

STUDY SERIES  
(*Survey Methodology #2015-04*)

**Usability Testing of the 2014 Census Test Online English Instrument**

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## EXECUTIVE SUMMARY

In April 2014, the Human Factors and Usability Research Group, part of the U.S. Census Bureau's Center for Survey Measurement, conducted a usability evaluation of a proposed online instrument to be used by respondents selected for the 2014 Census Test who chose to report online. The instrument would also be used to collect information from respondents who called the Census Bureau's telephone call center and completed the survey with an interviewer.

This usability evaluation had several objectives:

- to conduct usability testing of both the Spanish and English versions of the instrument and to determine if there were any issues in the instrument in either language;
- to obtain feedback on the different race screen designs and edit messages used in the different versions of the 2014 online instrument, and the new relationship categories, which included the distinction between "same-sex" and "opposite-sex" spouses and unmarried partners; and
- to obtain feedback on the draft email message, which would be sent to people in a 2014 Census Test panel.

This report presents only the results from testing the English version of the instrument. Results from the usability testing of the 2014 Census Test online Spanish instrument are reported elsewhere (Goerman and Meyer, forthcoming.)

Overall, the English version of the 2014 Census Test instrument worked well for the 11 English-speaking participants. We did find two places for improvement within the survey:

- We uncovered a repetitiveness in the questions asking about other places lived, i.e., the *overcount* questions.
- There was also a usability issue related to logging into the survey and making duplicate entries by mistake.

The feedback received on the different race screen designs and edit messages suggested no specific changes for the production test. The new relationship categories were understood, with only one participant spontaneously commenting on the categories. Participants understood the email message, suggesting no need for change. These and other findings are discussed in this report.

## **1. Introduction**

As part of the planning for the 2020 Decennial Census, the U.S. Census Bureau established the Optimizing Self-Response Team, charged with looking at ways to maximize self-response for the next census. As members of this team, staff from the Center for Survey Measurement's Human Factors and Usability Group was responsible for conducting usability testing of the proposed 2014 Census Test online instrument. The focus of the usability evaluation was to determine what, if any, changes needed to be made to the instrument prior to 2014 Census Test in June of that year.

Testing included an assessment of the following:

- Objective 1: Document any usability issues with the online instrument that caused the user to enter incorrect information, become frustrated with the instrument, or prevent a submission.
- Objective 2: Collect user feedback on the new screens for the 2014 Census Test – specifically the login, address collection screens, the three race screen versions, the three race edit messages, and the relationship screen.
- Objective 3: Determine if the users understood the proposed content of 2014 Census Test email, whether they had any concerns with the Census Bureau emailing them, and collect any user comments on the format of the email.

## **2. 2014 Census Test Internet Instrument Background**

The 2014 Census Test online instrument included two ways to start the survey – 1) a user could enter a 14-digit identification number included in the sampled household's mailing materials, or 2) a user could enter the survey without a number. The questions differ slightly depending upon the way the user accesses the survey. Within this report, we refer to the first situation as an "ID" path and the second situation as a "nonID" path.

Figure 1 is a screen shot of the first screen for the 2014 Census Test instrument. Respondents in the ID path entered their User ID number and then continued by clicking "Login." Respondents in the nonID path clicked the "click here" link and proceeded to additional address collection screens. Those address screens had been previously tested and respondents found them satisfactory. Additionally, the address information collected on those screens could be map-spotted and geocoded, which is important in order to tabulate respondent-provided addresses accurately (Nichols, Childs, and King, 2014a, 2014b).

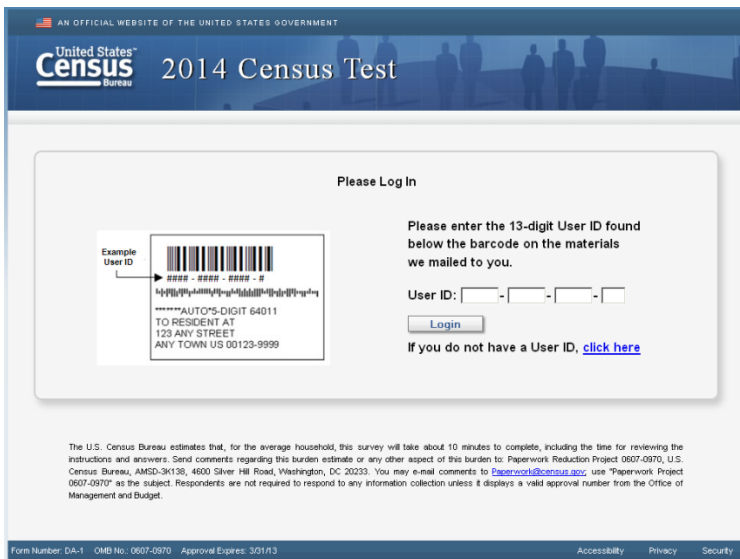


Figure 1: First or login screen for the 2014 Census Test online instrument

The 2014 Census Test Internet instrument ID path included different experimental panels for the relationship, race and Hispanic origin questions, and the edit messages. The nonID path only included one panel for each of the questions tested.

The relationship question was tested using two treatments. The first treatment used nearly the same relationship question as the 2010 Decennial Census and the 2012 National Census Test. The only difference was the addition of the Foster child response option. A second treatment added two same-sex relationship options (Figure 2). All participants in this usability testing received the second version with the same-sex relationship response options because this version had not received as much testing as the other version.

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United States Bureau **2014 Census Test**

Instructions FAQs Logout

**Next, we need to record each person's relationship to Jane Doe.**

**John Doe is Jane Doe's \_\_\_\_\_.** [\(Help\)](#)

- Opposite-sex husband/wife/spouse
- Opposite-sex unmarried partner
- Same-sex husband/wife/spouse
- Same-sex unmarried partner
- Biological son or daughter
- Adopted son or daughter
- Stepson or stepdaughter
- Brother or sister
- Father or mother
- Grandchild
- Parent-in-law
- Son-in-law or daughter-in-law
- Other relative
- Roomer or boarder
- Housemate or roommate
- Foster child
- Other nonrelative

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**Figure 2: New relationship question**

There were three race and Hispanic origin treatments – Version 1 is a combined race and Hispanic origin option with checkboxes and write-ins on the same screen (Figure 3), Version 2 is a combined race and Hispanic origin option with checkboxes and write-ins on separate screens (Figure 4 and Figure 5), and Version 3 includes separate Hispanic origin and race questions, similar to questions used in the past (Figure 6 and Figure 7).

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# 2014 Census Test

[Instructions](#) [FAQs](#) [Logout](#)

**What is Jane Doe's race or origin?** Select one or more boxes **AND** enter the specific race(s) or origin(s). [\(Help\)](#)

White — Enter origin(s), for example, German, Irish, English, Italian, Lebanese, Egyptian, and so on.

Hispanic, Latino, or Spanish origin — Enter origin(s), for example, Mexican or Mexican American, Puerto Rican, Cuban, Dominican, Salvadoran, Colombian, and so on.

Black or African Am. — Enter origin(s), for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somalian, and so on.

Asian — Enter origin(s), for example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, and so on.

American Indian or Alaska Native — Enter name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Muscogee (Creek) Nation, Mayan, Doyan, Native Village of Barrow Inupiat Traditional Government, and so on.

