**Full Report for Round 1 of Usability Testing
for the Consumer Expenditure Web Diary Survey**

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Abstract

The Human Factors and Usability Research Group of the US Census Bureau conducted usability testing on a prototype version of the Consumer Expenditure (CE) Web Diary Survey from January-April 2012. The CE diary examines the buying habits of people in the United States and the products and services that are bought by people in this country. Respondents to the CE Web Diary in the field complete the diary for two weeks for all of the items that they buy or for which they spend money (i.e., all of their "expenses"). There were 42 participants in the usability study and this report summarizes the usability and accessibility results.

1. Introduction

The Human Factors and Usability Research Group of the US Census Bureau conducted usability testing on a prototype version of the Consumer Expenditure (CE) Web Diary Survey from January-April 2012.The CE diary examines the buying habits of people in the United States and the products and services that are bought by people in this country. Respondents to the CE Web Diary in the field complete the diary for two weeks for all of the items that they buy or for which they spend money (i.e., all of their "expenses").

The CE Diary is divided into four categories of expenditures (Food and Drink Away from Home; Food and Drink for Home Consumption; Clothing, Shoes, Jewelry, and Accessories; and All Other Products and Services). Respondents record all purchases and expenses by entering details about the expenses into the appropriate categories.

Currently, field representatives working with the paper version of the CE Diary do not instruct respondents to organize their expenses before entering them into the diary form. It was of interest to determine if such an instruction would improve data accuracy or ease of data input. Furthermore, if organizing the expenses prior to data entry was determined to be beneficial, it was of interest to determine if a specific style of organization improved response quality and usability more than another does.

For the CE Diary usability testing, one version of the instrument was tested and three treatment groups were formed to examine behaviors of data entry that might differ when expenses were organized in different ways by potential respondents. Each treatment group was presented with the same set of expenditures, but the expenditures were presented in three formats corresponding to three possible organization styles for respondents. Participants in Group 1 received the expenditures organized by day and person (i.e. the household member to whom the expenditure was attributed), Group 2 participants were presented with the expenditure items organized according to the categorical type of purchase, and Group 3 participants were presented with the expenditure items with no organization (this was the control group that reflects the expected current behavior for respondents in the survey). We hypothesized that the item presentation of Group 2 would be the most efficient and satisfactory way to organize the expenses because it matched the Diary's current format. Additionally we thought Group 1's organizational structure

was better than Group 3's lack of structure, which would prove to be the least efficient and least satisfying in terms of recording purchases.

These expectations were based on our examination of how the online diary is structured in comparison to the paper diary, which is being adapted to the Web. In the online diary, the tabs that indicate the type of purchase are the prominent feature and match the categories of expenses described above (See Figure 1 below). The paper diary requests information about the categories of expenditures nested within each day of the data collection period (see Figure 2 below). Each day of the collection period has pages for each of the four categories.

Figure 1: Screenshot of Web Diary Instrument featuring "tabs" for categories

| EXAMPLE | SUN | MON | TUE | WED | THU | (FRI) | SAT |

1. Food and Drinks Away from Home

Examples:
breakfast buffet / carry-out lunch / dinner & cocktails at restaurant
pizza delivery / Chinese takeout / child's school lunch
beer at happy hour / pretzels at ballgame / wine at tavern
croissant from café / ice cream from truck / wedding reception caterer
soda from vending machine / hot dog from convenience store / popcorn and soda at movies

← Please unfold the LEFT FLAP to see Additional Examples

Mark (X) one that best describes the type of meal				Description (See examples above and on the flap)	Mark (X) one that best describes where you made this purchase				Total Cost with tax & tip — Include tax & tip for part 1 only.	If alcoholic beverages included, mark (X) all that apply			Enter the total cost of the alcohol
breakfast (1)	lunch (2)	dinner (3)	snack/other (4)		Fast Food Take-out Delivery Concession (1)	Full Service Places (2)	Vending Machines or Mobile Vendors (3)	Employer or School Cafeteria (4)		wine (1)	beer (2)	other (3)	
X				bagel, juice				X	2 | 79				|
	X			pizza	X				5 | 57				|
			X	coffee	X				1 | 35				|
	X			sandwich, soda				X	5 | 15				|
			X	chips			X		| 70				|
	X			elem.school lunch - month				X	45 | 00				|
			X	soda			X		| 65				|
		X		buffet		X			62 | 23	X			12 | 00
			X	drinks from cash bar		X			15 | 00		X	X	15 | 00

(Note callout: "Level of detail needed: briefly describe the meal.")

Figure 2: Paper version of the Diary Survey

We thought that any organization of expenditures would work better than a quasi-random presentation of purchases. We suspected, however, that many respondents might deal with sorting receipts of their expenses while attempting to complete the diary now. The "disorganized' treatment (Group 3) therefore may serve as a benchmark against which to measure the benefits of organization, if any.

This full report identifies high-priority usability issues identified across all three conditions and provides accuracy and efficiency results. Eye-tracking data accompanies the results, and participant comments from the think-aloud process are included, which augment the data.

2. Procedure

The Usability Lab recruited 42 participants within and outside the Census Bureau using the Lab participant database. The usability study was conducted on-site at Census Bureau Headquarters in Suitland, MD. There were 22 male participants and 20 female participants, with ages ranging from 21 years old to 61 years old, with a median age of 41 years old. All participants had at minimum a high school diploma.

Each participant was randomly assigned to Group 1, Group 2 or Group 3. The usability testing sessions were held in the Usability Lab, with the participants in a room with a computer and

Tobii eye-tracking monitor, and the testing administrators (TAs) in a separate room from which they could view the participant through one-way glass and through computer monitors. Participants and TAs could communicate via a system of microphones and speakers in the rooms. All sessions were recorded using digital video tapes.

TAs read an introductory protocol (Appendix A: Introductory Protocol) to each participant which explained the purpose of the study, and gave basic instructions. All participants signed a consent form (Appendix B: Consent Form). Prior to using the CE Web Diary website, each participant was instructed to "think aloud" as he/she used the Diary and participated in a short (approximately 1-2 minute) practice session for thinking aloud using the wtop.com news site. Each participant was calibrated for eye-tracking prior to using the CE Web Diary and eye-tracking was performed using the Tobii eye-tracking monitor.

Following the introductory protocol, the TA read instructions for completing the Diary to the participants (these are the talking points used by the field representatives) and provided each participant with login information, a list of purchases and household members (Appendix C: Participant Instructions and Data Lists), and a starting date for the Diary. The talking points can be found in Appendix D: Talking Points. The participants were told that they could either use their own email for the purposes of creating a Diary account or that one would be provided for them.

The TA then left the room and requested that the participant complete a demographic questionnaire (Appendix E: Demographic/Computer Background Questionnaire). Following this, a sound check was performed and the participants began item entry, item correction and data submission for each of five tasks (Appendix F: Participant Task List). Participants in each group received a purchase list corresponding to the group to which they had been assigned.

Once the participants had finished the tasks, the TA instructed them to complete a Satisfaction Questionnaire (Appendix G: Satisfaction Questionnaire), and returned to the participant room to conduct a debriefing (Appendix H: Debriefing Questionnaire).

3. Results: Accuracy, Efficiency, and Autofill Analyses

3.1 Accuracy and Autofill

Participants were asked to report the expenses in one of the following categories: Food and Drink Away from Home; Food and drink for Home Consumption; Clothing, Shoes, Jewelry and Accessories; All other Products and Services. Across all groups, participants were able to enter 86% of the data successfully into the correct category. Accuracy data are reported in Figure 2 below. On average, participants successfully entered 9.64 out of 12 (80%) items correctly into the "Food and Drink Away from Home" category, 99% of items correctly into the "Food and Drink for Home Consumption" category, 1.79 out of 2 items (89%) correctly into the "Accessories" category, and 10.76 out of 12 (90%) items correctly into the "Other" category. It is interesting to note that participants in Group 1 performed poorly in their accuracy scores as compared with participants from Groups 2 and 3.

Across all categories, Group 2 participants correctly categorized the data list 94% of the time, and used autofills for 34% of their entries. Group 2 on average correctly placed "Food and Drink Away from Home" items 86% of the time, "Food and Drink for Home Consumption" items 99% of the time, "Clothing, Food, Jewelry and Accessories" items 100% of the time, and "All Other Products and Services" items 99% of the time.

Across all categories, Group 3 participants correctly categorized the data list 90% of the time, and used autofills for 50% of their entries. Group 3 on average correctly placed "Food and Drink Away from Home" items 87% of the time, "Food and Drink for Home Consumption" items 92% of the time, "Clothing, Food, Jewelry and Accessories" items 89% of the time, and "All Other Products and Services" items 92% of the time.

