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MEMORANDUM FOR ACS Research and Evaluation Steering Committee

From: Robert A. Kominski /***Signed***/
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Subject: 2010 ACS Content Test Evaluation Report Covering Computer and Internet

Attached is the final report for the 2010 ACS Content Test for the computer and Internet questions. This report describes the results of the new computer and Internet content that will go into the 2013 ACS questionnaire.

If you have any questions about this report, please contact Hyon B. Shin (301) 763-6169 or Kurt J. Bauman (301) 763-6171.

Attachment: (2010 ACS Content Test Evaluation Report Covering Computer and Internet)

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2010 ACS Content Test Evaluation Report Covering Computer and Internet

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EXECUTIVE SUMMARY

Test Objective

In late August through mid-December 2010, the Census Bureau conducted a field test of new and revised content in the 2010 American Community Survey (ACS) Content Test. The results of that testing will determine the content to be incorporated into production ACS starting in 2013.

Computer ownership and Internet subscription questions need to be added into the American Community Survey due to legislative changes. The Broadband Data Improvement Act requires that the Secretary of Commerce, in consultation with the Federal Communications Commission, expand the ACS to elicit information from residential households to determine whether they own or use computers at their address, whether they subscribe to an Internet service and, if so, whether they subscribe to dial-up or broadband Internet service at that address.

The goal of this project is to evaluate the two versions of computer ownership and Internet subscription questions in the 2010 ACS Content Test to help determine which one will ultimately go into ACS production starting in 2013.

Methodology

A set of three proposed new questions on computer ownership, Internet subscription, and Internet subscription type were part of the 2010 ACS Content Test. One question asked about computer ownership or usage. A second question asked whether the household accessed or subscribed to the Internet. A third question asked to what type of Internet service the household subscribed. The two versions of these three questions were tested using a split-ballot design with the following differences between them:

- Question order: Internet Access and Internet Subscription Types came first in the control version, while Computer Types was first in the test version.
- Internet question construct: The control version of Internet Access only measured subscription, while the test version measured access and subscription. [1]

The four original research questions were joined by two supplemental questions that were originally not considered a selection criterion. These two questions were added after the results from the content test were analyzed.

[1] For an explanation of the terminology used to describe the different questions and answers, see Page 2.

Research Questions and Results

1. Are the estimates for computer ownership and Internet subscription comparable to or higher than existing data sources?

The estimates from the ACS Content Test were compared to the data collected in the 2010 October Current Population Survey (CPS).[2] The data collected in the CPS are not considered a "gold standard" and therefore the comparison should be interpreted with care. The estimates for both the control and test versions were comparable to the CPS. Estimates of mobile subscription and use of handheld devices were lower in the CPS but the differences are most likely due to survey differences between the CPS and the ACS. Further information is provided in the results section of this report.

2. Which question version has lower item missing data rates?

Overall, the test version performed better for Computer Types and Subscription Types. The test version had lower item missing rates for two of the three Computer Types as well as all the Subscription Types. There was no significant difference in the item missing data rates between the test and the control versions for the overall estimates[3] of Computer Types or Subscription Types. For the question on Internet access, the control version had a lower item missing data rates and therefore performed better.

3. Do the question versions have similar or different response distributions?

The response distributions showed the test version elicited higher estimates of the Computer Types compared to the control version. The only statistically different estimates for Subscription Types were for cable Internet, which had higher estimates in the control version, and for mobile broadband plan, which had lower estimates in the control version. Without a comparable data source, however, the differences should be noted but do not yield conclusions as to which version performed better in the content test.

4. Which question version results in more reliable estimates?

The test version had a significantly lower gross difference rate (GDR) than the control for one Computer Type category, desktops, while there was no evidence of a difference for the other categories. There were no significant differences for the GDRs for Subscription Types. For Internet Access, the test version had a significantly higher GDR than the control version.

[2] The 2010 October Current Population Survey questions are shown in Appendix C.
[3] Since the Computer Types and Subscription Types allowed for more than one answer to be checked, the overall estimate for these two questions refer to the calculation of any of the answer categories being checked.

For Computer Types, the index of inconsistency (IOI) was significantly higher for desktops in the control. For Internet Access, those who responded "Yes-have access" had a significant difference where the test had almost double the IOI.

The GDR and IOI show that the test is more reliable for those reporting desktops but less reliable for those who said they had Internet Access.

5. For the write-in responses to "Some Other Type of Computer" or "Some Other Service," is there a frequent response that indicates a need to edit the instruction and/or the examples given for a response category? Does accounting for the information gathered from the write-ins change any of the estimates?

The write-in frequency distributions for Computer and Internet Types show that the majority of respondents supplied a type of computer that was already a choice in the question. A notable exception, however, was tablet computers. Considering the prevalence with which tablet computers were written in the write-in box, we will include instructions to inform respondents to consider tablet computers an "other" type of computer.

One category that is not considered a computer yet is the fourth most commonly written-in device is gaming systems. Current gaming systems, while able to connect to the Internet, are not considered a type of computer by the sponsoring agencies, FCC and NTIA, and by the Census Bureau. We understand that this is a fast-changing sector and we will be cognizant of perhaps changing this if future gaming systems advance enough to be considered a computer. Currently, however, we will instruct respondents and CATI/CAPI interviewers to not consider gaming systems a type of computer.

Where appropriate, the edited data were coded responses back into existing categories. This process resulted in higher estimates for almost all of the categories. The differences were not large but did increase the estimates.

6. Which question version results in more reliable estimates?

The test version had a higher CFU inconsistency rate, mail inconsistency rate, and a higher commission rate with respect to the Internet Access and Subscription Types questions. For the Content Follow-up (CFU), the test version had a higher inconsistency rate compared to the control. For the mail, the omission rate was not statistically different but the commission rate was more than double that of the control version.

While we don't know whether the answers in the content test or the answers in the CFU are the correct answers, we see from these results that the test version of Internet Access elicits poorer results. Combining these results with the results from the other research questions, we concluded that the control version performed better.

Summary

Overall, the test version of the computer and Internet use questions performed better than the control version. The test version results had lower item nonresponse rates, were more reliable, and were answered consistently between the initial interview and the follow-up for Computer Types and Subscription Types. The test version, however, did not perform as well as the control version for the estimates on Internet Access. The results indicated that the test version of this question was met with some confusion which led to higher item missing data rates, higher rates of inconsistency, and lower reliability estimates.

Since the test version performed better on two out of the three possible questions and it captures not only access but subscription to an Internet service, the recommendation is to proceed with the test version of the computer and Internet use questions in the 2013 American Community Survey.

1. BACKGROUND

1.1 Motivation for the 2010 ACS Content Test

To evaluate proposed changes to the content of the American Community Survey (ACS), the Census Bureau conducted the 2010 ACS Content Test. The objective of the ACS Content Test, for both new and existing questions, was to determine the impact of changing question wording, response categories, and redefinition of underlying constructs on the quality of data collected.

Through the Office of Management and Budget (OMB) Interagency Committee on the ACS, subject matter experts from the Census Bureau and key data users from other federal agencies collaborated in identifying revised and new questions for inclusion in the content test. The suggested new and revised questions affected both the housing and detailed person sections of the ACS questionnaire.

In the housing section, the food stamps question was altered to reflect a name change for the food stamps program. In addition, a series of new questions were added related to household computer ownership and Internet subscription.

Several changes were made in the detailed person section. First, a change in data needs for the veteran series led to a revised set of response categories for the veteran status and period of military service questions. Second, the question wording of the cash public assistance income question was modified to address under-reporting of assistance on behalf of children and single payment recipients. Third, to simplify the income questions related to wages (wages, salary, commissions, bonuses, or tips) and property income (interest, dividends, rental income, royalty income or income from estates and trust), these questions were broken up into smaller questions for the Computer-Assisted Telephone Interviewing (CATI) and Computer-Assisted Personal Interviewing (CAPI) instruments only. Fourth, a set of new questions on parental place of birth were added to to allow data users to divide the population into "first generation" (the foreign born), "second generation" (the children of immigrants), and "third or higher generation" (native born with no foreign-born parents).

To meet the test objective of the 2010 ACS Content Test, analysts evaluated changes to question wording, response categories, instructions, and examples relative to a control version of the question or another version for new questions. Specifically, this report discusses computer ownership and Internet subscription.

Computer ownership and Internet subscription questions need to be implemented into the American Community Survey due to legislative changes. The Broadband Data Improvement Act (SR.1492) requires that the Secretary of Commerce expand the ACS to elicit information from residential households to determine whether households own or use computers at their address, whether persons subscribe to an Internet service and, if so, whether they subscribe to dial-up or broadband Internet service at that address.

Two versions of the computer ownership and Internet subscription question series were tested in the 2010 ACS Content Test. The ordering of the question was altered between versions to explore a potential context effect related to Internet subscription and computer ownership. In combination with the ordering effect, the question on Internet subscribership was broadened to ask about Internet access in conjunction with subscribership to distinguish the concepts of Internet access versus subscription.

Since there are three separate questions asked about computer and Internet use[4], for ease of reading the results throughout the remainder of this report, the following is our shorthand terminology for each of the three questions:

Computer Types = the questions on both the control and test that asks about what types of computing devices are owned or used by any member of the household.

Internet Access = the question on the control that asks whether the household subscribes to the Internet and the question on the test that asks if the household accesses the Internet with or without a subscription.

Subscription Types = the questions on both the control and test that ask what type of Internet subscription the household is using.

Additionally, the answer categories for the three questions were riddled with long descriptors. For ease of reading this report, the following shorthand is used:

Desktop = desktop, laptop, netbook, or notebook computer
Handheld = handheld computer, smart mobile phone, or other handheld wireless computer
Other = some other type of computer

Dial-up = dial-up service
DSL = DSL service
Cable = cable modem service
Fiber optic = fiber optic service
Mobile = mobile broadband plan for a computer or a cell phone
Satellite = satellite service

1.2 Previous Testing or Analysis

The computer ownership and Internet subscription questions were tested in the ACS for the first time. Prior to the ACS, the Census Bureau asked a similar set of questions about computers and Internet on the Current Population Survey (CPS). The questions asked on the ACS Content Test were derived from various questions asked in the CPS but were not taken directly from previously tested questions.

[4] See Appendix B to read the three questions on computers and Internet usage.

1.3 Recommendations from Cognitive Testing

Prior to conducting the content test, the Research Triangle Institute (RTI), Westat, and Research Support Services (RSS) conducted cognitive interviewing, under contract, to assist in identifying a final set of questions for the field test. Three versions of each question topic were tested with the goal of choosing the best one for the revised questions and the best two for the new questions.[5] The questions were pretested in the three modes used in the ACS data collection (paper, telephone interview, and personal interview) in English and Spanish. Cognitive interviews consisted of one-on-one interviews using the proposed questions in the context of the ACS survey. Survey methodologists also conducted respondent debriefings.

All three cognitively tested versions asked about both computer ownership and Internet subscription (Hinsdale, M., et. al., 2009). Overall, the terminology for computer types and Internet subscription were universally understood. The cognitive testing report stated that the intent of each of the questions was easily comprehended.

Versions 1 and 2 asked about the specific computer devices whereas Version 3 only asked if a computer was owned or used in the household. Most respondents knew the difference among the different computers listed.

All three versions asked about the specific Internet services. The types of services, while easily understood, were not easily answered by some respondents. This was due to the respondents' lack of knowledge about the type of service the household used, mostly because a spouse or a housemate was the responsible party, not because of confusion on the types of service. In most cases, another household member took care of the Internet service. This was true across the versions. The one item that was confusing to almost all respondents was the exclusion of Wi-Fi (wireless fidelity) from the answer category about wireless Internet service. Even those who knew what Wi-Fi was did not understand why it was being excluded.

The cognitive testing report recommended going with either Version 2 or Version 3 without any significant wording changes, however, further recommendations were made during the Expert Review (see Section 1.4)

1.4 Recommendations from the Expert Review Panel

Following the cognitive testing, an expert review panel, composed of government survey methodology experts, reviewed and added changes to the final question versions proposed to move forward from the cognitive testing into the field test. The proposed changes for each question topic were approved by the corresponding OMB interagency subcomittee responsible for initiating the research. The OMB provided final approval of the proposed changes.

[5] See Appendix E, page E-3 to read the three versions of the computer and Internet use questions that were cognitively tested.

The expert review panel suggested several changes to the findings from the cognitive testing report. Appendix E shows the three versions that were cognitively tested. Of these choices, the expert review panel's first suggestion was to go with the three-part questions that asked about Computer Types, Internet Access, and Subscription Types. The other change was to use the forced-choice answer categories for Computer Types and Subscription Types. Finally, "At this home, apartment, or mobile home…" was added to each question to keep it consistent with the other questions on the current ACS form.

After consultation with the expert panel and the sponsoring agencies, it was determined that a question order effect would also be tested in the field test as well as keeping the instructions on what devices should be excluded for Computer Types.

Test Version 1 was chosen to be the basis for the three questions that went into the content test. The same two questions were asked for Computer Types and Subscription Types while two different questions were developed for Internet Access. In the control version, Internet Access was asked first with a simple YES/NO answer category, followed by the Subscription Types and Computer Types questions. In the test version, Computer Types was asked first, followed by the modified Internet Access question which asked about access with or without a subscription, and finally the Subscription Types question. The final questions can be read in Appendix B.

2. SELECTION CRITERIA

Originally ten research questions were proposed with four of the questions impacting the selection criteria questions and six supplemental research questions. The four main research questions evaluated which version had comparable estimates compared to existing data sources, which version had lower item missing data rates, whether the test and control versions had similar or different response distributions, and which question version resulted in more reliable estimates. An extensive explanation on how these research questions were evaluated is discussed in section 3.3 in the Methodology Section.

After the field test, two supplemental questions were moved to be considered part of the selection criteria. The research questions that evaluated the responses to the write-in answers to Computer Types and Subscription Types and that assessed which question version resulted in more respondents who inconsistently answered Internet Access and Subscription Types were moved to the selection criteria.
These six questions were used to determine which version of the computer ownership and Internet subscription questions would go forward in the 2013 American Community Survey.

3. METHODOLOGY

3.1 Data Collection Methods

The initial stages of the Content Test consisted of content determination, cognitive laboratory pretesting, and expert reviews for the purpose of developing alternate versions of question content. The field test portion of the ACS Content Test used the data collection methodology currently used in the production ACS (i.e., mail questionnaire, follow-up CATI, and follow-up CAPI) with an added reinterview conducted via a CATI instrument known as the Content Follow-Up (CFU). Additional data were collected on respondent and interviewer behavior during the field test via Computer Audio Recorded Interviewing (CARI) technologies for a subset of respondents during the CATI and CAPI follow-up modes of data collection.

The Content Test followed the same schedule and procedures for the mail, CATI, and CAPI operations as the September 2010 ACS production panel. Questionnaires were mailed to sampled households at the end of August 2010. The Content Test used an English-only mail form but the automated instruments (CATI, CAPI, and CFU) included both English and Spanish versions. Households not responding by mail and for which we had a phone number were contacted for a CATI interview during the month of October 2010. In November 2010, Census Bureau field representatives visited a sample of households that did not respond by mail or CATI to attempt a CAPI interview. The CAPI operations ended December 2, 2010.

The field test included a CATI CFU reinterview to collect additional measures for the study of response error. This operation started approximately two weeks after the initial mail out of questionnaires and ended two weeks after the end of the CAPI follow-up data collection operation. The CFU included all occupied households for which we received a response in the original interview and had a telephone number. A response was defined as a case where the household provided data through at least the first person's place of birth question for mail cases or at least a sufficient partial interview for CATI/CAPI interviews. The reinterview was conducted about 2 to 4 weeks after the original interview and with the original respondent when possible. Note that the CFU CATI interview was an abbreviated version of the original Content Test interview. The CFU instrument included the basic demographic section and only those questions preceding the questions being tested in the housing and the detailed person sections to provide context (see Appendix D for the flow of the CFU instrument).

The ACS Content Test did not include all of the production data collection operations and processes. First, while the Telephone Questionnaire Assistance program's toll-free number was available to Content Test respondents for assistance, the CATI instrument did not include content changes from the Content Test. Therefore data collected from Content Test respondents via TQA CATI interview were not included in our analysis. Second, since our objective was to study response error using unedited data, the Content

Test excluded the Failed Edit Follow-up (FEFU) CATI operation and the edit and imputation data processes.