Native Hawaiian or Other Pacific Islander — Enter origin(s), for example, Native Hawaiian, Samoan, Guamanian or Chamorro, Tongan, Fijian, Marshallese, and so on.

Some other race or origin — Enter race(s) or origin(s).

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Figure 3: Version 1 - Combined race question with checkboxes and write-ins on same screen

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**What is Jane Doe's race or origin?** Select one or more boxes [\(Help\)](#)

White — For example, German, Irish, English, Italian, Lebanese, Egyptian, and so on.

Hispanic, Latino, or Spanish origin — For example, Mexican or Mexican American, Puerto Rican, Cuban, Dominican, Salvadoran, Colombian, and so on.

Black or African Am. — For example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somalian, and so on.

Asian — For example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, and so on.

American Indian or Alaska Native — For example, Navajo Nation, Blackfeet Tribe, Muscogee (Creek) Nation, Mayan, Doyan, Native Village of Barrow Inupiat Traditional Government, and so on.

Native Hawaiian or Other Pacific Islander — For example, Native Hawaiian, Samoan, Guamanian or Chamorro, Tongan, Fijian, Marshallese, and so on.

Some other race or origin

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Figure 4: Version 2 - Combined question with checkboxes and write-ins on separate screens- first of 2-part question

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United States Census Bureau 2014 Census Test

Instructions | FAQs | Logout

You said that Jane Doe is:

- White
- Hispanic, Latino, or Spanish
- Black or African Am.

Next, we will collect detailed information for each race or origin listed above.

What is Jane Doe's **WHITE** origin? — Enter origin(s), for example, German, Irish, English, Italian, Lebanese, Egyptian, and so on. [\(help\)](#)

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Figure 5: Version 2 - Combined question with checkboxes and write-ins on separate screens –second of 2-part question

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Instructions | FAQs | Logout

Is Jane Doe of Hispanic, Latino or Spanish origin? Select one or more boxes. [\(help\)](#)

- 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(s), for example, Salvadoran, Dominican, Guatemalan, Colombian, Spaniard, Ecuadorian, and so on.

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Figure 6: Version 3 - Hispanic origin question used in prior censuses – first of 2-part question



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**What is Jane Doe's race?** Select one or more boxes. For this survey, Hispanic origins are not races. [\[help\]](#)

White — Enter origin(s), for example, German, Irish, English, Italian, Lebanese, Egyptian, and so on.

Black or African Am. — Enter origin(s), for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somali, and so on.

American Indian or Alaska Native — Enter name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Muscogee (Creek) Nation, Mayan, Doyan, Native Village of Barrow Inupiat Traditional Government, and so on.

Chinese  
 Filipino  
 Asian Indian  
 Vietnamese  
 Korean  
 Japanese  
 Other Asian — Enter origin(s), for example, Pakistani, Cambodian, Hmong, Thai, Laotian, Bangladeshi, and so on.

Native Hawaiian  
 Samoan  
 Guamanian or Chamorro  
 Other Pacific Islander — Enter origin(s), for example, Tongan, Fijian, Marshalese, Palauan, Tahitian, Papua New Guinean, and so on.

Some other race — Enter race(s) or origin(s).

**Figure 7: Version 3 - Race question used in prior censuses – second of 2-part question**

Three experimental edit messages for the race/Hispanic origin item were also tested. The messages were shown when a respondent did not provide any race or ethnicity details in at least one write-in field. Edit flag 1 was in green and included a message indicating that the respondent should select the next button if they did not identify with an origin (Figure 8). Edit flag 2 was identical to the previous version but was red instead of green (Figure 9). Edit flag 3 was identical to the first but did not include a message indicating that the respondent should select the next button if they did not identify with an origin (Figure 10). In all versions of the survey, there was also a short red message that would appear if no response was selected.

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**i** Please provide a specific response in the space below. If this person does not identify with a specific origin, use the "Next" button to continue.

**You said that Jane Doe is:**  
 White  
 Hispanic, Latino, or Spanish  
 Black or African Am.

Next, we will collect detailed information for each race or origin listed above.

**What is Jane Doe's WHITE origin?** — Enter origin(s), for example, German, Irish, English, Italian, Lebanese, Egyptian, and so on. [\(Help\)](#)

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Figure 8: Edit flag 1 - "Green long" edit message

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Instructions FAQs Logout

**x** Please provide a specific response in the space(s) below the checked box(es). If this person does not identify with a specific origin, use the "Next" button to continue.

**What is Jane Doe's race or origin?** Select one or more boxes **AND** enter the specific race(s) or origin(s). [\(Help\)](#)

White — Enter origin(s), for example, German, Irish, English, Italian, Lebanese, Egyptian, and so on.

Hispanic, Latino, or Spanish origin — Enter origin(s), for example, Mexican or Mexican American, Puerto Rican, Cuban, Dominican, Salvadoran, Colombian, and so on.

Black or African Am. — Enter origin(s), for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somalian, and so on.

Asian — Enter origin(s), for example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, and so on.

American Indian or Alaska Native — Enter name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Muscogee (Creek) Nation, Mayan, Doyan, Native Village of Barrow Inupiat Traditional Government, and so on.

Native Hawaiian or Other Pacific Islander — Enter origin(s), for example, Native Hawaiian, Samoan, Guamanian or Chamorro, Tongan, Fijian, Marshalese, and so on.

Some other race or origin — Enter race(s) or origin(s).

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Figure 9: Edit flag 2 - "Red long" edit message

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Instructions | FAQs | Logout

**i** Please provide a specific response in the space(s) below the checked box(es).

**What is Jane Doe's race or origin?** Select one or more boxes **AND** enter the specific race(s) or origin(s). [\(help\)](#)

White — Enter origin(s), for example, German, Irish, English, Italian, Lebanese, Egyptian, and so on.

Hispanic, Latino, or Spanish origin — Enter origin(s), for example, Mexican or Mexican American, Puerto Rican, Cuban, Dominican, Salvadoran, Colombian, and so on.

Black or African Am. — Enter origin(s), for example, African American, Jamaican, Haitian, Nigerian, Ethiopian, Somali, and so on.

Asian — Enter origin(s), for example, Chinese, Filipino, Asian Indian, Vietnamese, Korean, Japanese, and so on.

American Indian or Alaska Native — Enter name of enrolled or principal tribe(s), for example, Navajo Nation, Blackfeet Tribe, Muscogee (Creek) Nation, Mayan, Doyan, Native Village of Barrow Inupiat Traditional Government, and so on.

Native Hawaiian or Other Pacific Islander — Enter origin(s), for example, Native Hawaiian, Samoan, Guamanian or Chamorro, Tongan, Fijian, Marshallese, and so on.

Some other race or origin — Enter race(s) or origin(s).

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Figure 10: Edit flag 3 - "Green short" edit message

### 3. Method

#### 3.1. Participants

Between April 2 and April 10, 2014, Census Bureau usability staff conducted a usability evaluation of the English version of the 2014 Census Test online instrument. Eleven participants took part. Participants were recruited through advertisements on Craigslist, in local newspapers, and personal connections. One participant was a new hire at the Census Bureau. All respondents lived in the Washington, D.C. metropolitan area. Participants had at least one-year Internet experience.