Across all categories, Group 1 participants correctly categorized the data list 75% of the time, and used autofills for 44% of their entries. Group 1 on average correctly placed "Food and Drink Away from Home" items 68% of the time, "Food and Drink for Home Consumption" items 78% of the time, "Clothing, Food, Jewelry and Accessories" items 79% of the time, and "All Other Products and Services" items 79% of the time.
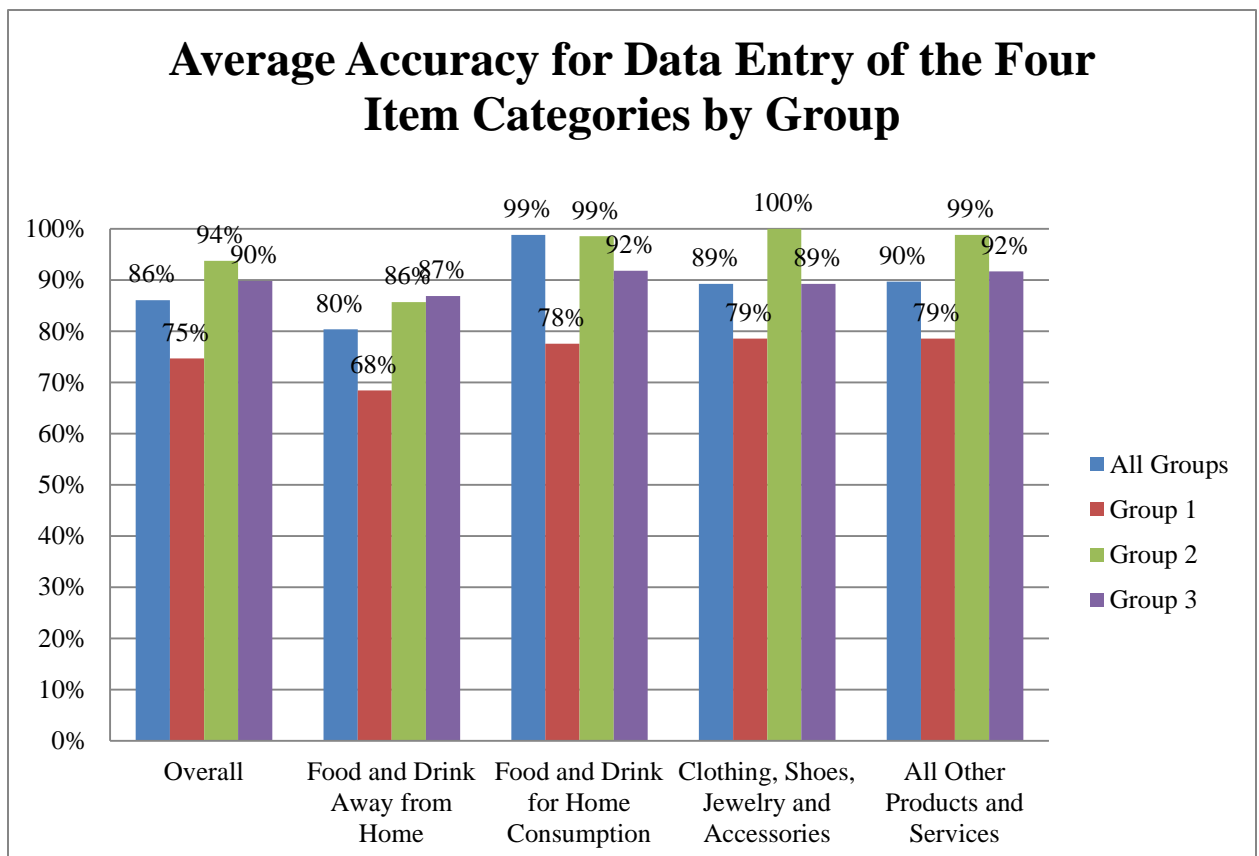
Figure 3: Accuracy Data for Data Entry

3.2 Efficiency Data

Efficiency is measured by the time it took participants to complete the diary from the time when the participant first arrived on the data entry page to when he/she finished entering the data. Completion was marked by one of the following: the participant said either that he/she was finished or began the next task (Not all participants verbally noted that they were finished).   On average, it took participants 27 minutes and 54 seconds to complete the diary.   Group 1 had the fastest average completion time of 22 minutes and 45 seconds.   Similarly, Group 2 had an average completion time of 26 minutes and 18 seconds.   As predicted, Group 3 had much slower completion times, with an average of 34 minutes and 39 seconds. A visual presentation of this data appears in Figure 3 below.

Average Completion Times for Data Entry in Minutes and Seconds
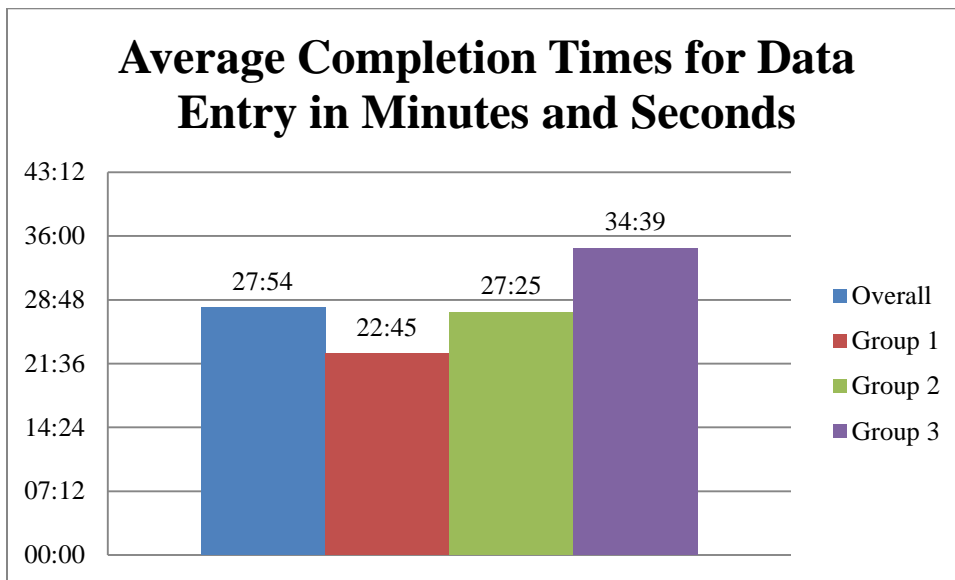
Figure 4: Average Completion Times for Data Entry

It is interesting to note that while Group 1 had the fastest average completion time; it also had the worst accuracy scores by a great margin. This could suggest a speed/accuracy tradeoff, or problems with the style of organization.   While Groups 2 and 3 did not differ greatly on accuracy scores, it took participants in Group 3 much longer to complete the diary. This is likely due to the extra level of mental processing required when the participants had to think about how to categorize each item, rather than having them already organized by category as in the Group 2 condition.

Our conclusion is that it would likely increase satisfaction and reduce the time and frustration experienced while entering data into the diary if either A) the respondents are encouraged to organize their receipts/purchases in the 4 categories prior to entering the data, or B) if the categories were removed from the diary.

3.3   High-Priority Issues

High-Priority issues are likely to prevent users from accomplishing their tasks. These issues need careful attention while revising or upgrading the CE web survey.

3.3.1 The Field Representative (FR) talking points are too long, too complex, and not attended to by the Respondents (R).

As Nielsen and Norman have stated, "Studies of user behavior on the Web find a low tolerance for difficult designs or slow sites. People do not want to wait. And they don't want to learn how to use a home page. There's no such thing as a training class or a manual for a Web site. People have to be able to grasp the functioning of the site immediately after scanning the home page--for a few seconds at most" (Nielsen & Norman, 2000).

The FR talking points are currently seven pages long and reading them aloud took about 15 minutes. Participants made errors in creating their accounts and entering the expenses (both of which were covered in the talking points). This suggests that they did not listen to or did not retain the information read to them. At least seven participants verbally expressed concern about being able to remember the instructions. One participant commented, "I wasn't paying attention." Therefore, it logical to assume that the instructions would not be remembered several days later if a field representative read these to an R who would not start to take the survey for several days. One participant entered his birthday as the start date instead of the one assigned to him. This occurred even though minutes earlier the TA had read aloud the FR talking points that described the start date and physically pointed them out to him. He had to be reminded of the start date in order to proceed. Additionally, three other participants entered the current date as the start date initially.

Reading the password character requirements is especially unnecessary because there is little to no chance that anyone would remember that information seconds later, let alone days later when they went to create an account. Participants in our study did not remember that information minutes after we read it to them. That information is also contained at the top of the password screen. Twenty-two of the participants (52%) failed to create a password on the first try, and needed up to four attempts to be successful. Thirteen participants (31%) commented negatively about the account creation process, with the majority of the negative comments being about the password. Nineteen participants (45%) commented about trying to find a place to assign the purchases to the correct roster member, despite this having been explained to them in the FR talking points.

Recommendation: Good Usability for a Web site is indicated by a user being able to accomplish a task efficiently and with ease without the need for extensive instructions. Implementing Usability principles (such as those suggested in this report) in the design of the site is critical for this. In general, users will not read or attend to extensive instructions. Instructions should be minimal if they exist at all and they should be easy to understand and follow.

We suggest a much shortened version of the FR talking points. Our recommendations are included in **Appendix I: Recommended Revisions to FR Talking Points**. We suggest providing a video clip of a demonstration of someone entering expenses into the CE Web Diary because talking about hypothetical Web screens does not work as well as a real visual example where the R can see the actual screen and someone really using it.

Other issues with the FR talking points:

The images are much too small for the R or the FR to see.

There are typos in the document (e.g., "you will enter all clothing, shoes, jewelry, and accessories purchases." pg. 3).

The instructions to the FR instruct him/her to refer to nonexistent images in the "user guide" or letter, "*Point out the column on the user guide*" for the Food and Drink for Home Consumption, Clothing, Jewelry, and Accessories, and Other tabs/sections. There is only one image in the talking points, and it is for the Food and Drink Away from Home tab. Because each section requires different details regarding the purchases, each section should have its own image in the talking points.

3.3.2 Having the participant sort the items into 4 categories adds unnecessary burden, time, potential attrition, and error.

Many participants started entering all of the expenses into the first tab, despite the lengthy FR talking points instructions describing the four different tabs. Despite three additional prompts from the TA one participant did not figure out the tabs until she had been entering all items into the "Food and Drink Away from Home" tab for over 15 minutes.

Furthermore, some participants entered an item into the wrong category, and seemed to think it would be laborious to re-enter the data in the appropriate section to correct it. One participant said "Oh, I put the video game in the wrong section…I wish I could just move it." Four participants expressed frustration at not being able to duplicate data when more than one entry of the same item was necessary or being able to move the data when entered into the incorrect category.

One participant in the Group 3 condition (their item list was not organized) opted to reorganize the items presented to them into categories to match the organization of the diary before beginning the data entry process. Because respondents may not have their expenditure information organized in this way (or at all), they may spend more time reorganizing their information in an attempt to match the data entry pattern displayed by the instrument. This can lead to frustration, mental fatigue, and drop-out. One participant in the Group 3 condition who did not reorganize her items commented, "This would exasperate me if I had to do this in real life," after switching from tab to tab to enter the data.

Twenty-three of 42 participants (55%) used a categorical strategy (Group 2's strategy) to enter the data items regardless of the way the items were presented to them. Twenty-nine of 42 participants (69%) used the strategy prescribed to them by their data entry list, and 13 chose alternative strategies. Out of the 42 participants in the study, nine participants (21%) who were not assigned Group 2's strategy chose to use that strategy rather than the one prescribed to them. One participant entered the data in a random order, another entered the data items categorically by day, and the remaining two entered all of the data into the first tab (Food and Drink Away from Home) with no regards to category.

