STUDY SERIES
(Survey Methodology #2013-10)

**2010 Census Internet Form:
Report on Rounds 1 and 2 of
Usability Testing and One Round
of Accessibility Testing**

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The views expressed are those of the authors and not necessarily those of the U.S. Census Bureau.

Abstract

This report documents two rounds of usability testing conducted on successive iterations of a prototype user interface developed for potential online data collection in the 2010 Census. Following the first round of testing, many usability recommendations and other changes were implemented. The second round of testing found the prototype user interface to be generally usable by sighted participants but unusable by those with visual disabilities. Methods of testing, results, and recommendations are detailed in this report. For reasons unrelated to usability, further development of a system for online data collection in the 2010 Census was cancelled by the Director of the Census Bureau.

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1.0 Introduction

In 2008, during the time when the U. S. Census Bureau was considering fielding an Internet form as a response option in the 2010 Census, plans were being developed for conducting usability testing on early prototypes. The first round of usability testing on the prototype Internet form took place between August 13 and August 20, 2008. Testing with eight participants recruited from the Human Factors and Usability Research Group's participant database occurred in the Human Factors and Usability Research laboratory at Census Bureau Headquarters in Suitland, Maryland. Members of the 2010 Census Internet Team observed many of the sessions.

Following further development of the prototype form, the second round of usability testing took place between September 16 and September 19, 2008. Three internal Census Bureau employee participants and seven external participants participated in the second round of testing on the revised prototype. The three internal participants were individuals with a range of visual impairments, from extreme tunnel vision to almost total blindness. Software tools were used to evaluate the user-interface software for compliance with federal regulations mandating access to electronic technology for people with disabilities, i.e., Section 508 of the Rehabilitation Act of 1973, as amended in 1998[2].

Further development and testing were cancelled upon a high-level decision not to field an Internet form with the 2010 Census.

1.1 Purpose

The purpose of the usability testing was to identify any problems that actual respondents might have with the online form. Accessibility testing was conducted to identify any violations of the Section-508 regulations.

1.2 Scope

Round 1. Although prior work had been done toward design and development of a Census Internet form (e.g., for the Census test in 2005), the tab-based (e.g., multiple tabs across the top of the page for bookmarking different sub-topics) user interface upon which the 2005 testing was performed was deemed too complex to implement at a national level. Figure 1 shows a screen shot from the 2005 National Census online Test.

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[2] This Act has since been revised, but we followed the standards that were available in 2008 when the testing was performed.
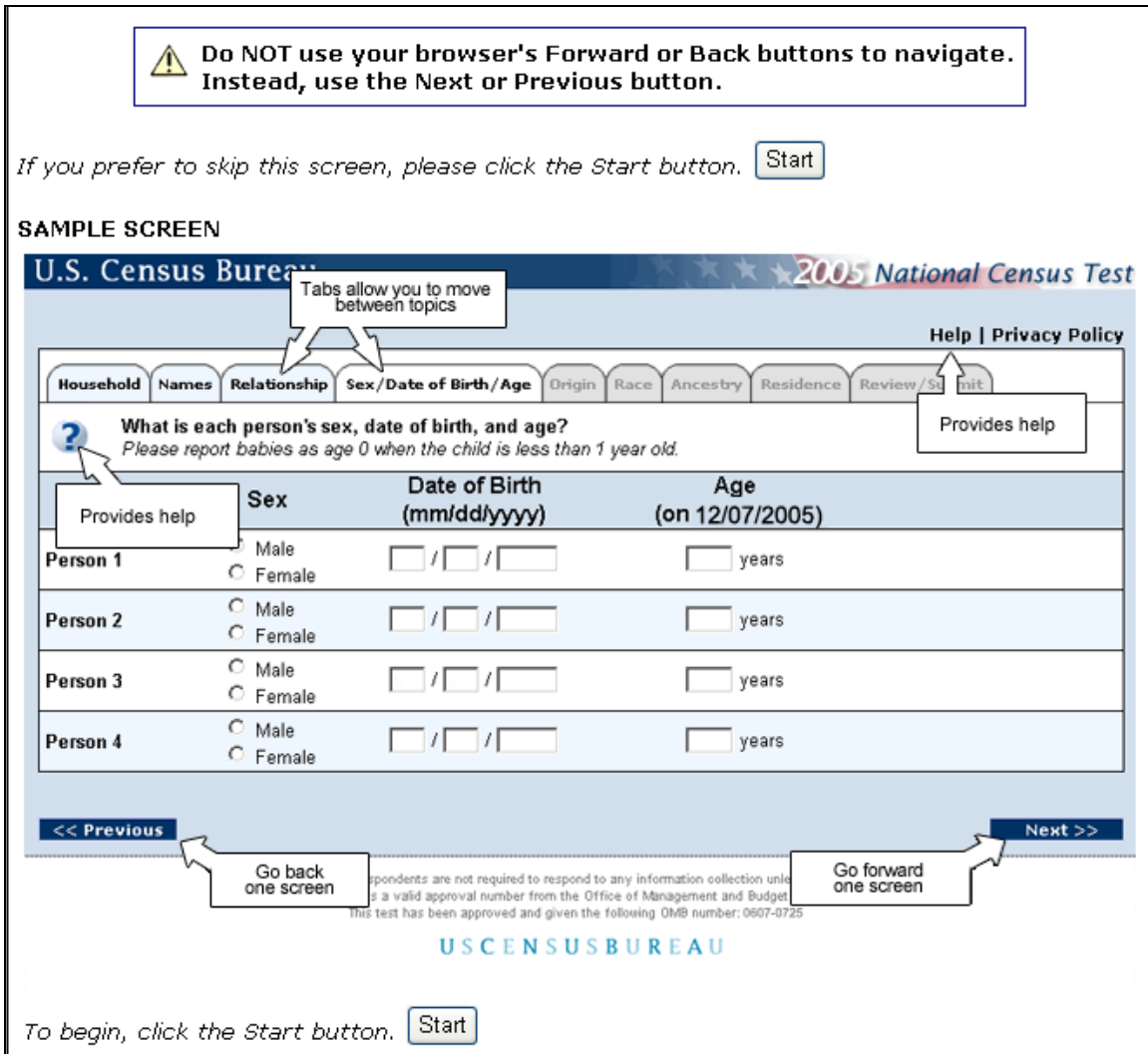
Figure 1: Screen shot from the 2005 National Census Test

Thus, consideration of a user interface with tabs for the various questions was defined as out of scope. The user interface was to be as simple as possible while providing basic editing capabilities and an age-checking function. The user interface tested in Round 1 was a wireframe prototype with limited functionality.

Round 2 usability testing focused on evaluating changes made since Round 1 testing, using a more fully functional prototype. Round 2 also consisted of Section 508 Accessibility testing.

2.0 Method

This section describes the techniques used to evaluate usability in both rounds and accessibility in the second round.

2.1 Usability

In this section, we present the methods used to evaluate usability in both rounds of testing.

2.1.1 Methods Used in Round-1

Participants and Observers

Participants in the Round-1 testing were recruited from among members of the general public who have signed up with the Statistical Research Division (SRD) to participate in cognitive or usability testing.   As shown in Table 1, educational level varied from a high school diploma to a Master's degree. Each of the eight test participants self-reported having basic computer-literacy skills and at least five years of prior experience in navigating Web sites (range = 5-9). On a scale where 1 represented low familiarity and 5 represented high familiarity, participants' self-reports compute to a mean level of 3.25 for familiarity with Census terms and data (range = 2-4). That is, they reported a moderate level of familiarity with Census terms and data. There is reason to suspect that this estimate may be somewhat inflated because of the demands of the situation.

Table 1. Characteristics of External Participants in Round-1 Usability Testing of a Low-Fidelity Prototype Internet Form for the 2010 Census[3]

Participant	Education	Daily Internet use (hours)	Computer Experience*	Internet Experience*	Comfort level navigating the Internet**	Familiarity with Census terms and data**
1	High School/GED	1-3	5	5	4	4
2	Bachelors (BA/BS)	1-3	7	7	5	3
3	High School/GED	4-6	8	8	5	4
4	Bachelors (BA/BS)	7 or more	9	9	5	2
5	Unknown	4-6	7	6	4	3
6	Bachelors (BA/BS)	4-6	8	6	5	3
7	Masters (MA/MS)	1-3	6	8	4	3
8	Masters (MA/MS)	4-6	7	8	5	4

*=Questions were asked on a 9-point Likert scale (1 = low, 9 = high).
**=Questions were asked on a 5-point Likert scale (1 = low, 5 = high).

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[3] See Appendix C for the questions.

Observers from the team were invited to watch the usability tests on television screens in a separate room from the test participant and test administrator (i.e., the observation room in the usability suite). At the end of the formal debriefing, the test administrator polled the observers for any questions they might want to ask the participant. If there were questions, the test administrator went back to the test room and asked them while the video recording continued. At the end of several test sessions, the test administrator and observer(s) discussed preliminary the findings from that session and compared them to findings from other sessions. Sometimes the observer(s) left before the end of a session, and no discussion took place.

Facilities and Equipment

Here we describe the testing environment, including instrumentation for recording each test session.

Testing Facilities

The test participant sat in a small room, facing a one-way glass and a wall camera, in front of an LCD monitor equipped with an eye-tracking machine that was placed on a table at standard desktop height. The test participant and test administrator sat next to each other in the same room.

Computing Environment

The participant's workstation consisted of a Dell OptiPlex GX150 personal computer with a Pentium IV processor, a Tobii LCD monitor equipped with cameras for eye tracking, a standard 101/102 key quiet keyboard, and a PS2 IntelliMouse with a wheel.

The operating system was Windows XP for all test participants.

Audio and Video Recording

Video of the prototype application on the test participant's monitor was fed through a PC Video Hyperconverter Gold Scan Converter, mixed in a picture-in-picture format with the camera video, and recorded via a Sony DSR-20 digital Videocassette Recorder on 124-minute, Sony PDV metal-evaporated digital videocassette tape. Audio for the videotape was picked-up from one desk and one ceiling microphone near the test participant. The audio sources were mixed in a Shure audio system, eliminating feedback, and fed to the videocassette recorder.

Eye Tracking

The participant's eye movements were recorded during the usability test. Using the ClearView 2.0 software program, the Tobii eye-tracking device monitored the participant's eye movements and recorded eye-gaze data. This type of eye tracking

requires the calibration of each eye. When the eye tracker was not able to calibrate to the participant's eyes, we continued the session without eye tracking.

Data collected from the eye-tracking device includes eye-gaze position, timing for each fixation, eye position, and areas of interest. Areas of interest (AOIs) were defined prior to the usability evaluation as areas of particular interest to the 2010 Internet Team.

Materials

Testing materials included the following items provided in the appendices noted.

General Introduction (Appendix A)

The test administrator read some background material and explained several key points about the session. The general introduction emphasized that the participant's skills and abilities were not being tested: The participant was helping in an evaluation of the online form's look and feel.

Consent Form (Appendix B)

Prior to beginning the usability test, the test participants completed a general consent form. The consent form documented the participant's agreement to permit videotaping of the testing session.

Questionnaire on Computer Use and Internet Experience (Appendix C)

Prior to the usability test, test participants completed this questionnaire by providing detailed information on their computer use and Internet experience. This information provides an overview of the group's diversity in using computer technology. Except for educational experience, the data presented in Table 1 come from participants' self-reports on this questionnaire.

Prototype Screens (Appendix D)

The process of completing and submitting the form began with the login screen. Participants were observed closely to determine their sequence of actions for logging in. Eye tracking captured where the participant looked and how much of the text (e.g., the instructions) the participant actually read. Appendix D includes the login screen and other screens that make up the wireframe prototype form, including both versions of the Date of Birth Screen.

User Satisfaction Questionnaire (Appendix F)

The original version of the Questionnaire for User Interface Satisfaction (QUIS) included dozens of items related to user satisfaction with a user interface (Chin, Diehl, and Norman, 1988). In a usability test at the Census Bureau, SRD typically uses 10 to 12 QUIS-like items that the usability team has tailored to the particular user interface being evaluated. In this study, we used a modified version that included items worded for the 2010-Census-Internet context.

Debriefing Questions (Appendix G)

After completing the tasks, the test participants answered debriefing questions about their overall experience using the prototype 2010 Census Internet form.

Procedure

The test participant reported to the Census Bureau headquarters in Suitland, Maryland. Upon arriving, the test participant was seated in the testing room equipped for eye tracking. The test administrator greeted the participant and read the general introduction. Next, the participant read and signed the consent form, and the test administrator's assistant started the video recording. The test participant then completed the questionnaire on computer use and Internet experience. The test administrator remained in the test room, seated to the participant's right.

Since this test used the eye-tracking device, the participant's eyes were calibrated at this time. Calibration was usually completed in about fifteen to twenty seconds, by having the participant look at a dot moving across the computer screen. Three attempts were made to calibrate. If calibration was not obtained, the session continued without eye tracking. When (and if) calibration was completed, the test administrator's assistant operated the eye-tracker. Six participants were calibrated successfully in Round 1, three each for each of the two versions of the prototype. Three participants were calibrated successfully in Round 2.

Following calibration, the participant attempted to log into the Internet form. While completing the form, the participants were encouraged to read the questions aloud and verbalize what they were thinking.