3.2 Sample Design

The 2010 Content Test consisted of a national sample of 70,000 residential addresses in the contiguous United States (the sample universe did not include Puerto Rico, Alaska, and Hawaii). The sample design for the Content Test was largely based on the ACS production sample design with some modifications to meet the test objectives. The modifications included adding an additional level of stratification by stratifying addresses into high and low mail response areas, over-sampling addresses from the low mail response areas to ensure equal response from both strata, and sampling units as pairs. The high and low mail response strata were defined based on ACS mail response rates at the tract-level. The paired sample selection formed pairs by first systematically sampling an address within the defined sampling strata and then pairing that address with the address listed next in the geographically sorted list. However, the pair was not likely comprised of neighboring addresses. One member of the pair was randomly assigned to the control group and the other member was assigned to the test group. Those addresses assigned to the test group received the revised ACS questions and the questions new to the ACS. The control group received the current questions on the production ACS as well as different versions of the new questions.

Another modification to the production ACS sample design included adding a third sampling stage. At the first stage, the production 2010 ACS first stage sample was used as the Content Test first stage sample. At the second stage, all housing units in the ACS first stage sample not selected in the production 2010 ACS second-stage sample were selected as the Content Test second-stage sample. In addition, any units that were selected to be in other operations (e.g., training, other tests, etc.) were not selected in the Content Test second stage sample. At the third stage, addresses were selected using a sampling method similar to the production ACS second stage sample design with the exception of adding the high and low mail response stratification.

3.3 Methodology Specific to Computer and Internet Use

A set of three proposed new questions on Computer Types, Internet Access, and Subscription Types were part of the 2010 ACS Content Test. Given our split-ballot experimental design, we tested two versions of the computer and Internet questions with the following differences between them:

- Question order: Internet Subscription and Internet Subscription Type came first in control version, while Computer Ownership Type was first in the test version.
- Internet question construct: The control version of Internet Subscription only measured subscription, while the test version measured access and subscription.

The questions as they appear in the mail form are shown in Appendix B and the CATI/CAPI question versions are shown in Appendix C.

Several methodologies were used to test which version had response distributions more comparable to existing data sources, lower item nonresponse rates, more reliable estimates, and which question version resulted in fewer respondents who inconsistently answered the Internet Access and Subscription Types questions.

The first analysis compared the response distributions of the computer and Internet use questions to the 2010 October Supplement to the Current Population Survey (CPS). Formal statistical comparisons could not be made since the content test data were not edited or imputed, adjusted for nonresponse, nor raked to known population totals, however, we checked estimates for the computer and Internet use questions for comparability.

To analyze which version had lower item nonresponse rates, three different types of rates were calculated: item missing data rates, invalid data rates, and specification error rates.

The missing data rate is the proportion of households which fail to provide any type of response, or which respond with "Don't Know" or "Refused." For Subscription Types, the universe included all households which were offered the question, or (in the mail mode) provided a response even if they were supposed to skip it.

The invalid data rate is the proportion of households which respond with both "Yes" and "No." As above, for Subscription Types, the universe included all households which were offered the question, or in the mail mode, provided a response even though they were supposed to skip it. For the test version's Internet Access, the invalid data rate is the proportion of households which respond to "No access to the Internet at this house, apartment, or mobile home" AND to at least one of "Yes, with a subscription to an Internet service" or "Yes, without a subscription to an Internet service."

Specification errors occur when a respondent interprets and responds to a question differently from the intent of the questionnaire designers. We considered one type of specification error a type of nonresponse in this analysis. For the test version's Internet Access, we calculated the proportion of mail response households which responded to both "Yes, with a subscription" and "Yes, without a subscription" but not "No access to the Internet at this house, apartment, or mobile home."[6] It is possible for a household to have Internet access both with and without a subscription. The question was not intended to be mark-all-that-apply, however, so such responses would be indicative of specification error.

We calculated rates two ways for the forced-choice questions. First, for the multiple questions option, we calculated the rates separately for each response category as if it were an individual question. A particular item was considered missing if "Yes" and "No" were both unchecked, or in the case of "Some Other Type of Computer" and "Some Other Service," if "Yes" and "No" were both unchecked and there were no codable write-in responses. A particular category was considered invalid if "Yes" and "No" were both

[6] This scenario is not possible in CATI/CAPI since the instrument only allowed for one response.

checked, or in the case of "Some Other Type of Computer" and "Some Other Service," if "Yes" and "No" were both checked and there was no codable write-in.

Second, for the single question option, we calculated the rates as if Computer Types and Subscription Types were each one question with several response options. In this instance, a response was considered missing if "Yes" and "No" were both unchecked for all of the categories and there was no codable write-in response. A response was considered invalid if "Yes" and "No" were both checked for all of the categories and there was no codable write-in response.

For the CATI/CAPI questions, an altered skip pattern was used in the Content Follow-up (CFU). In the field test, proper skip patterns were implemented so if a household indicated they did not have Internet access, the questions regarding which types of Internet service the household might have wasn't asked. In the CFU, however, the altered skip pattern asked Subscription Types anyway. Using data derived from the content test and the altered skip pattern in the CFU, the number of respondents who either responded "No" for Internet Access but answered "Yes" to any one of the Subscription Types, or "Yes" for Internet Access but "No" for all Subscription Types were compared.

For the mail questions, calculations were made for when a respondent answered a question they were not meant to answer and when a respondent failed to answer a question they were supposed to answer. Using data from the mail respondents, the number of respondents who commit these two errors are calculated. Only households with a valid response in both the content test and the CFU for an individual category were included in this analysis.

Using data from the content test and CFU, we compared the gross difference rates, indices of inconsistency, and the L-fold indices of inconsistency between the two versions to check the reliability of the data.

The gross difference rate (GDR) is the percentage of inconsistent answers between the original interview and the CFU. The GDR halved is an estimator for the simple response variance. The GDR was calculated using a two-sided simultaneous pairwise comparison between the control and the test versions.

The index of inconsistency (IOI) is the percentage of total variance due to simple response variance and provides an estimate of the magnitude of response variability. An IOI was computed for each response category and an overall index of inconsistency, called the L-fold index of inconsistency, was reported for the entire question, where applicable. The L-fold IOI is a weighted average of the individual indices computed for each response category.

The final analysis to determine which version resulted in fewer respondents who inconsistently answered the Internet Access and Subscription Types questions was to use the data derived from the content test and the altered skip pattern in the CFU to calculate the number of respondents who either report "No" for Internet Access and "Yes" for one

or more of the Subscription Types, or "Yes" for Internet Access and "No" for all Subscription Types between the two versions. In mail cases, the error or omission and error of commission were compared between the control and test versions.

4. LIMITATIONS

Control and test CATI-CAPI workload assignments were not assigned using an interpenetrated experimental design. That is, interviewers were allowed to administer interviews for both control and test cases, in addition to production ACS cases. The potential risk of this approach was the introduction of a cross-contamination or carry-over effect due to the interviewer administering multiple versions of the same question item. Interviewers were trained to read the questions verbatim to minimize this risk, but there still exists the possibility that an interviewer may have deviated from the scripted wording of one question version to another. This could potentially mask a treatment effect from the data collected.

The CFU reinterview was not conducted in the same mode of data collection for households that responded by mail or CAPI in the original interview since CFU interviews were only administered using a CATI mode of data collection. As a result, the data quality measures derived from the reinterview may include some bias due to the differences in mode of data collection.

Respondents needed to provide a telephone number in the original Content Test interview or the Census Bureau had to be able to find a telephone number for that unit through reverse address look-up to be included in the CFU interview. As a result, 18.4 percent of the responding households from the original interview were not eligible for the CFU reinterview.

We did not have the same respondent in the CFU that we had in the original interview for 9.1 percent of the CFU cases. This means that differences between the original interview and the CFU for these cases could be due in part to having different people answering the questions.

The Content Test did not include the production weighting adjustments for seasonal variations in ACS response patterns, nonresponse bias, and under-coverage bias. The CFU portion of the Content Test did include a unit nonresponse adjustment for those Content Test cases that responded to the Content Test, but failed to respond to the CFU. As a result, the statistics derived from the Content Test data do not provide the same level of inference as the production ACS to the entire population of housing units and persons in the contiguous United States.

Specific limitations to the computer and Internet use questions include not having exact questions to compare the results, even though the 2010 CPS was a good data source to use. Without exact question wording, implementation, and data collection, the data will have comparability limitations. Another limitation was testing both an order effect without using identical questions. Using two different questions for Internet Access most

likely affected the results beyond evaluating the order of the questions. Since the computer and Internet use questions were asked at the household level, if the respondent was not the one who was responsible for acquiring or maintaining their Internet subscription, some were not knowledgeable enough to answer the Subscription Types question accurately.

5. RESEARCH QUESTIONS AND RESULTS

Table A shows the unit response rates for each of the modes of data collection and all modes combined (excluding CFU) by the control and test groups. The comparison between control and test show that respondent participation was similar for both control and test for each of the modes of data collection and all modes combined, with the exception of the CATI mode. The test treatment produces a CATI rate of response that is 3 percentage points higher compared to that of the control. We are not able to explain the increase in response due to the test treatment for the CATI mode of data collection other than by random occurrence given that the conditions affecting unit response were equivalent between the test and control groups.

Table A. Content Test Response Rate Comparisons Between the Control and Test Treatments

Mode	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
All Modes (CFU excluded)	95.4	0.2	95.7	0.2	-0.3	0.3	No
Mail	58.1	0.5	57.7	0.5	0.5	0.7	No
CATI	52.6	1.2	49.6	1.0	3.0	1.5	Yes
CAPI	90.4	0.5	91.5	0.5	-1.1	0.7	No
CFU	54.3	0.5	53.5	0.6	0.8	0.7	No

Source: U.S. Census Bureau, 2010 American Community Survey Content Test

5.1 Are the estimates for computer ownership and Internet subscription comparable to or higher than existing data sources?

Table 1 (see Appendix A) shows the response distributions of the computer and Internet categories for the test version, the control version, and the estimates from the 2010 October Current Population Survey (CPS). The 2010 October CPS, while not considered a "gold standard", was in the field at the same time as the content test which makes it ideal to compare the results. Overall, the content test results were comparable to the data from the CPS with the exception of those who reported having a mobile subscription type and the use of handheld devices. The content test estimates were considerably higher than the CPS, regardless of treatment. The test and the control versions showed 40 percent and 34 percent, respectively, of respondents reporting they owned a handheld device while the CPS showed 21 percent reporting they owned a handheld. The difference in mobile broadband plans for a computer or a cell phone also

showed a big difference where the test estimated 23 percent and the control estimated 21 percent while the CPS estimated only 9 percent.

This disparity could be explained by the difference in how the questions are asked between the ACS and the CPS. In the CPS instrument, after asking the questions on computer ownership and Internet access, the answer categories are all read aloud and the respondent is allowed to mark-all-that-apply. In the ACS CATI/CAPI instrument, however, each individual answer category is read aloud and the respondent answers either yes or no for each one before being asked the next answer category. This forced-choice option forces allows the respondent to consider each category separately whereas the CPS's approach relies on the respondent to hear all the options and relay back to the interviewer all that apply. Ericson and Nelson (2007) reported that questions that use a forced-choice format elicit more responses than a mark-all-that-apply, as witnessed in their test of health insurance questions in the 2006 ACS Content Test.

Analysis of the data show that for the ACS test and control treatments, multiple devices were reported more in the ACS than in the CPS. By summing up the distributions of Computer Types and Subscription Types for each survey/treatment, the ACS test version had 121 percent reporting Computer Type and 127 percent Subscription Type. The ACS control version had 112 percent and 132 percent. In the CPS, however, multiple devices were reported 101 percent and multiple Subscription Types were reported 105 percent. The lower reporting of multiple devices in the CPS is mostly due to the lower responses in handheld devices and mobile Internet access.

Another explanation for the ACS/CPS differences in handheld devices and mobile broadband is those devices/connection types could be secondary to their laptop/computers and their home Internet connection type. Even though we asked about all types they may own or use, reporting the secondary devices may not occur to some respondents as quickly in the mark-all-that-apply approach.

5.2 Which question version has lower item missing data rates?

Table 2 highlights the different item missing data rates between the test and control treatments. Overall, there was no significant difference between treatments for the questions overall or for those who own or use a desktop computer. For all the other answer categories under Computer Types and for each of the Subscription Types, the control version had significantly higher missing data rates.

For Internet Access, the test version had higher item missing data rates. The test version's two "Yes" categories ("Yes with a subscription" and "Yes without a subscription") was not as easily understood or answered compared to the simpler "Yes"/"No" answer category in the control version. This is illustrated by many of the results throughout this section and by what we learned during cognitive testing.

So, while the test version had better results for Computer Types and Subscription Types, it had poorer results for Internet Access.

5.3 Do the question versions have similar or different response distributions?

The response distributions shown in Table 3a show that there are statistical differences between the test and the control versions for Computer Types and Subscription Types. Without a comparable data source, however, the differences should be noted but do not yield conclusions as to which version performed better in the Content Test.

Comparing the distribution who responded "Yes" to the control Internet Access question and "Yes, access with a subscription" answer category in the test Internet Access question, no significant difference is shown between these two categories (72 percent versus 71 percent).

When reviewing the number of computers, the test version had more Computer Types reported than the control version. The shift seems to occur between having just one computer category to having more than one. Perhaps reading and hearing the Computer Types questions first in the test veresion, respondents notice the handheld devices answer category more readily compared to the control version which asks about Internet Access and Subscription Types first. They may be more apt to report multiple devices.

For number of Subscription Types, the control version had a lower proportion of households which had zero Subscription Types while the test had a lower proportion for those with one Subscription Type. In the control version, the Subscription Types question is asked before the Computer Types question, therefore, respondents may not be thinking about their handheld devices which are more likely to be associated with the "mobile broadband plan…" answer category for Subscription types. In the test version, however, we ask about Computer Types first which could then help respondents recall that their handheld devices (e.g. smart phones) use a mobile broadband plan. Hence the test version could elicit reporting of more than one Subscription Type.

The additional analysis for broadband types show the control had lower proportions of zero and two broadband types, while the test had a lower proportion with one broadband type.[7] Since the broadband types estimates follow a similar pattern as the Subscription Types estimates, the same theory about having multiple types of Internet service would apply here.

5.4 Which question version results in more reliable estimates?

Using data from the content test and the Content Follow-up (CFU), comparisons of the gross difference rates (GDR), indices of inconsistency (IOI), and the L-fold indices of inconsistency were compared between the two versions.

The GDR is the percentage of inconsistent answers between the original interview and the CFU. Table 4a shows that the test version had a significantly lower GDR than the control for those who provided a response for the desktop category in both the content test and the CFU, while there was no evidence of a difference for the other categories.

[7] Broadband Types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

There was no significant difference in the GDR for any of the Subscription Types. Comparing the test and control versions for Internet Access with a subscription, the test version had a significantly higher GDR than the control. It could be respondents responded inconsistently when the concept of "access" was introduced during the CFU.

Table 4b shows that for desktop, the control version had higher IOI. For Internet Access, those who responded "Yes - have access with a subscription" had a significant difference where the test had almost double the IOI. For Subscription Types, the only significant difference was in the aggregate L-fold indices where the test was lower than the control version.

For most response categories for Internet Access, both treatments had low indices of inconsistency. The index was high for the test's "Yes, without a subscription" and the test question's Aggregate L-Fold was moderate.[8] While the high and moderate inconsistencies should be noted, the reader should not be alarmed by it. Singer and Ennis (2003) conclude that answer categories with rarer populations, for instance those who responded to the "other" categories for Computer Types and Subscription Types, the index of inconsistency could be higher for these categories when only a few respondents change their response from the initial interview to the re-interview.

Once again, the test version of Internet Access did not perform as well as the control version. The concept of having Internet Access with or without a subscription resulted in high inconsistency between the content test and the CFU. While the desktop category performed better in the control version, the rest of the results were not conclusive as to which one performed better.

5.5 For the write-in responses to "Some Other Type of Computer" or "Some Other Service," is there a frequent response that indicates a need to edit the instructions and/or the examples given for a response category? Does accounting for the information gathered from the write-ins change any of the estimates?

The write-in frequency distributions for Computer and Internet Types show that the majority of respondents supplied a type of computer that was already a choice in the question (see Table 5a and Table 5b). A notable exception, however, was tablet computers. Considering the prevalence with which tablet computers were written in the write-in box, we will include instructions to inform respondents to consider tablet computers an "other" type of computer.