Four participants changed strategy in midstream. One participant in Group 1 began using her prescribed Day-and-Person strategy, changed to the categorical strategy, then reverted to her prescribed strategy. Similarly, two participants in Group 3 also changed to a categorical strategy partway through the task, then reverted to the original list after feeling that there would not be

enough to time in the session to reorganize the items and enter them all. The remaining participant had entered nearly all of the data items into the first tab, and then realized that the Diary is organized by categories. Three participants (one of which self-corrected halfway through) entered all of the data into the first tab.

One participant (Group 3) completely reorganized the data list into categories before beginning to enter the data. After accounting for the time he spent reorganizing the data (4 minutes and 46 seconds), this participant had the second fastest time for completion among Group 3 participants (his time was 23 minutes and 3 seconds).

Recommendation: If respondents were allowed to simply enter all of the expenses into one tab and choose the location and nature of the purchase from the drop-down menus, the time spent and cognitive burden required to complete the diary would most likely be greatly reduced. We recommend testing a version of this diary survey that utilizes a single data entry page. Further specification about the details of the purchase could be made using the drop-down fields to the right of the description field.

3.3.3 The programmed start date entry parameters are too rigid (i.e., it has to be the prescribed day or the system prevents entry into diary).

Three participants tried to enter the current date as the start date, despite hearing the entire FR talking points instructions, which included a section on the start date. Many had to be reminded of the start date, even when it was written on the back of the letter that they were given. One participant was unable to enter the survey using the start dates provided and no data could be collected for that session.

Having such a rigid start date is not making best use of technology to improve upon the paper diary. It is actually more restrictive, since the paper diary allows any dates to be hand-written in any date fields.

Recommendation: Allow some flexibility for the start date; one week prior and after the specific start date would be a minimal window. We suggest always allowing the current date as a valid response to permit respondents to initially enter the diary; this may prevent break-offs at this point from people who lost their letter and/or forgot the start date.

3.3.4 The "Save and Submit" button caused confusion

Fifteen participants (36%) expressed confusion about the functionality of the "Save and Submit" button. Some participants expected to move to the next tab automatically when they hit "Save and Submit" and often commented that it did not indeed "submit." Some participants clicked this button after every row of data entry, others clicked it after completing each section, and others clicked it intermittently as it occurred to them. This variation in patterns of how people used this button shows that it is not clear what the button does and how frequently it is to be used. Almost all participants expressed uncertainty over how they would submit their data and be "finished" with the session. One participant, upon seeing the "Save and Submit" button, commented "Oh, Save AND Submit…I would think there would be just a 'Save' button." When probed on what (s)he thought the "Save and Submit" button would do (s)he said, "It would submit, then wipe it clean so you have a brand new clear screen." Another participant thought

that clicking the "Save and Submit" button would "Blank out and advance to the next category, that would be more secure."

Recommendation: This issue would be corrected instantly by eliminating the four tabs and using only one single data-entry page for a list. Another solution that would require very little programming would be to have a "Submit" button near the "Logout" link that takes the respondents to the same screen (i.e., back to the login screen), but provides a different message that reassures them that their data have been submitted to the Census Bureau. An example is shown in Figure 5 below. The current logout message is shown in Figure 6 and a suggested revision appears in Figure 7.
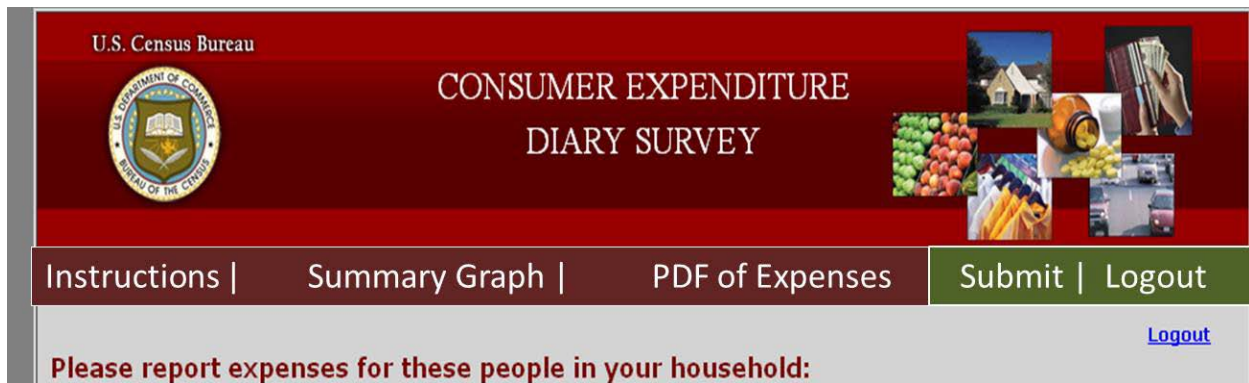
Figure 5: Example of Recommended "Submit" and "Logout" Buttons (other colors with more contrast would be preferable for color-blind users).
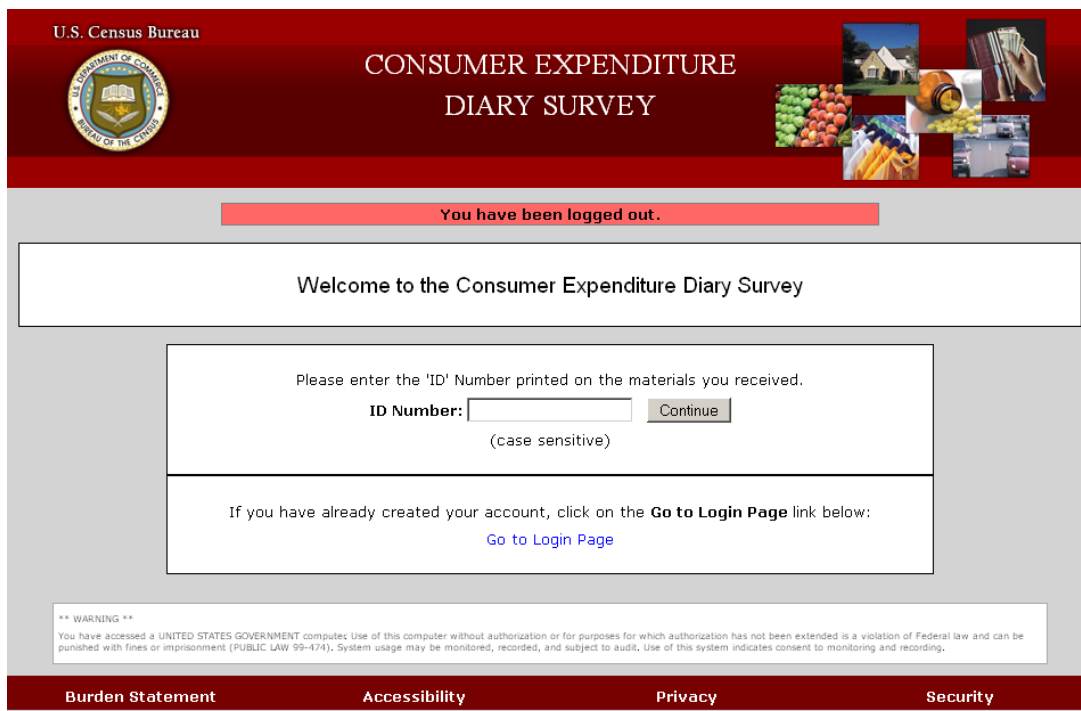
Figure 6: Current Logout message
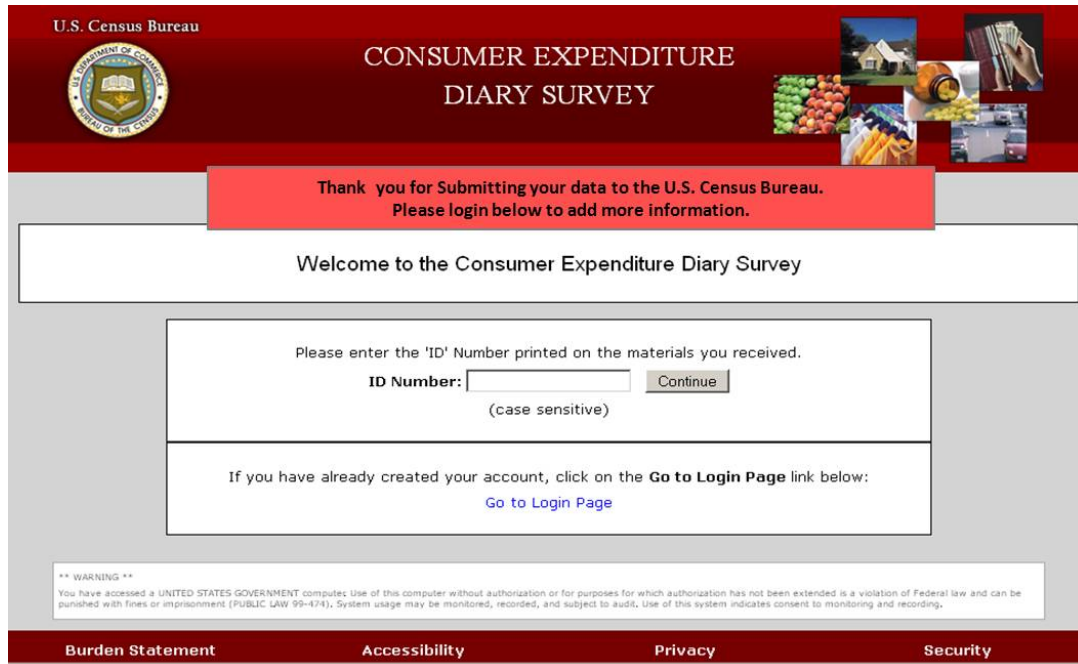
Figure 7: Example of Recommended "Submit" Screen

3.3.5 There is no validation message for the "Clear" button; data can very easily be erased without the participant noticing

In one session, the participant cleared a row of data (ice-cream sandwich) and only noticed this much later when pondering why there was a blank line in the list. During debriefing, she said that she did not realize that she had accidentally erased that row of data.

Recommendation: Add a soft edit validation message that says something along the lines of "Are you sure you want to clear this row of data?" before these data are cleared.

3.3.6 Entered data disappear after password fails on password creation page and when "Back" button in browser is hit before an autosave occurs

The login procedure is complicated and long, involving a number of separate pieces with stringent formatting requirements. Participants were extremely frustrated when they failed to create a password that complied with the requirements, resulting in an error message and having to reenter all of the login pieces. This appears to be a security requirement. However, hitting the browser "Back" button restored the previously entered information, which means it was not securely deleted. All participants who had this happen commented that they were frustrated when the information disappeared. One participant said, "This is a nightmare."