Each participant completed the Census 2010 form twice, first using personal household data and then using data provided by the test administrator. The data provided by the test administrator was in the form of a scenario, that is, it represented a kind of role-playing: The test administrator took on the role of "Ethel," who was described as the participant's neighbor. Since she was not familiar with computers, Ethel needed help to fill out her form on the Internet, and the participant had volunteered to help her. This scenario put the participant in the role of an interviewer who asked Ethel the questions on the form and pointed out any important instructions. Ethel was able to read both the

questions and the instructions, but the participant was told to read as much aloud as he or she thought necessary. Acting as Ethel, the test administrator referred to a sheet of paper with all the information to be reported for Ethel's household (e.g., names, ages, dates of birth).

For the first question (internally referred to as POP count), participants in Round 1 entered a number representing the size of the household into a data-entry field or selected the size of the household from a dropdown list. A text-entry field versus dropdown list was varied at random in the software. The purpose of this manipulation was to get a sense for participants' success and satisfaction with each method of implementing the POP-count response field. Additionally, there were two versions of the Age and Date of Birth Question, one with a drop-down option, and one with a text-entry only option.

During both of the participant's attempts to complete the form, the test administrator noted any hesitations, backtracking, or other behaviors. After the participant completed the second submission of the form, the eye-tracking device was stopped, but the video recording continued. The test participant then completed the modified QUIS silently.

Beginning with items rated especially high or low on the QUIS, the test administrator then asked the debriefing questions. This was an opportunity for a conversational back-and-forth exchange, but the test administrator remained neutral. At the conclusion of the usability evaluation, the video recording was stopped. On average, a usability session lasted about 60 to 75 minutes.

2.1.2 Methods Used in Round 2

The methods for Round 2 were kept as close as possible to the methods used for Round 1. They differed from Round 1 in the following ways:
- We made some adjustments to the scenario so that it would take less time for the participant to complete.
- There was just one version of the POP Count Question (as opposed to the two versions tested in Round 1).
- We included participants with visual disabilities.

The following subsections describe aspects of methods that differed from those used in Round 1. Where the methods were essentially similar, the descriptions under Round 1 apply to Round 2.

Participants

Seven of the 10 participants in the Round-2 testing were recruited from among members of the general public who had signed up with SRD to participate in cognitive or usability testing. As shown in Table 2, educational level varied from a high school diploma to a doctoral degree. Each of the 7 external test participants self-reported having basic computer-literacy skills and at least five years of prior experience in navigating Web sites (range = 5-9). On a scale where 1 represented low familiarity and 5 represented high

familiarity, the external participants' self-reports compute to a mean level of 2.57 for familiarity with Census terms and data (range = 1 - 4). That is, they reported a low to moderate level of familiarity with Census terms and data.

Additionally, we recruited three internal participants (Census employees) who have various kinds of visual impairments. Two of these participants regularly use Job Access With Speech (JAWS), one of the most popular screen readers. The third employee with visual impairments describes his condition as "severe tunnel vision," and he uses screen-magnification capabilities in his daily work. The two employers who use JAWS came to the accessibility laboratory to test the prototype, and we videotaped them using a portable Sony video recorder mounted on a tripod. We visited the third employee at his cubicle so that he could test the prototype using his regular screen settings. We also videotaped this session using portable equipment (Sony video recorder and tripod).

Table 2. Characteristics of External and Internal Participants in Round-2 Usability Testing of a Prototype Internet Form for the 2010 Census[4]

Participant#	Education	Daily Internet use (hours)	Computer Experience*	Internet Experience*	Comfort level navigating the Internet**	Familiarity with Census terms and data**
1	Some college	1-3	7	7	4	2
2	Ph.D.	4-6	5	9	3	3
3	Bachelors (BA/BS)	4-6	9	9	5	4
4	Bachelors (BA/BS)	4-6	7	8	5	1
5	High School/GED	1-3	5	5	3	4
6	Masters (MA/MS)	1-3	9	9	5	3
7	Bachelors (BA/BS)	7+	8	9	5	1
8 internal, JAWS user	Some college	1-3	8	8	4	3
9 internal, JAWS user	BA/BS	1-3	9	8	5	4
10 internal, uses screen magnification	college	1-3	8	6	NA	NA

Note: Participants 1-7 were recruited externally, from outside the Census Bureau.
*=Questions were asked on a 9-point Likert scale (1 = low, 9 = high)
**=Questions were asked on a 5-point Likert scale (1 = low, 5 = high)

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[4] See Appendix C for the questions.

2.2 *Methods Used for Testing Compliance with Federal Accessibility Regulations*

Accessibility testing was conducted to identify any violations of the Section-508 regulations. Violations were identified using JAWS reader software.

In Round 2, three internal participants with visual disabilities participated. The primary focus for these participants was identifying issues with interface usability Section 508 compliance.

3.0 Results

The results are presented according to the priority level of the findings (high, medium, or low). High-priority issues are severe and can bring the user to a standstill or cause some type of break-off from the survey. All accessibility issues are rated high-priority because of the Federal Section 508 regulations. Medium-priority findings are those that could potentially make a task difficult, but not impossible, such as viewing text that has low contrast with its background. Low-priority findings mean the user can complete the task, but improvements could be made to the design.

3.1 *High-Priority Observations, Usability/Accessibility Issues, and Recommendations*

Usability findings are based on observations made during usability testing within the context of best practices for online user-interface design (e.g., Lazar, 2005; Koyani, Bailey, & Nall, 2003). Usability findings for participants with disabilities are included among the usability findings. Accessibility findings are based on the output of diagnostic software as well as manual confirmation of Section-508 violations.

3.1.1 Login Screen

Round-1 Observations: People did not generally know where they were when brought to this screen. Several needed prompting to get started. Two people thought they were supposed to enter zeros in the boxes. All of the participants found their Census ID number once they knew they needed it. Instructions were given in long sentences that wrapped from the right side of the screen to the next line on the left.

Round-1 Usability Issues: The screen does not help people get oriented. The black bar at the top makes the white text seem unimportant. The white text is difficult to read. Text to the right of the black bar is cut off. Overall, this screen does not convey a welcoming feeling. Instructions are not written for the Web.

Round-1 Recommendations: Provide more introductory content beneath the black bar. Eliminate redundant wording (e.g., one of the two statements about where to find the Census ID Number). If the text in the black bar is kept, the word "internet" needs to be capitalized. Revise the text on this page according to the final form of the draft text

submitted for review. In the next round of usability testing, have the participant type in the URL for the form, to increase realism.

To resolve the problem with the zeroes in the graphic of the Census ID number, replace them with a sequence of 20 numbers: 01234567891011121314. A sequence like this is typically used in examples showing where to locate a bank's routing number, as shown in Figure 2:
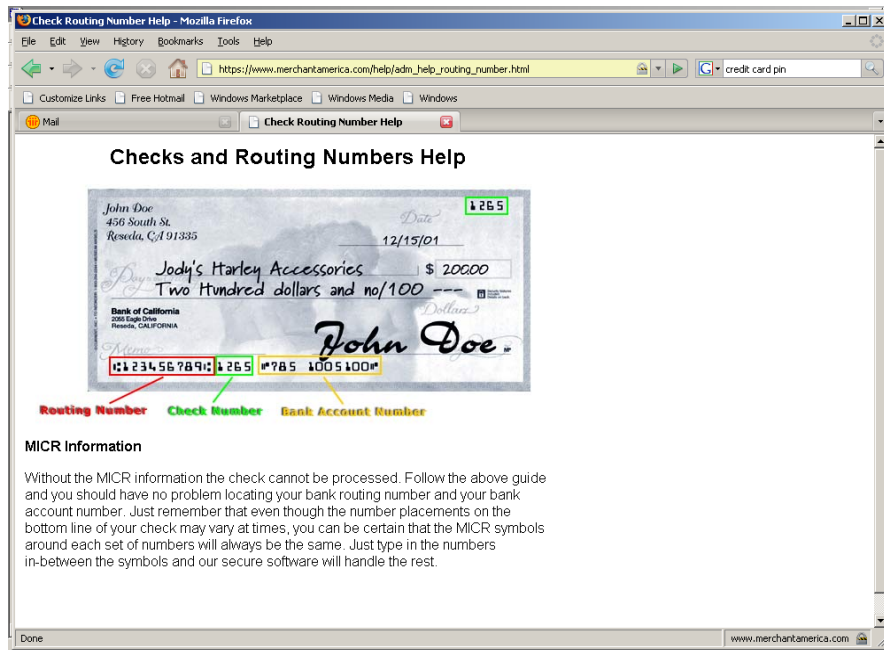
Figure 2. Example of numeric sequence commonly used to help participants locate information on paper, in this case a bank's routing number.

Online respondents may be more likely to understand that an ordered sequence of numbers is a "fake" number than they are to recognize a set of zeroes as a fake number. Test this approach in the second round of usability testing.

Introductory content should be written for the Web (short sentences, bulleted phrases), for participants who just want to scan for keywords. Reading online is different from reading on paper and, thus, requires a different style of writing (e.g., Redish, 2007).

Text should not wrap from the far right of the screen to the far left because this kind of formatting makes it difficult for the user to read smoothly from one line to the next. Make the text extend no farther than the right edge of the graphic.

Round-2 Observations: Since a string of zeroes remained for the Census ID number, it was not possible to evaluate whether participants recognized a sequence of numbers as a fake number. One of the seven external participants entered zeroes as the Census ID number and received an error message upon submitting it.

Although participants experienced uncertainty and problems getting oriented in both rounds, the eye-tracking data revealed a relatively consistent pattern from Round 1 and Round 2. Participants appeared to have scanned the directions, typed in their Census ID and logged into the Internet form, clicking where expected. For both rounds, most fixations occurred on the first text box (Figure 3). The changes made for Round 2 may have slightly increased the number of fixations on the sample Census ID number and may have promoted slightly more reading as compared to the eye-tracking results for Round 1. Further testing would be needed to verify these interpretations.

Figure 3. Eye-tracking data from the login screen: Fixations were tightly clumped for the three participants who calibrated in Round 1 but more spread out for the three who calibrated in Round 2.

Round-2 Usability Issues: The graphic showing the Census ID number in zeroes remains somewhat problematic. Visually impaired participants needed someone to read their number to them because it was on the paper form and not accessible to them electronically.

Round-2 Recommendations: It might be better to use the letter x to represent all the digits, since people should recognize that a string of x's cannot possibly be their Census ID number. We recommend testing with x's versus testing with a sequence of numbers, as was recommended after Round 1. Consider ways to provide electronic access to Census ID numbers for those with visual impairments.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.1.2 Formatting of Residence Rules

Round-1 Observations: If people read the residence rules at all, it was not clear to them where to find "our guidelines."

Round-1 Usability Issues: The alternating shades of blue tend to separate the guidelines from the text that goes with them. There is too much space between the introductory lines of text and the bulleted guidelines.

Round-1 Recommendations: Display all the content of the residence rules in a pale blue section, using the pale blue that is currently used just for the bulleted content. Reduce the spacing between the text and the bulleted guidelines.

Round-2 Observations: Design changes as recommended appear to have resolved the issues for sighted participants. There were no problems for the visually impaired participants.

Round-2 Usability Issues: No issues for sighted participants. There were no problems for the visually impaired participants.

Round-2 Recommendations: No change.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.1.3 Wording, Placement, and Behavior of Edit (Error) Messages

Round-1 Observations: People generally did not see the high-level edit message about there being "a problem with an answer below." We hypothesize that since they had just hit the Continue button, their eyes went to what they expected to be a new question as they tried to figure out what was going on. This was where they might have scrolled down or noticed the announcement at the top. Once they realized that they had not answered some questions, they assumed that they must resolve all the edit messages before being allowed to continue. Nothing told them otherwise.

Round-1 Usability Issues: Although placement of the specific messages below the related question is effective, some wording in the edit messages is inconsistent with other content, since the message wording is leftover from the 2005 test (e.g., a message may say "hit next to continue," but there is no "next" button on the screen). Additionally, some people said that they expected the specific edit messages to disappear automatically when the problems were corrected.

The placement of the generic message announcing "a problem," under the black banner, takes it out of the user's line of sight. The wording is too vague to be effective in directing the user to look below for specific messages. The message refers to "an answer below," but it does not say there are additional, specific messages below. Therefore, it

requires the user to make an inference that it would be a good idea to look below. This is more cognitively demanding than it needs to be.

Round-1 Recommendations: Place the generic message just above the actual content for whatever page the user is on. Reword the text of this message to prod the user to look below for the specific problems. Revise the wording of specific messages so that they are consistent with the current prototype. Include the information that it is OK to continue if the answer is unknown. If messages can disappear or be grayed out once the user has made a change, doing so would satisfy some unmet expectations and give the user visual confirmation that it was OK to continue.

Round-2 Observations: The only difference between Rounds 1 and 2 was the edit message text and the placement of that message at the top of the screen. The text in the edit message during Round 1 read, "There was a problem with the answers below. Please review." The text during Round 2 stated, "Some answers are missing or inconsistent. Please see the messages below." The message in Round 2 was placed just above the actual content for that page. In both rounds, participants still needed to scroll down to find the first instance of an edit message in a pink box.

From the eye-tracking data shown in Figures 4 and 5, it appears that participants in both rounds eventually read the edit message at the top of the page and proceeded through the document looking for the missing/inconsistent information. The red images in Figures 4 and 5 indicate where the eyes fixated more, or in other words where the participants spent more time looking. There are more red areas in Round 1 than in Round 2 as shown by Figures 4 and 5 respectively, suggesting that the participants in the first round were spending more time looking through the form than in the second round.