The mean age of the participants was 41 years (range 22-56 years), and the mean education level was 16 years of schooling (range 12 -18 years). See Table 1 for details about the characteristics of the participants, including demographics and Internet use.

**Table 1. Participant characteristics**

Participants	n=11
<b>Gender</b>	
Female	7
Male	4
Mean age in years (Standard Deviation)	41 (10.2)
<b>Education</b>	
≤ Some college	3
Bachelors degree	4
Post Bachelors degree	4
<b>Race</b>	
White	7
Black	2
White/Black	2
<b>Hispanic origin</b>	
Yes	1
No	10
Mean weekly Internet usage in hours (Standard Deviation)	21 (15.8)

### 3.2. Study design

The 11 participants were assigned to complete the 2014 Census Test using either the ID or the nonID path. The assignment order was based upon when the instrument path was functional. Six participants were provided an identification number and completed the ID path of the 2014 Census online instrument. Five participants were not provided a number and completed the nonID path. The nonID path included the new relationship question, race Version 2 (combined question with write-ins on a separate screen, and Edit flag 3 (green short). For the six participants who completed the ID path questionnaire, three received race Version 3 (two had Edit flag 3 and one had Edit flag 1); and three received race Version 1 (two had Edit flag 1 and one had Edit flag 2).

Each usability test session consisted of the participant completing the 2014 Census Test online instrument while being observed by a test administrator (TA). Each participant was instructed to answer the questions using his or her real life information, with the exception of the address information for participants assigned to the ID path. Those participants were instructed to pretend the preloaded address was their address. Participants were not instructed to think aloud while completing the survey.

All but one of the tests took place at the Census Bureau's usability lab. The lab uses desktop computers with either an X120 or T120 Tobii eye tracking hardware and software. Camtasia was used to record video and audio. Participants accessed the online survey through a Windows 7 operating system with version 10 of the IE browser. The externally tested

participant accessed the online survey via a laptop with an X260 Tobii eye tracker and IE browser version 10. All testing occurred one-on-one; one participant completed the survey and one TA observed and interacted with the participant.

### **3.3. Test Procedure**

Each usability session lasted between 60 and 90 minutes. Upon arriving at the usability lab (or at the remote location), the participant signed a consent form that referenced the 0607-0725 OMB control number for this study, the confidentiality of the session, the volunteer nature of the study, and what will be recorded during the session. Once the consent form was signed, the audio/video recorder was started. Then, the TA read to the participant a set of instructions about the session. The participant completed a paper demographic questionnaire and the online questionnaire about their computer and Internet experience. Once that was complete, the participants' eyes were calibrated for the eye tracking.

With eye tracking "on," the TA asked the participant to read over an email message. Once they were finished reading the email, eye tracking was stopped. The TA then asked the participant questions about the email. With eye tracking "on," the participant completed the online 2014 Census Test online instrument. Halfway through the survey, the TA interrupted the participant and asked him/her to exit the survey. After the participant saved and logged out of the survey, the participant was asked to resume. After completing the survey, eye tracking was stopped and the participant answered a satisfaction questionnaire about the online Census survey they had just completed.

During the last part of the session, the TA showed the participant power point slides with screen shots of specific screens of interest from the 2014 Census Test instrument and asked debriefing questions about them. With eye tracking "on," the TA showed the participant power point slides with the race edit messages and then asked debriefing questions about the race edit messages. At the end of the session the participant was asked for any final comments on the survey as a whole. The TA stopped the video recording, and with the exception of the new Census Bureau hire, the participant received the \$40 honoraria and was escorted from the building.

## **4. Results**

This section provides detailed findings on accuracy, subjective satisfaction ratings, and observational, debriefing and other usability results with the 2014 Census Test instrument.

#### 4.1. Participant Accuracy

In this usability testing, participant accuracy is defined as the successful completion of tasks using the application. All participants completed the survey during the usability test and all participants could log out and log back into the survey. However, one participant completed the survey twice, which indicated a usability problem. The first time she was assigned to the ID path and completed part of the survey. Then, after logging out, she logged back in using the nonID path and had to complete the entire survey from the beginning. This error is described in Section 4.3.4.

#### 4.2. Participant Satisfaction

After completing the online survey, participants completed a subjective satisfaction questionnaire to assess different aspects of the survey. Table 2 contains the distribution of satisfaction ratings for each topic. Overall, respondents rated the survey positively on the characteristics measured.

**Table 2. Participants' Satisfaction ratings with specific aspects of the instrument**

Scale labels	Distribution of responses							NR	Mean
	1	2	3	4	5	6	7		
Screen layout Confusing (1) – Clear (7)	0	0	0	0	2	3	5	1	6.3
Use of terminology through the survey Inconsistent (1) – Consistent (7)	0	0	0	2		2	6	1	6.2
Instructions displayed on the screens. Inadequate (1) – Adequate (7)	0	0	0	0	3	1	6	1	6.3
Questions displayed on the screens. Confusing (1) – Clear (7)	0	0	0	1	1	1	4	3	6.3
Questions can be answered in a straightforward manner Never (1) – Always (7)	0	0	0	1		4	5	1	6.3
Organization of questions, instructions, and response categories in the survey Confusing (1) – Clear (7)	0	0	0	0	1	4	5	1	6.4
Forward navigation Impossible (1) – Easy (7)	0	0	0	0	0	1	9	1	6.9
Overall experience of completing the survey Difficult (1) – Easy (7)	0	0	0	0	1	2	7	1	6.6
Technical/Specialized Terminology Too frequent (1) – Appropriate (7)	0	0	0	1	1		8	1	6.5
Overall reaction to the survey Confusing (1) – Clear (7)	0	0	0	1	2	4	3	1	5.9
Frustrating (1) – Satisfying (7)	0	0	0	1	2	1	3	1	5.9
Difficult (1) – Easy (7)	0	0	0	0	2	0	6	1	6.4

Source: 2014 Census Test Usability Testing - English

### 4.3. Usability Issues and Recommendations

In this section, we discuss the observational and debriefing results from the usability test sessions. We present the issues and the recommendations for improvement along with the priority of the issue and the objective the issue was tied to.

As a reminder, there were three objectives of the testing:

- Objective 1: Document any usability issues with the online instrument which caused the user to enter incorrect information, become frustrated with the instrument, or prevent a submission.
- Objective 2: Collect user feedback on the new screens for the 2014 Census Test – specifically the login, address collection screens, the three race screen versions, the three race edit messages, and the relationship screen.
- Objective 3: Determine if the users understood the proposed content of 2014 Census Test email, whether they had any concerns with the Census Bureau emailing them, and collect any user comments on the format of the email.

We classified the usability issues into the following categories:

- High priority: These issues can prevent users from accomplishing their goals – they might lead to errors while accomplishing their tasks or they might lead to excessive amount of user time to accomplish the task. They are critical and should be addressed quickly.
- Medium priority: These issues reduce the efficiency with which tasks can be completed. They slow down and frustrate the user, but do not necessarily halt the interaction.
- Low priority: These issues are minor, but significant enough to warrant user comments. They negatively impact user satisfaction with the application, but do not directly affect performance.
- Positive finding: There are no usability issues with the design.