Other surveys conducted by the Census Bureau make use of an auto-generated PIN that is provided to the respondents and the account creation process is much more streamlined (e.g., ACS- Ashenfelter, Holland, Quach, Nichols, & Lakhe, 2011; CQS-Ashenfelter, Holland, Quach, & Nichols, 2011).

Recommendation: We recommend implementing a PIN login screen to reduce participant frustration and cognitive burden and to reduce the amount of time it takes respondents to log into the survey diary.

Data are lost when the browser "Back" button is clicked (without clicking Save & Submit first) on the first data entry page used (Default: Food and Drink Away from Home) and it navigates back to the roster page. One participant did this and expressed great frustration at having to enter all of the data again for the Food and Drink Away from Home tab.

Recommendation: Save the data each time something is entered into a new "Description" field to prevent data loss in cases like this. This may reduce frustration and break-offs.

3.3.7   The Summary Screen Pie Chart is Illegible

The pie chart that is generated when the "Summary Screen" button is clicked uses white numbers against light-colors in the graphic. This is difficult to read. Compounding the problem is that when the "slices" of the pie are close together, the numbered labels are displayed on top of one another, making it impossible to read any of them (Figure 4).
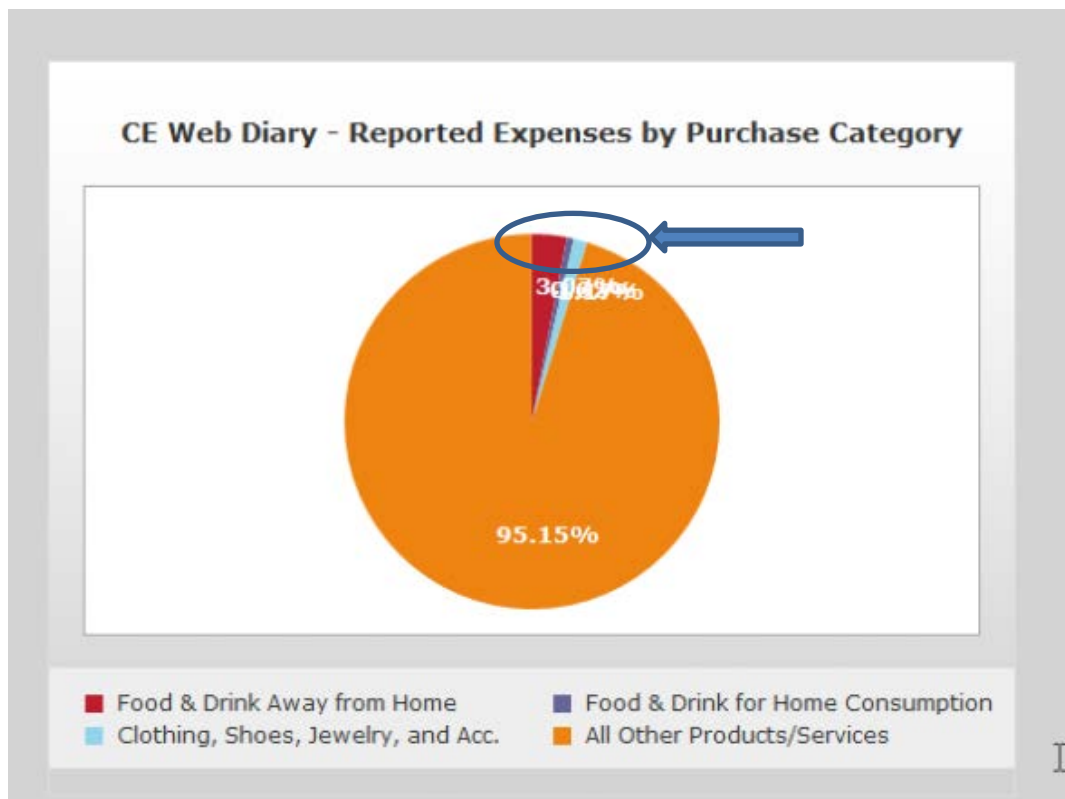
Figure 8: Problematic Summary Screen labels.

Recommendation: Use a black or dark font for the pie chart labels.   Additionally, program the pie-chart generator to have lines pointing to each slice with the labels displayed a set distance away from each other so that each label can be read (Figure 5).   Each label should use at least

12-point font, which is a Web standard. We recommend that they be bolded for contrast and visibility.
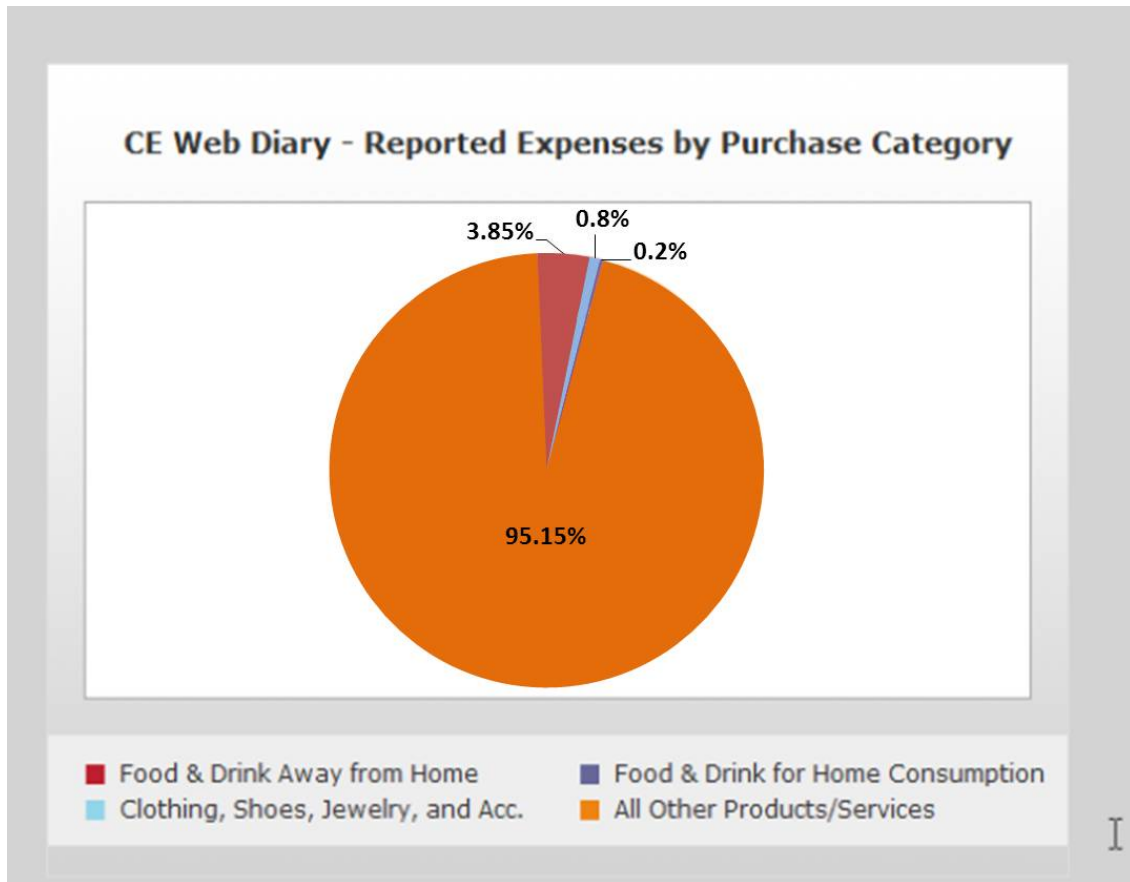
Figure 9: Recommended changes to the Summary Screen pie chart

3.4   Medium-Priority Issues

Medium-Priority issues are likely to cause navigation errors or to cause performance issues resulting in additional time required for users to complete tasks.

3.4.1   Over-reporting of alcohol and soda in "Total Alcohol Cost" column

The reporting of alcohol was described in detail in the FR talking points. Despite having these instructions read directly to them, 32 participants (76.19 percent) incorrectly entered the alcohol purchase, and one participant entered the soda from the roast beef sandwich item as alcohol by checking "other." The "Other" checkbox may have confused the participant into considering the soda as being categorized as alcohol. If it is unclear what is to be included in this column, purchases of alcohol may be misreported (or non-alcoholic beverages could contribute to over-reporting of alcohol purchases). At least 15 participants over-reported the $20.00 bottle of wine purchased on Day 1 by Dan and Amanda Smith by including its cost in both the "Total Cost with tax and tip" column and the "Total Alcohol Cost" column. Examples of misreporting of alcohol appear below in Figures 10 and 11 below, and correct reporting of alcohol purchases are shown in Figures 12 and 13 below.

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Figure 10: Correct Reporting of Alcohol with meal (P4)

Figure 11: Over-reporting of alcohol with meal

Figure 12: Correct reporting of alcohol itemized

Figure 13: Over-reporting of alcohol itemized

Some participants included the soda from Ben Smith's "roast beef sandwich and soda" expense under the "Total Cost for Alcohol" column.

Recommendation: Alcohol reporting columns should be visually separated from the rest of the purchase cost and instructions to not report alcohol in the "Total Cost with Tax and Tip" should appear in this column. One method is to create borders around the columns, one for food and non-alcoholic beverage purchase information with a title such as "Food and Non-Alcoholic Beverages" and another border around the alcohol-related columns with a title such as "Alcohol

Included in Purchase". Further testing should be done to determine if such a change would increase accurate alcohol reporting.

3.4.2   Lack of clarity about where to report specific items

Items such as the stuffed animal, the deodorant, and the pack of cigarettes were problematic for some participants.

Four participants classified the stuffed animal under the clothing and accessories category and many others pondered doing so. One participant entered the stuffed animal under clothing. For task two (making corrections to the purchases), he first looked under "Other" when going to change the dollar amount. Next, he checked the clothing section, saw it, and said, "Oh, I was dumb. I entered it in the wrong category. I would have changed it anyway" and used the clear button to delete it from "Clothing" and re-entered it under "Other," this time using the pre-fill he did not use the first time. We believe this is due to confusion with the term "Accessories" which participants may not interpret as meaning a fashion accessory. Instead, participants may have interpreted "Accessory" in its alternate definition "a thing of secondary or subordinate importance" or "an object or device not necessary in itself, but adding to the beauty, convenience, or effectiveness of something else" (Merriam-Webster, 2013).

Still others were not sure where to put the men's deodorant. One participant had serious doubts about the classification of the deodorant. "I feel like I've made a mistake." The deodorant was the one non-food item on the grocery list. Because groceries are specifically mentioned in the FR talking points, this may confuse Respondents into assuming that any item bought during a grocery shopping trip belongs under "Food and Drink for Home Consumption." Furthermore, because the title for this category and the "Food and Drink Away from Home" title both contain "Food and Drink" and differ only at the ends, participants may be more likely to ignore the identical piece of the phrase in order to differentiate the categories. Thus, the "Food and Drink for Home Consumption" category may be unclear and simply interpreted by some respondents as the category under which grocery items are listed.

The pack of cigarettes item was observed on occasion to be entered into or considered for the "Food and Drink for Home Consumption" category. One participant remarked, "I consume it, but I don't eat it" while deciding which category to use for this item.

Recommendation: Use simpler, plainer words to describe the categories. Words such as "Accessories" and "Consumption" may be particularly problematic. Modifying "Accessories" with the word "Fashion" may be clearer, or shortening the category to "Clothing, Shoes, and Fashion Items." Instead of "Consumption," "Food and Drink Used at Home" or "Consumed at Home" may be easier to understand. We recommend testing of alternate category names or alternate text with very brief descriptions of each category that appears when the user mouses over one of the category titles.

3.4.3   The Account Creation Page does not function correctly in Mozilla Firefox

The Account Creation Page automatically moved from the Account Creation Page to the login screen with the time-out error message at the top when we attempted to create an account using

Firefox. The latest we observed this happening was 3/15/2012. It functioned correctly using Microsoft Internet Explorer.

Recommendation: Make sure that the programming works across all of the most popular browsers, especially Firefox, before it is released.

3.4.4   No way to specify which family members purchased which items

Although the participants were required to complete a roster for their vignette household members, no drop-down list was provided to select which family members purchased what items.

Because the diary requires that a roster of household members be created, respondents expected household members to be somehow linked to their purchases. Several participants looked for a way to specify which family member made which purchases and then commented that they either could not find the way or that there should be one.

About half (19) of the participants commented that they were looking for a place to specify which family member made each purchase. For instance, one participant said, "I can't really tell so much if it's going to be Amanda or Dan [lobster dinners]." Some asked the Test Administrator whether such an option for specification existed after unsuccessfully searching for it, at which point they were told (reminded really– it was in the FR talking points) that the list of names at the top of the screen was a reminder for whom to keep in mind when completing the CE Diary.

Recommendation: We recommend testing two main options for resolving this issue: 1) Remove the roster altogether. The reminder to include everyone in the household ("economic unit") can be reinforced in the FR talking points (See the suggested revised FR talking points in Appendix I) and on the instrument itself; 2) Test a way to specify family members at the item entry level, such as a drop-down menu based on the names entered on the roster screen.

3.4.5   Level of specificity is unclear

One participant commented, "It doesn't ask me how much Pepsi, like a 6-pack. Bread. How much bread? How many loaves? Case of soda or one can?" For the wine, even though he entered it under "Food and Drink Away from Home," one participant wrote "wine away from home" for the wine that Amanda Smith purchased because, as he said, "I don't think Amanda is drinking it in the car." He did not think there was enough specification in the dropdown options for the intended consumption of the item.

3.4.6   Prefills/Predictive Text are outdated, unnecessary, and satisficing may lead to incorrect or inaccurate answers – participants sometimes selected "ice cream product" or "orange drink"

The prefills that come up as suggestions for entries into the "Description" field are outdated and can lead to inaccurate answers. Participants did not use the prefills for the most part and preferred to type their own answers. One participant commented that "By the time the right thing comes up on the list, I've already typed the whole word anyway, which defeats the purpose."

The participants do not need to know the categories that are used to code the data. A few participants commented that "COMPUTER GAME CARTRIDGES" (Figure 14) is an outdated term and that video games have not come on cartridges for quite a while, except for some handheld exceptions.

Figure 14: COMPUTER GAME CARTIDGES Prefill

Figure 15 shows that ORANGE DRINK and ORANGE PASSION come up when "orange" is entered into the Food and Drink for Home Consumption tab. However, ORANGE JUICE does not come up until almost the whole phrase is entered.

Figure 15: ORANGE DRINK and ORANGE PASSION

Figure 16 shows that "FROG LEGS" is the first option to come up in the Prefill list when "Fro" is entered, rather than a much more frequently used word like "Frozen."

Figure 16: FROG LEGS

Recommendation: Remove the auto-fill feature.

3.4.7 All of the actions required by the Respondent are "below the fold" – not visible when the screen initially loads (and it jumps back to the top of the page when moving from tab to tab)

When the first data entry screen loads on the Consumer Expenditure Diary Survey, the data entry fields for the diary itself are not even visible because they are below the fold of the page. Users must scroll down to see them. Participants sometimes expressed confusion over what to do first because there are no clear actions that they can take to enter data when they get to this screen. Three participants commented negatively about the data entry page starting below the fold (when a tab is clicked or after the roster screen is completed).

Reducing the space used by items in the top portion of the page could resolve this issue. There are many ways that the top portion of this screen could be reduced. First, the reddish burgundy banner at the very top of the page is unnecessarily wide. The title of the survey only uses about half of the space. The six images in the right-hand corner of the screen seem to be the only reason this banner is so wide (Figure 17). These images, starting at the upper-left and moving clockwise, depict a house [presumably representing a mortgage payment – Other], a wallet with cash showing, cars [Other], clothing [Clothing, Jewelry, and Accessories], produce [Food and Drink for Home Consumption], and pills/medications in the center [Other]. There are no images that represent the first category that appears to respondents when they open the diary – Food and Drink Away from Home.

Figure 17: Set of six images from the upper-right corner Instrument

Although these images are the only images on the page and are the most colorful feature, participants do not look at these images on any of the pages. We provide heatmaps and gaze opacity plots to demonstrate this.

The heatmaps also show that the lists of example items in the header of the four categories may be unnecessary. The terms used are outdated and often were not read by participants.

Figure 18 shows the first screen that participants saw the ID Entry page, and a heatmap indicating the pattern of eye fixations that were distributed on the screen. The areas in red received the most eye fixations (i.e., active attention) and the green areas received the least fixations. Figure 18 shows that participants did not attend to the images even though this was the first time they saw they page and were exploring the content in order to proceed.
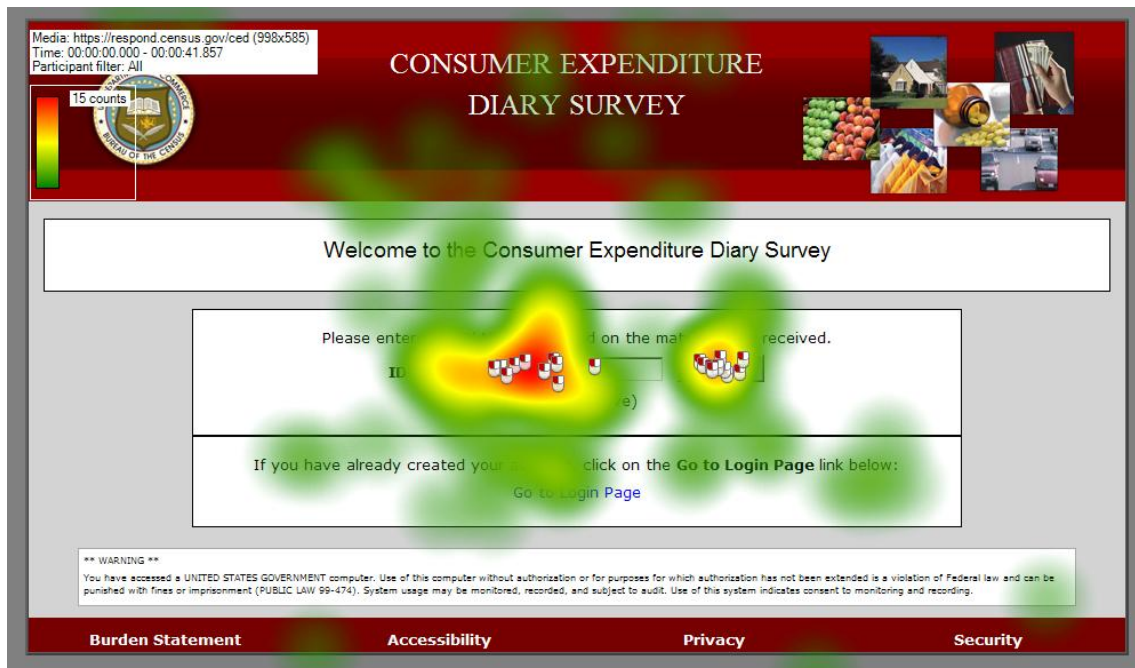
Figure 18: ID Entry Screen (n=15)

Figure 19 shows a gaze opacity version of the same heatmap of the ID Entry page, which shows the areas that received the most attention (in white) and the areas that were not looked at in black. The images do not appear in the white areas, meaning participants did not look at them.