One possible interpretation is that the participants in Round 1 spent time reviewing each individual question since the original edit message at the top of the page did not provide clues to which person or question had triggered the error. They did not know to look for a message within the form indicating for whom information was incorrect. The change in the wording from Round 1 to Round 2 provided the user with a clue that there was some message within the form indicating which information was incorrect. However, as one participant commented, even with the change of wording, respondents still "have to find what's inconsistent." Instead of hunting through each question for each person, however, the participants in Round 2 scanned through the form until they found the error message, which one participant described as the "pink thing." Participants then made corrections to the form. This interpretation is supported by the eye-tracking data.

Round-2 Usability Issues: Scrolling to the first instance of an edit message can be labor intensive. The first time a user receives the message at the top of a page, she is not sure what to expect below. A goal is to decrease, not increase, the user's level of uncertainty.

Round-2 Recommendations: Reduce the user's uncertainty by moving the cursor to the first instance of an edit message. If feasible, give the user a button to click on within the message at the top of the page, which would be labeled, "Go to first edit."

Figure 4. Heat map of edit messages in Round 1 (n = 3).

Text within the figure:

United States Census 2010

This is the official internet form for the 2010 Census. It is quick and easy, and your answers are protected by law.

U.S. DEPARTMENT OF COMMERCE
Economics and Statistics Administration
U.S. CENSUS BUREAU

There was a problem with the answers below. Please review.

On the last page, you reported that there were 9 people living or staying here on April 1, 2010. On this page, please provide information for each of those people. If the number of people is incorrect, please press your browser's back button and correct the number of people in Question 1.

Person 1

1. Start with a person living here who owns or rents this house, apartment, or mobile home. If the owner or renter lives somewhere else, start with any adult living here. This will be Person 1. What is Person 1's name? HELP
   First Name: Ethel   MI: G   Last Name: O'Connor

2. What is Person 1's sex? HELP
   ○ Male ● Female

3. What is Person 1's date of birth? HELP
   Month: March   Day: 23   Year: 1973
   What was Person 1's age on April 1, 2010? *Please report babies as age 0 when the child is less than 1 year old.* HELP
   Age on April 1, 2010: 37

   NOTE: Please answer BOTH Question 4 about Hispanic origin and Question 5 about race. For this census, Hispanic origins are not races.

4. Is Person 1 of Hispanic, Latino, or Spanish origin? HELP
   ☑ No, not of Hispanic, Latino, or Spanish origin
   ☐ Yes, Mexican, Mexican Am., Chicano
   ☐ Yes, Puerto Rican
   ☐ Yes, Cuban
   ☐ Yes, another Hispanic, Latino, or Spanish origin
   — *Enter origin, for example, Argentinean, Colombian, Dominican, Nicaraguan, Salvadoran, Spaniard, and so on.*

5. What is Person 1's race? Mark one or more boxes. HELP
   ☑ White
   ☐ Black, African Am., or Negro
   ☐ American Indian or Alaska Native — *Enter name of enrolled or principal tribe.*

   ☐ Asian Indian   ☐ Japanese   ☐ Native Hawaiian
   ☐ Chinese   ☐ Korean   ☐ Guamanian or Chamorro
   ☐ Filipino   ☐ Vietnamese   ☐ Samoan
   ☐ Other Asian — *Enter race, for example, Hmong, Laotian, Thai, Pakistani, Cambodian, and so on.*   ☐ Other Pacific Islander — *Enter race, for example Fijian, Tongan, and so on.*

   ☐ Some other race — *Enter race.*

6. Does Person 1 sometimes live or stay somewhere else? HELP
   ● No ○ Yes — *Mark all that apply.*
   ☐ In college housing
   ☐ In the military
   ☐ At a seasonal or second residence
   ☐ For child custody
   ☐ In jail or prison
   ☐ In a nursing home
   ☐ For another reason

Callout box:
Once they realized they had not gone forward, participants in Round 1 read the error message, and then reviewed each individual question.

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Figure 5. Participants in the second round read the error message immediately, then scanned the form looking for messages indicating inconsistent/missing answers (n = 3).

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.1.4 Date of Birth and Age

Round-1 Observations:

a. *Dropdown lists for Month, Day, and Year*: There were two versions of the Age and Date of Birth Question- one with a drop-down box and one with a text-entry only option. In general, none of the test participants had problems with these dropdown lists. In the debriefings, most participants did not even recall the use of a dropdown or a text-entry field to enter date of birth. The major issue was the question of whether to leave the year blank if it was not known. One participant worked quite hard to figure out how to get the word "YEAR" back into the display in place of the year he had selected for the mother-in-law in the scenario. He suggested that it would help to have "Unknown" or "Don't Know" as one of the options. He tried to enter Unknown as an option, and "Unk" was accepted.

Some participants wondered aloud whether it was OK to leave the year blank. Some went to help and some ignored help, although they reported that they were aware that it was available. One participant who could not find the answer to this question in help suggested that the help content should be specific to the form (i.e., that help should be given in context of the specific question or instruction tied to the help button the user has selected). A few participants read the specific help aloud and understand that it was OK to estimate age but not to guess at the year. Despite this knowledge, some still went ahead and guessed at the year to make it consistent with the estimated age of 85 in the scenario.

b. *Age*: Most participants recognized that age was calculated for them. One participant tried to type over the age displayed for her; but once she caught on to the automatic calculation, she had no problems with age for later persons. Several participants mentioned that they would like to have a reverse calculator for year, that is, if they entered an estimated age, the computer would come up with the corresponding year of birth. Of course, this would violate the Census Bureau's preference that year not be estimated.

In addition, it appeared that some participants did not realize that they had to (or did not try to) type the grandmother's age (from the scenario) in the text field during the scenario. Perhaps this was because age had been automatically calculated for them in all earlier instances. When the year is unknown, but an estimated age is known, the text field for age is off to the right and far from the bolded black question about age. This layout may contribute to participants missing it as a field that can be filled in, even if the year is unknown. People may assume that the age field is entirely under automatic control.

Round-1 Usability Issues:

a. *Dropdown lists for Month, Day, and Year*: Even if respondents do not know the year, many still said that they wanted to enter something.

b. *Age*: Since participants were reluctant to enter an estimated age, there seems to be a need for visible guidance on estimating age or an option to indicate that the age entered is an estimate.

Round-1 Recommendations:

a. *Dropdown lists for Month, Day, and Year*: Since during the debriefing participants did not remember whether they had used a dropdown or a text-entry field and since accuracy did not seem to be affected one way or the other, the use of a dropdown or text-entry field is left for the developers to decide. If a dropdown is used, provide an option for the user to select "Unknown" from the dropdown list. If possible, write out the word "Unknown." If necessary, use the abbreviation "Unkn." Consider adding instructions on the form that it is OK to estimate age but not year of birth. Give the user an option to select "Estimated" or "Actual" as a description of the age entered.

b. *Age*: Partially covered in Recommendation a. If year and age are both left blank, an edit message could prompt the respondent to enter an estimated age.

Consider moving the age field closer to the black bolded question. To facilitate this change, revise the wording about babies: Remove "Please, " "the child," and "old" so it reads, "Report a baby as age 0 if he/she is younger than one year." The objective is to shorten this sentence so that it does not need to wrap to the next line. Changing "babies" to "baby" makes that noun consistent in number with "he/she." As written, the instruction refers to multiple "babies" and one "child" in the same sentence.

Round-2 Observations: The dropdown option was chosen for this question. The developers went with the dropdown for entering age because they considered it more secure than a text-entry field.

Round-2 Usability Issues: None.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.1.5 Hispanic and Race Section

Round 1 - Observations: Some people read aloud the note asking them to answer both the Hispanic and race questions. Other people completely missed the note. Some who missed the note answered the Hispanic question and skipped the race question. During the scenario for the nanny and her family, almost all the participants had trouble deciding what to do at the race question. Some went to help, which advises respondents with no other alternative to check "Some other race" and enter Hispanic in the text field. Without consulting help, others decided to select "Some other race" and to enter Mexican-American in the text field.

For the mother-in-law in the scenario, who was part American Indian, some participants asked about the tribe, but others did not ask and left the text box blank. For the foster child in the scenario, who had a Native Hawaiian father and a mother from Fiji, some people entered "Fiji" or "Fijian" in the text box, but others left it blank. Preliminary eye-tracking data shows that some participants did not look at the text box for Other Pacific Islander, even if they read the instruction to "Enter race…"

Round-1 Usability Issues:

a. Since the note is important, it needs to stand out more than it does since not all participants read it.
b. The guidance in the help, which some participants found, seems to contradict the message that "Hispanic origins are not races." The help text says, "Respondents providing write-in entries such as multiracial, mixed, interracial, or a Hispanic/Latino group (for example, Mexican, Puerto Rican, or Cuban) in the "Some other race" write-in space are included in this category." Such contradictions create confusion.

c. The text-entry boxes do not attract the attention of some respondents.

Known cognitive, social, and anthropological issues with the Hispanic and race questions are outside the scope of this report. That being said, we observed virtually every participant experiencing some confusion about the meanings of terms and having difficulty with the concept of racial categorization during the scenario. Some participants expressed negative feelings about these questions and displayed heightened, negative affect when talking about them.

Round-1 Recommendations:

a. Putting the note on a background with a contrasting color may help draw attention to it.

b. Make the content of the help consistent with the message on the form (with regard to Hispanic origins not being races).

c. Add highlighting to the text boxes, perhaps a yellow background with the phrase, "Principal Tribe:" or "Race:" used as labels, where appropriate.

Round-2 Observations: The Round-1 recommendation to place the boxed note on a yellow background was not implemented, but the box was removed and the text was bolded. As shown in Figures 6 and 7, eye-tracking data indicate that the bolding in Round 2 was less effective than was the text box (Round 1) in drawing the user's attention to the note as there is less red on the note in Round 2.

From the heat maps, it appears participants looked at the note more closely towards the beginning of the form than later on in the form in Round 2. During the test scenario, participants did not have to make a decision about Hispanic origins and race until later in

the scenario. By this point, participants did not appear to read the boxed note. This suggests participants were answering the question based on their prior knowledge and may have forgotten the note from earlier on the form. One problem with this behavior is participants may have misinterpreted the race question (See Figure 6).

This is the first time participants see the instruction about Hispanic origin on the form.

This is the first time participants must make a decision about a person with a Hispanic background. The heat map indicates fewer fixations than earlier.
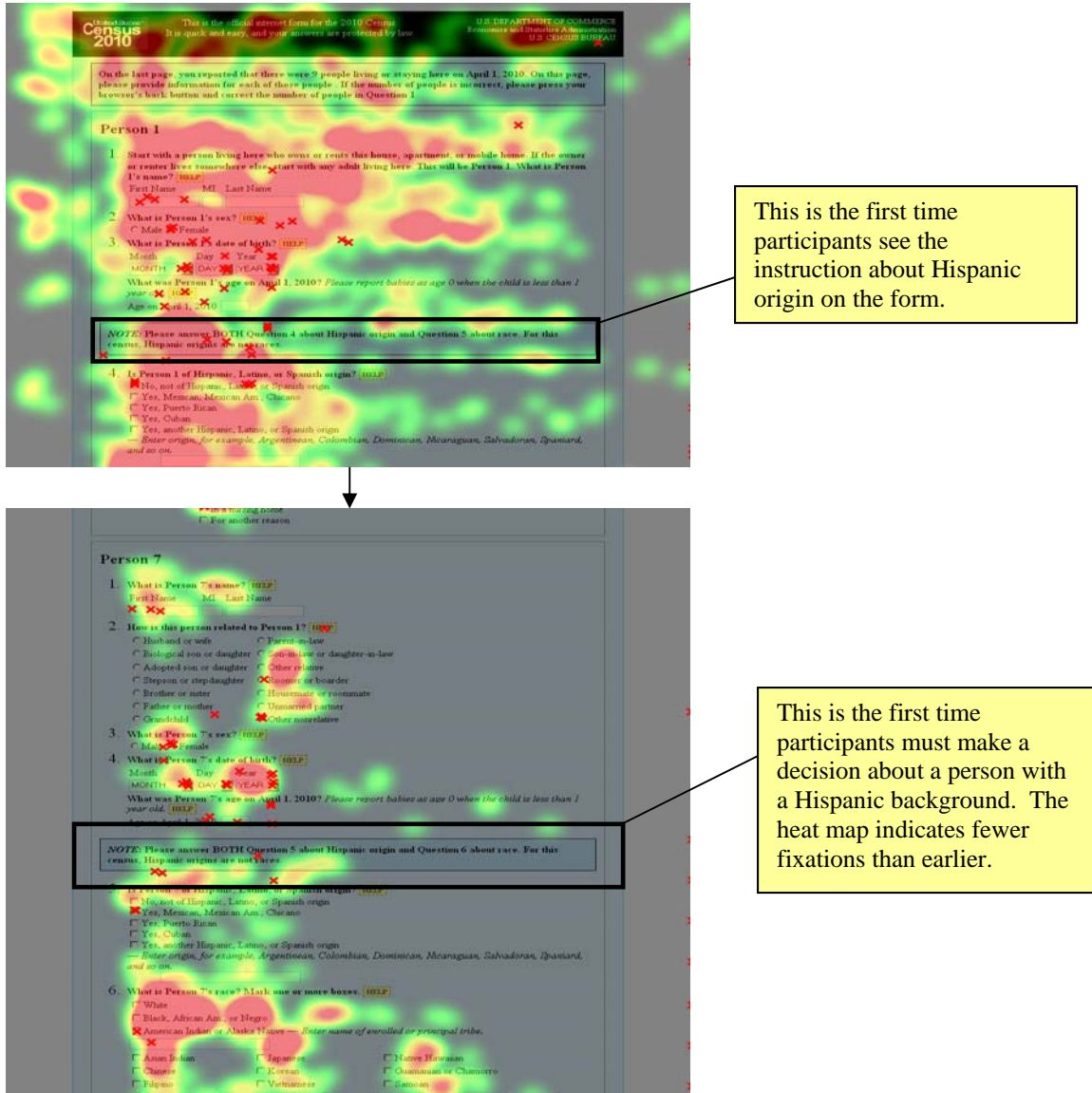
Figure 6. As participants continued filling out the form, they appeared to read the boxed instructions less closely (Round 1, n=3).