One category that is not considered a computer yet is the fourth most commonly written-in device is gaming systems. Current gaming systems, while able to connect to the Internet, are not considered a type of computer by the sponsoring agencies, FCC and NTIA, and by the Census Bureau. We understand that this is a fast-changing sector and we will be cognizant of perhaps changing this if future gaming systems advance enough

[8] The Census Bureau's general benchmarks for reliability state that index values of less than 20 percent indicate Low inconsistency, 20-50 percent indicate Moderate inconsistency, and over 50 percent indicate High inconsistency.

to be considered a computer. Currently, however, we will instruct respondents and CATI/CAPI interviewers to not consider gaming systems a type of computer.

Table 5c shows that editing the data based on the coded responses, while not large differences, did result in higher estimates for almost all of the categories.

5.6 Which question version results in more respondents who inconsistently answer Internet Subscription and Internet Subscription Type?

The test version had a higher CFU inconsistency rate, mail inconsistency rate, and a higher commission rate with respect to the Internet Access and Subscription Types questions (see Table 6).[9] The test showed the mail inconsistency rate being 4 percent versus 2 percent in the control. For the Content Follow-up (CFU), the test version had a higher inconsistency rate (8 percent) compared to the control (5 percent). For the mail, the omission was not statistically different but the commission rate was 12 percent in the test and 5 percent in the control.

While we don't know whether the answers in the content test or the answers in the CFU are the true answers, we can see from these results that the test version of Internet Access elicits poorer results. Combining these results with the results from the other research questions, we concluded that the control version performed better.

5.7 For urban areas and for rural areas, do the two question versions have differential item nonresponse rates, response distributions, or reliability of the data?

The differential item missing data rates, response distributions, and reliability of data information varied for urban and for rural areas. For item missing data rates, the same items had similar levels of significance in both urban and rural areas (see Tables 7a and 7b). While the overall missing data rates for Computer Types and Subscription Types were not significantly different between the control and the test, the individual items had higher item missing data rates in the control version in both urban and rural areas. For Internet Access, however, both the urban and rural areas had higher item missing data rates in the test version.

In urban areas, the test version had more respondents reporting owning each computer type as well as higher instances of mobile broadband connection. The control version, however, had a higher estimate of those subscribing to a cable Internet connection (Table 7c). The Rao-Scott Chi-square tests of dependence indicate that the percent distribution of multiple answer categories was dependent on question version in urban areas (Table 7d).

[9] Inconsistency rate is the percentage of mail responders who answered Internet Access and Subscription Types inconsistently. The commission rate is the percentage of mail respondents who responded "No" (Control version) or "Yes, without a subscription" or "No" (Test version) to Internet Access but responded to Subscription Types.

In rural areas, the only significant difference in the estimates of type of computer ownership, Internet Access with or without a subscription, and type of Internet subscription between the test and the control versions was for the percentage who reported owning a handheld device (Table 7e). As with urban areas, the rural areas also had significant Chi-square test statistic indicating that the percent distribution of multiple answer categories was independent of question version (Table 7f).

The gross difference rates and index of inconsistency in urban and rural rates are shown in Tables 7g, 7h, 7i, and 7j. The results are similar to those found at the national level. The test version of Internet Access performed poorly compared to the control version but performed better for the Computer Types that were statistically different. Most of the results for Subscription Types were not significantly different and therefore cannot be used to determine which version performed better.

5.8 For each mode of data collection, do the two question versions have differential item nonresponse rates, response distributions, or reliability of the data?

Tables 8a, 8b, and 8c show the item missing data rates by the three modes of collection, Mail, CATI, and CAPI. For the Mail mode, the control version showed higher item missing data rates than the test version for the overall Computer Types, handhelds, and the other types of computers as well as for the Internet Access item. In the CATI and CAPI modes, only those with Internet Access showed a significant difference with the test version having higher item missing data rates than the control version.

Response distribution differences for the three modes are shown in tables 8d, 8f, and 8h. Some sporadic differences were seen but without any discernible pattern. Tables 8e, 8g, and 8i show the Chi-square statistics for the three modes.

In the Mail mode, the control had a higher gross difference rate (GDR) and a higher index of inconsistency rate (IOI). The test version, however, had a higher GDR and higher IOI for handhelds and a higher IOI for the other category than the control (Tables 8j and 8m). The test version had higher GDR and higher IOI for those with Internet Access.

Similar patterns are discernible in the CATI and CAPI modes where the control had higher GDR and IOI for desktop but higher GDR and IOI for the Internet Access with a subscription item.

The only Subscription Type that showed significant differences for the reliability measures was for satellite subscription. In the Mail mode, the control version had a higher GDR (13 percent versus 10 percent) whereas in the CAPI mode, the test version had a higher IOI (70 percent versus 42 percent).

The Mail mode, having the largest sample size compared to CATI and CAPI, had many results that were significantly different between the test version and the control version,

however, all three modes followed the same patterns as the results from the national level. The test version had favorable results with Computer Types and Subscription Types but performed less well for the Internet Access items, compared to the control version.

5.9 For each mail response stratum, do the two question versions have differential item nonresponse rates, response distributions, or reliability of the data?

For both the high and low strata, the item missing data rates are presented with the control version having higher item missing data rates for handhelds and other devices and for all Subscription Types (Tables 9a and 9b). The test version, however, had higher item missing data rates for Internet Access for both strata.

As with the results for the item missing data rates and the Chi-square statistics, the response distributions were similar to the national level for the high and low strata (Tables 9c, 9d, 9e and 9f). Similarly, Tables 9g, 9h, 9i, and 9j showed similar gross difference rates and index of inconsistency rates. As with the results from the other research questions, both strata had estimates similar to that of the national level estimates. The test version of Internet Access had poorer results than the control version whereas the results with significant differences showed Computer Types and Subscription Types having favorable estimates compared to the control version.

5.10 Does either question version elicit respondent or interviewer behaviors that may contribute to interviewer or respondent error?

Data were collected on respondent and interviewer behavior during the field test for a subset of the CATI and the CAPI modes of data collection. The behavior of the respondents and interviewers were collected via Computer Audio Recorded Interviewing (CARI) technologies. The Center for Survey Management (CSM) analyzed the behavior coding for all the new items in the content test. The Behavior Coding Report (Pascale, et.al, 2011) describes the methodology used by CSM to evaluate the content test recordings and the results.

CSM evaluated the computer and Internet questions for all three questions: Computer Types, Internet Access, and Subscription Types. The Behavior Coding Report's findings show that for Computer Types and Subscription Types, no significant difference between the test and the control for interviewer and respondent behaviors to the question. This is not surprising since the two questions were identical in both versions.

For Internet Access, however, the report shows that the test version was the most problematic in how interviewers and respondents read, understood, and answered this question. As we suspected with the higher item missing data rates, higher errors of omission and commission, lower reliability, and higher inconsistency rates for the test version of Internet Access, the confusion of Internet access with a subscription and

Internet access without a subscription appears to be substantiated by the behavior of both interviewers and respondents.

6. SUMMARY

The 2010 ACS Content Test tested questions on computer ownership and Internet use, which have never been asked on the ACS before. The inclusion of computer and Internet questions were dictated by the introduction of Senate Resolution S.1492. Broadband Data Improvement Act.

Four main research questions and six supplemental questions were used to gauge the strength of one version of the computer and Internet questions over the other version. Several analyses were used to evaluate each research question. We compared the content test data to existing data sources, examined which version had lower item nonresponse rates, had more reliable estimates, and which question version resulted in more respondents who consistently answered the Internet Access and Subscription Types questions.

We also evaluated the data written in the write-in fields on Computer Types and Subscription Types. The fast-pacing change of technological devices and Internet-based applications will hopefully be captured by what respondents supply in the write-in fields. For instance, tablet computers existed when the questions were developed but in the short two and a half years since the beginning of this content test cycle, the use of tablet computers has far outpaced what we anticipated. These technological breakthroughs will continue to add to our knowledge and understanding of what devices and services the U.S. population is using.

The complexity of having three separate questions, with multiple answers possible for Computer Types and Subscription Types, as well as the different wording for Internet Access between the control and the test versions, created a multifaceted analysis of the results. No one version clearly outperformed the other. The test version results had lower item nonresponse rates and improved reliability in terms of respondents answering consistently between the initial interview and the follow-up. The exception to the test version performing better was with Internet Access. The results indicated that the test version of this question was met with some confusion which led to higher item missing data rates, higher rates of inconsistency, and lower reliability estimates.

The test version performed better on two out of the three possible questions. Despite the results in the test version of Internet Access, the better outcomes of Computer Types and Subscription Types, as well as the added benefit of having the word “access” which can be used to compare ACS results to other data sources, the recommendation is to proceed with the test version of the computer and Internet use questions in the 2013 American Community Survey.

REFERENCES

Ericson, L. and Nelson, C. (2007), "A Comparison of Forced-Choice and Mark-All-That-Apply Formats for Gathering Information on Health Insurance in the 2006 American Community Survey Content Test." Presented at the 2007 Federal Committee on Statistical Methodology Conference, U.S. Census Bureau, Washington D.C.

Hinsdale, M., McFarlane, E., Weger, S., Schloua-Glusberg, A., and Kerwin, J. (2009), "Cognitive Testing of the American Community Survey Content Test Items", RTI International, Research Triangle Park, NC.

Pascale, J., Goerman, P., and Drom, K. (2011) "ACS 2010 Content Test Behavior Coding Report." U.S. Census Bureau, Washington D.C.

Singer, P. and Ennis, S. (2003), "Census 2000 Content Reinterview Survey: Accuracy of Data for Selected Population and Housing Characteristics as Measured by Reinterview", Census 2000 Evaluation B.5, U.S. Census Bureau, Washington D.C.

Senate Resolution 1492 [110th]: Broadband Data Improvement Act http://www.govtrack.us/congress/billtext.xpd?bill=s110-1492.

Appendix A: Tables

Table 1. Response Distributions of the Computer and Internet Categories (Use for RQ 1)

	ACS				CPS	
	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Estimate (%)	Standard Error (%)
Computer Types[1]						
Desktop	77.3	0.4	75.9	0.4	79.6	0.2
Handheld	39.7	0.5	33.8	0.4	21.2	0.2
Other	3.9	0.2	2.5	0.2	0.7	0.1
Internet Access[2,3]						
Yes	71.0	0.5	71.7	0.5	71.9	0.3
Subscription Types[4]						
Dial-up	6.6	0.3	6.9	0.3	3.9	0.1
DSL	33.7	0.5	34.9	0.5	35.2	0.2
Cable	47.8	0.5	52.3	0.6	47.4	0.2
Fiber-Optic	7.6	0.3	7.3	0.3	5.2	0.1
Mobile	23.1	0.4	20.5	0.5	9.1	0.1
Satellite	6.3	0.3	7.0	0.3	2.7	0.1
Other	2.3	0.2	2.6	0.2	1.4	0.0

Source: U.S. Census Bureau, 2010 American Community Survey Content Test and the 2010 October Current Population Survey.

1 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level.

2 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who responded "Yes."

3 For the comparison of Internet Access, the CPS question used to create the percentage of households with a subscription to an Internet service is HENET2b. See the Computer and Internet Use Briefing Document to view the CPS questionnaire.

4 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni-Holm multiple comparison method at the $\alpha = 0.10$ level.

Note: Since multiple answers could be chosen, the cumulative frequency does not equal 100%.

0.0 - rounds to zero

Table 2. Item Missing Data Rates of the Computer and Internet Categories (Use for RQ 2)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types[1]	n=19,454		n=19,451				
Overall	2.6	0.2	2.8	0.1	-0.2	0.2	No
Desktop	2.9	0.2	3.1	0.2	-0.2	0.3	No
Handheld	9.8	0.3	15.6	0.3	-5.8	0.4	Yes
Other	26.9	0.4	28.9	0.4	-2.1	0.6	Yes
Internet Access[2]	n=19,454		n=19,451				
Missing data rate	4.2	0.2	2.7	0.1	1.5	0.3	Yes
Invalid rate - Access [3]	0.1	0	0	0	0.1	0	Yes
Specification - Access[4]	0.2	0	N/A	N/A	N/A	N/A	Yes
Subscription Types[5]	n=14,465		n=13,841				
Overall	1.0	0.1	1.1	0.1	-0.1	0.1	No
Dial-up	24.7	0.4	28.9	0.5	-4.2	0.6	Yes
DSL	18.8	0.4	22.0	0.4	-3.1	0.5	Yes
Cable	15.4	0.3	17.4	0.4	-2.0	0.5	Yes
Fiber-Optic	26.8	0.4	31.2	0.5	-4.3	0.6	Yes
Mobile	25.3	0.4	29.5	0.5	-4.2	0.6	Yes
Satellite	26.7	0.4	30.4	0.5	-3.7	0.6	Yes
Other	31.6	0.5	34.1	0.5	-2.5	0.7	Yes

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.

1 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level.

2 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who responded "Yes."

3 Invalid rate - the proportion of households which responded with both "Yes" and "No."

4 Specification error rate - the proportion of mail response households which responded to both "Yes, with a subscription" and "Yes, without a subscription" but not "Not access to the Internet at this house, apartment, or mobile home" in the test version. This scenario is not possible in the CATI/CAPI since the instrument only allows one response. The significant difference of the specification error rates refer to the test estimates that differ from zero. Statistical significance of differences is determined at the $\alpha = 0.10$ significance level using a one-sided test.

5 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni-Holm multiple comparison method at the $\alpha = 0.10$ level.

0.0 - rounds to zero

Table 3a. Response Distributions for Computer and Internet Categories (Use for RQ 3)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types[1]	n= 18,907		n=18,802				
Desktop	77.3	0.4	75.9	0.4	1.4	0.5	Yes
Handheld	39.7	0.5	33.8	0.4	5.9	0.6	Yes
Other	3.9	0.2	2.5	0.2	1.4	0.3	Yes
Internet Access	n=18,507		n=18,813				
Access with a subscription	71.0	0.5	71.7	0.5	-0.7	0.7	No
Access without a subscription	4.2	0.2	N/A	N/A	N/A	N/A	N/A
No Internet access	24.8	0.5	N/A	N/A	N/A	N/A	N/A
Subscription Types[2]	n=14,310		n=13,678				
Dial-up	6.6	0.3	6.9	0.3	-0.2	0.3	No
DSL	33.7	0.5	34.9	0.5	-1.2	0.7	No
Cable	47.8	0.5	52.3	0.6	-4.5	0.7	Yes
Fiber-Optic	7.6	0.3	7.3	0.3	0.3	0.4	No
Mobile	23.1	0.4	20.5	0.5	2.5	0.7	Yes
Satellite	6.3	0.3	7.0	0.3	-0.7	0.4	No
Other	2.3	0.2	2.6	0.2	-0.2	0.2	No
Number of computer types	n= 18,907		n=18,802				
0 computer types	20.2	0.4	21.5	0.3	-1.4	0.5	Yes
1 computer type	41.2	0.4	46.1	0.4	-4.8	0.6	Yes
2 computer types	36.1	0.4	31.0	0.4	5.1	0.6	Yes
3 computer types	2.5	0.2	1.4	0.1	1.1	0.3	Yes
Number of subscription types	n=14,310		n=13,678				
0 subscription types	7.7	0.3	4.0	0.2	3.7	0.3	Yes
1 subscription type	64.7	0.5	69.0	0.5	-4.3	0.8	Yes
2 subscription types	21.7	0.5	20.5	0.5	1.2	0.7	No
3 subscription types	5.9	0.3	6.6	0.3	-0.7	0.4	No
Number of broadband types[3]	n=13,870		n=13,232				
0 broadband types	10.5	0.3	6.3	0.2	4.2	0.4	Yes
1 broadband type	63.2	0.6	68.5	0.6	-5.3	0.8	Yes
2 broadband types	21.2	0.5	19.6	0.5	1.6	0.7	Yes
3 broadband types	5.0	0.3	5.5	0.3	-0.5	0.4	No

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.

1 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level.

2 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni-Holm multiple comparison method at the $\alpha = 0.10$ level.

3 The number of broadband types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

Table 3b. Rao-Scott Chi-Square of the Multiple Answer Computer and Internet Use Categories (Use for RQ 3)

	Chi-Sq Statistic	Significant
Number of computer types	99.5	Yes
Number of subscription types	119.3	Yes
Number of broadband types	101.1	Yes

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.