Figure 19: Gaze Opacity Plot of the the ID entry page (n=23)

Figure 20 below shows a gaze opacity plot for the account creation page, which is the next screen of the CE Diary that participants saw. They still did not look at the images (or anything else in the header).
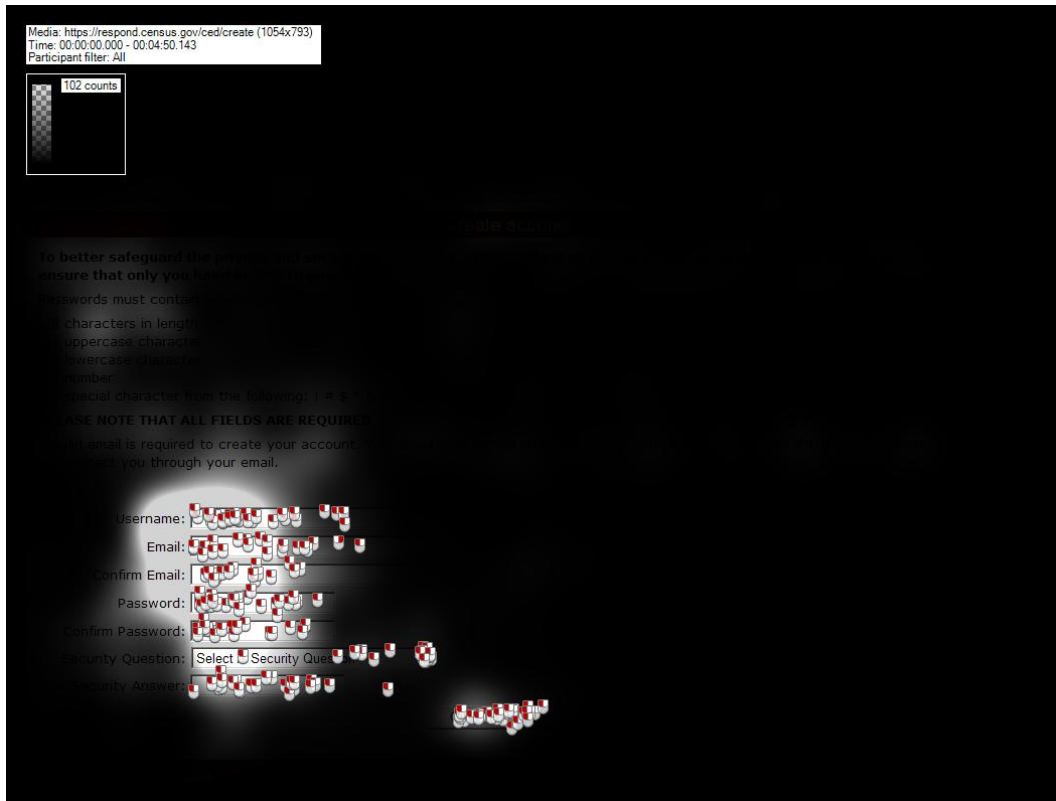
Figure 20: Gaze Opacity Plot for the Account Creation Page (n=23)

Figure 21 below displays the gaze opacity plot for the Login screen, which the participants saw after they verified their account information through a link in an email they received from the Census Bureau. They still did not look at the images.
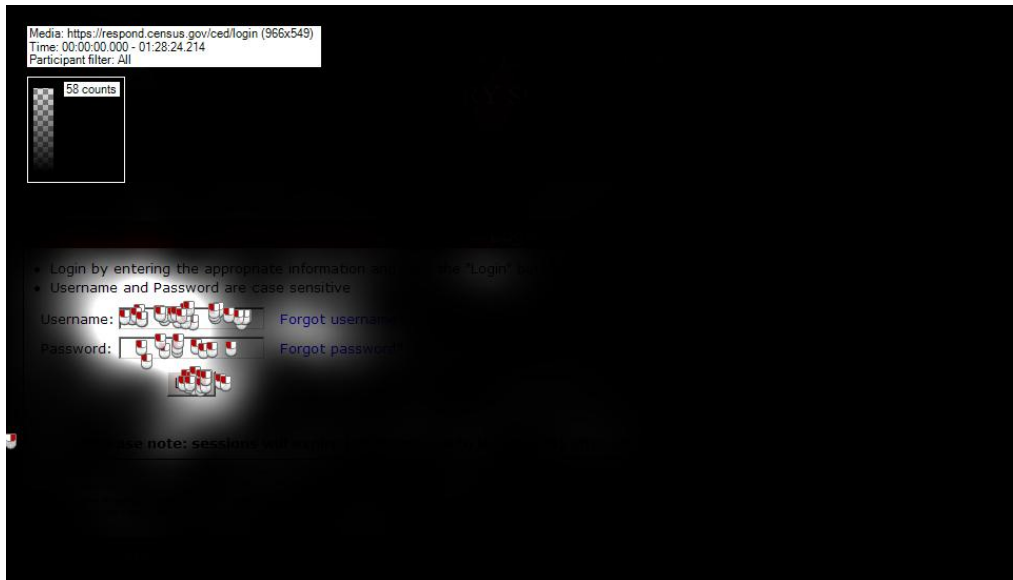
Figure 21: Gaze Opacity Plot for the Login screen (n=23)

Figure 22 provides a gaze opacity plot for the Food and Drink Away from Home data entry page, which is the first page that appears after the participant enters the roster information and begins the survey diary. In addition to not looking at the images, the participants also did not attend much to the list of examples above the data entry fields. These did not seem to provide a significant amount of information to participants and they can be removed.
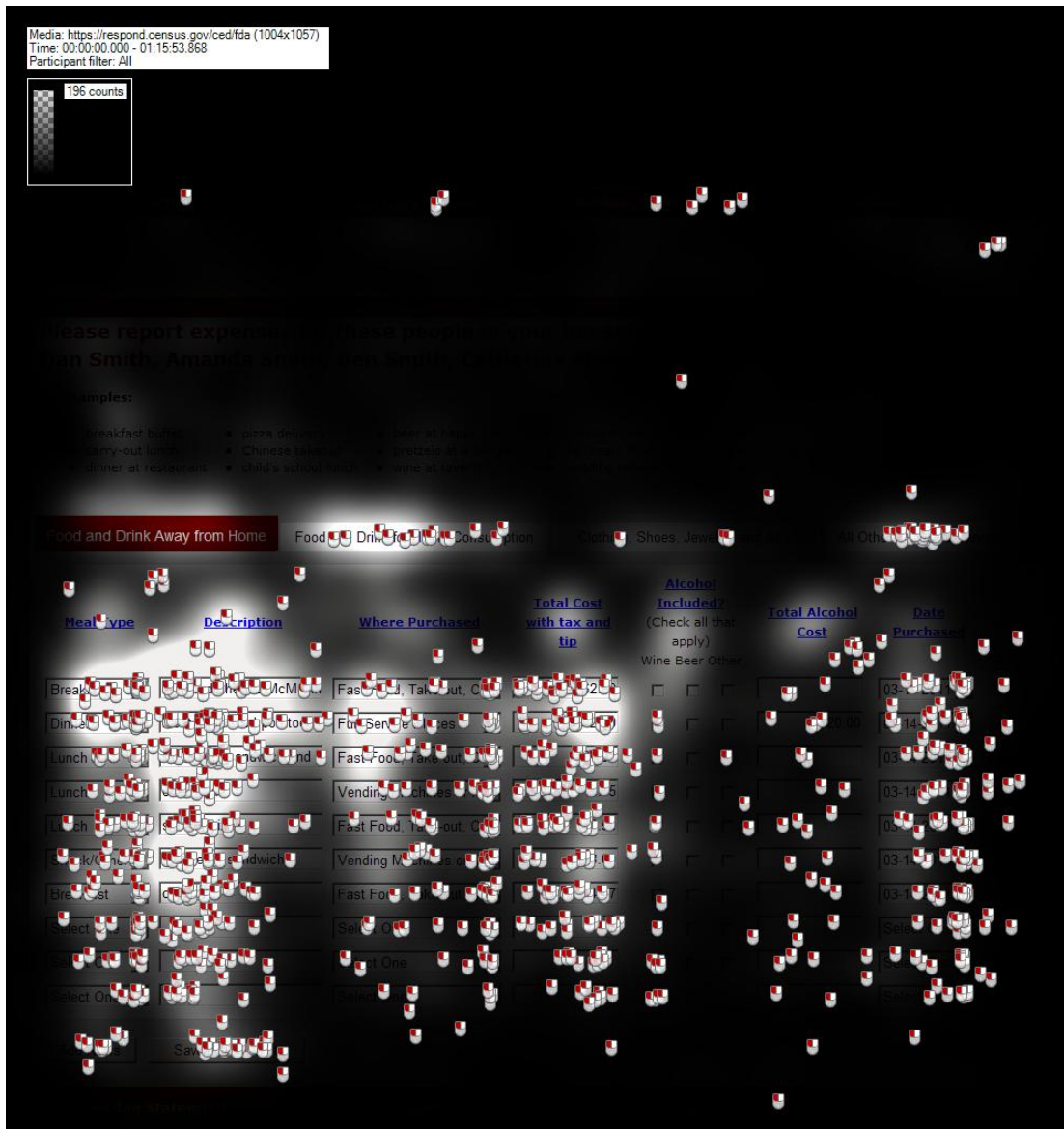
Figure 22: Gaze Opacity Plot for the Food and Drink Away from Home data entry page (n=23)

Figure 23 shows a gaze opacity plot for the Food and Drink for Home Consumption page. Again, participants did not look at the images and did not actively attend to the list of examples in the header above the text entry fields.
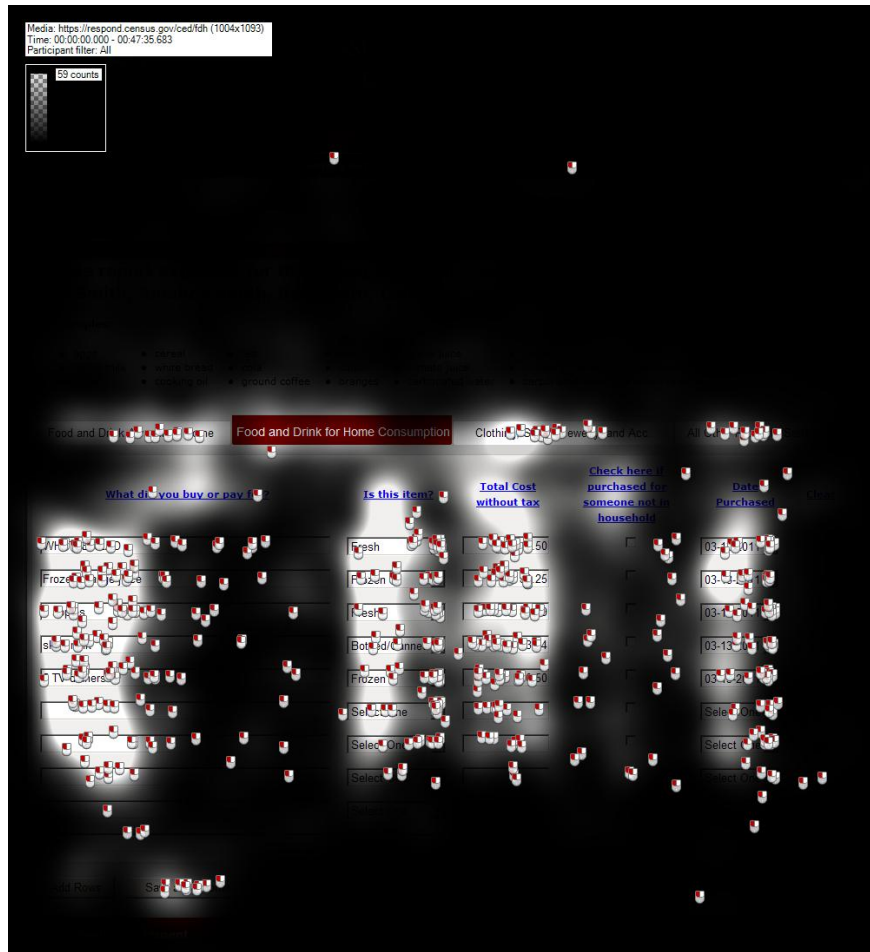
Figure 23: Gaze Opacity Plot for the Food and Drink for Home Consumption Page (n=23)