During the second round of testing, the note about Hispanic origins not classified as races for the census was no longer in a text box, but displayed in bolded text. It appears that participants fixated on the bolded text less during Round 2 than they did on the text boxes in Round 1 (See Figure 7).

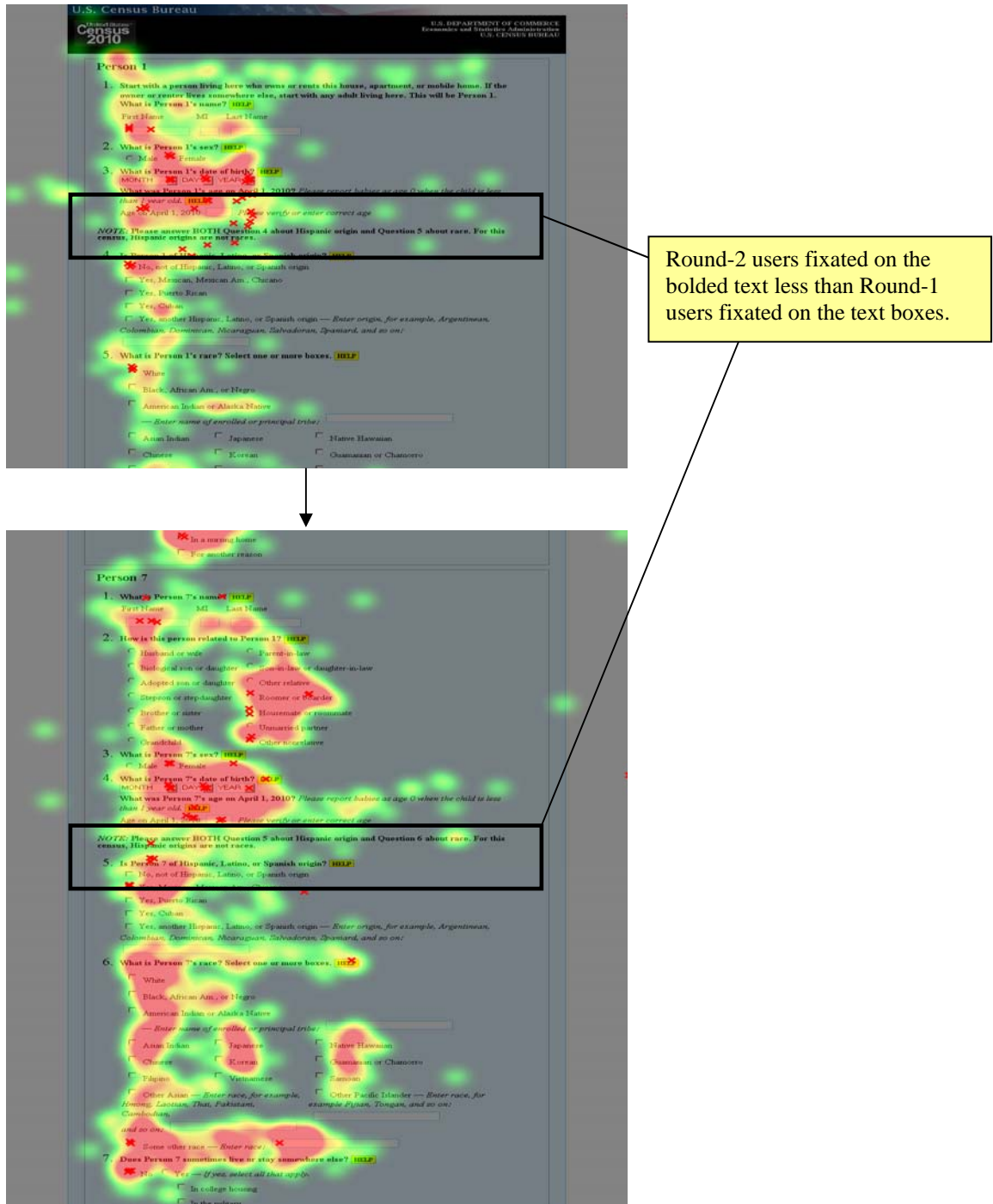Round-2 users fixated on the bolded text less than Round-1 users fixated on the text boxes.

Figure 7. In Round 2, participants did not fixate long on the bolded text explaining that Hispanic origins are not considered races for the Census (Round 2, N=3).

In Round 2, the blinking cursor in the boxes for Tribe, Other Pacific Islander, and Some Other Race helped sighted participants to notice those fields during the scenario. Figure 8 shows an example for Other Pacific Islander: Compared to the first round of testing, participants fixated more on the box connected to the Other Pacific Islander during the second round of testing.

Round 1 (N=3)

Round 2 (N=3)

Participants fixated more times on the box with the flashing cursor.

Figure 8. Round-2 participants fixated more on the text box with the blinking cursor than Round-1 participants did on the non-highlighted text box.

One Round-2 participant did not click the box for "Some other race," but entered Mexican-American in the text entry field. She received an edit message directing her to answer the question, yet she pressed the continue button and was allowed to continue. Later, on the review screen, the field was filled in with Mexican-American.

Round-2 Usability Issues: Drawing the user's attention to the instructions to answer both questions is still an issue.

Round-2 Recommendations: Consider implementing the earlier recommendation to place the instructions on a yellow background inside a text box. If the user has entered something in a text field but has not clicked on an answer category, such as "Some Other Race," click the answer category automatically. This solution is already implemented elsewhere in the instrument at the "Live somewhere else" question. At that question if the user selects one of the options but has not clicked Yes, the Yes button is selected automatically.

3.1.6 Live or Stay Somewhere Else (Overcount Question)

Round-1 Observations: The only problem observed was that some participants wanted to or did check "For another reason" under the Yes column, when the answer was really No. One participant suggested adding "None of the above" at the bottom of the stack.

One of the authors (K. Ashenfelter) pointed out that this question is really asking two questions:
1) Does Person 1 sometimes live or stay somewhere else?
AND
2) If yes, for what reason does Person 1 sometimes live or stay somewhere else?

Round-1 Usability Issues: The stacked check boxes may be so strong in attracting attention that some people miss the No/Yes selection. Then the only option vague enough to resemble No is "For another reason."   If people miss the No/Yes choice, they are trying to answer the first question by making one or more selections from among the check boxes. This implicit double question is more cognitively demanding than it needs to be.

Round-1 Recommendation: The checkboxes should be lined up directly under the Yes option instead of being lined up under the "M" in Mark all that apply. Change the instruction after Yes to say " – If Yes, select all that apply."

Round-2 Usability Issues/Recommendations: Same as Round 1.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.1.7 Review and Submit

Round-1 Observations: Participants were not sure about what to do if they needed to make a correction. It was not clear that they had to click the back button since this instruction was not displayed on the screen. At least one participant expected to be able to click on a person's name to be taken to a place where he could edit the data.

One participant suggested removing the second Submit button if both Submit buttons were visible on the screen. All participants agreed that it was useful to have the review page instead of having to scroll back through everything, especially if they were reporting for a large household.

Round-1 Usability Issues: Lack of a clear process for making changes does not serve participants well. It leaves them wondering what to do.

Round-1 Recommendation: Provide a workable method for the user to go back to answers that need to be changed. Include text in the instructions about what to do if changes are needed. Retain a submit button at both the bottom and top of the page.

Round-2 Usability Issues/Recommendations: Same as Round 1.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.1.8 Thank You Page

Round-1 Observations: Most participants did not report feeling confident that their data had been submitted to the Census Bureau. Several suggested including the Census ID number or the family name of Person 1 in the Thank You to help confirm that their specific data had been received. Some mentioned that they would like a confirmation number.

Round-1 Usability Issue: The current content leaves the user with a feeling of uncertainty.

Round-1 Recommendation: Add text that confirms the data have been received. Provide a little more feedback to say what they are being thanked for, e.g., Thank you for participating online in the 2010 Census! Provide a unique confirmation number or reflect the Census ID number, if possible.

Round 2 Usability Issues/Recommendations: Same as Round 1.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.2 Moderate-Priority Findings and Recommendations

3.2.1 Layout Issues

Round-1 Observations:

a. Most participants found Question 3 (tenure) hard to read. At first, it seems as if it is asking whether the residence is a house, apartment, or mobile home. When participants get to the options, however, they see that a different question is being asked. One participant, who was a former English teacher, did not "see" the question until

participating in the scenario. When entering her own household data, this participant wanted to edit the question so that it would say, "Is this **a** house, apartment, or mobile home?" Much later, she saw that the question was really about the nature of the payment, if any, being made for the residence. During the debriefing, she suggested asking, "Is **your** house, apartment, or mobile home --" We do not recommend this wording because the housing unit may not belong to the person completing the form. We do, however, recommend reworking this question for online presentation.

b. The text posted in the darker blue box before Person 1 is written for reading from paper, not for reading online.   Several people thought it meant they had chosen the wrong number of people.

Questions are laid out for reading from paper. The question wording wraps from the far right to the far left. For example, in Person 1, question 1, "What is Person" is at the far right of the screen, and "1's name?" is at the far left.

In the questions for each person, most of the response fields are placed beneath the label identifying the data element. Thus, the field for First Name is beneath the label; the Month of birth appears beneath the label; but the field for Age on April 1, 2010 appears to the right of the label. This is a minor inconsistency, but it could contribute to the amount of vertical scrolling required of the respondent.

Round-1 Usability Issues:

a.   The way the tenure question (Q3) is laid out- with a stem followed by a dash, followed by a Help icon, followed by a bank of radio buttons- does not lead to the hoped for continuity of reading. The stem and the options are quite disconnected from each other.

b. When reading online, people typically skip anything that looks like a paragraph of text, such as the note before Person 1.

c. In general, the layout of the questions makes reading difficult online. The current layout increases cognitive demand unnecessarily. In many instances, the wrapping of text from the far right to the left creates a spatial disconnect between the explanatory text and the question/answer text.

d. The vertical layout requires more vertical scrolling than a more horizontal layout would require.

Round-1 Recommendations:

a. Since the Census Bureau is apparently not interested in whether the unit is a house, apartment, or mobile home, we recommend changing the question to ask, "Is the place where you live…" followed by the options. An ellipsis (…) should be used instead of a dash to show that the wording continues after a break.

b. The whole first part of Person 1, Question 1 is not a question. The first three sentences describe Person 1 and should be placed underneath the heading, **Person 1**. Redish (2007) recommends using short phrases and bulleted items, not complete sentences when writing for the Web
c. The question is, "What is Person 1's name?" That should be the only text following the number for Person 1, question 1. It should not be broken up the way it is now, which requires the user to keep the first part in mind while trying to find the end of the question. The whole questionnaire should be examined for instances of text wrapping that lead to spatial disconnects for the user.

d. It would be possible to reduce vertical scrolling on this page by placing all the data fields to the right of their labels, for example:

First Name _____ MI ____ Last Name _____

Month _____ Day _____ Year _____

Doing this would use more of the blank space on the screen (to the right). Reduction of vertical scrolling should be a design goal for this online form because it can get to be extremely long, depending on the number of people in the household.

Round-2 Usability Issues/Recommendations: Same as Round 1.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.2.2 Backward Tabbing for Automatic Tabbed Fields

Round-1 Observation: Several participants commented spontaneously that they liked the automatic tabbing on the login number and the telephone number. One participant needed to change the phone number. He wanted to use SHIFT + TAB to go backwards, but this keyboard short cut did not work.

Staff discovered that entering a space for the first digit of the area code (first screen, telephone number) and then submitting generates an error message. When the user attempts to resolve the edit, it is difficult to add the missing number because it is not immediately obvious that an extra space has been entered. To add another digit to the area code, the user first has to delete the extra space. Since the extra space is not obvious, a user who had entered an extra space by accident might not realize that the extra space is there. If this field accepted only numbers, it would not be possible to enter a space accidentally.

Round-1 Usability Issues: Disabling standard word-processing controls violates the participants' expectations of how the controls work. Section 508 requires keyboard shortcuts for all mouse actions. Accidental entry of a space in an auto-tabbing field can cause problems for the user.

Round1-Recommendations: Enable standard keyboard commands for tabbing. Limit auto-tabbing fields to numeric characters.

Round-2 Usability Issues/Recommendations: Same as Round 1.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.2.3 Button Labeling for Continue to Next Screen

Round-1 Observation: The arrows used in these buttons are made up of hyphens and forward-pointing carats ("greater-than" signs).

Round-1 Usability Issue: A screen reader will read the button label as, "Hyphen Greater Than Continue to Next Screen Hyphen Greater Than."