Table 4a. Gross Difference Rates[1] for the Computer and Internet Categories (Use for RQ 4)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types[2]							
Desktop	4.3	0.3	6.5	0.3	-2.2	0.4	Yes
Handheld	14.3	0.5	14.3	0.6	0.0	0.7	No
Other	6.8	0.5	5.5	0.4	1.4	0.7	No
Internet Access							
Access with a subscription	9.1	0.4	4.6[3]	0.3	4.5	0.5	Yes
Access without a subscription	7.5	0.4	N/A	N/A	N/A	N/A	N/A
No Internet access	5.3[4]	0.3	N/A	N/A	N/A	N/A	N/A
Subscription Types[5]							
Dial-up	5.2	0.4	6.6	0.5	-1.3	0.6	No
DSL	15.5	0.7	16.6	0.8	-1.1	1.1	No
Cable	13.9	0.7	14.4	0.7	-0.4	1.0	No
Fiber-Optic	6.2	0.5	6.8	0.5	-0.6	0.8	No
Mobile	23.5	0.9	22.9	0.9	0.6	1.2	No
Satellite	8.1	0.4	8.8	0.5	-0.7	0.7	No
Other	5.8	0.6	6.1	0.5	-0.3	0.7	No

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.

1 The Gross Difference Rate (GDR) is the percentage of inconsistent answers between the original interview and the Content Follow-Up interview.

2 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level.

3 In the dichotomous case, the GDRs for the two response categories are equivalent. Therefore, the control version's GDR value for the "No" response category is equivalent to that of the "Yes" response category ("Access with a subscription" in the table.)

4 The GDR for the test version's combined categories "Access with a subscription" and "Access without a subscription" is equivalent to the GDR for "No Internet access."

5 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni-Holm multiple comparison method at the $\alpha = 0.10$ level.

0.0 - rounds to zero

Table 4b. Index of Inconsistency[1] for the Computer and Internet Categories (Use for RQ 4)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types[2]							
Desktop	12.6	0.8	18.6	0.9	-6.0	1.2	Yes
Handheld	29.8	1.1	30.5	1.4	-0.7	1.5	No
Other	81.4	3.7	82.8	4.0	-1.5	5.4	No
Aggregate (L-fold) Indices	33.8	0.9	34.6	0.8	-0.8	1.2	No
Internet Access							
Access with a subscription	21.8	0.9	11.6	0.7	10.2	1.1	Yes
Access without a subscription	76.5	3.2	N/A	N/A	N/A	N/A	N/A
No Internet access	14.3	0.8	N/A	N/A	N/A	N/A	N/A
Aggregate (L-fold) Indices	24.8	0.8	N/A	N/A	N/A	N/A	N/A
Subscription Types[3]							
Dial-up	36.6	2.3	43.3	2.5	-6.6	3.6	No
DSL	31.9	1.4	33.6	1.6	-1.7	2.2	No
Cable	28.2	1.4	30.2	1.4	-2.0	2.1	No
Fiber-Optic	34.0	2.5	34.8	2.7	-0.8	4.1	No
Mobile	55.3	2.0	54.9	2.1	0.4	2.8	No
Satellite	68.5	2.8	59.1	3.2	9.4	4.6	No
Other	86.0	3.5	83.2	4.0	2.8	5.3	No
Aggregate (L-fold) Indices	58.1	0.8	61.0	0.8	-2.9	1.3	Yes

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.

1 The Index of Inconsistency (IOI) is the percentage of total variance due to the simple response variance and provides an estimate of the magnitude of response variability. The Census Bureau's general benchmark for reliability states that index values of less than 20 percent indicate low inconsistency, 20 to 50 percent indicate moderate inconsistency, and over 50 percent indicate high inconsistency.

2 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level.

3 For this family of two-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni-Holm multiple comparison method at the $\alpha = 0.10$ level.

Table 5a. Computer Types Write-Ins (Use for RQ 5)

Write-in category	Frequency	Percent	Cumulative Frequency	Cumulative Percent
DESKTOP	208	18.8	208	18.8
LAPTOP	155	14.0	363	32.9
NOCOMP	145	13.1	508	46.0
GAMECONSOLE	129	11.7	637	57.7
IPAD	86	7.8	723	65.5
PC	42	3.8	765	69.3
IPOD	30	2.7	795	72.0
CELLPHONE	27	2.5	822	74.5
DELL	27	2.5	849	76.9
EREADER	19	1.7	868	78.6
ITOUCH	19	1.7	887	80.3
BLACKBERRY	16	1.5	903	81.8
IPHONE	16	1.5	919	83.2
SMARTPHONE	16	1.5	935	84.7
SERVER	14	1.3	949	86.0
HP	13	1.2	962	87.1
MAC	13	1.2	975	88.3
PDA	12	1.1	987	89.4
TABLET	11	1.0	998	90.4
HARDWARE	10	0.9	1,008	91.3
WEBTV	10	0.9	1,018	92.2
BRANDNAME	9	0.8	1,027	93.0
GPS	9	0.8	1,036	93.8
HANDHELD	9	0.8	1,045	94.7
NOTEBOOK	8	0.7	1,053	95.4
SOFTWARE	7	0.6	1,060	96.0
NETBOOK	6	0.5	1,066	96.6
WORK	6	0.5	1,072	97.1
HOMECOMPUTER	5	0.5	1,077	97.6
CALCULATOR	4	0.4	1,081	97.9
TYPEWRITER	4	0.4	1,085	98.3
IBM	3	0.3	1,088	98.6
LIBRARY	3	0.3	1,091	98.8
MP3	3	0.3	1,094	99.1
APPLIANCE	2	0.2	1,096	99.3
BLIND	2	0.2	1,098	99.5
GOOGLETV	1	0.1	1,099	99.6
INTERNET	1	0.1	1,100	99.6
PHONE	1	0.1	1,101	99.7
TABLETOP	1	0.1	1,102	99.8
TOSHIBA	1	0.1	1,103	99.9
WATCH	1	0.1	1,104	100.0

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.

Note: Frequencies are unweighted.

Table 5b. Subscription Type Write-Ins (Use for RQ 5)

Coded Write-In	Frequency	Percent	Cumulative Frequency	Cumulative Percent
CABLE	163	20.6	163	20.6
WIRELESS	98	12.4	261	33.0
NOINTERNET	87	11.0	348	44.1
MOBILE	84	10.6	432	54.7
UNCODABLE	50	6.3	482	61.0
ATT	45	5.7	527	66.7
FIBER	44	5.6	571	72.3
WIFI	44	5.6	615	77.9
SATELLITE	41	5.2	656	83.0
PHONE	32	4.1	688	87.1
VERIZON	22	2.8	710	89.9
DSL	18	2.3	728	92.2
DIALUP	13	1.7	741	93.8
OTHER	8	1.0	749	94.8
RADIO	6	0.8	755	95.6
BROADBAND	5	0.6	760	96.2
ANTENNA	4	0.5	764	96.7
COLLEGE	4	0.5	768	97.2
TOWER	4	0.5	772	97.7
HIGHSPEED	3	0.4	775	98.1
LINEOFSIGHT	3	0.4	778	98.5
T1	3	0.4	781	98.9
LIBRARY	2	0.3	783	99.1
TV	2	0.3	785	99.4
WEBTV	2	0.3	787	99.6
APT	1	0.1	788	99.8
LMDS	1	0.1	789	99.9
MOBILE	1	0.1	790	100.0

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.
Note: Frequencies are unweighted.

Table 5c. Estimate Differences Between Edited and Unedited Write-Ins in Appropriate Categories (Use for RQ 5)

Control Version	Edited (%)	Standard Error (%)	Unedited (%)	Standard Error (%)	Edited - Unedited (%)	Standard Error (%)	Significant
Computer Types[1]							
Desktop	76.2	0.3	75.9	0.4	0.3	0.0	Yes
Handheld	33.9	0.4	33.8	0.4	0.1	0.0	Yes
Other	0.8	0.1	2.5	0.2	-1.8	0.1	Yes
Subscription Types[2]							
Dial-up	6.9	0.1	6.9	0.3	0.1	0.0	Yes
DSL	35.0	0.5	34.9	0.5	0.1	0.1	Yes
Cable	52.6	0.6	52.3	0.6	0.2	0.0	Yes
Fiber-Optic	7.4	0.3	7.3	0.3	0.1	0.0	Yes
Mobile	21.0	0.5	20.5	0.5	0.5	0.1	Yes
Satellite	7.0	0.3	7.0	0.3	0.1	0.0	Yes
Other	0.9	0.1	2.6	0.2	-1.7	0.1	Yes
Test Version	Edited (%)	Standard Error (%)	Unedited (%)	Standard Error (%)	Edited - Unedited (%)	Standard Error (%)	Significant
Computer Types[1]							
Desktop	77.6	0.4	77.3	0.4	0.3	0.0	Yes
Handheld	39.8	0.5	39.7	0.5	0.1	0.0	Yes
Other	1.3	0.1	3.9	0.2	-2.7	0.2	Yes
Subscription Types[2]							
Dial-up	6.6	0.2	6.6	0.3	0.0	0.0	No
DSL	33.7	0.5	33.7	0.5	0.0	0.0	No
Cable	48.1	0.5	47.8	0.5	0.3	0.1	Yes
Fiber-Optic	7.7	0.3	7.6	0.3	0.1	0.0	Yes
Mobile	23.6	0.4	23.1	0.4	0.5	0.1	Yes
Satellite	6.3	0.3	6.3	0.3	0.1	0.0	Yes
Other	0.8	0.1	2.3	0.2	-1.5	0.1	Yes

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.

1 For this family of one-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni multiple comparison method at the $\alpha = 0.10$ level.

2 For this family of one-sided hypothesis tests, the family-wise error rate has been controlled using the Bonferroni-Holm multiple comparison method at the $\alpha = 0.10$ level.

0.0 - round to zero

Table 6. Inconsistency, Omission, and Commission Rates for Internet Access and Subscription Types (Use for RQ 6)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Mail - Inconsistency Rate[1]	4.1	0.2	2.2	0.2	1.9	0.3	Yes
CFU - Inconsistency Rate[2]	8.1	0.4	4.8	0.3	3.3	0.5	Yes
Mail - Omission Rate[3]	1.2	0.1	1.2	0.1	0.0	0.2	No
Mail - Commission Rate[4]	11.6	0.4	5.2	0.2	6.4	0.4	Yes

Source: U.S. Census Bureau, 2010 American Community Survey Content Test.

1 Mail Inconsistency Rate - The percentage of mail respondents who answered Internet Access and Subscription Types inconsistently.

2 CFU Inconsistency Rate - The percentage of CFU respondents who answered Internet Access and Subscription Types inconsistently. (All CFU respondents received the Subscription type question, regardless of their answer to Internet Access.)

3 Mail Omission Rate - The percentage of mail respondents who responded "Yes" (Control version) or "Yes, with a subscription" (Test version) to Internet Access but did not respond to Subscription Types

4 Mail Commission Rate - The percentage of mail respondents who responded "No" (Control version) or "Yes, without a subscription" or "No" (Test version) to Internet Access but responded to Subscription Types.

Table 7a. Item Missing Data Rates of the Computer and Internet Categories for Urban Areas (Use for RQ 7)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types	2.5	0.2	2.7	0.2	-0.2	0.2	No
Desktop	2.8	0.2	3.0	0.2	-0.2	0.3	No
Handheld	9.6	0.3	15.1	0.4	-5.5	0.5	Yes
Other	27.2	0.5	28.9	0.5	-1.7	0.7	Yes
Internet Access[1]							
Yes	4.0	0.2	2.6	0.2	1.4	0.3	Yes
Subscription Types	1.1	0.1	1.1	0.1	0.0	0.2	No
Dial-up	25.8	0.5	29.2	0.6	-3.4	0.7	Yes
DSL	19.7	0.5	22.2	0.5	-2.5	0.6	Yes
Cable	14.7	0.4	15.9	0.4	-1.2	0.6	Yes
Fiber-Optic	27.3	0.5	30.5	0.6	-3.2	0.7	Yes
Mobile	26.2	0.5	29.6	0.5	-3.4	0.7	Yes
Satellite	27.7	0.5	30.7	0.6	-3.0	0.7	Yes
Other	32.3	0.5	33.8	0.6	-1.4	0.8	Yes

Source: 2010 American Community Survey Content Test.

1 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who reponded "Yes."

Table 7b. Item Missing Data Rates of the Computer and Internet Categories for Rural Areas (Use for RQ 7)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types	3.0	0.4	3.3	0.4	-0.3	0.6	No
Desktop	3.4	0.4	3.7	0.4	-0.3	0.6	No
Handheld	10.5	0.6	17.2	0.7	-6.7	0.9	Yes
Other	25.6	0.8	28.6	0.9	-3.0	1.1	Yes
Internet Access[1]							
Yes	4.7	0.5	3.1	0.3	1.6	0.6	Yes
Subscription Types	0.8	0.2	1.1	0.2	-0.4	0.2	No
Dial-up	21.1	0.9	27.6	0.8	-6.5	1.1	Yes
DSL	16.0	0.7	21.5	0.8	-5.5	1.1	Yes
Cable	17.6	0.8	22.0	0.8	-4.4	1.1	Yes
Fiber-Optic	25.2	0.9	32.7	0.9	-7.5	1.2	Yes
Mobile	22.5	0.8	28.8	0.9	-6.3	1.2	Yes
Satellite	23.3	0.8	29.3	0.9	-6.0	1.1	Yes
Other	29.0	1.0	34.6	1.0	-5.6	1.4	Yes

Source: 2010 American Community Survey Content Test.

1 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who reponded "Yes."

Table 7c. Response Distributions for Computer and Internet Categories for Urban Areas (Use for RQ 7)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	78.0	0.4	75.9	0.5	2.2	0.6	Yes
Handheld	41.4	0.6	35.3	0.5	6.1	0.6	Yes
Other	4.1	0.3	2.4	0.2	1.7	0.4	Yes
Internet Access							
Access with a subscription	71.9	0.5	72.2	0.5	-0.3	0.7	No
Access without a subscription	4.3	0.3	N/A	N/A	N/A	N/A	N/A
No Internet access	23.8	0.5	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	5.4	0.2	5.7	0.3	-0.4	0.3	No
DSL	32.5	0.6	33.4	0.6	-0.9	0.8	No
Cable	52.0	0.6	56.8	0.6	-4.8	0.8	Yes
Fiber-Optic	8.6	0.3	8.1	0.3	0.5	0.4	No
Mobile	23.5	0.5	20.5	0.6	2.9	0.8	Yes
Satellite	4.7	0.3	4.9	0.3	-0.2	0.4	No
Other	2.3	0.2	2.3	0.2	0.0	0.3	No
Number of computer types							
0 computer types	19.5	0.4	21.5	0.4	-2.0	0.5	Yes
1 computer type	40.1	0.5	44.8	0.5	-4.6	0.7	Yes
2 computer types	37.7	0.5	32.4	0.5	5.3	0.6	Yes
3 computer types	2.6	0.2	1.3	0.1	1.3	0.3	Yes
Number of subscription types							
0 subscription types	7.5	0.3	4.1	0.2	3.4	0.3	Yes
1 subscription type	64.1	0.6	68.4	0.6	-4.2	0.9	Yes
2 subscription types	22.2	0.5	21.0	0.6	1.1	0.7	No
3 subscription types	6.2	0.3	6.6	0.3	-0.3	0.5	No
Number of broadband types[1]							
0 broadband types	9.4	0.3	5.8	0.3	3.6	0.4	Yes
1 broadband type	63.5	0.6	68.2	0.7	-4.7	0.9	Yes
2 broadband types	21.8	0.5	20.5	0.5	1.3	0.7	No
3 broadband types	5.3	0.3	5.5	0.3	-0.2	0.5	No

Source: 2010 American Community Survey Content Test.

1 The number of broadband types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

Table 7d. Rao-Scott Chi-Square of the Multiple Answer Computer and Internet Use Categories for Urban Areas (Use for RQ 7)

	Chi-Sq Statistic	Significant
Number of computer types	94.0	Yes
Number of subscription types	80.3	Yes
Number of broadband types	62.8	Yes

Source: 2010 American Community Survey Content Test.