Figure 24 displays a gaze opacity plot for the Clothing, Jewelry, and Accessories page. Since there were only two items that fit this category for this round of usability testing, participants only fixated upon and clicked on the first few data entry fields. They did not attend to the images in the upper-right-hand corner of the screen, nor did they look at the list of examples very many times. One participant did comment that she was reading the examples to see if stuffed animals were listed here, stuffed animals were not listed there, so she commented that the list of examples was not helpful.
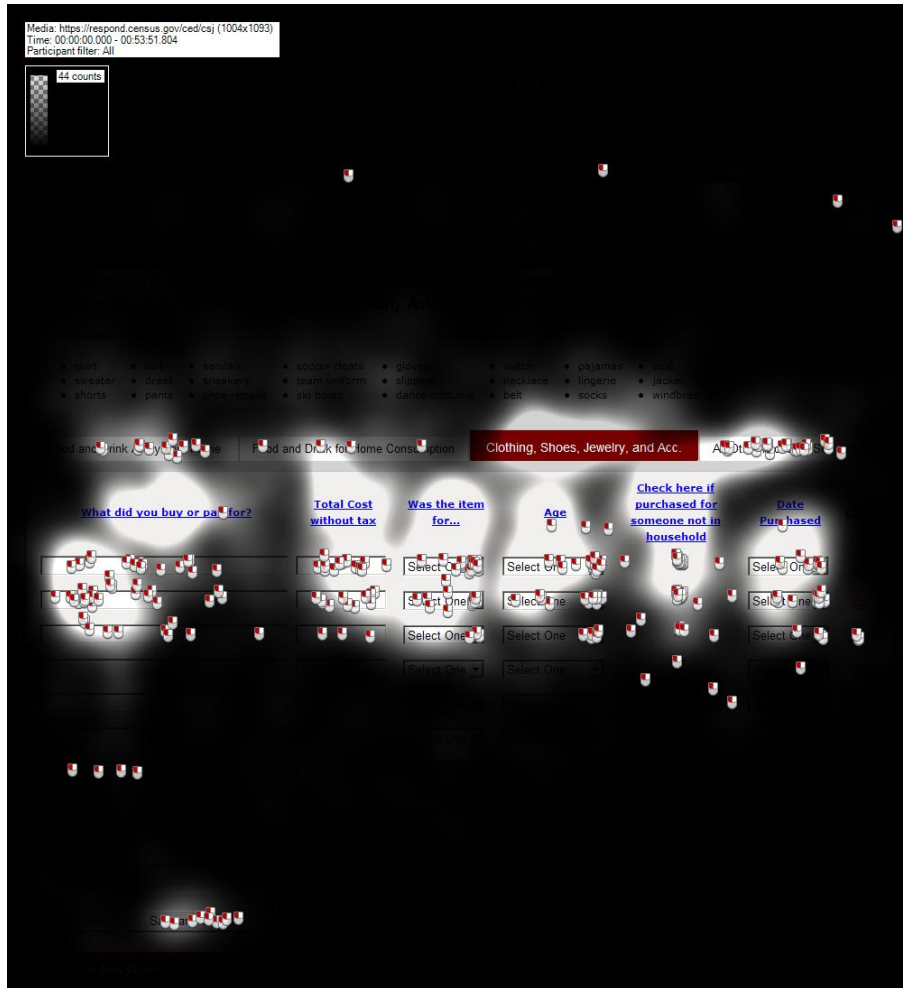
Figure 24: Gaze Opacity Plot for the Clothing, Jewelry, and Accessories Page

Figure 25 provides a gaze opacity plot for the All Other Products and Services page. Participants did not attend to the images in the upper-right-hand corner of the screen, nor did they look at the list of examples very many times.
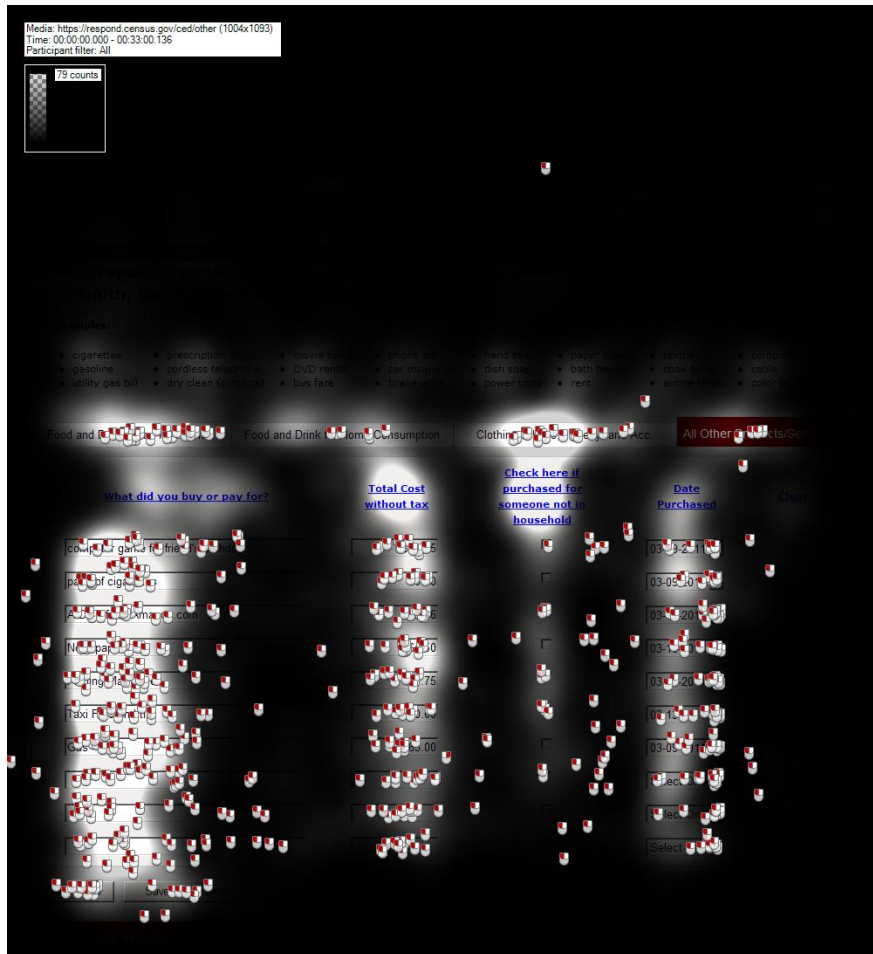
Figure 25: Gaze Opacity Plot for the Other Purchase Page

Recommendation: We recommend getting rid of the pictures in the header, because the Web design is part of the outdated look and feel on which many participants commented. The banner can be trimmed down a great deal once the pictures are removed. If a picture must be kept here, we recommend keeping only one and making it the more generalizable wallet picture. An even better option would be to have the instructional video that we recommend elsewhere in this report available to the Respondent in this location.

Another reason that the top section of page takes up too much space is that the gray bar between the header at the top of the page and the roster section is extremely wide, although it only contains one "Logout" link (Figure 26).

Recommendation: This entire section could be eliminated and the "Logout" link could be moved next to the "About the Survey" link.

Figure 26: Wasted space between the header and the roster and examples section

3.4.8 The name of the Survey Diary is overly complex

The name "Consumer Expenditure Diary Survey" is unnecessarily long and confusing for describing the data that it collects. One participant astutely pointed out that non-native English speakers might have a very hard time understanding what the survey is about.

In order to demonstrate the difference in usage between "expenditure" and similar, simpler words like "purchase" and "cost," a word frequency analysis was performed using the SUBTLEX database (Bysbaert & New, 2009). The SUBTLEX word frequency database was compiled based on the frequency of occurrence in print of American subtitles from film and television (51 million total words). The database provides a word's frequency per million words. The frequency of the words "consumer," "household" and "economic unit" used is listed in Table 1.

The noun "expenditure" occurred 14 times per 1 million.

Word	Freq/1 Million	Word	Freq/1 Million
expenditure	14	consumer	106
purchase	325	household	354
expense	380	economic	253
cost[1]	2801	Unit	1845

Table 1: Frequency of the listed words used per million uses

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[1] Includes "cost" in all parts of speech categories, including verbs, which inflates this estimate.

"Expenditure" is only used 14 times per million words, which makes it a rarely used word.

Recommendation: We recommend testing a version of this survey diary with a title that utilizes simpler and more frequently used terminology. We suggest for "Household Expense Diary." The Respondent does not need to know that we use the term "economic unit" to describe the category that the Census Bureau is really looking to capture. The word "household" is used in the FR talking points and appears in the survey instrument repeatedly as well.

This recommendation for simpler terminology is in line with the Plain Language initiative that is being implemented across the Federal government and across the Census Bureau.

3.5   Low-Priority Issues

Low-Priority issues are not absolutely connected to user performance, but are important points to be considered in further development of the site. Some of these issues are not from Usability Testing, but from Expert Review.

3.5.1   Summary Screen should say "Summary Graph"

The current label is not an adequate description of the content that pops up when the button is clicked.

Recommendation: Using the phrase "Summary Graph" gives the R a better idea of what can be found by clicking on the link.

3.5.2   The Review/Print Expenses button does not indicate that a PDF will be generated.

This lack of information violates Census IT Standard 15.0.2 and user expectations. There is nothing asking respondents whether they want to save or open a PDF file.

Recommendation: Change the button label to "PDF Expense Summary" or "Expense Summary Document (PDF)." There also needs to be a link to an Adobe Reader somewhere on every screen where this button is shown. We recommend utilizing an intermediary screen between the data entry page and opening the PDF file where the R has the clear choice whether or not they want to open a PDF.