Round-1 Recommendation: If arrows are necessary, use graphical arrows without alt tags.

Round-2 Usability Issues/Recommendations: Same as Round 1.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

3.2.4 Write-in Field or Dropdown for Pop Count

Round-1 Observation: Participants did not recall that they had used one or the other method in providing their own household count or the count for the scenario. When asked about this design element in the debriefing, most of them said it did not matter to them. They generally said they had no preference.

Round-1 Usability Issue: Use of a write-in or a dropdown is apparently not an issue for the kinds of people represented by our participants. Although some wore glasses, they were all able to see and read the screen on their own. They all felt comfortable with dropdowns. They were all reasonably literate, and some were highly literate. An issue may arise for people with low or no vision or for people with minimal computer skills or low literacy.

Round-1 Recommendation: Include at least one person who is legally blind or who has low vision in the next rounds of testing. Try to include internal participants with low literacy and/or low computer skills.

Round-2 Usability Issues/Recommendations: Same as Round 1.

Accessibility Issues/Recommendations: There were no accessibility issues and we have no recommendations.

4.0 References

Koyani, S.J., Bailey, R.W. & Nall, J.R. (2003) Research-Based Web Design & Usability Guidelines. U.S. Department of Health and Human Services. http://www.usability.gov/pdfs/guidelines.html

Lazar, J. (2005). *Web usability*. Boston, MA: Addison-Wesley.

Redish, J. (2007). *Letting go of the words: Writing web content that works*. San Francisco: Elsevier/Morgan Kaufmann.

Appendix A. General Introduction

<Used for Both Round 1 and Round 2>

Thank you for your time today. My name is <Name>, and I will be working with you today. We will be evaluating a prototype of an Internet form for the 2010 Census by having you complete the form: once for your own household and again using data for another situation that we have constructed.   We are going to use your comments to give feedback to the developers of the form. Your comments and thoughts will help them make changes to improve the form. I did not create the form, so please do not feel like you have to hold back on your thoughts to be polite. Please share both your positive and negative reactions to the form. The session should take about an hour.

[Any questions?]

We want you to understand that we are not evaluating you or your skills, but rather you are helping us see how well the form works.

First, I would like to ask you to read and sign this consent form. It explains the purpose of the session and informs you that we would like to videotape the session, with your permission. Only those of us connected with the project will review the tape. We will use it mainly as a memory aid. We may also use clips from the tape to illustrate key points about the design of the online form.

[Hand consent form; give time to read and sign; sign own name and date.]

So today, you will be helping us test the usability of the 2010 Census Internet form. Your feedback is valuable, and we appreciate your help. We are going to do some eye tracking, which should not cause you any discomfort.

Before we get started, please take a moment to complete this computer usage and Internet experience questionnaire.   Do you have any questions?

While you complete this form, my colleague and turn on the tape recorder. Then we will do the exercise to calibrate your eyes.

[If there are observers…] Just to let you know, we have some team members from the Census Internet project watching this session in another room. They are interested in the design of the form and how well it works for you. They may want to ask a few questions at the end of the session.

[Hand computer experience form],

Now my colleague will calibrate your eyes for the eye tracking. Please position yourself in front of the screen so that you can see your nose in the reflection at the bottom of the

monitor. To calibrate your eyes, please follow the blue dot across the screen with your eyes.

[Do Calibration]

Now that we have your eyes calibrated, we are ready to begin. First, I will ask you to work on completing the online Census form with your own household data. You may change names and other pertinent information, but I would like you to report for the number of people currently in your household. Later, I will give you data on a large household and ask you to help your neighbor complete a form using that data.

As you work on the form, please read the questions aloud and explain why you are entering the answers you enter. As you work on a question, talk about what you are doing, what you plan to do, and why. If you click on a link, describe where you expect the link to take you.

During the session, I may remind you to read the questions and talk about them if you get quiet.

[Any questions?]

Appendix B. Consent Form

Consent Form

Usability Study of the 2010 Census Internet Form

Each year the Census Bureau conducts many different usability evaluations. For example, the Census Bureau routinely tests the wording, layout and behavior of products, such as Web sites and online surveys, in order to obtain the best information possible from respondents.

You have volunteered to take part in a study to improve the usability of the 2010Census Internet form. In order to have a complete record of your comments, your usability session will be videotaped. We plan to use the tapes to improve the design of the product. Staff directly involved in the usable design research project will have access to the tapes. Your participation is voluntary and your answers will remain strictly confidential.

This usability study is being conducted under the authority of Title 13 USC. The OMB control number for this study is 0607-0725. This valid approval number legally certifies this information collection.

I have volunteered to participate in this Census Bureau usability study, and I give permission for my tapes to be used for the purposes stated above.

Researcher's Name: _____

Researcher's Signature: _____ Date: _____

Participant's Name: _____

Participant's Signature: _____ Date: _____

Appendix C. Questionnaire on Computer Use and Internet Experience

1. Do you use a computer at home or at work or both?
    (Check all that apply.)
    ___Home
    ___Work
    ___Somewhere else, such as school, library, etc.

2. If you have a computer at home,
    a. What kind of modem do you use at home?
    ___Dial-up
    ___Cable
    ___DSL
    ___Wireless (Wi-Fi)
    ___Other _____
    ___Don't know _____

    b. Which browser do you typically use at home? Please indicate the version if
    you can recall it.
    ___Firefox
    ___Internet Explorer
    ___Netscape
    ___Other _____
    ___Don't know

    c. What operating system does your home computer run in?
    ___MAC OS
    ___Windows 95
    ___Windows 2000
    ___Windows XP
    ___Windows Vista
    ___Other _____
    ___Don't know

3. On average, about how many hours do you spend on the Internet per day?
    ___0 hours
    ___1-3 hours
    ___4-6 hours
    ___7or more hours

4. Please rate your overall experience with the following:
Circle one number.

	No experience								**Very experienced**
Computers	1	2	3	4	5	6	7	8	9

Internet   1   2   4   5   5   6   7   8   9

5. What computer applications do you use?
Mark (X) for all that apply

        ___E-mail

        ___Internet

        ___Word processing (MS-Word, WordPerfect, etc.)

        ___Spreadsheets (Excel, Lotus, Quattro, act.)

        ___Accounting or tax software

        ___Engineering, scientific, or statistical software

        ___Other applications, please specify_____

For the following questions, please
circle one number.   **Not Comfortable**
                                              Comfortable

6. How *comfortable* are you in learning
to navigate new Web sites?   1   2   3   4   5

7. Computer windows can minimize, resized, and scrolled through. How *comfortable* are you in manipulating a window?	1	2	3	4	5
8. How *comfortable* are you using, and navigating through the Internet?	1	2	3	4	5

	Never				**Very Often**
9. How *often* do you work with any type of data through a computer?	1	2	3	4	5
10. How *often* do you perform complex analyses of data through a computer?	1	2	3	4	5
11. How *often* do you use the Internet or Web sites to find information? (e.g., printed reports, news articles, data tables, blogs, etc.)	1	2	3	4	5

	Not familiar				**Very familiar**
12. How *familiar* are you with the Census (terms, data, etc.)?	1	2	3	4	5

Appendix D. Prototype Screenshots

D.1 Round 1 – Low-Fidelity Prototype[5]
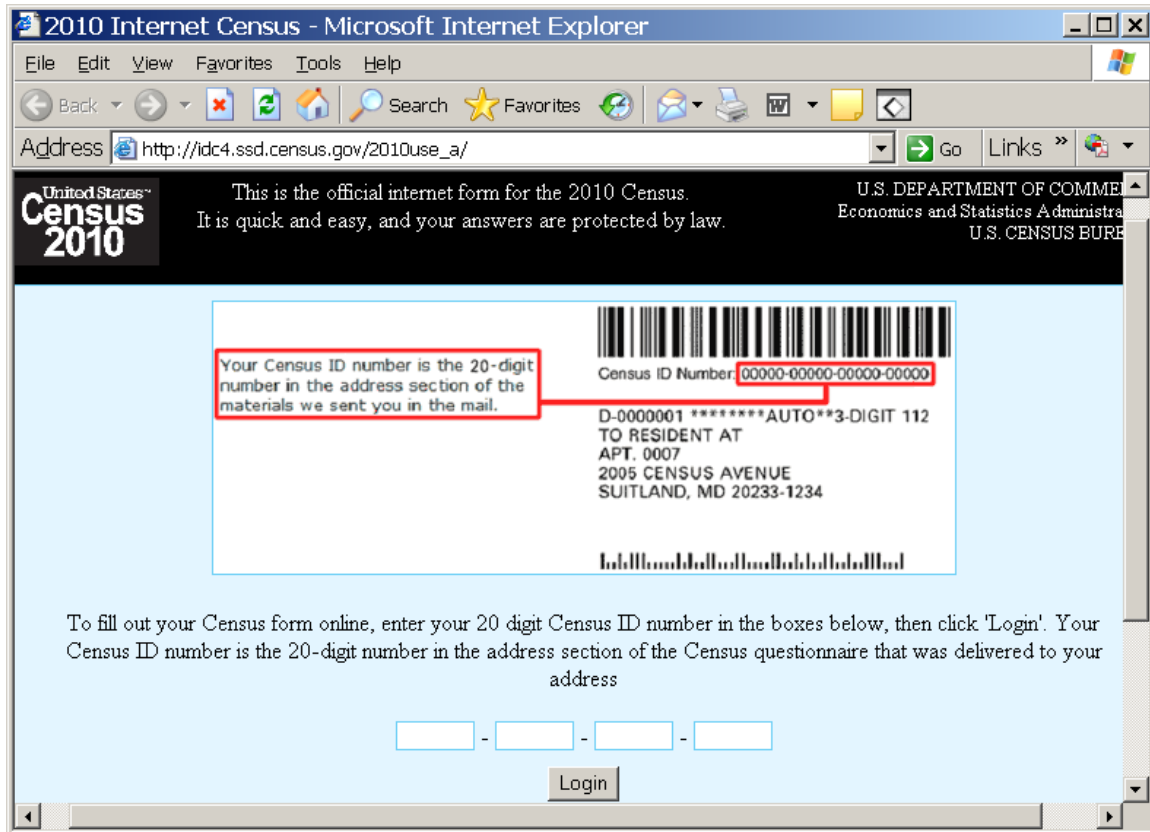

 Figure 9. Login screen for low-fidelity prototype

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[5] The screens for Round 2 were almost identical except that only text entry version of the Date of Birth question was used.
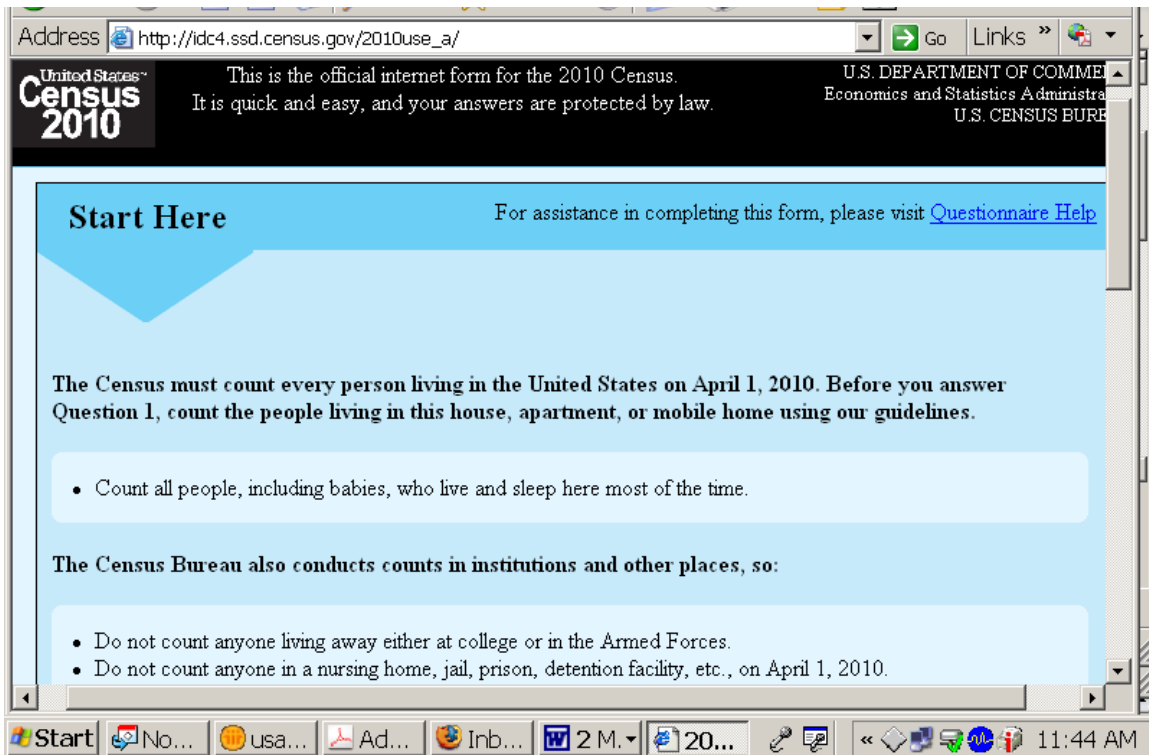
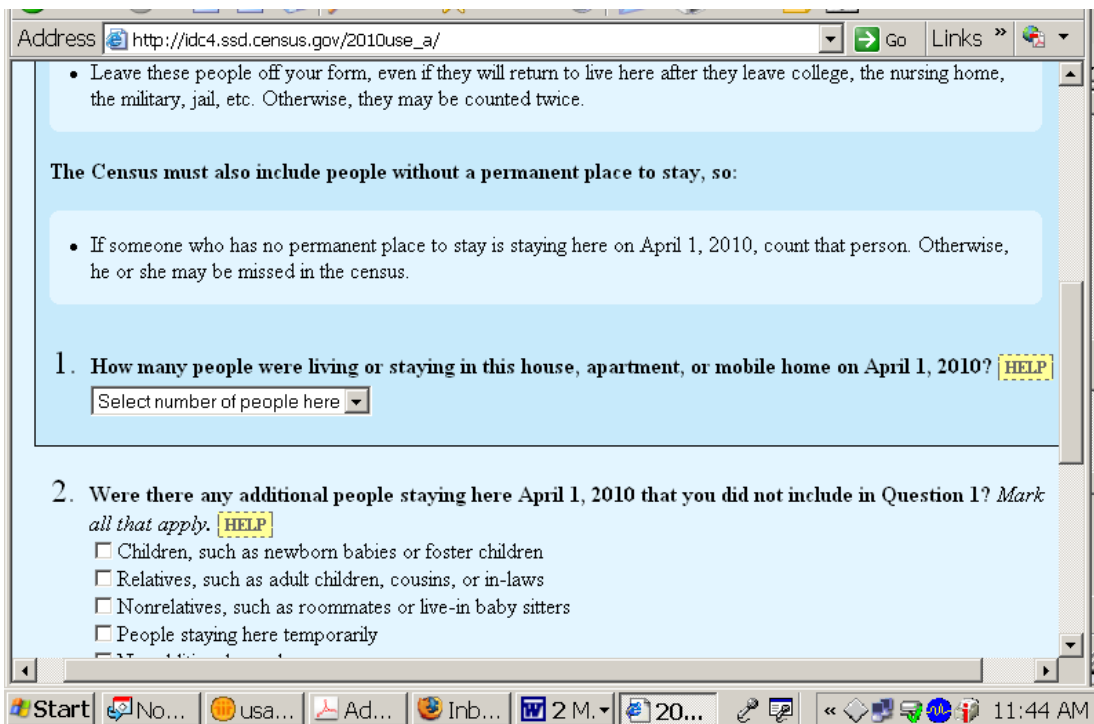**Figure 10. Top of residence rules for low-fidelity prototype.**