Table 7e. Response Distributions for Computer and Internet Categories for Rural Areas (Use for RQ 7)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	74.8	0.9	75.5	0.9	-0.7	1.2	No
Handheld	33.7	1.0	27.7	0.9	6.0	1.3	Yes
Other	3.5	0.4	3.1	0.4	0.4	0.7	No
Internet Access							
Access with a subscription	67.6	0.9	69.4	1.0	-1.8	1.3	No
Access without a subscription	3.9	0.5	N/A	N/A	N/A	N/A	N/A
No Internet access	28.4	0.9	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	10.8	0.7	10.8	0.6	0.1	1.0	No
DSL	38.1	1.2	39.4	1.1	-1.3	1.6	No
Cable	33.9	1.2	36.8	0.9	-3.0	1.5	No
Fiber-Optic	4.2	0.5	4.7	0.5	-0.4	0.7	No
Mobile	21.2	1.0	20.0	0.9	1.2	1.5	No
Satellite	11.4	0.8	13.3	0.8	-1.9	1.2	No
Other	2.6	0.4	3.4	0.5	-0.8	0.5	No
Number of computer types							
0 computer types	22.5	0.8	22.3	0.9	0.3	1.1	No
1 computer type	44.9	1.0	50.6	1.0	-5.7	1.4	Yes
2 computer types	30.7	1.0	25.6	0.9	5.0	1.2	Yes
3 computer types	1.9	0.3	1.5	0.3	0.5	0.4	No
Number of subscription types							
0 subscription types	8.4	0.5	3.8	0.4	4.6	0.6	Yes
1 subscription type	66.7	1.0	71.8	1.1	-5.1	1.5	Yes
2 subscription types	20.0	1.0	18.1	0.9	2.0	1.4	No
3 subscription types	4.8	0.5	6.3	0.5	-1.5	0.7	No
Number of broadband types[1]							
0 broadband types	14.6	0.7	8.4	0.5	6.2	0.9	Yes
1 broadband type	62.1	1.2	70.1	1.1	-7.9	1.7	Yes
2 broadband types	19.2	1.1	16.3	0.9	3.0	1.6	No
3 broadband types	4.0	0.5	5.2	0.6	-1.2	0.7	No

Source: 2010 American Community Survey Content Test.

1 The number of broadband types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

Table 7f. Rao-Scott Chi-Square of the Multiple Answer Computer and Internet Use Categories for Rural Areas (Use for RQ 7)

	Chi-Sq Statistic	Significant
Number of computer types	19.9	Yes
Number of subscription types	46.7	Yes
Number of broadband types	41.6	Yes

Source: 2010 American Community Survey Content Test.

Table 7g. Gross Difference Rates[1] for the Computer and Internet Categories for Urban Areas (Use for RQ 7)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	3.9	0.3	6.3	0.4	-2.4	0.5	Yes
Handheld	14.7	0.6	14.5	0.7	0.1	0.8	No
Other	7.1	0.6	5.5	0.5	1.6	0.9	No
Internet Access							
Access with a subscription	9.3	0.5	4.5	0.3	4.9	0.5	Yes
Access without a subscription	7.8	0.4	N/A	N/A	N/A	N/A	N/A
No Internet access	5.6	0.4	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	5.3	0.4	6.7	0.6	-1.4	0.6	No
DSL	15.9	0.8	17.5	0.9	-1.5	1.2	No
Cable	14.0	0.8	14.9	0.8	-0.9	1.2	No
Fiber-Optic	6.3	0.6	7.6	0.7	-1.3	0.9	No
Mobile	24.0	1.0	24.1	1.1	-0.1	1.4	No
Satellite	6.4	0.5	7.3	0.5	-0.9	0.7	No
Other	5.6	0.6	5.6	0.5	0.0	0.8	No

Source: 2010 American Community Survey Content Test.

1 The Gross Difference Rate (GDR) is the percentage of inconsistent answers between the original interview and the Content Follow-Up interview.

Table 7h. Gross Difference Rates[1] for the Computer and Internet Categories for Rural Areas (Use for RQ 7)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	5.4	0.8	7.5	0.8	-2.0	1.2	No
Handheld	12.9	1.0	13.7	1.4	-0.8	1.7	No
Other	6.4	0.9	5.6	0.8	0.7	1.2	No
Internet Access							
Access with a subscription	8.4	0.9	5.1	0.7	3.3	1.1	Yes
Access without a subscription	6.5	0.8	N/A	N/A	N/A	N/A	N/A
No Internet access	4.3	0.6	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	5.4	0.9	6.0	0.8	-0.6	1.2	No
DSL	13.1	1.1	13.1	1.3	0.0	1.5	No
Cable	13.4	1.3	12.8	1.4	0.5	1.8	No
Fiber-Optic	5.6	0.9	4.4	0.8	1.2	1.3	No
Mobile	21.7	1.7	19.0	1.7	2.7	2.2	No
Satellite	13.3	1.3	12.7	1.4	0.5	2.0	No
Other	6.4	1.0	7.9	1.2	-1.4	1.4	No

Source: 2010 American Community Survey Content Test.

1 The Gross Difference Rate (GDR) is the percentage of inconsistent answers between the original interview and the Content Follow-Up interview.

Table 7i. Index of Inconsistency[1] for the Computer and Internet Categories for Urban Areas (Use for RQ 7)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	11.9	0.9	18.1	1.0	-6.2	1.3	Yes
Handheld	30.1	1.2	30.5	1.5	-0.4	1.6	No
Other	78.3	4.3	84.5	4.6	-6.2	6.1	No
Aggregate (L-fold) Indices	33.9	0.9	34.9	0.9	-1.0	1.2	No
Internet Access							
Access with a subscription	22.6	1.0	11.4	0.8	11.2	1.2	Yes
Access without a subscription	76.6	3.6	N/A	N/A	N/A	N/A	N/A
No Internet access	15.5	1.0	N/A	N/A	N/A	N/A	N/A
Aggregate (L-fold) Indices	26.0	1.1	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	48.1	3.4	51.8	3.5	-3.7	5.1	No
DSL	33.0	1.6	35.7	1.8	-2.7	2.5	No
Cable	29.0	1.7	33.4	1.8	-4.4	2.7	No
Fiber-Optic	30.4	2.6	34.7	3.1	-4.3	4.3	No
Mobile	55.3	2.2	57.8	2.3	-2.4	3.3	No
Satellite	72.2	4.9	77.8	4.0	-5.7	6.0	No
Other	92.2	3.3	82.7	5.5	9.5	6.4	No
Aggregate (L-fold) Indices	58.5	1.1	63.1	1.0	-4.6	1.6	Yes

Source: 2010 American Community Survey Content Test.

1 The Index of Inconsistency (IOI) is the percentage of total variance due to the simple response variance and provides an estimate of the magnitude of response variability. The Census Bureau's general benchmark for reliability states that index values of less than 20 percent indicate low inconsistency, 20 to 50 percent indicate moderate inconsistency, and over 50 percent indicate high inconsistency.

Table 7j. Index of Inconsistency[1] for the Computer and Internet Categories for Rural Areas (Use for RQ 7)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	15.1	2.2	20.5	2.2	-5.4	3.1	No
Handheld	29.1	2.3	31.7	3.2	-2.6	3.7	No
Other	93.7	3.9	78.2	8.4	15.5	9.5	No
Aggregate (L-fold) Indices	34.0	1.8	34.8	2.1	-0.7	2.7	No
Internet Access							
Access with a subscription	19.7	1.9	12.1	1.5	7.5	2.4	Yes
Access without a subscription	74.8	6.7	N/A	N/A	N/A	N/A	N/A
No Internet access	11.2	1.4	N/A	N/A	N/A	N/A	N/A
Aggregate (L-fold) Indices	21.3	1.8	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	23.0	3.5	27.4	3.8	-4.4	4.9	No
DSL	26.6	2.2	26.3	2.6	0.3	3.1	No
Cable	27.5	2.7	26.3	2.8	1.2	3.6	No
Fiber-Optic	55.1	7.1	36.9	5.7	18.2	9.1	No
Mobile	55.5	4.0	45.4	4.0	10.0	5.4	No
Satellite	67.4	4.6	44.8	4.3	22.6	7.0	Yes
Other	72.4	7.4	84.3	5.5	-11.9	8.8	No
Aggregate (L-fold) Indices	57.2	1.6	55.4	1.5	1.8	1.9	No

Source: 2010 American Community Survey Content Test.

1 The Index of Inconsistency (IOI) is the percentage of total variance due to the simple response variance and provides an estimate of the magnitude of response variability. The Census Bureau's general benchmark for reliability states that index values of less than 20 percent indicate low inconsistency, 20 to 50 percent indicate moderate inconsistency, and over 50 percent indicate high inconsistency.

Table 8a. Item Missing Data Rates of the Computer and Internet Categories for MAIL Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types	2.9	0.2	3.5	0.2	-0.6	0.3	Yes
Desktop	3.4	0.2	3.9	0.2	-0.5	0.3	No
Handheld	15.2	0.4	25.3	0.5	-10.1	0.6	Yes
Other	44.9	0.6	48.9	0.6	-4.0	0.8	Yes
Internet Access[1]							
Yes	4.9	0.2	3.4	0.2	1.5	0.3	Yes
Invalid Rate - Access (Mail Only)[2]	0.1	0.0	0.0	0.0	0.1	0.0	Yes
Specification - Access (Mail Only)[3]	0.2	0.0	N/A	N/A	N/A	N/A	Yes
Error of Omission - (spec error universe)[4]	25.7	13.3	N/A	N/A	N/A	N/A	Yes
Subscription Types	1.4	0.1	1.4	0.1	-0.1	0.2	No
Dial-up	37.9	0.6	45.9	0.6	-8.0	0.8	Yes
DSL	28.0	0.6	33.8	0.6	-5.7	0.7	Yes
Cable	22.9	0.5	26.6	0.5	-3.7	0.7	Yes
Fiber-Optic	39.7	0.5	47.4	0.6	-7.7	0.7	Yes
Mobile	37.7	0.6	46.1	0.6	-8.3	0.8	Yes
Satellite	40.8	0.6	48.3	0.6	-7.5	0.8	Yes
Other	48.6	0.7	54.3	0.6	-5.7	0.9	Yes

Source: 2010 American Community Survey Content Test.

1 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who reponded "Yes."

2 Invalid rate - the proportion of households which reponded with both "Yes" and "No"

3 Specification error rates - the proportion of mail response households which responded to both "Yes, with a subscription" and "Yes, without a subscription" but not "Not access to the Internet at this house, apartment, or mobile home." This scenario is not possible in the CATI/CAPI since the instrument only allows one response. The significant difference of the specification error rates refer to the test estimates that differ from zero.

4 Error of omission rates - of the households which responded to both "Yes" questions but not the "No" question, the percentage of households which do not provide a valid "Yes" response to at least one Internet Subscription type and do not provide a codable write-in. The significant difference of the error of omission rates refer to the test estimates that differ from zero.

0.0 - rounds to zero

Table 8b. Item Missing Data Rates of the Computer and Internet Categories for CATI Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types	0.2	0.1	0.4	0.2	-0.2	0.2	No
Desktop	0.6	0.2	0.8	0.2	-0.2	0.3	No
Handheld	0.8	0.2	1.2	0.3	-0.4	0.3	No
Other	0.6	0.2	0.8	0.2	-0.2	0.3	No
Internet Access[1]							
Yes	1.8	0.3	0.6	0.2	1.2	0.4	Yes
Subscription Types	0.7	0.3	0.5	0.2	0.2	0.3	No
Dial-up	2.1	0.5	2.8	0.5	-0.7	0.7	No
DSL	4.3	0.7	4.3	0.6	0.0	0.8	No
Cable	3.5	0.6	3.2	0.6	0.3	0.8	No
Fiber-Optic	7.7	1.0	9.3	0.8	-1.5	1.4	No
Mobile	5.4	0.8	4.2	0.6	1.2	1.0	No
Satellite	3.0	0.6	2.5	0.4	0.5	0.8	No
Other	2.8	0.6	2.5	0.5	0.4	0.8	No

Source: 2010 American Community Survey Content Test.

1 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who reponded "Yes."

Table 8c. Item Missing Data Rates of the Computer and Internet Categories for CAPI Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types	2.6	0.4	2.3	0.3	0.4	0.5	No
Desktop	2.8	0.4	2.4	0.3	0.4	0.5	No
Handheld	2.9	0.4	3.1	0.3	-0.1	0.5	No
Other	3.2	0.4	2.9	0.3	0.3	0.5	No
Internet Access[1]							
Yes	3.6	0.5	2.1	0.3	1.5	0.6	Yes
Subscription Types	0.3	0.1	0.6	0.2	-0.3	0.2	No
Dial-up	0.6	0.2	1.3	0.3	-0.6	0.3	No
DSL	1.9	0.3	2.8	0.5	-0.9	0.5	No
Cable	1.4	0.3	2.5	0.4	-1.1	0.5	No
Fiber-Optic	2.9	0.4	4.2	0.5	-1.3	0.7	No
Mobile	2.3	0.5	2.5	0.4	-0.2	0.6	No
Satellite	1.0	0.2	1.7	0.3	-0.7	0.4	No
Other	0.8	0.2	1.7	0.4	-0.9	0.4	No

Source: 2010 American Community Survey Content Test.

1 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who reponded "Yes."

Table 8d. Response Distributions for Computer and Internet Categories for MAIL Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	79.8	0.4	79.4	0.4	0.4	0.6	No
Handheld	38.7	0.5	32.3	0.5	6.4	0.7	Yes
Other	2.4	0.2	1.3	0.1	1.1	0.2	Yes
Internet Access							
Access with a subscription	75.9	0.5	76.0	0.4	0.0	0.7	No
Access without a subscription	2.6	0.2	N/A	N/A	N/A	N/A	N/A
No Internet access	21.5	0.5	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	6.9	0.3	6.4	0.3	0.4	0.4	No
DSL	30.5	0.5	32.2	0.6	-1.7	0.8	Yes
Cable	44.8	0.6	49.5	0.6	-4.8	0.8	Yes
Fiber-Optic	7.0	0.3	7.2	0.3	-0.1	0.4	No
Mobile	18.3	0.4	16.2	0.4	2.1	0.6	Yes
Satellite	6.8	0.3	7.8	0.3	-1.0	0.4	Yes
Other	1.7	0.1	2.4	0.2	-0.6	0.2	Yes
Number of computer types							
0 computer types	18.5	0.4	19.2	0.4	-0.7	0.5	No
1 computer type	43.6	0.5	49.2	0.5	-5.7	0.7	Yes
2 computer types	36.5	0.5	31.0	0.5	5.6	0.7	Yes
3 computer types	1.4	0.1	0.6	0.1	0.8	0.1	Yes
Number of subscription types							
0 subscription types	11.2	0.4	5.3	0.2	5.9	0.4	Yes
1 subscription type	67.3	0.6	74.5	0.5	-7.2	0.7	Yes
2 subscription types	17.1	0.5	15.2	0.4	2.0	0.6	Yes
3 subscription types	4.3	0.2	5.1	0.2	-0.7	0.3	Yes
Number of broadband types[1]							
0 broadband types	13.6	0.4	6.8	0.3	6.8	0.4	Yes
1 broadband type	65.8	0.6	74.0	0.5	-8.2	0.6	Yes
2 broadband types	16.7	0.4	14.8	0.4	1.9	0.6	Yes
3 broadband types	3.9	0.2	4.4	0.3	-0.5	0.3	No

Source: 2010 American Community Survey Content Test.

1 The number of broadband types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

Table 8e. Rao-Scott Chi-Square of the Multiple Answer Computer and Internet Use Categories for MAIL Mode (Use for R

	Chi-Sq Statistic	Significant
Number of computer types	111.5	Yes
Number of subscription types	237.6	Yes
Number of broadband types	256.9	Yes

Source: 2010 American Community Survey Content Test.

Table 8f. Response Distributions for Computer and Internet Categories for CATI Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	75.5	1.2	76.4	0.9	-0.8	1.7	No
Handheld	34.2	1.2	30.4	1.1	3.8	1.7	Yes
Other	4.1	0.5	2.9	0.5	1.1	0.6	No
Internet Access							
Access with a subscription	66.3	1.2	74.9	1.0	-8.6	1.7	Yes
Access without a subscription	6.2	0.6	N/A	N/A	N/A	N/A	N/A
No Internet access	27.4	1.1	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	8.3	1.1	9.6	1.0	-1.3	1.3	No
DSL	48.2	1.6	47.7	1.4	0.5	2.2	No
Cable	52.3	1.8	53.4	1.5	-1.1	2.2	No
Fiber-Optic	10.3	1.0	9.1	1.0	1.2	1.5	No
Mobile	29.2	1.8	25.6	1.5	3.6	2.5	No
Satellite	5.2	0.7	5.2	0.7	0.0	0.9	No
Other	3.9	0.7	3.8	0.6	0.1	0.9	No
Number of computer types							
0 computer types	23.1	1.1	22.5	0.9	0.6	1.6	No
1 computer type	42.6	1.3	46.9	1.3	-4.3	1.9	Yes
2 computer types	31.8	1.2	29.2	1.1	2.6	1.7	No
3 computer types	2.6	0.4	1.5	0.3	1.1	0.5	Yes
Number of subscription types							
0 subscription types	2.0	0.4	2.4	0.5	-0.4	0.6	No
1 subscription type	53.1	1.6	55.1	1.6	-2.0	2.5	No
2 subscription types	32.6	1.6	31.7	1.6	0.9	2.4	No
3 subscription types	12.3	1.3	10.8	0.9	1.5	1.5	No
Number of broadband types[1]							
0 broadband types	6.4	0.9	7.0	0.8	-0.6	1.1	No
1 broadband type	52.3	1.8	54.9	1.6	-2.7	2.6	No
2 broadband types	31.8	1.7	29.5	1.5	2.3	2.4	No
3 broadband types	9.6	1.2	8.6	0.9	1.0	1.4	No

Source: 2010 American Community Survey Content Test.

