

13. *Building type*: The question was difficult to read for users because of the similarity of the answer choices, as well as because the screens were small and information on the screen was so close together. One user said, "Your eyes get all confused because they are all the same." Another participant suggested that one response category should be "building with multiple units." A subsequent question then could ask for a range of the number of units within the building.

14. *Number of Rooms*: One participant included only the kitchen and number of bedrooms in the total number of rooms question because the instruction said to include the kitchen and bedrooms. This participant zoomed in to read the instruction better, and then appeared to focus on those instructions. Another participant said "It doesn't tell me how to count the garage, so I'm going to exclude garage." She did not include her garage in the final count.

15. *The screener type question before moving on to the next person in the household*: "If you cannot answer now" caused one participant in a related household to pause as it caused slight confusion for her; she wondered aloud why she wouldn't be able to answer now. Another participant, when initially reading the instruction (to choose the next person or to save and log out) said, "I don't understand what that means." She then chose herself and continued. Note: The ACS tested an updated version of the language on this screen to encourage respondents to continue answering as many questions as possible. Results are forthcoming.

16. *Last get married*: One participant, who was only married once, verbalized that this question was slightly offensive.

17. *Number of hours worked*: The wording for this question could be confusing. One participant said, "So they are asking if I work full time all year?" Another participant said, "...I don't work in weeks. I work in hours! So that doesn't work for me. I would have to figure out how many hours so I guessed." One participant who is a teacher as a profession asked "does work mean prep-time?"

18. *Usual hours worked each week*: One participant found it hard to answer because she said it "was variable."

19. *Number of weeks worked*: One participant was confused with the question. The participant wondered aloud, "do you want whether I worked full time?" (Figure 22)

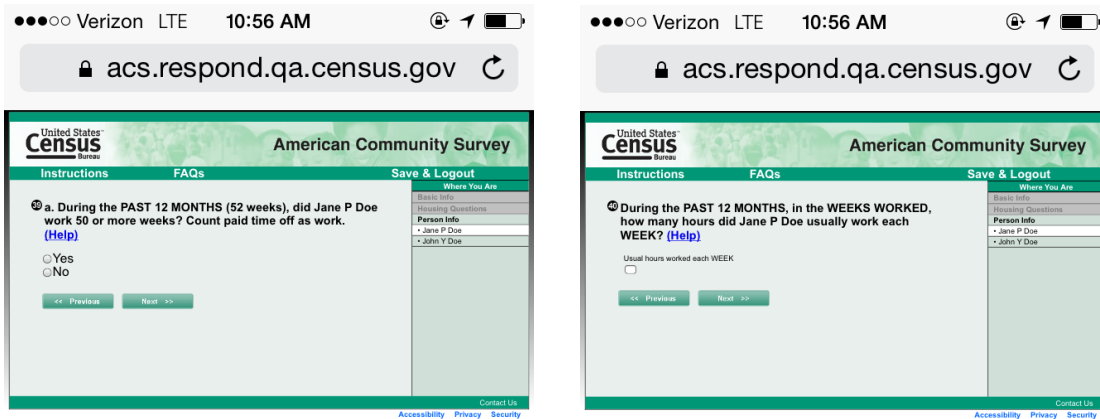


Figure 22 Screen-shot of “Weeks Worked” (left) / “Hours Worked” (right).

20. *Wages/Wages Amount and Self-employment*: Two participants had difficulty with the self-employment questions. Both participants entered the amount they made into two different wage questions. This inflated their final wage amount to double what it should have been. In both cases, the users corrected their final wage amount to the total amount they earned.

These participants were self-employed and/or worked on contract. The question series on income may end up yielding a wrong amount for respondents in these work situations because they may enter the amount they earn in the initial income questions (Wages Amount – Figure 23) and *again* under the self-employment series of questions (Figure 24). One user said, after seeing the “Est income” screen where the instrument had summed her self-employment wages with the amount she entered originally,

“340? Oh so I did it wrong. Ehhhhh. Now that they show me the total, when they asked for self-employment, because I already put that I’m self-employed and run my own business, those two are totally separate, and if I choose one I shouldn’t choose the other...” She continued, “It is now showing a total of 340,000 and it should be half that.”

This participant answered “no” to the final question in the series (“Est income”) and entered the amount she thought it should be.

Another participant, for the final amount she made, said it was not clear if it needs to be after taxes. This user read the word “net.” She said, “Net - What you take home in your pocket.” So then she said she had to think about what the final amount was after taxes.

wagesamt

Figure 23. Screen-shot of the “wagesamt” screen (Desktop view). Self-employed participants put the amount they make here and then again at a later screen that asks about self-employment.

selfempamt

Figure 24. Screen-shot of the selfempamt screen (desktop view). Self-employed participants also put the amount they make here and this doubles their wages.

21. *Where you worked last week*: One user said she couldn’t remember where she had worked, so she ended up backing up in the instrument and then changing her “yes” answer to “no.” When asked about it in debriefing, she said, “I couldn’t think of the address so I went back and said no

[sic] cause I could not remember the address.” A different user did not know it so he left it blank.

22. *Roster*: One user mentioned that it would make more sense if the question included the word “now,” as in, ‘is there anyone else staying there now, even for a short time?’ The participant said:

“This question would be more understandable if it said, ‘is there anyone staying there NOW even for a short time.’ If I were to answer it that way, it would be no. This question COULD be interpreted to say, is anyone staying there for a short time recently, or next week. The use of the word ‘is’ means here and now, but it would be clearer if it said now.”

23. *One user said that for security purposes she always puts her birthday as January 1 for any Internet questions*. If it were a paper form, she said she would have used her correct birthdate. For her two children, instead of putting in January 1, she left the DOB fields blank and only entered in the age. She read the error message and said “Yes I can ignore the date of birth.”

24. *Male/Female sex question*: One user said, “I prefer the survey to say gender.” This user also mentioned she thought there should be three choices with an additional category of “transgender.”

25. *Internet service question*: The response choice text uses the term “fiber-optic” which might not be a term that all users understand. One user answered ‘yes’ to that question but spontaneously verbalized, “but they call it Fios.”

26. *Transportation question*: One participant said he would like to have been able to check both bus and metro. He said “for more urban city areas allow more than one.”

27. *Roster building for single-person households*: The initial questions at the beginning of the survey (building the roster) annoyed one participant who said, “When it asked who lived with me— so many times. It was redundant/ annoying.”

28. *Computers in the home*: When participants, who were responding on a tablet, were answering the question about the types of computers in the home, they ALL answered **no** to other computers. One participant who was answering on her tablet said “if tablet is included under type b then yes” she tapped on the yes column and then went onto say about the other category option, “Other—I don’t know how to answer so I’m going to say no.” Note: It is our (the CSM researchers) understanding that tablets are supposed to be counted with the third category, “c) other computers in home.”

29. *Access to internet*: One participant said he did not know what was meant by “subscription.” He ended up answering “yes with subscription,” and said “I use Verizon.”

30. *Health insurance*: One participant when answering the health insurance question said that “I go to the VA but I’m not using it for insurance.” He continued, “It’s my clinic.” He then said he was going to click ‘No’ for the VA option. According to the interviewer instructions this participant should have clicked “Yes” to this question.¹²

31. *Water bill*: In many places across the country, water is billed quarterly. The question asks for the annual water bill amount. This can be confusing for users who may only be entering the amount of their most recent bill.

¹² VA health care is slightly different from the other questions in this series. All other questions refer to ‘current’ health insurance status. VA health coverage on the other hand has a much looser reference period in that once a person enrolls in the VA health care system, or once a person uses VA health care facilities, the person remains eligible for VA health care and should respond ‘yes’ to this question. Even if the person has health care coverage through a private employer, for example, and no longer uses VA health care, the person should still respond ‘yes’ to this question.

While we did have one participant that had recently paid her water bill and she appeared to do it correctly. She said, “I just paid this. It was \$77. So, 77×4 is the answer to that question.” Most all the other users did not verbalize this type of a calculation and from the small amounts that they put in the answer field, we speculate that they may only be putting in the most recent water bill, not the annual amount. The other bills they have previously been asked about (E.g., gas and electricity) were asked about it on a monthly cycle not annually.

32. *Baby age instruction for a single individual:* When the respondent is answering the date of birth and age for him or herself, the instruction about entering a zero for babies under age one doesn’t make sense. This is especially true if there are no babies or children in the household. One respondent who lived alone orally commented on this instruction. Making instructions or help context sensitive would suggest such a message should not appear for single householders.