Figure 11. Remainder of residence rules and initial questions in low-fidelity prototype.
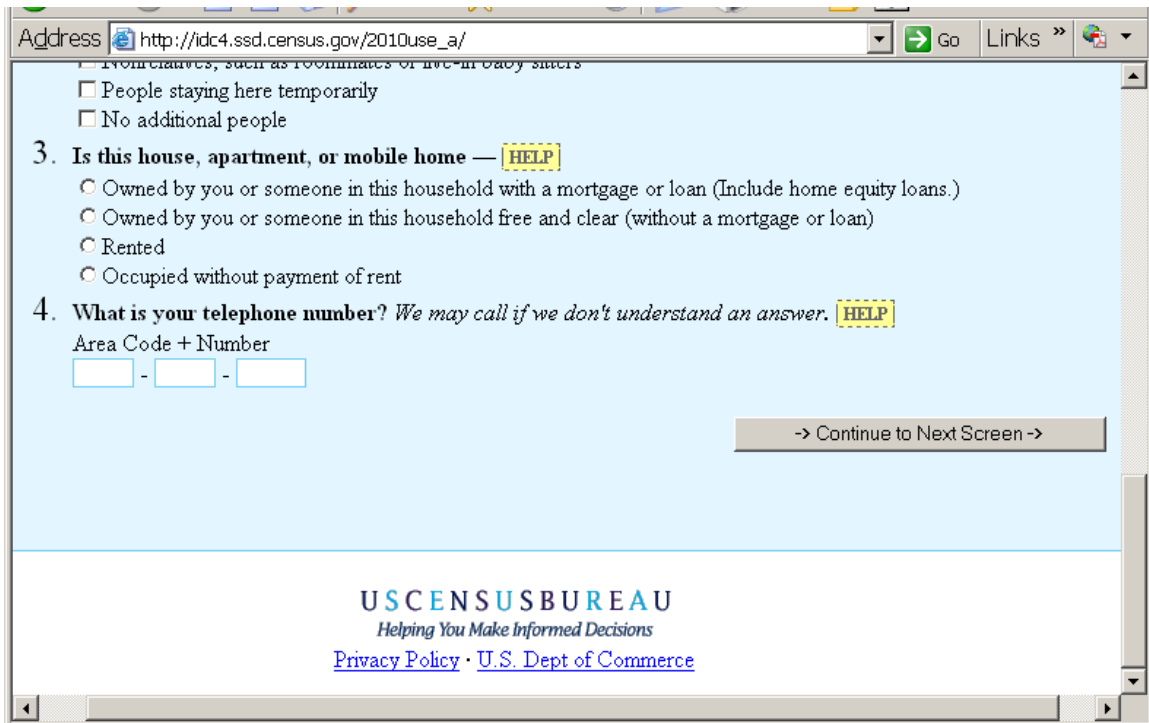
Figure 12. Bottom of question 2 with complete questions 3 and 4 in low-fidelity prototype.
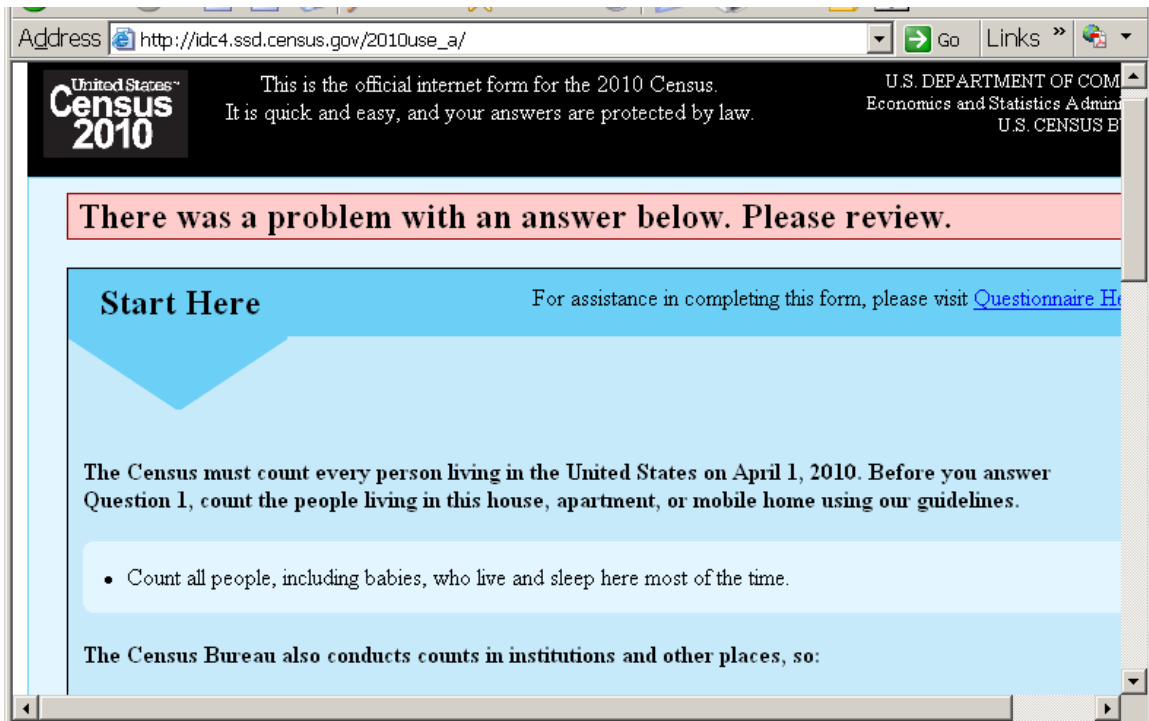

Figure 13. Notice of correction needed (in pink) for low-fidelity prototype.
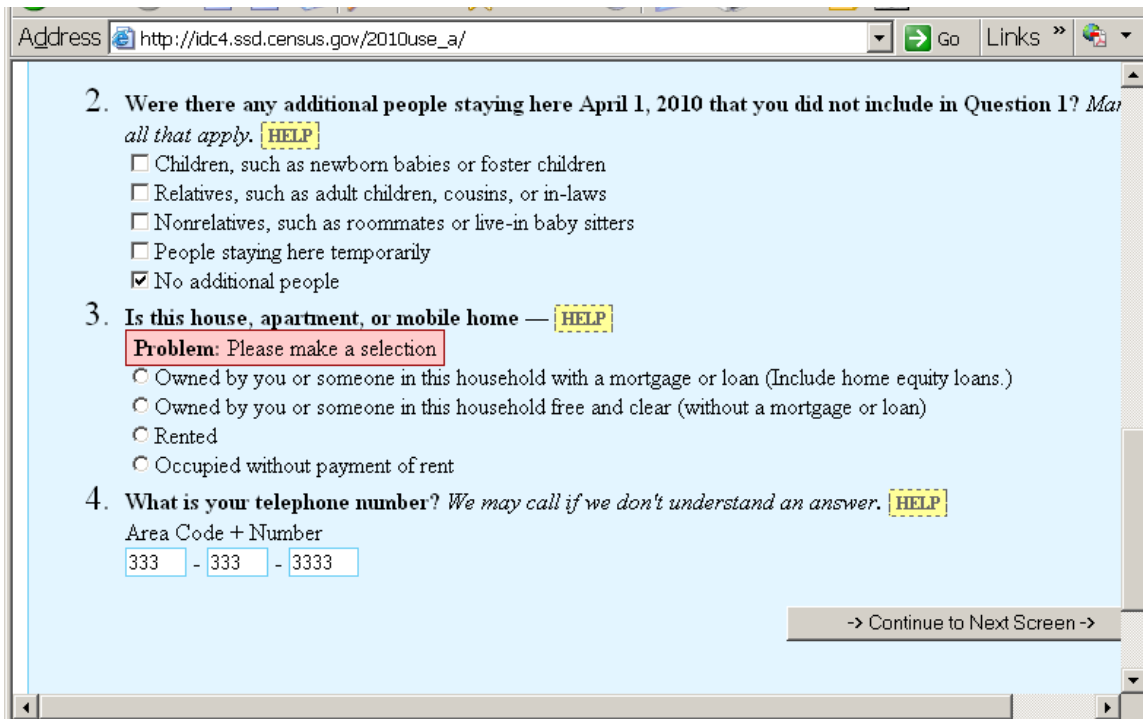
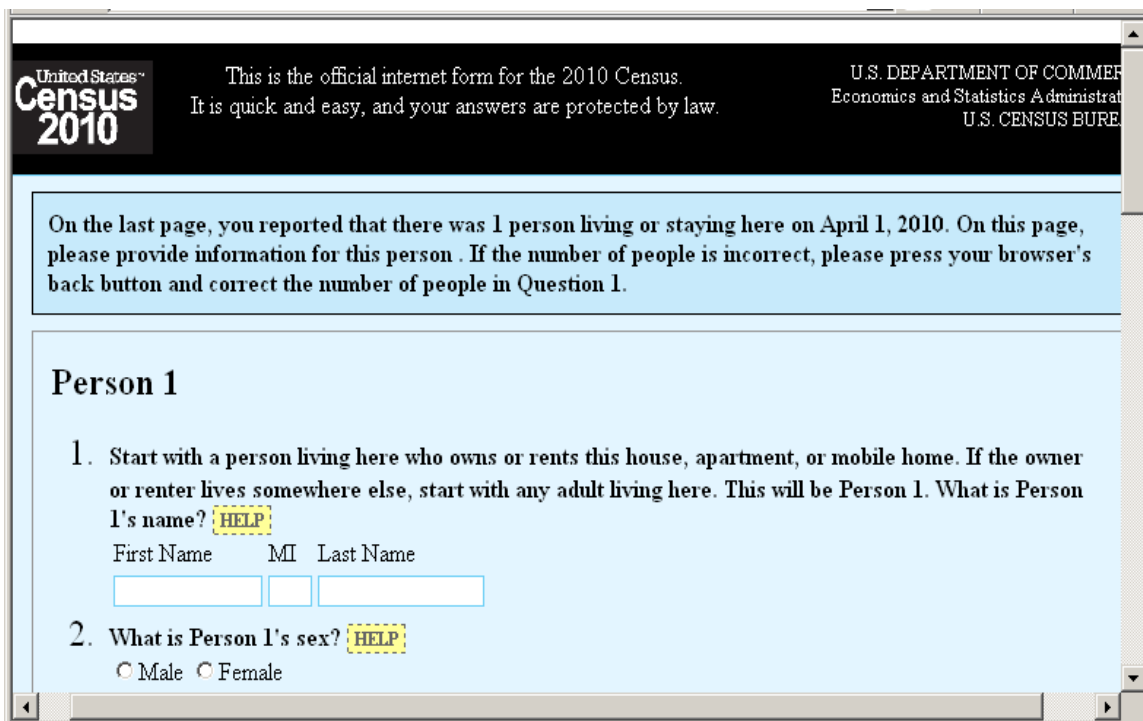**Figure 14. Example of edit message in low-fidelity prototype.**