1 The number of broadband types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

Table 8g. Rao-Scott Chi-Square of the Multiple Answer Computer and Internet Use Categories for CATI Mode (Use for R

	Chi-Sq Statistic	Significant
Number of computer types	9.0	Yes
Number of subscription types	1.7	No
Number of broadband types	2.0	No

Source: 2010 American Community Survey Content Test.

Table 8h. Response Distributions for Computer and Internet Categories for CAPI Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	73.7	1.0	70.3	0.9	3.4	1.3	Yes
Handheld	42.5	1.0	36.8	1.0	5.7	1.4	Yes
Other	6.4	0.6	4.4	0.4	2.0	0.7	Yes
Internet Access							
Access with a subscription	64.0	1.0	64.0	0.9	0.0	1.4	No
Access without a subscription	6.5	0.6	N/A	N/A	N/A	N/A	N/A
No Internet access	29.4	1.1	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	5.6	0.6	7.0	0.6	-1.4	0.8	No
DSL	37.3	1.2	36.9	1.2	0.5	1.7	No
Cable	53.6	1.4	57.7	1.3	-4.1	1.8	No
Fiber-Optic	8.2	0.8	7.1	0.7	1.1	1.1	No
Mobile	32.3	1.3	27.9	1.4	4.4	1.7	Yes
Satellite	5.3	0.7	5.8	0.6	-0.5	1.0	No
Other	3.3	0.5	2.7	0.4	0.6	0.7	No
Number of computer types							
0 computer types	22.3	0.9	25.1	0.8	-2.8	1.2	Yes
1 computer type	37.0	1.0	40.8	0.9	-3.8	1.2	Yes
2 computer types	36.5	1.0	31.6	1.0	5.0	1.4	Yes
3 computer types	4.2	0.5	2.5	0.3	1.7	0.6	Yes
Number of subscription types							
0 subscription types	1.3	0.3	1.7	0.3	-0.5	0.4	No
1 subscription type	61.6	1.4	61.5	1.4	0.1	2.0	No
2 subscription types	29.4	1.3	28.3	1.2	1.0	1.8	No
3 subscription types	7.8	0.7	8.5	0.9	-0.7	1.0	No
Number of broadband types[1]							
0 broadband types	4.9	0.6	5.2	0.5	-0.3	0.8	No
1 broadband type	60.4	1.4	61.5	1.4	-1.1	2.2	No
2 broadband types	28.3	1.3	26.4	1.1	1.9	1.7	No
3 broadband types	6.4	0.7	6.9	0.8	-0.5	1.1	No

Source: 2010 American Community Survey Content Test.

1 The number of broadband types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

Table 8i. Rao-Scott Chi-Square of the Multiple Answer Computer and Internet Use Categories for CAPI Mode (Use for RQ

	Chi-Sq Statistic	Significant
Number of computer types	26.3	Yes
Number of subscription types	1.8	No
Number of broadband types	1.3	No

Source: 2010 American Community Survey Content Test.

Table 8j. Gross Difference Rates[1] for the Computer and Internet Categories for MAIL Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	3.3	0.2	5.1	0.3	-1.8	0.4	Yes
Handheld	14.8	0.5	12.9	0.5	1.9	0.7	Yes
Other	6.2	0.5	4.3	0.4	2.0	0.7	Yes
Internet Access							
Access with a subscription	7.7	0.4	3.5	0.3	4.2	0.5	Yes
Access without a subscription	6.2	0.3	N/A	N/A	N/A	N/A	N/A
No Internet access	4.0	0.3	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	5.5	0.4	6.4	0.6	-0.9	0.7	No
DSL	13.0	0.6	13.2	0.7	-0.2	0.8	No
Cable	11.7	0.6	12.1	0.6	-0.5	0.9	No
Fiber-Optic	6.3	0.5	7.0	0.6	-0.8	0.8	No
Mobile	20.8	0.8	22.3	1.0	-1.5	1.2	No
Satellite	10.0	0.6	12.6	0.8	-2.6	1.0	Yes
Other	4.9	0.4	6.5	0.5	-1.5	0.7	No

Source: 2010 American Community Survey Content Test.

1 The Gross Difference Rate (GDR) is the percentage of inconsistent answers between the original interview and the Content Follow-Up interview.

Table 8k. Gross Difference Rates[1] for the Computer and Internet Categories for CATI Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	4.3	0.7	7.3	0.9	-3.0	1.1	Yes
Handheld	13.8	1.3	13.0	1.2	0.8	1.9	No
Other	4.7	0.8	4.3	0.7	0.4	1.1	No
Internet Access							
Access with a subscription	8.7	1.0	4.1	0.7	4.6	1.2	Yes
Access without a subscription	8.0	1.0	N/A	N/A	N/A	N/A	N/A
No Internet access	3.9	0.7	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	5.8	1.0	7.8	1.2	-2.0	1.5	No
DSL	19.8	1.8	22.3	1.8	-2.5	2.6	No
Cable	18.4	1.9	20.3	1.5	-1.9	2.5	No
Fiber-Optic	7.9	1.5	9.2	1.5	-1.4	1.9	No
Mobile	24.3	2.2	23.4	2.0	0.9	3.1	No
Satellite	4.7	1.1	6.3	1.1	-1.6	1.6	No
Other	6.4	1.3	7.6	1.2	-1.1	1.7	No

Source: 2010 American Community Survey Content Test.

1 The Gross Difference Rate (GDR) is the percentage of inconsistent answers between the original interview and the Content Follow-Up interview.

Table 8l. Gross Difference Rates[1] for the Computer and Internet Categories for CAPI Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	5.9	0.6	8.5	0.8	-2.7	0.9	Yes
Handheld	13.7	1.1	16.4	1.4	-2.7	1.7	No
Other	7.9	1.0	6.8	0.8	1.2	1.4	No
Internet Access							
Access with a subscription	11.5	0.9	6.6	0.7	4.9	1.1	Yes
Access without a subscription	9.6	0.8	N/A	N/A	N/A	N/A	N/A
No Internet access	7.7	0.8	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	4.8	0.8	6.5	1.0	-1.7	1.2	No
DSL	18.6	1.6	19.8	1.8	-1.2	2.6	No
Cable	16.8	1.6	16.2	1.6	0.6	2.3	No
Fiber-Optic	5.6	1.1	5.9	1.1	-0.3	1.7	No
Mobile	27.1	2.1	23.4	1.8	3.7	2.6	No
Satellite	6.4	0.8	5.5	0.6	0.9	1.0	No
Other	6.7	1.1	5.4	0.8	1.4	1.4	No

Source: 2010 American Community Survey Content Test.

1 The Gross Difference Rate (GDR) is the percentage of inconsistent answers between the original interview and the Content Follow-Up interview.

Table 8m. Index of Inconsistency[1] for the Computer and Internet Categories for MAIL Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	10.8	0.8	16.0	1.0	-5.2	1.3	Yes
Handheld	30.9	1.1	27.3	1.2	3.6	1.5	Yes
Other	85.9	3.4	83.4	4.2	2.5	5.5	No
Aggregate (L-fold) Indices	33.3	0.9	31.5	0.8	1.8	1.2	No
Internet Access							
Access with a subscription	20.3	1.0	9.7	0.7	10.6	1.3	Yes
Access without a subscription	80.9	2.9	N/A	N/A	N/A	N/A	N/A
No Internet access	11.9	0.7	N/A	N/A	N/A	N/A	N/A
Aggregate (L-fold) Indices	22.6	0.9	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	31.6	2.4	33.7	3.0	-2.2	3.7	No
DSL	26.4	1.2	26.3	1.4	0.1	1.6	No
Cable	23.6	1.1	26.6	1.4	-3.0	1.9	No
Fiber-Optic	31.2	2.5	29.3	2.3	1.8	3.7	No
Mobile	50.5	1.8	53.7	2.4	-3.2	2.9	No
Satellite	69.9	3.1	69.8	3.5	0.1	5.1	No
Other	78.5	4.6	80.5	4.4	-2.0	6.7	No
Aggregate (L-fold) Indices	55.6	0.8	59.0	0.9	-3.4	1.2	Yes

Source: 2010 American Community Survey Content Test.

1 The Index of Inconsistency (IOI) is the percentage of total variance due to the simple response variance and provides an estimate of the magnitude of response variability. The Census Bureau's general benchmark for reliability states that index values of less than 20 percent indicate low inconsistency, 20 to 50 percent indicate moderate inconsistency, and over 50 percent indicate high inconsistency.

Table 8n. Index of Inconsistency[1] for the Computer and Internet Categories for CATI Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	11.3	1.9	19.3	2.3	-8.0	2.7	Yes
Handheld	31.3	2.8	31.3	3.0	0.0	4.4	No
Other	75.2	9.2	70.5	8.6	4.7	11.4	No
Aggregate (L-fold) Indices	31.7	2.2	34.6	2.0	-2.9	3.0	No
Internet Access							
Access with a subscription	19.5	2.2	10.3	1.7	9.2	2.8	Yes
Access without a subscription	87.1	6.1	N/A	N/A	N/A	N/A	N/A
No Internet access	9.6	1.7	N/A	N/A	N/A	N/A	N/A
Aggregate (L-fold) Indices	21.7	2.2	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	34.6	6.8	42.6	5.4	-8.0	8.7	No
DSL	39.6	3.7	44.3	3.6	-4.6	5.2	No
Cable	36.9	3.8	40.6	3.1	-3.7	5.0	No
Fiber-Optic	37.5	6.5	44.4	6.7	-6.9	8.8	No
Mobile	56.1	5.1	60.3	4.7	-4.2	7.2	No
Satellite	51.5	10.0	62.0	9.2	-10.5	12.9	No
Other	82.4	11.1	87.3	8.4	-4.9	14.8	No
Aggregate (L-fold) Indices	63.9	2.4	67.1	2.3	-3.2	3.4	No

Source: 2010 American Community Survey Content Test.

1 The Index of Inconsistency (IOI) is the percentage of total variance due to the simple response variance and provides an estimate of the magnitude of response variability. The Census Bureau's general benchmark for reliability states that index values of less than 20 percent indicate low inconsistency, 20 to 50 percent indicate moderate inconsistency, and over 50 percent indicate high inconsistency.

Table 8o. Index of Inconsistency[1] for the Computer and Internet Categories for CAPI Mode (Use for RQ 8)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	15.6	1.6	22.1	2.0	-6.5	2.3	Yes
Handheld	28.2	2.3	34.5	2.9	-6.4	3.4	No
Other	79.2	6.1	84.7	6.6	-5.5	8.7	No
Aggregate (L-fold) Indices	35.4	1.8	39.6	2.0	-4.2	2.6	No
Internet Access							
Access with a subscription	25.1	1.9	14.7	1.7	10.4	2.4	Yes
Access without a subscription	71.4	5.4	N/A	N/A	N/A	N/A	N/A
No Internet access	19.0	1.9	N/A	N/A	N/A	N/A	N/A
Aggregate (L-fold) Indices	28.8	1.7	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	51.9	6.8	63.7	5.3	-11.8	8.8	No
DSL	39.5	3.4	42.1	3.8	-2.6	5.5	No
Cable	33.9	3.3	33.2	3.2	0.8	4.7	No
Fiber-Optic	38.3	6.5	42.6	7.5	-4.3	10.2	No
Mobile	61.7	4.5	54.9	4.1	6.8	5.8	No
Satellite	69.6	7.3	42.3	5.7	27.3	9.2	Yes
Other	94.7	4.8	84.9	9.5	9.8	10.7	No
Aggregate (L-fold) Indices	62.7	2.5	63.6	2.3	-0.8	3.2	No

Source: 2010 American Community Survey Content Test.

1 The Index of Inconsistency (IOI) is the percentage of total variance due to the simple response variance and provides an estimate of the magnitude of response variability. The Census Bureau's general benchmark for reliability states that index values of less than 20 percent indicate low inconsistency, 20 to 50 percent indicate moderate inconsistency, and over 50 percent indicate high inconsistency.

Table 9a. Item Missing Data Rates of the Computer and Internet Categories for HIGH Stratum (Use for RQ 9)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types	2.5	0.2	2.7	0.2	-0.1	0.3	No
Desktop	2.9	0.2	3.0	0.2	-0.1	0.3	No
Handheld	10.4	0.4	16.7	0.4	-6.4	0.6	Yes
Other	29.7	0.6	31.8	0.6	-2.1	0.8	Yes
Internet Access[1]							
Yes	4.1	0.3	2.6	0.2	1.5	0.4	Yes
Subscription Types	1.1	0.1	1.2	0.1	-0.1	0.2	No
Dial-up	26.4	0.5	30.9	0.6	-4.5	0.7	Yes
DSL	20.2	0.5	23.6	0.5	-3.4	0.6	Yes
Cable	16.2	0.4	18.2	0.5	-2.0	0.7	Yes
Fiber-Optic	28.4	0.5	33.0	0.6	-4.6	0.8	Yes
Mobile	26.9	0.5	31.4	0.6	-4.5	0.8	Yes
Satellite	28.6	0.6	32.6	0.6	-4.0	0.8	Yes
Other	33.8	0.6	36.4	0.7	-2.6	0.9	Yes

Source: 2010 American Community Survey Content Test.

1 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who reponded "Yes."

Table 9b. Item Missing Data Rates of the Computer and Internet Categories for LOW Stratum (Use for RQ 9)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types	2.7	0.2	3.2	0.2	-0.5	0.2	Yes
Desktop	3.1	0.2	3.5	0.2	-0.4	0.2	No
Handheld	8.1	0.2	12.3	0.3	-4.2	0.3	Yes
Other	18.5	0.4	20.5	0.4	-2.0	0.5	Yes
Internet Access[1]							
Yes	4.6	0.2	3.1	0.1	1.5	0.2	Yes
Subscription Types	0.8	0.1	1.0	0.1	-0.2	0.1	No
Dial-up	18.7	0.4	21.5	0.5	-2.9	0.7	Yes
DSL	14.0	0.4	16.0	0.5	-2.1	0.6	Yes
Cable	12.3	0.4	14.2	0.4	-1.9	0.5	Yes
Fiber-Optic	21.0	0.5	24.4	0.5	-3.4	0.7	Yes
Mobile	19.2	0.4	22.2	0.5	-3.0	0.7	Yes
Satellite	19.6	0.4	22.3	0.5	-2.7	0.7	Yes
Other	23.2	0.5	25.3	0.5	-2.1	0.7	Yes

Source: 2010 American Community Survey Content Test.

1 For the Test version, the percentage represents those who answered the category "Yes, with a subscription to an Internet service" and for the Control version, the percentage represents those who reponded "Yes."

Table 9c. Response Distributions for Computer and Internet Categories for HIGH Stratum (Use for RQ 9)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	80.4	0.6	79.3	0.5	1.1	0.7	No
Handheld	41.2	0.6	35.3	0.5	5.9	0.7	Yes
Other	3.9	0.3	2.4	0.2	1.5	0.4	Yes
Internet Access							
Access with a subscription	74.9	0.6	75.5	0.6	-0.7	0.9	No
Access without a subscription	3.8	0.3	N/A	N/A	N/A	N/A	N/A
No Internet access	21.3	0.6	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	6.4	0.3	6.3	0.3	0.1	0.4	No
DSL	33.3	0.6	33.9	0.6	-0.6	0.9	No
Cable	48.5	0.6	53.7	0.7	-5.3	0.9	Yes
Fiber-Optic	7.9	0.4	7.7	0.3	0.3	0.5	No
Mobile	23.0	0.5	20.6	0.6	2.5	0.9	Yes
Satellite	6.1	0.3	6.8	0.4	-0.7	0.5	No
Other	2.2	0.2	2.5	0.2	-0.3	0.3	No
Number of computer types							
0 computer types	17.5	0.5	18.7	0.4	-1.2	0.7	No
1 computer type	42.0	0.6	46.9	0.6	-4.9	0.8	Yes
2 computer types	38.0	0.6	33.1	0.6	4.9	0.7	Yes
3 computer types	2.6	0.3	1.3	0.2	1.2	0.3	Yes
Number of subscription types							
0 subscription types	7.2	0.3	3.4	0.2	3.7	0.3	Yes
1 subscription type	65.4	0.6	69.6	0.7	-4.2	1.0	Yes
2 subscription types	21.7	0.6	20.6	0.6	1.1	0.9	No
3 subscription types	5.7	0.3	6.3	0.4	-0.6	0.5	No
Number of broadband types[1]							
0 broadband types	9.8	0.4	5.4	0.3	4.4	0.4	Yes
1 broadband type	63.9	0.7	69.3	0.7	-5.4	1.0	Yes
2 broadband types	21.3	0.6	19.8	0.6	1.6	0.8	No
3 broadband types	4.9	0.3	5.5	0.4	-0.5	0.5	No

Source: 2010 American Community Survey Content Test.

1 The number of broadband types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

Table 9d. Rao-Scott Chi-Square of the Multiple Answer Computer and Internet Use Categories for HIGH Stratum (Use for RQ 9)

	Chi-Sq Statistic	Significant
Number of computer types	58.5	Yes
Number of subscription types	81.3	Yes
Number of broadband types	75.9	Yes

Source: 2010 American Community Survey Content Test.

Table 9e. Response Distributions for Computer and Internet Categories for LOW Stratum (Use for RQ 9)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	68.0	0.6	65.7	0.6	2.2	0.8	Yes
Handheld	34.9	0.6	29.2	0.5	5.7	0.8	Yes
Other	4.0	0.2	2.9	0.2	1.1	0.3	Yes
Internet Access							
Access with a subscription	59.3	0.6	60.1	0.7	-0.7	0.9	No
Access without a subscription	5.6	0.3	N/A	N/A	N/A	N/A	N/A
No Internet access	35.1	0.5	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	7.6	0.4	9.0	0.4	-1.4	0.5	Yes
DSL	35.1	0.6	38.4	0.6	-3.3	0.8	Yes
Cable	45.4	0.7	47.2	0.7	-1.8	0.9	No
Fiber-Optic	6.3	0.3	5.9	0.3	0.4	0.4	No
Mobile	23.1	0.5	20.3	0.6	2.8	0.6	Yes
Satellite	6.7	0.3	7.6	0.4	-0.9	0.5	No
Other	2.7	0.2	2.8	0.2	-0.1	0.3	No
Number of computer types							
0 computer types	28.2	0.6	30.1	0.6	-1.9	0.8	Yes
1 computer type	38.9	0.6	43.5	0.6	-4.6	0.8	Yes
2 computer types	30.6	0.5	25.0	0.4	5.7	0.7	Yes
3 computer types	2.2	0.2	1.5	0.1	0.8	0.2	Yes
Number of subscription types							
0 subscription types	9.7	0.3	5.9	0.2	3.8	0.4	Yes
1 subscription type	62.3	0.6	66.8	0.5	-4.5	0.8	Yes
2 subscription types	21.6	0.5	19.9	0.5	1.7	0.7	Yes
3 subscription types	6.4	0.3	7.4	0.3	-1.0	0.5	No
Number of broadband types[1]							
0 broadband types	13.2	0.4	9.5	0.3	3.7	0.5	Yes
1 broadband type	60.8	0.6	65.7	0.6	-4.9	0.8	Yes
2 broadband types	20.6	0.5	19.1	0.5	1.6	0.7	Yes
3 broadband types	5.3	0.3	5.7	0.3	-0.4	0.4	No

Source: 2010 American Community Survey Content Test.

1 The number of broadband types include the following Subscription Types: DSL, cable, fiber-optic, mobile, and satellite.

Table 9f. Rao-Scott Chi-Square of the Multiple Answer Computer and Internet Use Categories for LOW Stratum (Use for RQ 9)

	Chi-Sq Statistic	Significant
Number of computer types	77.2	Yes
Number of subscription types	89.8	Yes
Number of broadband types	61.8	Yes

Source: 2010 American Community Survey Content Test.

Table 9g. Gross Difference Rates[1] for the Computer and Internet Categories for HIGH Stratum (Use for RQ 9)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	3.4	0.4	5.8	0.4	-2.4	0.5	Yes
Handheld	13.6	0.7	14.0	0.8	-0.4	0.9	No
Other	7.3	0.7	5.8	0.6	1.5	1.0	No
Internet Access							
Access with a subscription	8.1	0.5	3.9	0.4	4.1	0.6	Yes
Access without a subscription	7.1	0.5	N/A	N/A	N/A	N/A	N/A
No Internet access	4.2	0.4	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	4.5	0.5	5.7	0.6	-1.2	0.8	No
DSL	14.3	0.8	15.9	1.0	-1.6	1.3	No
Cable	12.8	0.8	12.8	0.8	0.0	1.1	No
Fiber-Optic	5.9	0.6	6.7	0.7	-0.8	1.0	No
Mobile	23.6	1.1	22.5	1.1	1.2	1.5	No
Satellite	7.8	0.6	8.7	0.6	-0.9	0.8	No
Other	5.7	0.7	6.2	0.6	-0.5	0.9	No

Source: 2010 American Community Survey Content Test.

1 The Gross Difference Rate (GDR) is the percentage of inconsistent answers between the original interview and the Content Follow-Up interview.

Table 9h. Gross Difference Rates[1] for the Computer and Internet Categories for LOW Stratum (Use for RQ 9)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	7.1	0.4	8.9	0.5	-1.8	0.7	Yes
Handheld	16.6	0.7	15.3	0.7	1.2	0.8	No
Other	5.6	0.5	4.5	0.4	1.1	0.6	No
Internet Access							
Access with a subscription	12.2	0.6	6.8	0.4	5.4	0.7	Yes
Access without a subscription	8.8	0.5	N/A	N/A	N/A	N/A	N/A
No Internet access	8.5	0.5	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	7.8	0.6	9.3	0.6	-1.5	0.9	No
DSL	19.9	1.0	19.1	1.0	0.9	1.6	No
Cable	18.2	1.0	20.0	1.1	-1.8	1.6	No
Fiber-Optic	7.0	0.7	7.0	0.6	0.0	0.9	No
Mobile	23.0	1.0	24.4	1.0	-1.4	1.3	No
Satellite	9.0	0.6	9.0	0.7	0.1	0.9	No
Other	6.1	0.5	5.8	0.6	0.4	0.8	No

Source: 2010 American Community Survey Content Test.

1 The Gross Difference Rate (GDR) is the percentage of inconsistent answers between the original interview and the Content Follow-Up interview.

Table 9i. Index of Inconsistency[1] for the Computer and Internet Categories for HIGH Stratum (Use for RQ 9)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	11.1	1.2	18.2	1.2	-7.0	1.7	Yes
Handheld	27.9	1.4	29.2	1.7	-1.3	1.9	No
Other	83.9	4.7	85.1	5.1	-1.2	7.1	No
Aggregate (L-fold) Indices	32.8	1.1	34.3	1.1	-1.5	1.5	No
Internet Access							
Access with a subscription	21.1	1.2	10.8	1.0	10.3	1.5	Yes
Access without a subscription	75.2	4.3	N/A	N/A	N/A	N/A	N/A
No Internet access	12.8	1.1	N/A	N/A	N/A	N/A	N/A
Aggregate (L-fold) Indices	24.0	1.1	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	32.3	3.0	40.9	3.6	-8.6	5.2	No
DSL	29.3	1.5	32.2	1.9	-2.8	2.6	No
Cable	25.9	1.6	27.5	1.6	-1.6	2.4	No
Fiber-Optic	31.4	2.8	32.5	3.1	-1.0	4.5	No
Mobile	55.1	2.5	53.1	2.5	2.1	3.4	No
Satellite	67.3	3.6	60.2	4.3	7.1	5.9	No
Other	85.5	4.6	81.3	4.8	4.2	6.7	No
Aggregate (L-fold) Indices	56.5	1.0	59.6	1.0	-3.1	1.6	Yes

Source: 2010 American Community Survey Content Test.

1 The Index of Inconsistency (IOI) is the percentage of total variance due to the simple response variance and provides an estimate of the magnitude of response variability. The Census Bureau's general benchmark for reliability states that index values of less than 20 percent indicate low inconsistency, 20 to 50 percent indicate moderate inconsistency, and over 50 percent indicate high inconsistency.

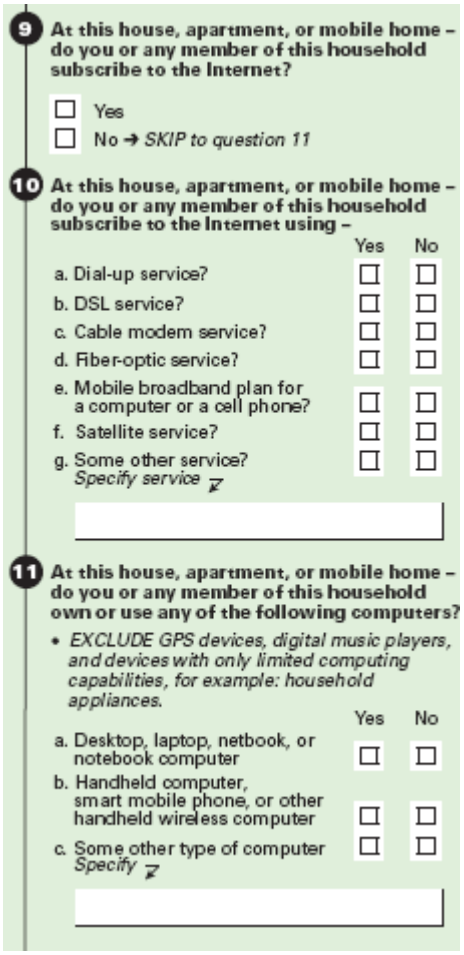
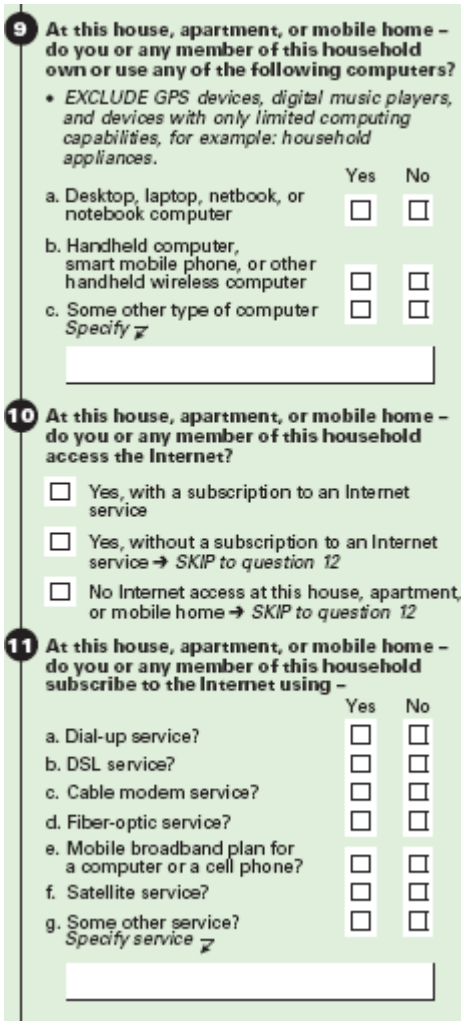
Table 9j. Index of Inconsistency[1] for the Computer and Internet Categories for LOW Stratum (Use for RQ 9)

	Test (%)	Standard Error (%)	Control (%)	Standard Error (%)	Test - Control (%)	Standard Error (%)	Significant
Computer Types							
Desktop	16.5	1.0	20.5	1.1	-3.9	1.6	Yes
Handheld	36.2	1.5	35.5	1.6	0.7	1.8	No
Other	73.8	4.6	75.8	4.1	-2.0	6.2	No
Aggregate (L-fold) Indices	37.4	1.0	36.3	0.9	1.1	1.4	No
Internet Access							
Access with a subscription	25.1	1.2	14.3	0.9	10.8	1.4	Yes
Access without a subscription	80.0	2.9	N/A	N/A	N/A	N/A	N/A
No Internet access	18.7	1.1	N/A	N/A	N/A	N/A	N/A
Aggregate (L-fold) Indices	28.1	1.1	N/A	N/A	N/A	N/A	N/A
Subscription Types							
Dial-up	50.3	3.2	49.3	3.4	1.0	4.8	No
DSL	41.3	2.1	38.4	2.1	2.9	3.2	No
Cable	36.4	2.0	40.1	2.1	-3.7	3.1	No
Fiber-Optic	44.9	4.0	45.8	3.8	-0.9	5.2	No
Mobile	56.0	2.4	61.2	2.6	-5.3	3.0	No
Satellite	72.2	3.1	55.9	3.5	16.3	4.3	Yes
Other	87.3	4.4	90.5	4.4	-3.2	6.4	No
Aggregate (L-fold) Indices	63.9	1.0	66.2	1.1	-2.3	1.7	No

Source: 2010 American Community Survey Content Test.

1 The Index of Inconsistency (IOI) is the percentage of total variance due to the simple response variance and provides an estimate of the magnitude of response variability. The Census Bureau's general benchmark for reliability states that index values of less than 20 percent indicate low inconsistency, 20 to 50 percent indicate moderate inconsistency, and over 50 percent indicate high inconsistency.

Appendix B: Images of the Mail Versions of the Control and Test Questions

ACS Control Version	ACS Test Version
	

Appendix C: CATI and CAPI Versions of the Control and Test Questions

ACS Control Version
Q9. **At this [house/apartment/mobile home] do you or any member of this household subscribe to the Internet?** Yes No [*Skip to Q11a]* Q10a. **At this [house/apartment/mobile home] do you or any member of this household subscribe to the Internet using a dial-up service?** Yes No Q10b. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a DSL service?** Yes No Q10c. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a cable-modem service?** Yes No Q10d. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a fiber-optic service**? Yes No Q10e. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a mobile broadband plan for a computer or a cell phone?** Yes No Q10f. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a satellite service?** Yes No

ACS Control Version

Q10g. At this [house/apartment/mobile home] **Do you or any member of this household subscribe to the Internet using some other service?**

Yes [Go to *Q10h*]
No [Go to *Q11a*]

Q10h. **What is this other type of Internet service?**

_____

Q11a. **For the next few questions about computers, EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.**

At this [house/apartment/mobile home] do you or any member of this household own or use a desktop, laptop, netbook, or notebook computer?

Yes
No

Q11b. At this [house/apartment/mobile home] **Do you or any member of this household own or use a handheld computer, smart mobile phone, or other handheld wireless computer?**

FR Instruction: EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.

Yes
No

Q11c. At this [house/apartment/mobile home] **Do you or any member of this household own or use some other type of computer?**

FR Instruction: EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.

Yes [*Go to Q11d]*
No [*Go to Q12]*

Q11d. **What is this other type of computer?**

FR Instruction: EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.

_____

ACS Test Version

Q9a. **For the next few questions about computers, EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.**

At this [house/apartment/mobile home] do you or any member of this household own or use a desktop, laptop, netbook, or notebook computer?

Yes
No

Q9b. **At this [house/apartment/mobile home] Do you or any member of this household own or use a handheld computer, smart mobile phone, or other handheld wireless computer?**

FR Instruction: EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.

Yes
No

Q9c. **At this [house/apartment/mobile home] Do you or any member of this household own or use some other type of computer?**

FR Instruction: EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.

Yes [Go to *Q9d*]
No [Go to *Q10a*]

Q9d. **What is this other type of computer?**

FR Instruction: EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.