Issues are ordered by objective and then priority.

#### 4.3.1. Overcount screen order and wording lead to errors. (Objective 1 and High priority)

*Description of issue:* Users experienced some usability issues with the questions that asked if a household member lived any place else (besides the sample address). We refer to this section within the questionnaire as the *overcount* screens. Four participants responded that someone in their household had somewhere else to live.

All four participants initially said yes to the first question (about the seasonal or second residence; see Figure 11) and yes to one of the subsequent questions about another place to live because of work, college, or child custody arrangements. These participants were asked to supply two addresses, but in each case there was only one other address, not two. For example, the seasonal address was also the person's college address.

Due to the current instrument design, participants could not specify that these addresses were the same place without typing them twice. Participants had some usability problems when they were asked to type the address in a second time. For example, one participant, when prompted a second time for the address, realized that she had incorrectly answered the initial question and navigated back to click "no" to the first question and then moved forward again. The next participant typed the same address twice.

The third participant misunderstood the two questions. She entered the address where the person stayed while working in the first address screen. She then attempted to enter the address of the job location in the second address screen. (However, she said she did not know the actual job address.) This was an incorrect interpretation of the question. At the bottom of the screen, there is an open-text box to enter more information about the location (see Figure 12), but she interpreted the instruction above the box as telling her to enter the description of the job: "please also provide a name or description of the job..." She typed, "[Name] is retired. He is an economist and has contracts. ..."). The gaze plot for this participant is in Figure 13. This plot shows how her gaze honed in on the words "description of the job."

One participant did not reveal his daughter's mother's address even though the daughter stays very frequently at this address. He said he did not want to involve the mother in something that he was unclear about, indicating that he did not understand why we wanted the mother's address and he did not know whether we would involve the mother directly in his census response. In this particular situation, the child spent most of the time with him, but he also said the situation changes in the summer when it is a 50-50 split. He said he would always put his daughter down on his form. He added that the census is about his household and the mother is not involved in his household. He contrasted the census situation to his daughter's school, saying that school information does involve the mother and that the school has both addresses (his and the mother's).



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United States Census Bureau 2014 Census Test

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The next few questions are about the people who live in your household. This is who we have listed at 561 Main Street:  
**Jane Doe**  
**John Doe**

Does anyone sometimes live or stay at another home, like a seasonal or second residence? [\(Help\)](#)

Yes  
 No

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Figure 11: First question in *overcount* question series

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Please provide the full address of the job (including military assignment) where John Doe sometimes lived or stayed. Fill in as much information as you know. [\(Help\)](#)

Please select the type of address associated with your residence.

Address Type:  Street Address  P.O. Box  Rural Route

Address Number:  Street Name:  Apt/Unit:   
For example: (5007) (N Maple Ave) (Apt. A\* or \*Lot 3\*)

City:  State:  ZIP Code:

If you do not know the exact address, please also provide a description or name of the job (including military assignment) location.

Form Number: DA-1 OMB No.: 0607-0970 Approval Expires: 3/31/13 Accessibility Privacy Security

Figure 12: Job address *overcount* question

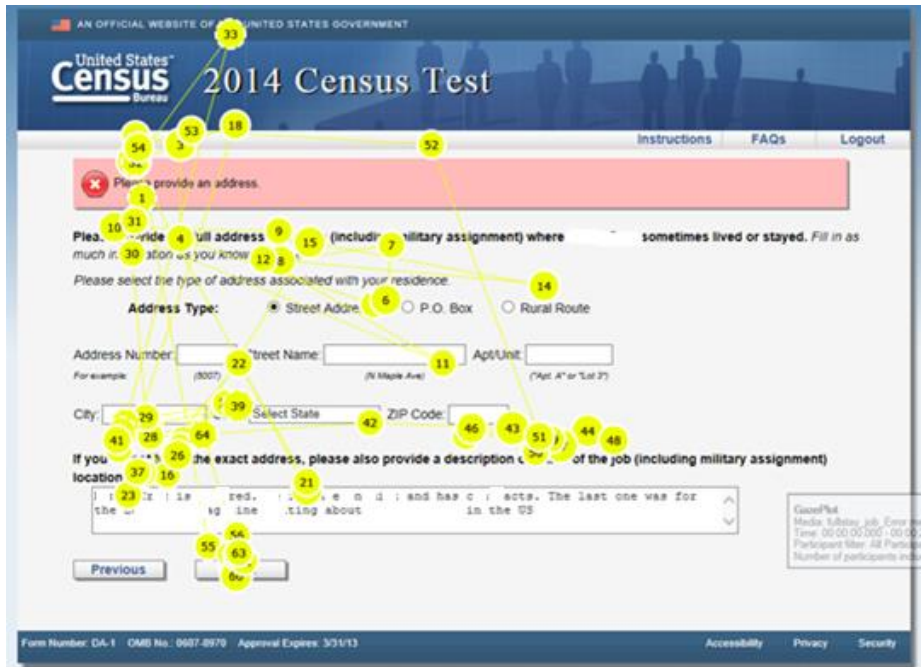


Figure 13: Gaze plot of one participant who understood that she needed to write in the description of the job since she did not know the job address

*Analysis:* There are several problems with the *overcount* question series. First, users do not understand that each alternate address only needs to be recorded once for each person who stayed there. Instead, users answer “yes” to the first question because the broad category of “sometimes living or staying at another home” seems to fit, and then they answer “yes” again to a subsequent question because it fits the specific situation. In two of the observed cases, the person stayed elsewhere because of a “job” and answered “yes” to that question. As the heatmap in Figure 14 shows, on the initial question, participants’ eyes hover over the part of the sentence that includes the words “live or stay at another home,” and skip over the example that is listed, missing the “seasonal,” and only very lightly noting the words “second residence.”



Figure 14: Eye tracking heatmap of initial *overcount* screen

A second problem with the current *overcount* series is that there is no way to identify the same residence for a second time without retyping the address. In the usability test sessions observed, one participant retyped the address again. Retyping the address could lead to errors if the address is not entered in the same way, making the same address appear to be a second address. Additionally, for large households where everyone stays at the same address, retyping the address is burdensome.

A third problem with the instrument is that the write-in instructions are ambiguous. If someone lives somewhere else because of a job, the Census needs the address where that person lived or slept - not the address of the place of employment. The write-in instruction in Figure 12 can be interpreted to mean the address either of the place of employment or the place of residence.

A fourth problem is that participants did not know why we collect the other addresses, which was illustrated by the one participant's reluctance to put his child's mother's address on his form.

*Recommendations:*

1. To encourage respondents to report an address only once, reorder the *overcount* questions so that the questions go from specific address questions (such as college) to more general address questions. A good example of this reordering is what was used in the automated 2010 Census Coverage Measurement (CCM) instrument. That survey instrument used a similar series of questions collecting other addresses where a person stayed. In that series, the problematic question about the other home was next to last (see Appendix A for order of the questions.) Even with a reordering, it is difficult to make each question completely unique. Data analysts should expect duplication of the address within the survey as was found in the CCM (Linse and Argarin, 2012).
2. To reduce burden, modify the question to clarify for the respondent that a second address should only be given if the other address is a different location.
3. To minimize burden, allow respondents to select any address previously reported for themselves or other family members. This design was used in the CCM and the survey used in the third round of the RTI, Inc. cognitive and usability testing. Both these data collections allowed a user to select an address later in the interview if it was mentioned again instead of retyping it (Linse, 2010; Geisen et al., 2012; Geisen et al., 2013).
4. To clarify the intent of the questions, re-word the screen that asks for the job address. One possible example is: “If you don't know the address of the place where <name> stayed while working, please enter as much information as you can. For example, enter the city and state, landmarks or cross streets, hotel name (if applicable) and so on.”

4.3.2. Content issues (Objective 1 and Medium priority)

*Description of the issue:* During the actual 2014 Census Test, one of the authors of this report observed an older adult completing the online form. The older adult had difficulty with the origin question, the verification question and the reference person question. These findings are found in Appendix B as they were not discovered during the usability testing sessions described in this report.

*Recommendation:* Make corrections to rectify these issues prior to the 2015 Census Test.

#### 4.3.3. Initial roster question content issue (Objective 1 and Low priority)

*Description of the issue:* One participant did not initially add his baby to the roster. He was able to add the child on the follow-up screen that mentions babies.

Another participant did not initially add his wife and two children to the roster. He was able to add them on the follow-up screen which asked for other relatives. During the debriefing, he said that he was thinking the roster question would first ask for immediate family members and then ask for other relatives.

*Analysis:* In both of these instances where family members were initially left off the roster, the subsequent screens that asked for specific yes/no answers for additional persons appeared to catch the missing people.

*Recommendation:* None

#### 4.3.4. Login issues and creating duplicate returns (Objective 2 and High priority)

*Description of the issue:* One task included in the usability test was to stop the participant mid-way through the online survey and ask them to suspend the survey. Once they had logged out, we then asked them to resume the online survey. The goal was to see if they could save and log out and then resume a session. This task required the participant to use a PIN. One participant who originally had been given an identification number attempted to re-enter the survey but inadvertently navigated to the nonID path. During the task, the TA told her to imagine she had forgotten her PIN. She entered her identification number and then correctly clicked the “Forgot PIN” link. She answered the security question correctly and received the new PIN. She clicked the link to login and entered her new PIN but did not reenter her ID. (The screen had not kept the ID from her previous entry.) Without an ID, but with a PIN, the “non-ID” path started. This participant then completed the nonID path of the instrument. She completed all the screens in the nonID version, including the screens she had previously completed in the ID path. This created two returns for her, the original partially completed return with the ID and the fully completed nonID return.

*Analysis:* This participant inadvertently completed two census forms. If not addressed, this issue could result in data errors, as it is not clear if the first unfinished

interview would take precedence and be completed during nonresponse follow-up, or if the first interview and subsequent nonID interview would be unduplicated.

*Recommendation:* There are at least two possible solutions to this problem. One is to keep the identification number on the screen if the respondent has entered it and clicks on the “Forgot PIN” link. Another solution is to remind users to enter their identification number again, if they enter a PIN but do not have an identification number entered.

#### 4.3.5. Race edits were not noticed when activated and during the debriefing these edits caused some confusion (Objective 2 and High priority)

*Description of the issue:* Generally, very few race edits were invoked during the actual sessions. Only three participants received them. Eye tracking data was collected from two of the three participants.

One participant, after receiving the long red edit on Version 1 of the race screen, mistook the edit to mean she could not select more than one race. This participant originally selected White and Hispanic, but did not write in an origin for the White race (she had written a Hispanic origin). After she received the edit, she navigated back and unselected the White response option. This participant identified herself as White, Black, and Hispanic on the paper demographic questionnaire, but we never gathered that information during the session, only that she was Hispanic. During the debriefing, she commented on the edit that she had seen: “In the first one I was a little nervous, the error that came up. The red box.... that made me feel insecure so the *only* thing I could do was check Hispanic.”

The red short and the red long messages appeared to work for one of the participants. This participant with Version 3 of the race screen initially did not select a race and received the short red message. He then selected one category (Black) and did not enter an origin. He then received the red long edit and then he typed in African American after looking at the categories. However, during the debriefing, this participant used the word “confusion” to describe how he was feeling after seeing the different edit messages.

The green long message also appeared to work for a participant. This participant, interacting with the Version 3 of the race screen selected a race (White) but then did

not specify an origin. He then received the green long edit and said that he did not really know what ethnicity to put because in his family history there were so many different ethnicities. In the end, he typed in “English.”

All participants were asked about the color of the edit messages during the debriefing portion of the study. One participant said that the color did not mean anything to him although a few other participants reported that the green color meant that they could ignore it. Most participants commented that the red icon of the “x” was off-putting.

Participants had these comments on the red color:

- Use the red color but change the icon to the exclamation point.
- The red long message was, “kind of a conflicting image. Red tells you, you skipped something, but the message says it’s okay to go on. [I’d] most likely fill something in on this one.”
- “It’s in red. [It] alerted me there is an issue. I’ve made an error. I clicked too many, perhaps there is something I am missing. Red means: Warning. Re-do. It means mistake.” When the test administrator asked if she could ignore the message, the participant responded, “I feel this is mandatory. It probably won’t let go any further. If you did you might be thrown out.”

Participants had these comments on the green color:

- “The green I could tell meant, read me and I also know that it’s positive and I haven’t done an error but I knew I had to read that. My sense is that I cannot proceed without filling out the page, I have to fill it out or the process is stopped.”
- On the long green edit: “Hey we’d appreciate it but not end of the world [if it was ignored].”
- On the short green edit:
  - “I liked it - was simpler with less to read, but I would feel more compelled to put in my origin.”
  - “Makes it easier to bypass the specifics. [I] prefer for it to be more direct. People might choose not to get more specific.”
  - “A mixture because it says to provide a response but the green makes it seem less angry. I don’t think you could skip.”
  - “This is my favorite one. I like that it’s larger. It looks easier. Just ahh it’s less wordy. It’s visually more pleasing.”

One participant, when asked to compare the two colors said, “Red might make you think you did something wrong. I like green better.”

*Analysis:* It appears from the eye tracking data that the two users who received edits while completing their census forms did not actually read the entire message – especially when it was the longer message. As shown in Figure 15 and Figure 16, only the first few words of the edits were read. In the gaze plot in Figure 17, the participant appeared to read the entire short message. During debriefing discussions with the participants, responses were mixed about what the message was telling them to do. While many participants said that the two long messages means they can ignore them if they want (particularly if it is green), the instruction may not be clear enough to tell the participant what they have to do. One participant said it needed to clarify that the first sentence indicates something needs to be written in the box. She said she thought she had already provided a specific response.