Figure 15. Instructions to the respondent, in box at the top of the page, and examples of help buttons in the low-fidelity prototype.
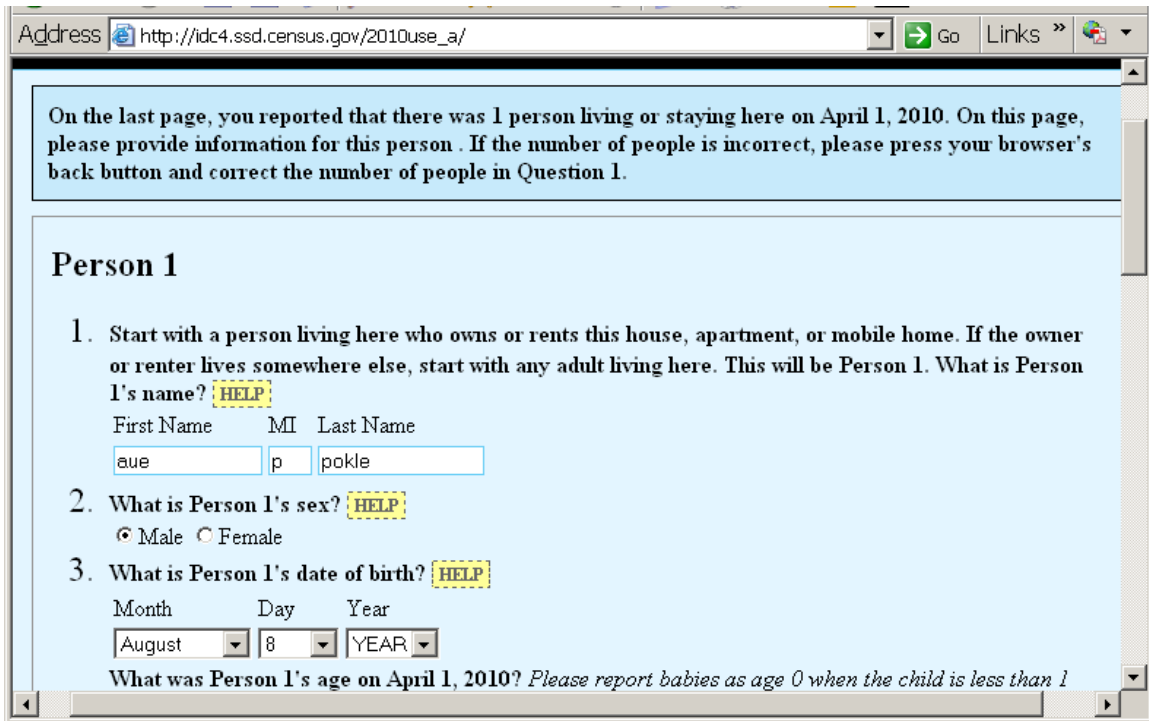
On the last page, you reported that there was 1 person living or staying here on April 1, 2010. On this page, please provide information for this person . If the number of people is incorrect, please press your browser's back button and correct the number of people in Question 1.

Person 1

1. Start with a person living here who owns or rents this house, apartment, or mobile home. If the owner or renter lives somewhere else, start with any adult living here. This will be Person 1. What is Person 1's name? HELP

   First Name   MI   Last Name
   aue   p   pokle

2. What is Person 1's sex? HELP
   ● Male ○ Female

3. What is Person 1's date of birth? HELP

   Month   Day   Year
   August   ▼   8   ▼   YEAR ▼

   What was Person 1's age on April 1, 2010? *Please report babies as age 0 when the child is less than 1*

Figure 16. Use of drop-down functionality for entering date of birth (question 3) in the low-fidelity prototype.

Person 1

1. Start with a person living here who owns or rents this house, apartment, or mobile home. If the owner or renter lives somewhere else, start with any adult living here. This will be Person 1. What is Person 1's name? HELP

   First Name   MI   Last Name
   aue   p   pokle

2. What is Person 1's sex? HELP
   ● Male ○ Female

3. What is Person 1's date of birth? HELP

   Problem: Please enter the date of birth. If you provided your best answer, or if you don't know this person's date of birth, please continue to the next question.

   Month   Day   Year
   August   ▼   8   ▼   YEAR ▼

   What was Person 1's age on April 1, 2010? *Please report babies as age 0 when the child is less than 1 year old.* HELP
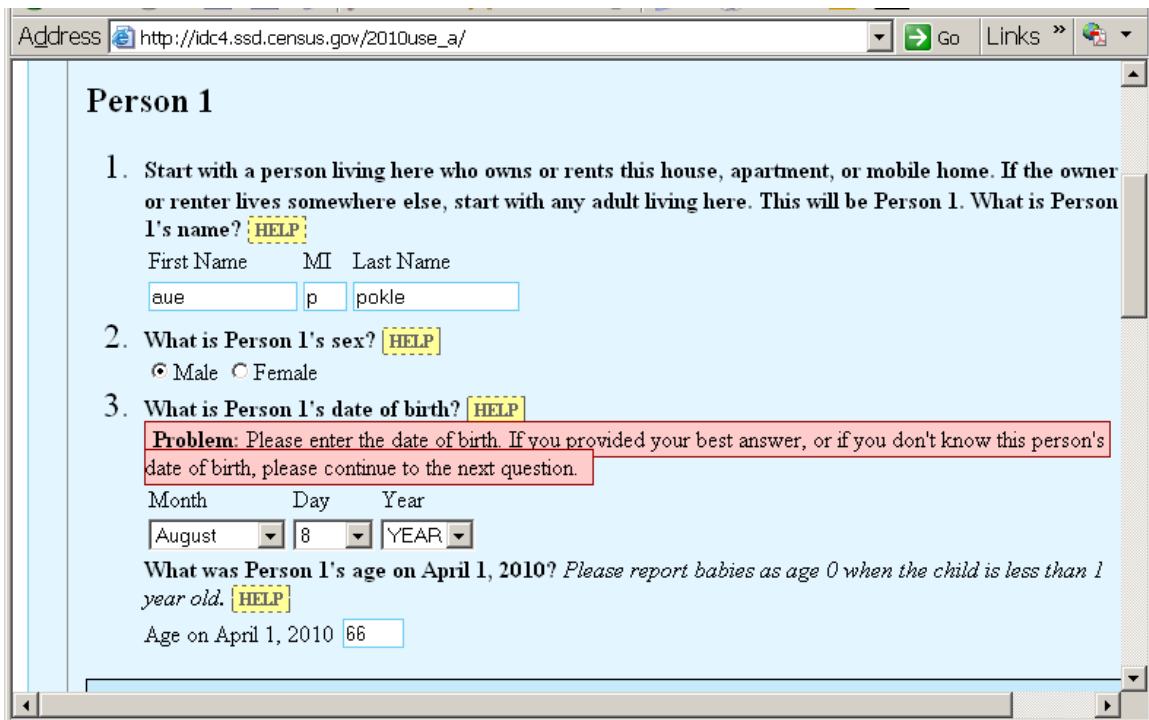
   Age on April 1, 2010 66

Figure 17. Example of edit message displayed when respondent does not select a year of birth, even if the field was intentionally left blank.
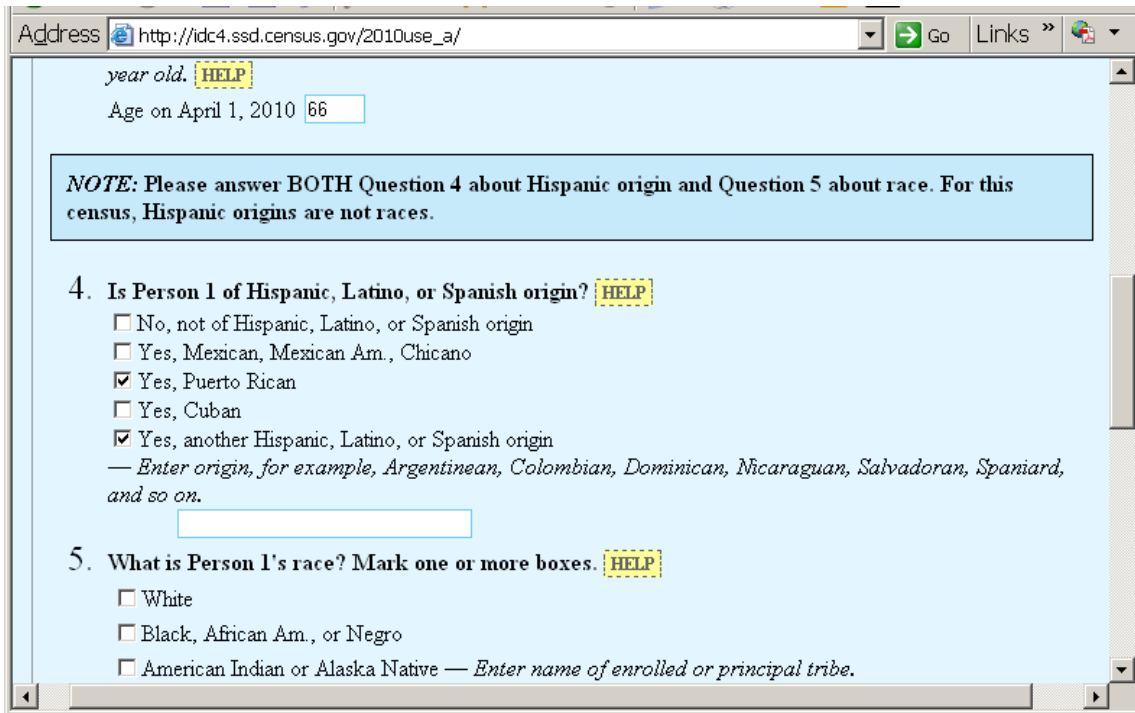
Figure 18. Instructions to respondents about answering both the question on Hispanic origin and the question on race (questions 4 and 5), in the low-fidelity prototype.
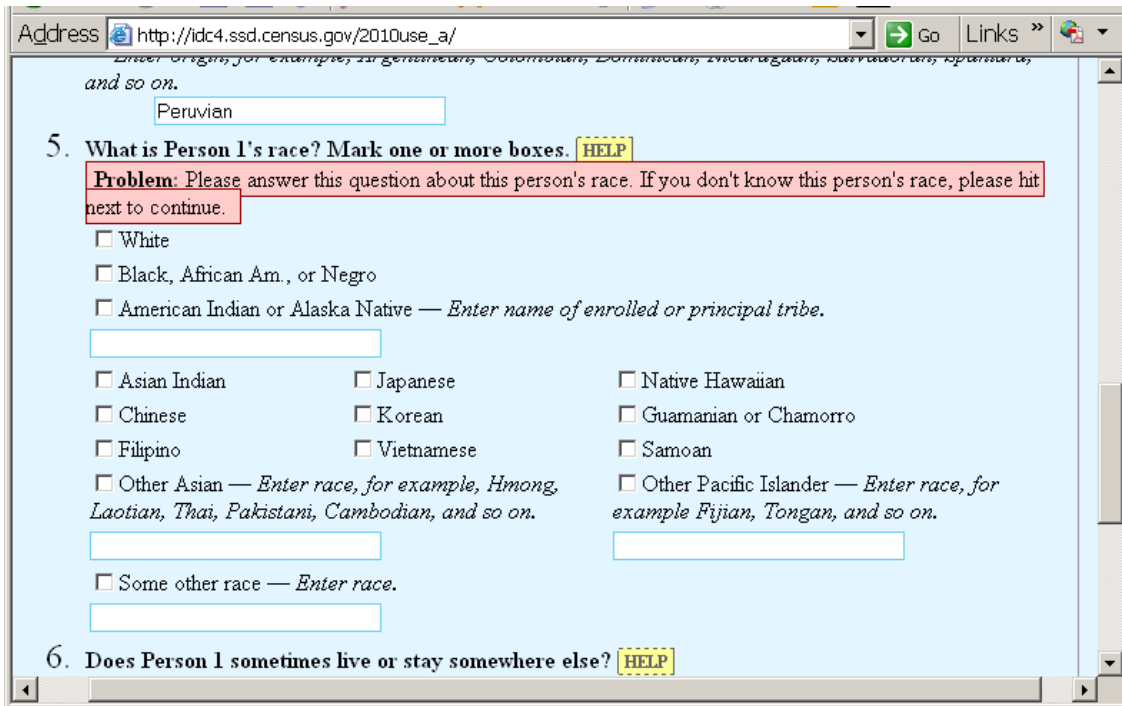