_____

Q10a. **At this [house/apartment/mobile home] do you or any member of this household access the Internet?**

Yes
No -> *Skip to Q12*

Q10b. **At this [house/apartment/mobile home] Do you or any member of this household access the Internet with or without a subscription to an Internet service?**

With a subscription to an Internet service
Without a subscription to an Internet service -> *Skip to Q12*

ACS Test Version

Q11a. **At this [house/apartment/mobile home] do you or any member of this household subscribe to the Internet using a dial-up service?**

Yes
No

Q11b. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a DSL service?**

Yes
No

Q11c. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a cable-modem service?**

Yes
No

Q11d. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a fiber-optic service?**

Yes
No

Q11e. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a mobile broadband plan for a computer or a cell phone?**

Yes
No

Q11f. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using a satellite service?**

Yes
No

Q11g. **At this [house/apartment/mobile home] Do you or any member of this household subscribe to the Internet using some other service?**

Yes [Go to *Q11h*]
No [Go to *Q12*]

Q11h. **What is this other type of Internet service?**
_____

Current Population Survey 2010 Questionnaires

COMP1 **At home, [do you / do you or any member of this household] own or use any of the following computers?**

<1> A desktop, laptop, netbook, or notebook computer
<2> A handheld computer, smart mobile phone, or other handheld wireless computer
<3> Some other type of computer (Please Specify) **(Go To COMP1s)**
<4> Do not own a computer

COMP1s **What is this other type of computer?**

NET2a **At home, [do you / do you or any member of this household] access the Internet?**

<1> Yes **(Skip to N2WHO)**
<2> No **(Skip to NET4a1)**

N2WHO **Who is that?** Enter person's line number (1-16)

NET2b **At home, [do you / does this household] access the Internet with or without a subscription to an Internet service?**

<1> With a subscription to an Internet service
<2> Without a subscription to an Internet service

SERV3 **At home, [do you / does this household] access the Internet using-**

<1> Dial-up service **(Skip to NET4a**)
<2> DSL service **(skip to NET5a)**
<3> Cable modem service **(skip to NET5a)**
<4> Fiber-optic service **(skip to NET5a)**
<5> Mobile broadband plan for a computer or a cell phone **(skip to NET5a)**
<6> Satellite service **(skip to NET5a)**
<7> Some other service **(skip to SERVsp)**

SERVsp **What is this other type of Internet service?**

NET4a **What is the main reason that you do not have high-speed (that is, faster than dial-up) Internet access at home?**

<1> Don't need it, not interested **(Go To NET5a)**
<2> Too expensive **(Go To NET4b)**
<3> Can use it somewhere else **(Go To NET5a)**
<4> Not available in area **(Go To NET5a)**
<5> Computer inadequate **(Go To NET5a)**
<6> Other reason(s) **(Go To NET4sp)**

NET4sp **What other reasons?**

NET4a1 **What is the main reason that you do not have Internet access at home?**

<1> Don't need it, not interested **(Go To NET5a)**
<2> Too expensive **(Go To NET4b)**
<3> Can use it somewhere else **(Go To NET5a)**
<4> Not available in area **(Go To NET5a)**
<5> No Computer or Computer inadequate **(Go To NET5a)**
<6> Other reason(s) **(Go To N4a1sp)**

N4a1sp **What other reasons?**

NET4b **What costs are you most concerned about?**

<1> Cost of the computer and/or other hardware (e.g., modem) **(Go to NET5a)**
<2> Cost of installing internet service **(Go to NET5a)**
<3> Cost of monthly internet service **(Go to NET5a)**
<4> Some other cost **(Go to N4bsp)**

N4bsp **What is that other cost?**

NET5a **^NETFILL,[do you \ do you or any member of this household] access the Internet at any location outside the home?**

<1> Yes **(Go To NET6) (If NUMHOU=1 Go To <NET7>**
Else If NUMHOU>1 Go To <NET6>)
<2> No **(Go To END)**

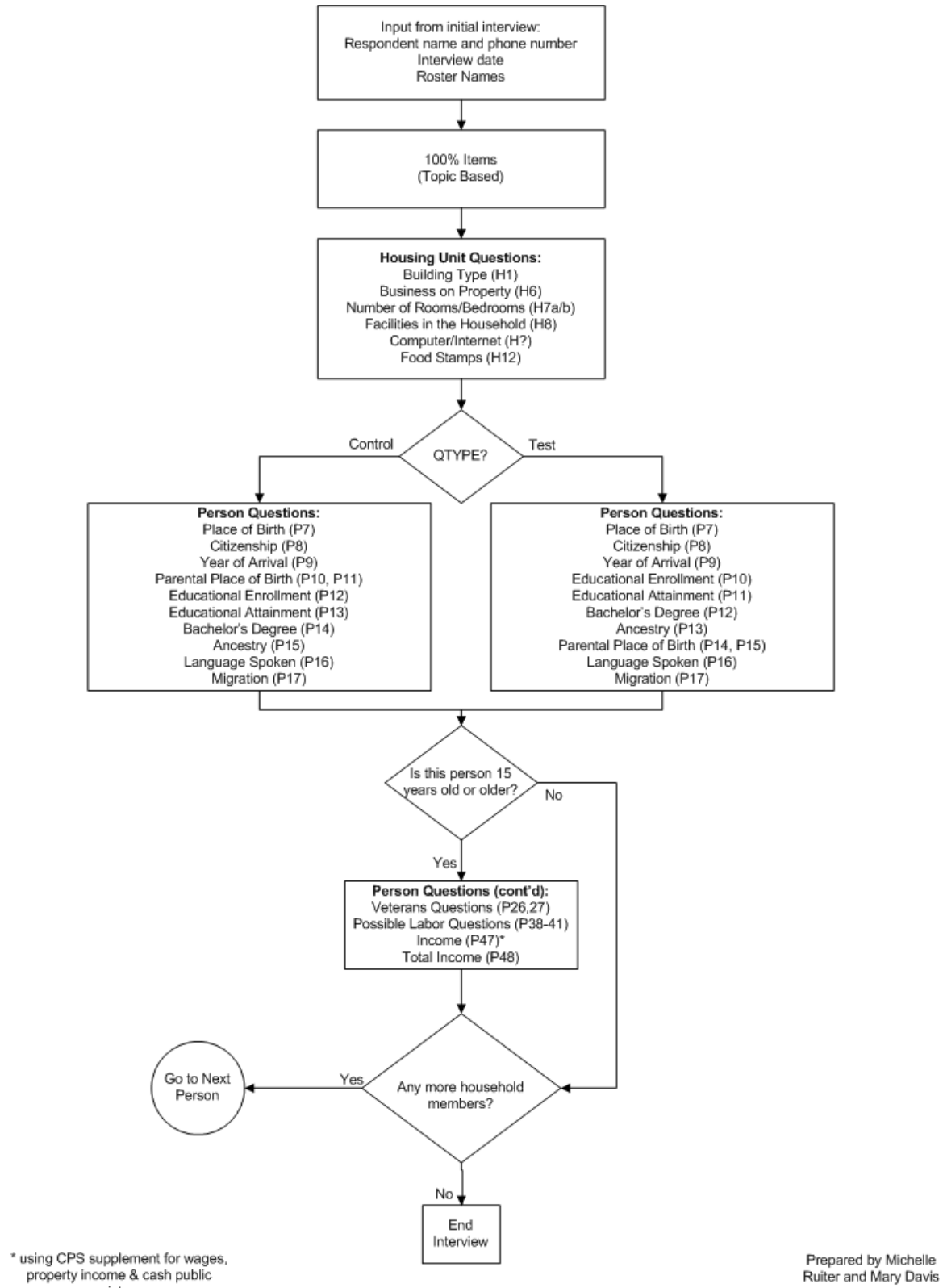
NET6 **Who is that?** Enter persons line number (1-16)

NET7 **[Do you / Do you or any member of this household] access the Internet at any of the following locations outside the home?**

<1> Workplace **(Go To End)**
<2> School **(Go To End)**
<3> Public library **(Go To End)**
<4> Community center **(Go To End)**
<5> Internet café / coffee shop in your area **(Go To End)**
<6> Someone else's house **(Go To End)**
<7> Another place outside the home **(Go To NET7sp)**

NET7sp **What other place outside the home?**

Appendix D: Flow of the Content Follow-Up



Appendix E: Information Page

Research Questions & Evaluation Measures:

No.	Research Questions	Evaluation Measures
1.	Does either version of the computer ownership and Internet subscription questions have lower item missing data rates?	• Compare the item missing data rates of the two versions.
2.	Do the two versions of the computer ownership and Internet subscription questions have similar or different response distributions?	• Compare the response distributions of the two versions.
3.	Which version results in more reliable estimates (at equal levels of detail)?	• Compare the gross difference rates and indexes of inconsistency of the two versions, using data obtained from the CFU, for individual and comparable response categories.
4.	Are the relative estimates of computer ownership and Internet subscription roughly comparable to existing data sources? Note: The comparisons need to be interpreted cautiously because of the different survey designs and universes as well as the age of the comparable data, given that this is a very time-sensitive topic.	• Compare the computer ownership estimates to similar statistics from the 2003 CPS Computer and Internet Supplement data and 2004 SIPP Wave 5 data to see if the Content Test statistics are roughly similar. • Compare the Internet subscription estimates to similar statistics from the 2007 CPS Computer and Internet Supplement to see if the Content Test statistics are roughly similar.
5.	For the write-in responses to the "other" categories, is there a frequent response that indicates a need to edit the instructions and/or the examples given for a response category?	• When applicable, evaluate the frequencies of the coded responses individually and relative to the overall distribution for the question.
6.	For each mode of data collection, does either version have lower item missing data rates?	• For each mode of data collection, compare the item missing data rates of the two versions.
7.	For each mode of data collection, do the two versions have similar or different response distributions?	• For each mode of data collection, compare the response distributions of the two versions.
8.	For urban versus rural areas, does either version have lower item missing data rates?	• For both urban and rural areas, compare the item missing data rates of the two versions.
9.	For urban versus rural areas, do the two versions have similar or different response distributions?	• For both urban and rural areas, compare the response distributions of the two versions.
10.	For urban versus rural areas, which version results in more reliable estimates (at equal levels of detail)?	• For both urban and rural areas, compare the gross difference rates and indexes of inconsistency of the two versions, using data obtained from the CFU, for individual and comparable response categories.
11.	For each mail response stratum (high and low response areas), does either version of the computer ownership and Internet subscription questions have lower item missing data rates?	• For each mail response stratum, compare the item missing data rates of the two versions.

Research Questions & Evaluation Measures:

No.	Research Questions	Evaluation Measures
12.	For each mail response stratum, do the two versions have similar or different response distributions?	• For each mail response stratum, compare the response distributions of the two versions.
13.	For each mail response stratum, which version results in more reliable estimates (at equal levels of detail)?	• For each mail response stratum, compare the gross difference rates and indexes of inconsistency of the two versions, using data obtained from the CFU, for individual and comparable response categories.
14.	Does either version elicit respondent and/or interviewer behaviors that may contribute to interviewer and/or respondent error?	• Compare the behavior coding results of the two versions derived from the CARI recordings.

Selection Criteria:

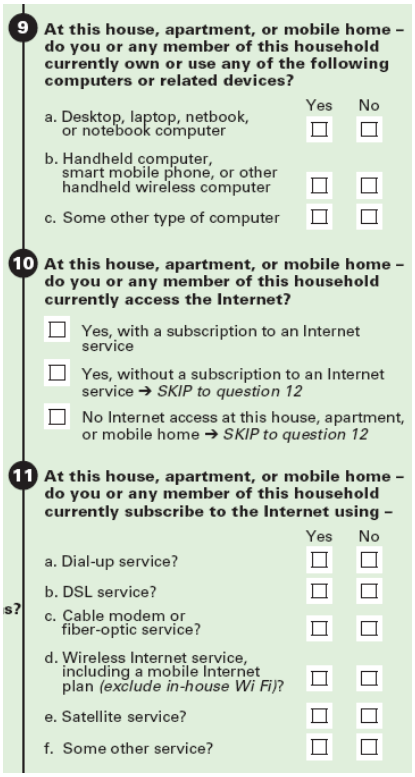
Research Question	Criteria
1,2,3	The item missing data rates, response distributions, and reliability (as measured by gross difference rates and the Index of Inconsistency) will be considered together when determining which version performs better.

Additional Criteria for Descriptive Statistics: (to be analyzed after all selection criteria)

Research Question	Criteria
4-14	Not part of selection criteria, they are presented to give information to help plan for the use of the computer ownership and Internet subscription data.

The two test versions to be field tested will be decided upon after cognitive testing is complete.

Test Version 1



9 **At this house, apartment, or mobile home – do you or any member of this household currently own or use any of the following computers or related devices?**

	Yes	No
a. Desktop, laptop, netbook, or notebook computer	☐	☐
b. Handheld computer, smart mobile phone, or other handheld wireless computer	☐	☐
c. Some other type of computer	☐	☐

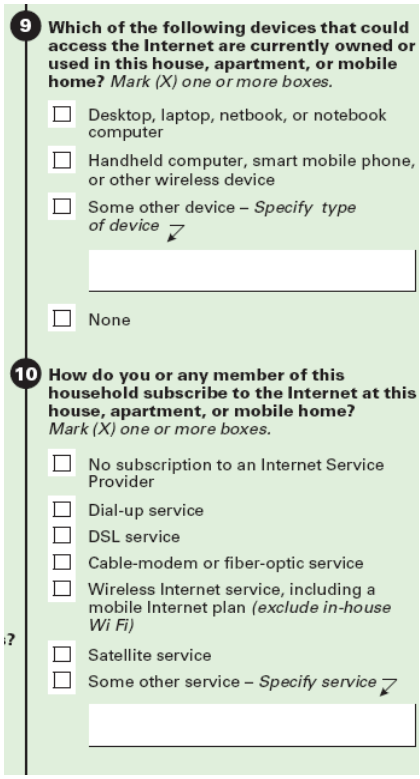
10 **At this house, apartment, or mobile home – do you or any member of this household currently access the Internet?**

- ☐ Yes, with a subscription to an Internet service
- ☐ Yes, without a subscription to an Internet service ➔ *SKIP to question 12*
- ☐ No Internet access at this house, apartment, or mobile home ➔ *SKIP to question 12*

11 **At this house, apartment, or mobile home – do you or any member of this household currently subscribe to the Internet using –**

	Yes	No
a. Dial-up service?	☐	☐
b. DSL service?	☐	☐
c. Cable modem or fiber-optic service?	☐	☐
d. Wireless Internet service, including a mobile Internet plan *(exclude in-house Wi Fi)*?	☐	☐
e. Satellite service?	☐	☐
f. Some other service?	☐	☐

Test Version 2



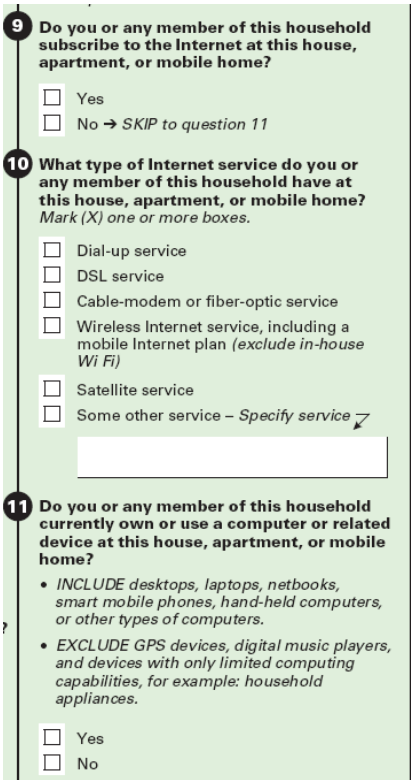
9 **Which of the following devices that could access the Internet are currently owned or used in this house, apartment, or mobile home?** *Mark (X) one or more boxes.*

- ☐ Desktop, laptop, netbook, or notebook computer
- ☐ Handheld computer, smart mobile phone, or other wireless device
- ☐ Some other device – *Specify type of device*
- ☐ None

10 **How do you or any member of this household subscribe to the Internet at this house, apartment, or mobile home?** *Mark (X) one or more boxes.*

- ☐ No subscription to an Internet Service Provider
- ☐ Dial-up service
- ☐ DSL service
- ☐ Cable-modem or fiber-optic service
- ☐ Wireless Internet service, including a mobile Internet plan *(exclude in-house Wi Fi)*
- ☐ Satellite service
- ☐ Some other service – *Specify service*

Test Version 3



9 **Do you or any member of this household subscribe to the Internet at this house, apartment, or mobile home?**

- ☐ Yes
- ☐ No ➔ *SKIP to question 11*

10 **What type of Internet service do you or any member of this household have at this house, apartment, or mobile home?** *Mark (X) one or more boxes.*

- ☐ Dial-up service
- ☐ DSL service
- ☐ Cable-modem or fiber-optic service
- ☐ Wireless Internet service, including a mobile Internet plan *(exclude in-house Wi Fi)*
- ☐ Satellite service
- ☐ Some other service – *Specify service*

11 **Do you or any member of this household currently own or use a computer or related device at this house, apartment, or mobile home?**

- *INCLUDE desktops, laptops, netbooks, smart mobile phones, hand-held computers, or other types of computers.*
- *EXCLUDE GPS devices, digital music players, and devices with only limited computing capabilities, for example: household appliances.*

- ☐ Yes
- ☐ No