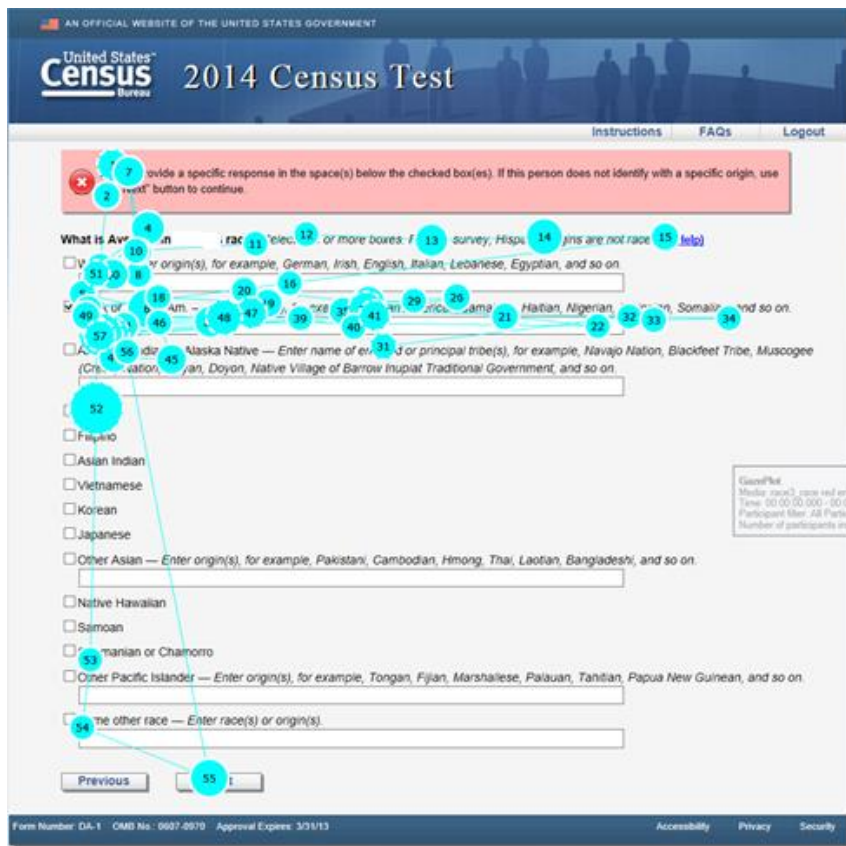


Figure 15: Gaze plot of one participant who received the red long edit message on Version 3 of the Race question



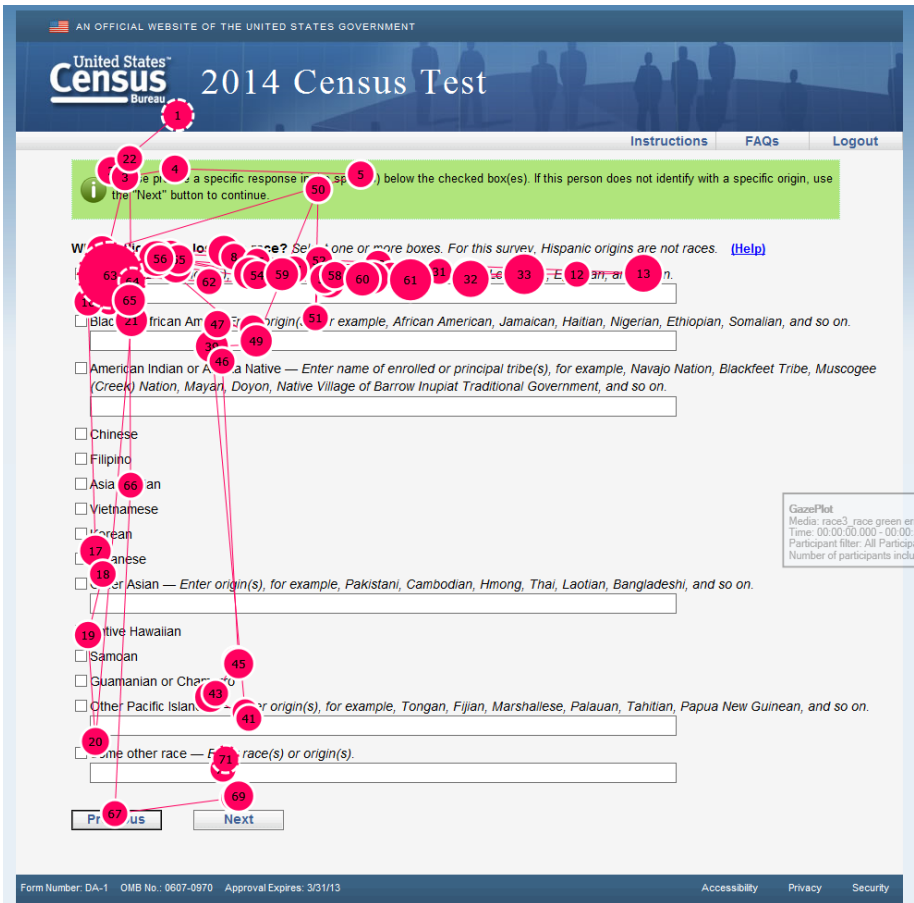
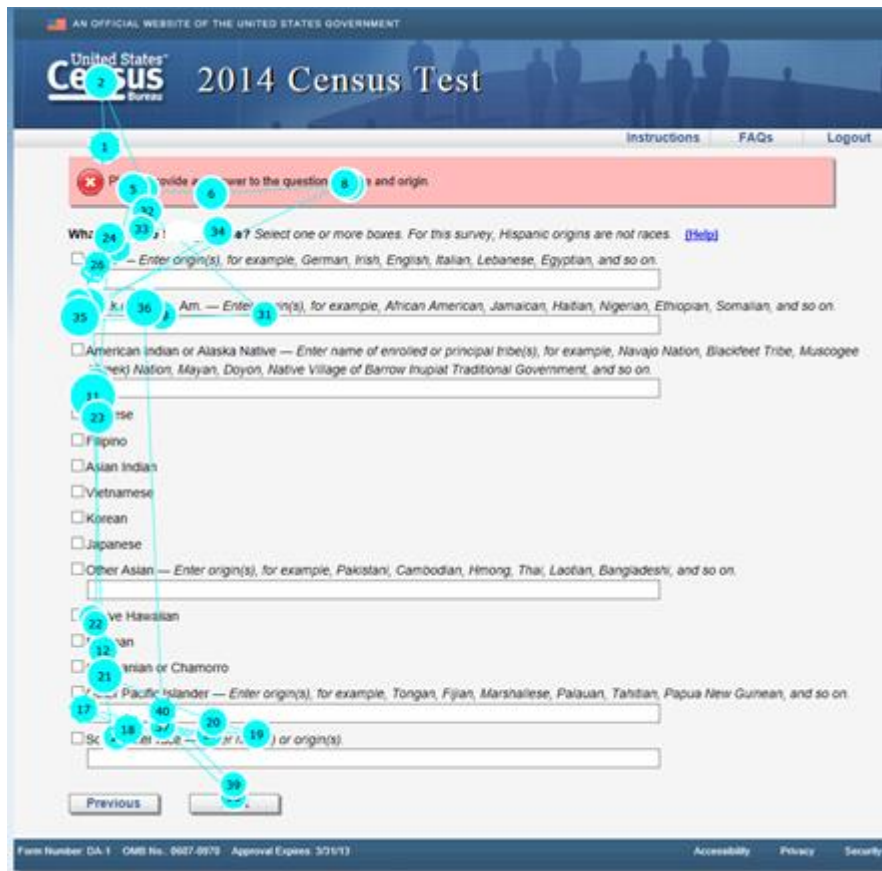


Figure 16: Gaze plot of one participant who received the green long edit message on Version 3 of the Race question



**Figure 17: Gaze plot of one participant who received the default short red edit message on the race question because he/she did not choose a race.**

*Recommendation:* Use the design of the online version of the American Community Survey (ACS) to highlight the write-in box on the race screen. The ACS design draws attention to the write-in field by highlighting it in a cream color and placing thick borders around the box. It also adds a black arrow pointing to the box as soon as the respondent selects a race choice, as shown in Figure 18. This design informs users which fields need to be completed. Combined with the edit message appearing at the top of the screen, this technique of highlighting the write-in box could aid users in understanding what still needs to be completed before moving onto the next screen.

Also, consider changing the long edit message to say something more specific about what needs to be done, such as “type in the highlighted box below the specific ethnic origin of NAME OF PERSON.”



Figure 18: Screen shot of the online ACS where the fill is highlighted in an off-white color, outlining it in bold and pointing to it with a black arrow when the selection is made

#### 4.3.6. Race screens caused some confusion (Objective 2 and Low priority)

*Description of the issue:* In general, most participants said they understood what the race screens were asking. A few participants did not fill in the ethnic origin. One participant (not of Hispanic Origin) who received the separate Hispanic origin and race questions in Version 3 said she was offended when asked for the Hispanic Origin because she said that Census had no interest in her ethnic background, they only had interest in Hispanics.

One participant did not realize he could select more than one race on Version 3 of the race screen. That participant wrote in the some other race category “half white and African American.” For the participant who answered the Census survey twice by mistake (see Section 4.3.4), she provided different answers to the race question in each of her Census submissions. She did not enter the specific Hispanic origin using Version 1 of the race screen, but entered the specific Hispanic origin when using Version 2 of the race screen. In this case, it appeared that Version 2 collected more detailed race information.

One participant commented about Version 3 of the race screen during the debriefing, “My question for example if you select White... you enter the country. But, why

when you select Asian you don't give the option to enter the country? Instead to have all those options? If you are Asian, you know that you are Chinese, Filipino, wherever, as the same way that White people are from Australia or Europe.”

The TA then asked her how she would answer this screen. The participant responded, “This is so difficult, I am White and Black. How can I explain? I have to write White Italian, Black African American but it doesn't include Hispanic, Yes Dominican.”

*Analysis:* Version 3 of the race screen is problematic for some users because they cannot see ahead that they will be asked for race after the Hispanic origin question. This version appears to give priority to one origin over the other by the order of the question. The other versions of the race screen are less problematic in that regard.

*Recommendation:* For the 2014 Census Test, we have no recommendations.

#### 4.3.7. Relationship question had no usability problems (Objective 2 and Positive finding)

*Description of the issue:* During the debriefing, participants were asked to comment on the relationship question. Participants did not appear to have problems with the new relationship question, though some commented that it was long and it took them a little longer than they expected to find the category they were looking for.

The one parent with an adopted child said she found the category and was not offended to see it listed as adopted because her child was Chinese and she was White. To her, it made sense to see the distinction between biological or adopted, but in other surveys or other instances she would just say it is her child (not her adopted child).

Participants understood opposite sex to mean a heterosexual couple and same sex to mean a gay couple. Participants understood the distinction between married and unmarried partner. Most participants said they approved of the way the Census was asking about same sex and opposite sex. An older woman of Spanish/Hispanic descent said that she was slightly surprised by the new categories, indicating that the relationships mentioned were not always openly discussed by her generation or culture. She was surprised by how open it was.

Test administrator: You said you were taken aback?

Participant: I didn't expect that this is so positive. So, I thought wow.

Test administrator: If at home would you continue with the survey?

Participant: Yes

One participant did not know what was meant by foster child.

And a few participants did not understand the distinction between roomer and boarder from housemate and roommate, though all understood it to be another person living or staying at the home, whether helping out with rent or not.

*Analysis:* We found no misreporting using the new relationship categories and no negative feedback on the categories.

*Recommendation:* For the 2014 Census Test, we have no recommendations.

#### 4.3.8. Address screen for nonID path had no usability problems (Objective 2 and Positive finding)

*Description of the issue:* The participants had no problems entering their addresses. However, separating address number from street name is not a typical design (see Figure 19).

The screenshot shows the '2014 Census Test' address entry screen. At the top, it says 'United States Census Bureau' and '2014 Census Test'. Below this, there are links for 'Instructions', 'FAQs', and 'Logout'. The main heading is 'Where did you live on July 1, 2014?' with a '(Help)' link. Below this, it says 'Please select the type of address associated with your residence.' and 'Address Type:' with three radio buttons: 'Street Address' (selected), 'P.O. Box', and 'Rural Route'. The form fields are: 'Address Number:' (with a sub-label '(5007)'), 'Street Name:' (with a sub-label '(N Maple Ave)'), and 'Apt/Unit:' (with a sub-label '(Apt. A' or 'Lot 3)'). Below these are 'City:', 'State:' (a dropdown menu labeled 'Select State'), and 'ZIP Code:'. At the bottom of the form are 'Previous' and 'Next' buttons. The footer contains 'Form Number: DA-1 OMB No.: 0607-0970 Approval Expires: 3/31/13' and 'Accessibility Privacy Security'.

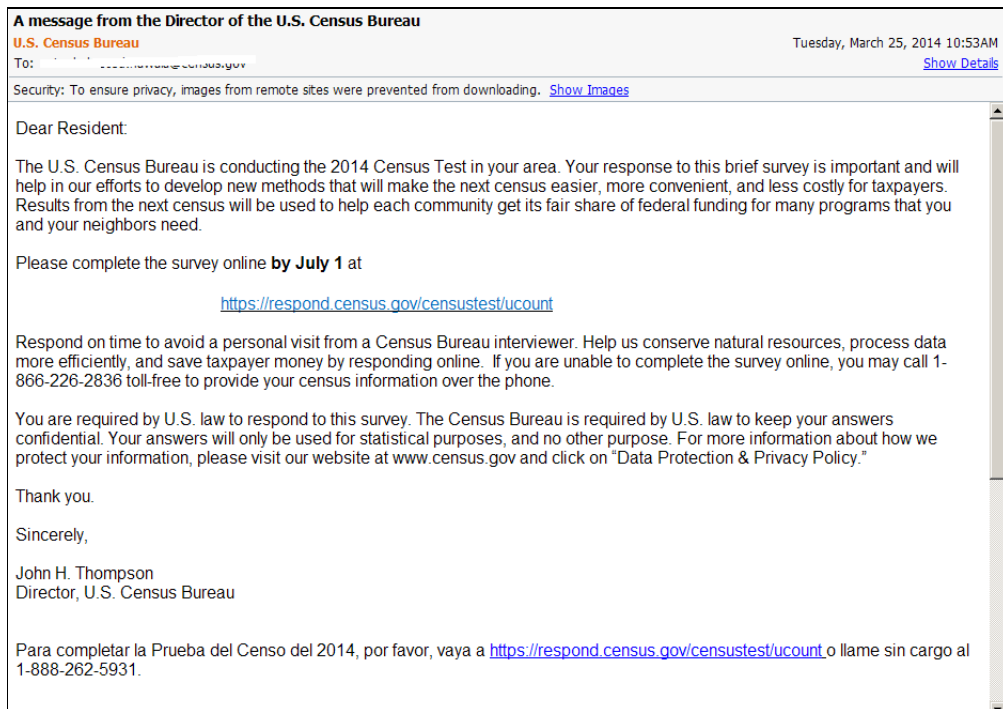
Figure 19: Address screen for nonID path

*Analysis:* Because of the atypical design, we suspect users will enter their address number and street name in the address number field. However, most users will be able to self-correct and separate the two pieces of data once they see a separate field for street name.