Figure 19. Edit message displayed (in pink) when the respondent has not selected a race for Person 1 in the low-fidelity prototype.
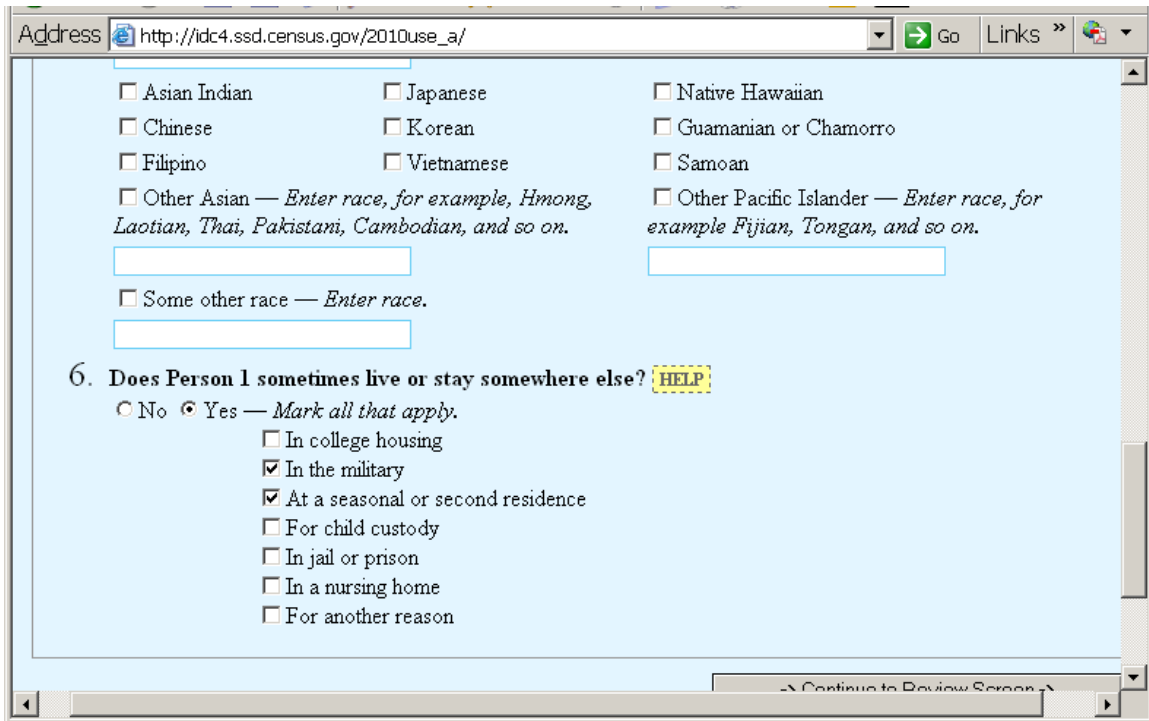
Figure 20. The overcount question (number 6), as displayed in the low-fidelity prototype.
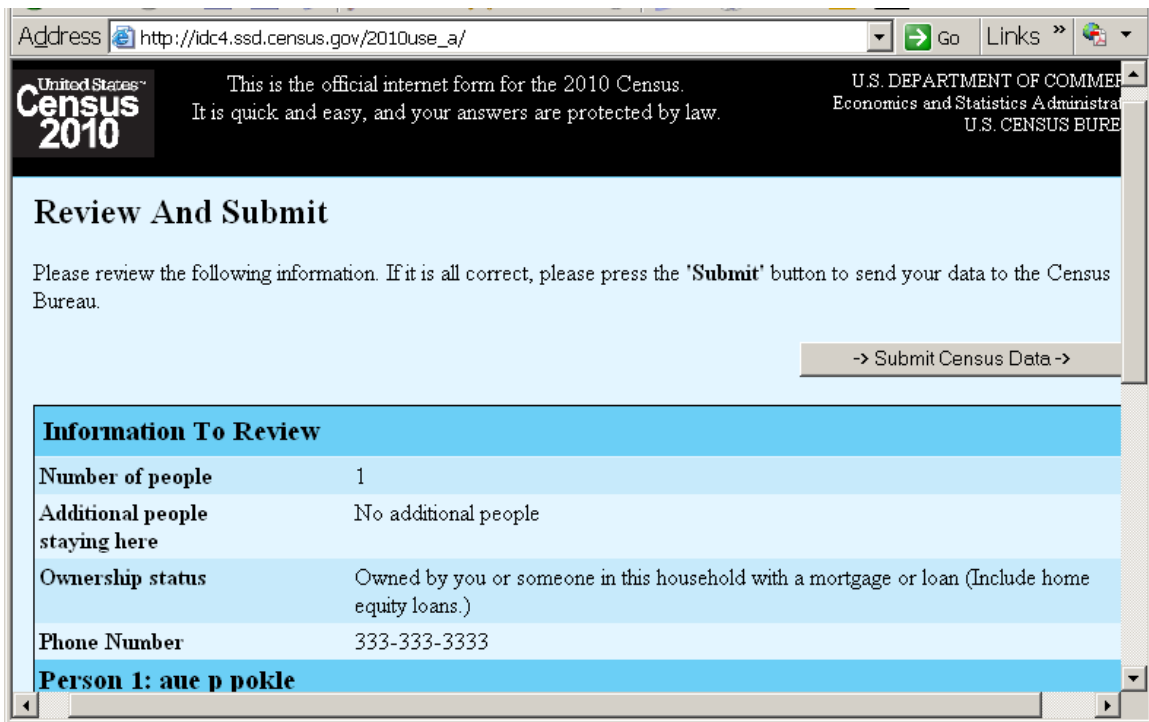

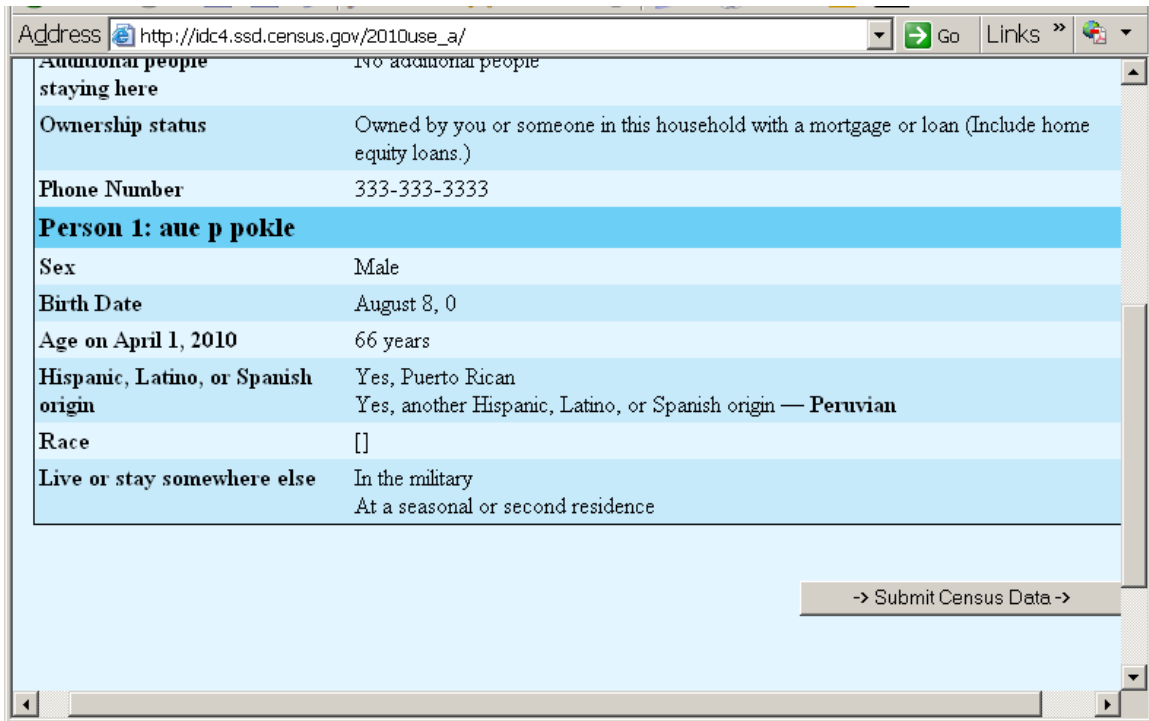**Figure 21. The top of the review and submit screen in the low-fidelity prototype.**

Figure 22. The bottom of the review and submit screen in the low-fidelity prototype.
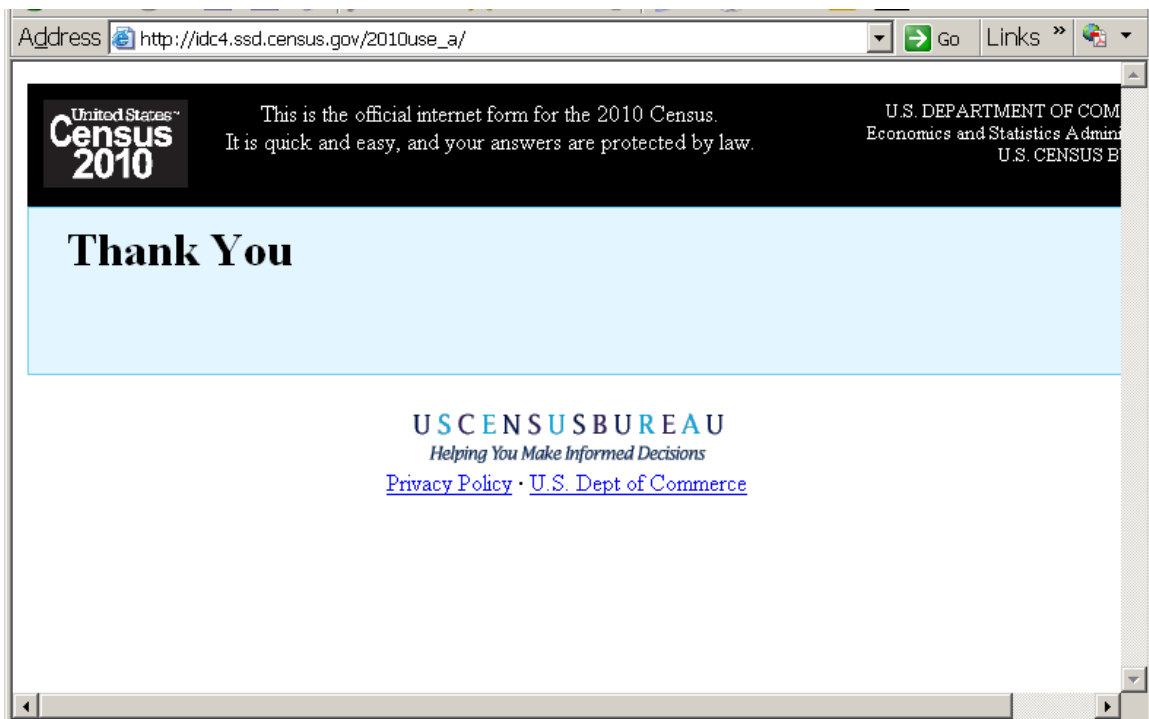

Figure 23. The confirmation page in the low-fidelity prototype.

Appendix E. Scenario (Round 2)[6]

Question:	Response:
Popcount = 8	The following people live in the household: ➢ P1: Respondent ➢ P2: Husband ➢ P3: Son of husband by first marriage, in college (if asked, still lives at home) ➢ P4: Foster child ➢ P5: Infant son ➢ P6: Mother of husband ➢ P7: Nanny ➢ P8: Nanny's son
Tenure	Paid off mortgage but have small home equity loan
Name	P1: Respondent – Ethel G. Robinson P2: Husband – Fred S. Robinson P3: Son #1 – Sam F. Robinson P4: Foster child: Sally A. Farmer P5: Son #2 – Adam G. Robinson P6: Mother-in-law – Natasha B. Robinson P7: Nanny – Rosa H. Lopez P8: Nanny's son – Pedro M. Lopez
Relationship	P2: husband P3: son (by first husband) P4: foster child P5: son (by current husband) P6: parent-in-law P7: other non-relative P8: other non-relative
Sex/DOB/Age	P1 Ethel: Female 03/23/1973 Age = 35 P2 Fred: Male 02/21/1963 Age = 45 P3 Sam: Male 07/24/1985 Age = 23 P4 Sally: Female 05/11/1999 Age = 9 P5 Adam: Male 03/23/2008 Age = 0 P6 Natasha: Female 11/23/?? DK age, about 85 P7 Rosa: Female 09/03/?? Age = 20? P8 Pedro: Male 02/16/20010 Age = 0
Origin	P1 – P6 are not of Hispanic, Latino, or Spanish origin. Nanny is Hispanic (Mexico).

[6] This is the scenario from Round 2. The scenario from Round 1 is not available.

	Nanny's child was born in the U.S.A.
Race	P1 Ethel: white P2 Fred: black P3 Sam: black and American Indian (Seneca tribe) P4 Natasha: black P5 Adam: white and black P6 Sally: Father is Native Hawaiian & mother is from Bali. P7 Rosa: She's Hispanic, as I already told you. P8: Mexican-American
Other Residence	P3: college student (living at home) P4: goes to nursing home for respite care

Appendix F. User Satisfaction Questionnaire

Please <u>circle</u> the numbers that most appropriately reflect your impressions about using this Web -based instrument.

1. Overall reaction to the online form:
    terrible   wonderful
    1 2 3 4 5 6 7 8 9 not applicable

2. Ease of finding Census ID number:
    confusing   clear
    1 2 3 4 5 6 7 8 9 not applicable

3. Use of terminology throughout the form:
    inconsistent   consistent
    1 2 3 4 5 6 7 8 9 not applicable

4. Information displayed on the screens:
    inadequate   adequate
    1 2 3 4 5 6 7 8 9 not applicable

5. Arrangement of questions and answer boxes on the screen:
    illogical   logical
    1 2 3 4 5 6 7 8 9 not applicable

6. Questions can be answered in a straight-forward manner:
    never   always
    1 2 3 4 5 6 7 8 9 not applicable

7. Organization of information on the form:
    confusing   clear
    1 2 3 4 5 6 7 8 9 not applicable

8. Moving forward through the form:
    impossible   easy
    1 2 3 4 5 6 7 8 9 not applicable

9. Overall experience of entering information:
    difficult   easy
    1 2 3 4 5 6 7 8 9 not applicable

10. Ease of understanding questions and instructions:
    difficult   easy   not applicable
    1 2 3 4 5 6 7 8 9

Further comments/suggestions: