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MEMORANDUM FOR ACS Research and Evaluation Steering Committee

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Subject: Design of the American Community Survey Internet Instrument

Attached is the American Community Survey Research and Evaluation report "Design of the American Community Survey Internet Instrument." This report details the design considerations in developing the American Community Survey Internet instrument used in both 2011 American Community Survey Internet tests. This Internet instrument will also be used in American Community Survey production (with minor changes) starting in January 2013.

If you have any questions about this report, please contact Jennifer Tancreto at 301-763-4250.

Attachment

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Design of the American Community Survey Internet Instrument

Final Report

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1. Introduction

The American Community Survey (ACS) is an on-going survey designed to provide communities with reliable and timely demographic, social, economic and housing data every year. The ACS collects data in every U.S. county and Puerto Rico and has an annual sample of about three million addresses allocated into twelve monthly samples of approximately 250,000 addresses each.

Currently, the ACS collects data using three sequential modes: mail, followed by nonresponse follow-up by telephone and finally personal visit¹. The 2011 ACS Internet Test was designed to evaluate the feasibility of introducing a web response mode during the mail data collection phase. The main objective was to determine the best way to present the Internet mode in the mailings to maximize response.

The Census Bureau tested “choice” and “push” strategies for notifying sampled units about the Internet mode. The choice strategy allowed households to choose between mail and web to respond. Under the choice strategy, the Census Bureau tested two approaches – a prominent versus a subtle choice. In the prominent choice, the web option was noticeably advertised in all mailings as an alternative to the mail questionnaire. Under the subtle choice design, the web option appeared only on the questionnaire in an inconspicuous place. The motivation for testing a subtle choice was to combat the potential response decrease that has occurred in previous studies when web is presented a response mode choice (Griffin *et al.* (2001); Smyth *et al.* (2010); Gentry *et al.* (2008); Lesser (2010)), while still providing the option for those who are specifically looking for it.

The push strategy directed households to use the Internet first before offering the paper questionnaire at a later mailing. If they did not respond by Internet after a few weeks, they received a paper questionnaire. While the push strategy has not proved effective in previous studies (Bentley *et al.*, 2006; Brady *et al.*, 2004), it seemed important to retest as it has potential cost savings. If successful in maintaining or increasing response, this strategy may save costs associated with printing, postage, data capture, as well as nonresponse follow-up costs.

We expected from past research that the likelihood of using the Internet will differ by the characteristics of the housing units (Lutig *et al.*, 2010; Guarino, 2001; Couper, 2000). Therefore, the ACS test included a stratification of the sample population into targeted and not targeted segments. The targeted segment consisted of geographic areas containing households that we expected to use the Internet at a higher rate. In general, they have a large proportion of people residing in these areas that are highly educated, married homeowners living in single-unit houses, or single renters with higher than average education living in urban multi-units. The people residing in the not targeted areas are generally as racially diverse or more than the national average, have the same or less education than the national average, and have the same or lower income than the national average (Bates, 2007).

2. Global Instrument Design

Given that the Internet mode was being offered to the entire population, the intent of our design was to enable even novice Internet users to easily respond to the ACS online. As a starting point, we reviewed research from previous Internet studies, and consulted external web design experts. Our design was heavily-based on design principles provided in Couper (2008). Given the complexities and length of the ACS, we consulted other studies as well as external experts to advise on the instrument navigation, appearance, and content.

¹ Mail and telephone nonrespondents are subsampled prior to inclusion in personal visit follow-up.

2.1 Navigation

The ACS instrument was designed for linear navigation through the survey questionnaire, similar to the mail, Computer Assisted Telephone Interview (CATI) and Computer Assisted Personal Interview (CAPI) modes. Users can move forward through the screens using the "Next" button, and return to a previously visited page in a linear fashion by selecting the "Previous" button until the desired page is shown. We chose linear navigation for this test to simplify instrument development. In future iterations, we want to research a more flexible approach, recognizing the potential complexity with the length of the survey and the skip patterns in the questionnaire.

We consulted the research literature when considering whether to use a person-based survey design (asking questions for one person in the household at a time) or a topic-based design (asking about the entire household for each question topic at one time). The 2005 National Census Test compared designs for the Census short form and found mixed results (Zajac *et al.*, 2007). The person-based design had a higher rate of break-offs, meaning that some people in the household had less or no data provided. The topic-based design resulted in higher item nonresponse rates for most items. Given these findings, as well as the fact that completion times were comparable between the designs, this study did not provide clear direction. Thus, we decided to emulate our current design for the CATI and CAPI modes, where we use a topic-based approach for the basic demographic questions at the front of the survey (relationship, age, date of birth, sex, Hispanic Origin, and race) and a person-based design for the detailed person questions (for example, educational attainment, employment, and income). There is a set of housing questions between topic- and person-based designs to help ease the transition. One reason for the difference in design between the two sections is that the detailed questions contain skip patterns, so a particular question may not be relevant for all household members. Secondly, a topic-based design may be particularly difficult for unrelated households, as the respondent may not know the answers for roommates. Moreover, there may be privacy issues with asking personal questions, such as income, in this manner.

One flexibility that the instrument provides is the ability for the user to choose the next household member for whom they want to answer the detailed person questions (see Figure 1). This feature will likely be most helpful in situations where there are unrelated household members.

Figure 1. Pick the Next Person Screen

USCENSUSBUREAU Helping You Make Informed Decisions	
AMERICAN COMMUNITY SURVEY	
Instructions FAQs Save & Logout	
➔ The next questions are about each person in the household. Select a name to begin answering questions about that person. If you cannot answer now for any person on the list, click Save & Logout.	
<input type="radio"/> John Q Public <input type="radio"/> Jane Q Public <input type="radio"/> Sarah Q Public	
<< Previous Next >>	
Where You Are	
Basic Info	
Housing Questions	
Person Info	
• John Q Public	
• Jane Q Public	
• Sarah Q Public	
Contact Us	

2.2 Access/Security

The Census Bureau, like all federal agencies, has strict Information Technology (IT) Security policies designed to protect the privacy and confidentiality of respondents. The challenge for this test was to find a way to meet the security requirements in a manner that was also user-friendly. Working with our internal IT security office, we developed plans for allowing users access to the instrument, as well as plans to let users re-enter the instrument as necessary to complete the survey.

Users could access the web survey using a ten-digit access code, which was provided to the selected housing unit on the mail label of the survey request. The system then generated a four-digit Personal Identification Number (PIN) that was required to re-enter the survey at a later time. Users could leave the survey at any time by using the “Save & Logout” feature or by manually exiting the browser. Also, users were automatically logged out if they left the survey idle for 15 minutes. To re-enter the instrument, users were required to enter their ten-digit User ID and the four-digit PIN they were given during their initial session. Lost or forgotten PINs could not be reset for security purposes. After five unsuccessful reentry attempts, users were locked out for 15 minutes. Returning users returned to the survey where they left off when they logged back in. Access to the instrument was disabled once a respondent submitted the survey.

Figure 2. Welcome/Log in Screen

USCENSUSBUREAU
Helping You Make Informed Decisions

**AMERICAN
COMMUNITY
SURVEY**

Welcome to the American Community Survey. You will need the materials we mailed to you to start the survey.
All the information that you provide will remain completely confidential.
[Para completar en español, oprima aquí.](#)

Please Log In

Enter the 10-digit User ID found below the barcode on the materials we mailed to you.
User ID: -

Enter the 4-digit PIN we gave you the first time you entered the survey.
PIN:

Login

The Census Bureau estimates that, for the average household, this survey will take 38 minutes to complete, including the time for reviewing the instructions and answers. You may email comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing burden, to: Paperwork@census.gov. Use "Paperwork Project 0607-0936" as the subject. Or you may send comments to: Paperwork Project 0607-0936, U.S. Census Bureau, 4600 Silver Hill Road, AMSD - 3K138, Washington, D.C. 20233.
Respondents are not required to respond to any information collection unless it displays a valid approval number from the Office of Management and Budget. The 8-digit number appears in the left side of the green bar at the bottom of the survey screen.

2.3 Web Survey Appearance

The web survey maintains the look and feel of the ACS mailing pieces, including the paper questionnaire and associated brochures. The screen background is the same light green color as the mail questionnaire, and the banner image was lifted from a brochure that is mailed to sampled addresses (see Figure 3). Similar to the mail questionnaire, questions were bolded and response options were not. Instructions and

examples were italicized. The questions on the web survey were numbered to map to the mail questionnaire in case respondents wanted to follow along.

The majority of the instrument displays one question per screen to help facilitate skip patterns and to keep page content short to avoid horizontal and vertical scrolling whenever possible. Some screens contain two questions when the topics are related. The majority of the questions use radio buttons and check boxes for responses, with text boxes for write-in fields where necessary. Question response labels that followed radio buttons and check boxes were clickable to provide users with a larger area to select an answer. For the write in fields that only accept a fixed length of characters (e.g., date of birth and telephone number), we used auto tabbing in fields to advance the cursor automatically. We avoided drop down menus in most cases due to potential for misuse (Dillman, 2000).

Figure 3. Example Question

The screenshot displays the American Community Survey web interface. At the top, the USCENSUSBUREAU logo is visible with the tagline "Helping You Make Informed Decisions". Below this, the "AMERICAN COMMUNITY SURVEY" title is prominently displayed. A navigation bar includes links for "Instructions", "FAQs", and "Save & Logout". On the right side, a "Where You Are" sidebar lists "Basic Info", "Housing Questions", and "Person Info", with the latter showing names: "John Q Public", "Jane Q Public", and "Sarah Q Public". The main content area features question 10a: "At any time IN THE LAST 3 MONTHS, has John Q Public attended school or college?". The question text includes a note: "Include only nursery or preschool, kindergarten, elementary school, home school, and schooling which leads to a high school diploma or a college degree. (Help)". Three radio button options are provided: "No, has not attended in the last 3 months", "Yes, public school, public college", and "Yes, private school, private college, home school". Navigation buttons for "<< Previous" and "Next >>" are located below the options. At the bottom right, a "Contact Us" link is present. A footer bar at the very bottom contains links for "Accessibility", "Privacy", and "Security".

2.4 Web Survey Features

The screens provide several helpful links. First, Frequently Asked Questions (FAQs) and instructions for completing the survey are accessible on every screen. These links contain general information about the ACS as well as tips for using the web survey. In addition, privacy, security, and accessibility information appear in links on the bottom right of every screen (as seen in Figure 3). These required links provide standard information about the Census Bureau’s privacy, security, and accessibility policies.

Furthermore, topic-specific help is provided by a link immediately following the question, where applicable. The help link generates a new window (rather than a pop-up that can be blocked) that is overlaid on the screen such that the user can still see the web survey. Each time “Help” is clicked, the help window refreshes with the information specific to the particular question. The navigation buttons (Next and Previous) follow the user’s line of sight from the response options. Clicking the “Next” or “Previous” button also saves the user’s response to that question.

We provide a specific “Save & Logout” feature to allow users to exit the survey if needed. We placed the link on the top menu bar on the right-hand side of the screen to discourage its selection since we would prefer users to complete the survey in one session in case they forget to return. There are three ways in which a user can leave the survey: click “Save & Logout”, close the browser, or he/she can be timed out

if the survey is left idle for 15 minutes. Regardless of the way the user exits the survey, no data will be lost since the data is saved every time a user navigates from each screen.

We also provide a general progress indicator labeled "Where You Are" to inform the user of their location in the survey. The fact that the time required to complete the ACS varies greatly depending on the age and characteristics of household members makes it is very difficult to accurately present a traditional completeness indicator. Yet, given the length of the questionnaire and the risk of a user feeling lost in the instrument, we felt we needed to provide a general measure to allow users to gauge their progress in the survey. Our progress indicator is displayed on the right-hand side of the screen, and highlights the section of the instrument in which the user is located at any given time while graying out completed sections. The indicator is not interactive; that is, respondents cannot click on the various sections to navigate within the instrument.

2.5 Unfolding Design

For some questions, one question does not make sense without the context of the preceding question. In these instances, the preceding question appears before the active question, but the text is gray indicating to the user the question is for reference only (See Figure 4). In fact, to change the answer to the preceding question, the user has to navigate back to the previous screen. Usability testing uncovered the need for the gray-out feature in the unfolding design. Test results suggested that users were revisiting the preceding question when it was intended for context only.

2.6 Auto Calculations

The ACS web instrument takes advantage of the automated technology when computations are required. First, the age is computed directly when the user provides date of birth. Secondly, after the user enters income from eight different sources, the instrument sums the amounts to provide a total income for verification for each person. In both places, the user can overwrite the automatic calculation.

2.7 Errors

Survey questions deemed critical to the ACS or critical to the instrument path are subject to soft edits when left blank. Moreover, the instrument provides error messages in some cases when inconsistent responses or out of range values are entered. In the event of an error or a blank response, the instrument renders a message directly above the question indicating that there is a problem with the information entered. Moreover, any write-in fields associated with that error are highlighted in yellow to draw attention to the source of the problem (see Figure 4). The user is given the opportunity to change the response and continue. If the user fails to change the problem response, he or she can bypass the error and continue in the instrument.

Figure 4. Unfolding Design with Error Message

The screenshot shows the USCENSUSBUREAU logo at the top with the tagline "Helping You Make Informed Decisions". Below the logo is the "AMERICAN COMMUNITY SURVEY" title and a navigation bar with "Instructions", "FAQs", and "Save & Logout". A "Where You Are" sidebar on the right lists "Basic Info", "Housing Questions", and "Person Info" with sub-items for "John Q Public", "Jane Q Public", and "Sarah Q Public".

The main content area contains a question: "The next few questions are about John Q Public's income during the PAST 12 MONTHS." It includes instructions: "For each type of income John Q Public received, give your best estimate of the TOTAL AMOUNT during the PAST 12 MONTHS. (NOTE: The 'past 12 months' is the period from today's date one year ago up through today.)" and "For income received jointly, report the appropriate share for each person - or, if that's not possible, report the whole amount for only one person and select 'No' for the other person."

The question is: "a. Did John Q Public receive any wages, salary, commissions, bonuses, or tips during the PAST 12 MONTHS? (Help)". It has two radio buttons: "Yes" (selected) and "No".

A yellow error message box with a red border and an exclamation mark icon says: "Please enter only numbers." This message is positioned above a text input field for "TOTAL AMOUNT for past 12 months" which contains "\$50K .00".

At the bottom of the main area are two buttons: "<< Previous" and "Next >>". A "Contact Us" link is located in the bottom right corner of the page.

2.8 Review & Edit

After the user has seen all of the survey questions for each household member, he or she has the option of reviewing all of the answers provided. The user can also choose to submit without reviewing. For those that choose to review, their responses are displayed in a table with abbreviated question labels on the left and their responses on the right. If the user left an item blank, the review screen displays "[BLANK]" in bold font, all capitalized, in brackets (see Figure 5).

The responses on the review screen are hyperlinks that take the user to the screen containing the question they wish to review or edit. The user can change the response or simply review the question and answer. When they are done, the only navigational button on this screen takes them to the Review & Edit screen.

In the event that the user changed a response that elicits a different instrument path than the original response, the review screen requests a response to the next question on that path. The review screen will continue to request answers to questions on the new path one by one as the questions on the new path are answered until there are no remaining new questions.

Figure 5. Review and Edit Screen

USCENSUSBUREAU
Helping You Make Informed Decisions

AMERICAN COMMUNITY SURVEY

Instructions FAQs Save & Logout

Review & Edit

Answers to Questions for John Q Public

ⓘ Additional information is needed. Please click the link on the highlighted row below to answer an additional question.

- ➔ To change a response, click on the underlined answer to return to that question.
- ➔ To complete an unanswered question, click on the underlined [BLANK] to return to that question.

[Print for your records](#)

Sex	Male
Date of birth	12/12/1966
Age	44
Hispanic, Latino, or Spanish origin	Not Hispanic/Latino/Spanish
Race	White Japanese
Place of birth	Outside the United States Ireland
➔ Citizenship	➔ [BLANK]
Attended school	Public school/college
Grade level attended	College undergraduate years Graduate or

3. Paradata

Paradata have been defined as data or measurements about the survey process, not including the response data. In Internet surveys, paradata include the location of break-offs, changed answers, error messages, mouse clicks, quantity of help requests, and response times, among other things. These paradata can be used to identify potential problems with the survey instrument from question wording to design. Additionally, they can help researchers understand the process the respondent takes to complete the survey, which can in turn help them identify ways to make the survey task less burdensome for respondents.

The ACS web survey was designed to collect click data that trail the user's mouse clicks on each screen, as well as time stamps associated with each click. Using this information, we plan to study behavior related to the user's interaction with the instrument to assess instrument design. That is, we will look at break-offs, impact of error messages, answer changes, number of sessions, navigation, use of instrument features, and response time. In addition to evaluating the instrument design, this information will guide the changes we make to the instrument for the next iteration of Internet testing.

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