*Recommendation:* For the 2014 Census Test, we have no recommendations.

#### 4.3.9. Email message had no usability problems (Objective 3 and Positive finding)

*Description of the issue:* Most users appeared to read the email that contained the link to the census form (contained in Figure 20) and there were no usability problems identified with it.



**Figure 20: Email tested for pre-registered 2014 Census Test respondents**

The heatmap in Figure 21 shows that users did read most of the sentences in the main body of the email. The heatmap also shows that participants did not notice the subject line at the top of the page or the social media links at the bottom of the page. Participants said they noticed the Spanish sentence at the bottom but stopped reading at that point because they knew it was not directed at them.

Participants had mostly positive feedback about the content of the email, saying they liked that it mentioned saving money and conserving natural resources. When asked about the survey link in the email, most participants said they would click on the link and answer the survey. One participant said he would like it all to be automated. He gave the example of when he gets medicine prescriptions re-filled and it is a seamless automated system that takes care of it. He said he would like to have a number to call to do it that way.

During the debriefing, we asked participants what email address they entered into the survey. Most participants said they typed in the email they checked most often or quite frequently. Only one participant said they would give their junk email address in the survey.

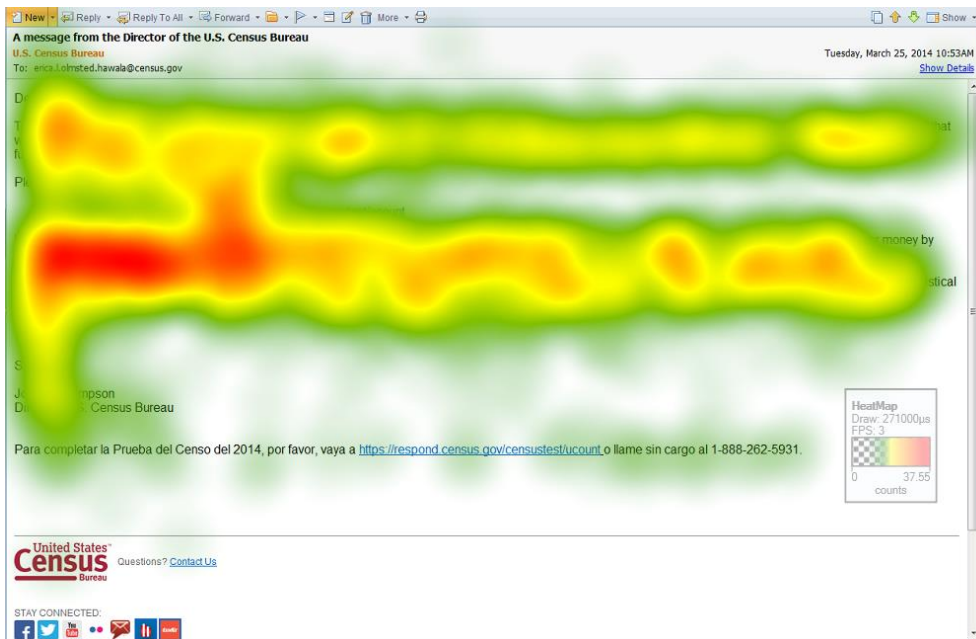


Figure 21: Heatmap of the email message. Red areas indicate more fixations on those areas

*Analysis:* We found no misunderstanding with the email message content.

*Recommendations:* Continue to use the information that resonated well with participants: saving money and natural resources.

## 5. Conclusion

Although everyone completed the survey, we uncovered several issues during usability testing. One of the highest priority issues was that we discovered an easy way for a user to inadvertently create a duplicate census response. This path had not been noticed during user acceptance testing. Secondly, the *overcount* series had some question wording and usability issues. Participants entered incorrect address information based on the job address question wording. Depending upon how they answered, the survey participants were asked to enter the same address multiple times – and at least one participant did not answer accurately because he did not know the intent of the address questions. The race and ethnicity screens were difficult to answer and some participants answered inaccurately. Not everyone understood they could enter more than one race and many participants did not initially enter an origin. We did not find a pattern with one type of edit message helping more than another edit message, and in fact, the edit message did not always convey what the respondent needed to do. Participants understood and answered the new relationship question accurately. Participants also understood the content of the email message that contained the link to the census form.

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Appendix A: Order of Alternative Place to Live from the CCM

ORDER OF ALTERNATIVE PLACE TO LIVE FROM THE CCM

Introduction to module: **Some people have more than one place to live or stay and could be counted in more than one place. The Census Bureau would like to make sure everyone you mentioned was only counted once.**

College alternate address:

**During March or April, were you or was NAME attending college?**

(If yes) **Who was attending college?**

**What is the address where you were staying in March and April?**

Other Relative address:

**During March or April did you or NAME live or stay part of the time somewhere else with a parent, grandparent, son, daughter, or some other relative?**

(If yes) **Who stayed somewhere else?**

**What is the address of the other place you stayed?**

Military address:

**During March or April, were you or was NAME away because of military service?**

(If yes) **Who was away because of military service?**

**Were you gone for two weeks or less or for more than two weeks in March or April?**

(If more than two weeks) **Were you staying in the US or outside the US?**

(If in US) **What is the address where you stayed?**

Job address:

**During March or April, did you or NAME have a job that involved living or staying someplace else?**

(If yes) **Who stayed someplace else?**

**Did you stay at one place or more than one place while working?**

(If one place) **What is the address where you stayed/sstayed the most?**

Seasonal address:

**Do you or does NAME have a seasonal or second home?**

(If yes) **Who does?**

**What is the address of your other home?**

Other place:

Appendix A: Order of Alternative Place to Live from the CCM

**In the past year, was there any other place you, or NAME stayed often?**

(If yes) **Who stayed often at another place?**

**What is the address where you stayed?**

## Appendix B: Post-usability testing observation

During the actual 2014 Census Test, one of the authors of this report observed an older adult completing the online form. Three issues were discovered during this observation.

- The reference person question (“Of the people who lived at ADDRESS, who owns the house...?”) appeared even though the older adult lives alone. The question was confusing, as it asked about the people who lived at the address. She was confused by the question as it did not make sense given she had reported that she lived alone.
- She sighed when she read the instruction for the verification question (“Please enter a verification question for your PIN.”). She stated that we were making this too difficult; she initially assumed after reading “please enter” that she had to make up a question, instead of selecting a verification question. She eventually figured out she had to select a question.
- Finally, this older adult received Version 2 of the race question and was confused when asked about her “origin.” She orally asked if she should put “American” as she was born in America. It was confusing as her parents were born in Germany and she was conflating “national origin” with “ethnicity.”

These issues had not appeared during the initial usability testing.