3.5.3   The screen jumps to the top of the page when "Add more Rows" is clicked at the bottom of the screen.

This is potentially very irritating for Respondents, since they were just working at the very bottom of the screen when they clicked "Add more Rows." Four participants commented negatively about the page jumping above the fold after adding rows.

Recommendation: Program the screen to stay stable and not jump to the top when "Add more Rows" is clicked.

3.5.4   The "Clear" buttons do not actually get rid of the row of data and have no confirmation prompt, which could lead to unintentional data loss.

If the red "Clear" icon is clicked, the data values that were entered in the row are deleted, but an empty row of text entry fields remains. Some of the participants commented that they expected

the entire row, including the text entry boxes, to be deleted when they clicked the "clear" button. Eight participants (19.05 percent) verbally expressed wishing the clear button would remove the blank row from the screen. The empty row carries over to the "Review/Print Expense" Tab, which produces a PDF with a blank row of data for each cleared row. One participant who saw this row produced on the PDF commented that the technology for the survey was "extremely dated" and that the blank row should have automatically been deleted before a PDF report was produced.

Recommendation: Have the rows actually disappear once they are cleared. Another recommendation suggests a warning message before data are deleted to prevent accidental data loss.

3.5.5 The "Clear" buttons do not line up with their corresponding rows.

If the "Clear" buttons are lined up with the bottom of the rows, it may be difficult for Respondents to visually discern which button belongs to which row. Because there is no prompt to confirm deletion of data, this may lead to unintentional data loss, frustration, or break-off.
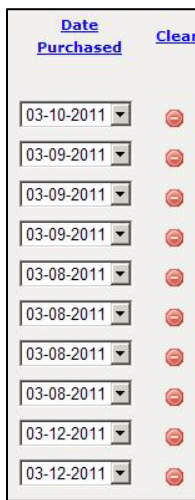
Figure 27: The "Clear" icons and the corresponding data rows

Recommendation: Vertically align the center axes of the "Clear" icons with the vertical center axes of the adjacent drop-down boxes.

3.5.6 The Census Bureau logo is a past version and not the current 2011 version.

In addition to contributing to the antiquated look and feel of the website, the modern logo should be used to assure Respondents that this is a Census Bureau survey.
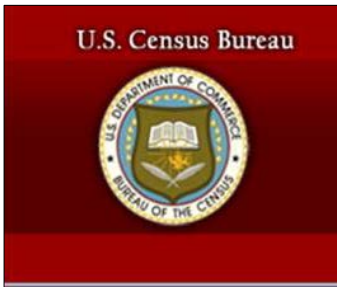
Figure 28: Past Census Bureau Log from Round 1

Testing Figure 29: New Census Bureau logo

Recommendation: Use the New Census Bureau Logo.

3.5.7 Lack of Updated Grocery Terms for current times

There is no "Organic" or "Green" terminology. Is milk "fresh" or "bottled?" If it is in a carton in the grocery store, it is not as fresh as from the farm, but it is not powdered or canned either. Is Wonder Bread "fresh" or "Other?" What does "Other" mean?

Some Health and Beauty Aids (HBA) are also labeled "Fresh" because they contain fruit and vegetable ingredients.

Recommendation: Test at least one version of the survey diary that contains options for marking whether something is "organic" versus just "fresh." We recommend adding three categories, "Organic fresh," "Organic canned/bottled," and "Organic other" for this test.

3.5.8 The layout appears outdated and overly "busy"

The layout of the page, as described by one participant was like a "Pre-2000 design" and "extremely outdated." The large header and overall look and feel most likely contribute to this perception. There is also a great deal of information contained on each screen, much of it not used by participants (see the discussion of the eye-tracking results above). One participant said, "I can see it's going to take a while just trying to navigate the pages."

Recommendation: Get rid of all unnecessary content. Also, consider using a color scheme that is more pleasant for Respondents. There is scientific evidence that blue is the most preferred color and generates the most positive emotional response (Schloss & Palmer, 2009).

3.5.9 Comments in Group 3 about lack of organization and need for "streamlining"

All of the participants in Group 3 made at least one comment about the unorganized list of purchases being difficult to enter because there was not enough structure to that list. One participant in Group 3 said, "There's got to be a way to make entering this data a bit more streamlined." He suggested having respondents organize purchases by day.

Recommendation: Test a version of the FR talking points that suggests that respondents may organize their receipts by category to the best of their ability for easier data entry later. Because

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the results show better accuracy for the data entry and higher levels of satisfaction for the Group 2 method, it is recommended that a suggestion for organization be included in the FR talking points.

3.5.10 Although the instructions in FR talking points say that the roster cannot be adjusted once it is complete, it can actually be altered if you use the browser "back" button.

Changes to the roster can be made if the R uses the browser "back" button during his or her first session in the CE Web Diary.

Recommendation: Another recommendation in the report suggests eliminating the roster, which is the most efficient solution. An alternative solution would be to make sure that the roster screen expires once the "next" button is clicked on that screen. On the data entry pages, the browser "back" button should lead back to an expired page notice, or be locked to prevent backing up to the roster screen.

3.6 Satisfaction Data

Satisfaction data were collected using a ten-question Satisfaction Questionnaire with ten-point rating scales, with 1 being the lowest rating for satisfaction and 10 being the highest rating of satisfaction (See Appendix G for the Satisfaction Questionnaire). Overall, satisfaction ratings tended to be in the upper half of the rating scale (5-10). Groups differed for certain questions, including Overall Experience of Completing the Diary, Ease of Movement, Knowing Where You Are in the Diary, and Organization. In general, Group 3 participants tended to give lower ratings for the Web Diary than the other two groups for these questions. The frequency spread for Overall Satisfaction (for all participants) and the frequency spreads for the questions above (broken down by group) appear in Figures 29-33 below. Additional Frequency Spreads appear in Appendix J.

Due to the lack of organization of items in the Group 3 treatment (and by contrast the organization of items identical to the diary for Group 2), participants in Group 3 had to click from tab to tab much more frequently than participants in Group 2, who generally only had to click between the tabs a few times while entering the data. This may have influenced the levels of satisfaction scores between the two groups. The above listed questions that yielded notable differences all refer to movement and organization within the Diary. This may further support a decision to advise respondents to organize their data prior to entry or to change the organization of Diary itself.

Overall experience of completing the diary
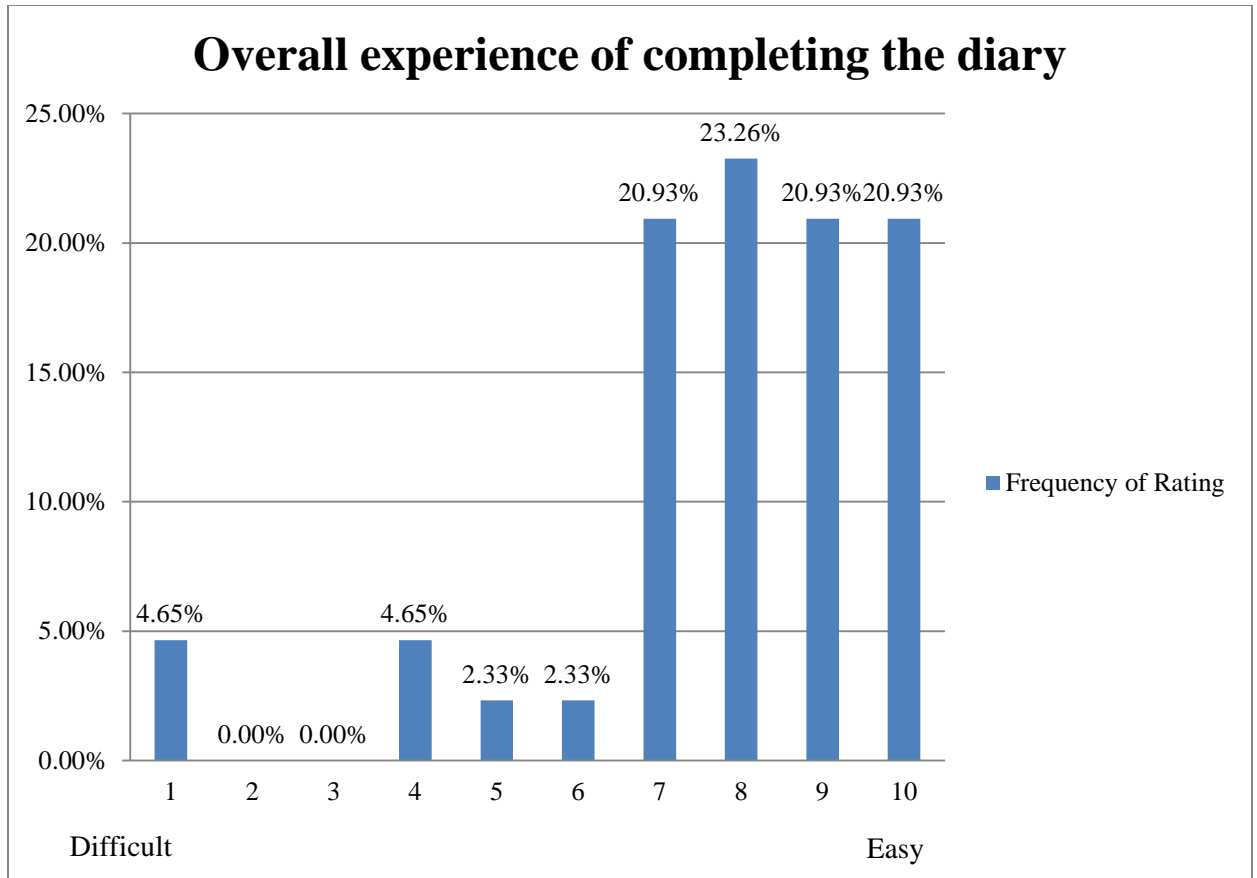
Figure 30: Frequency Spread for "Overall experience Completing the Diary" Question (*n*=42)

Knowing where you were in the form

Frequency of Rating: Group 1
Frequency of Rating: Group 2
Frequency of Rating: Group 3

Confusing — Clear

Figure 33: Frequency Spread for "Knowing where you were in the form" question, By Group, (*n*=42)

Organization of question, instructions, and response categories in the diary
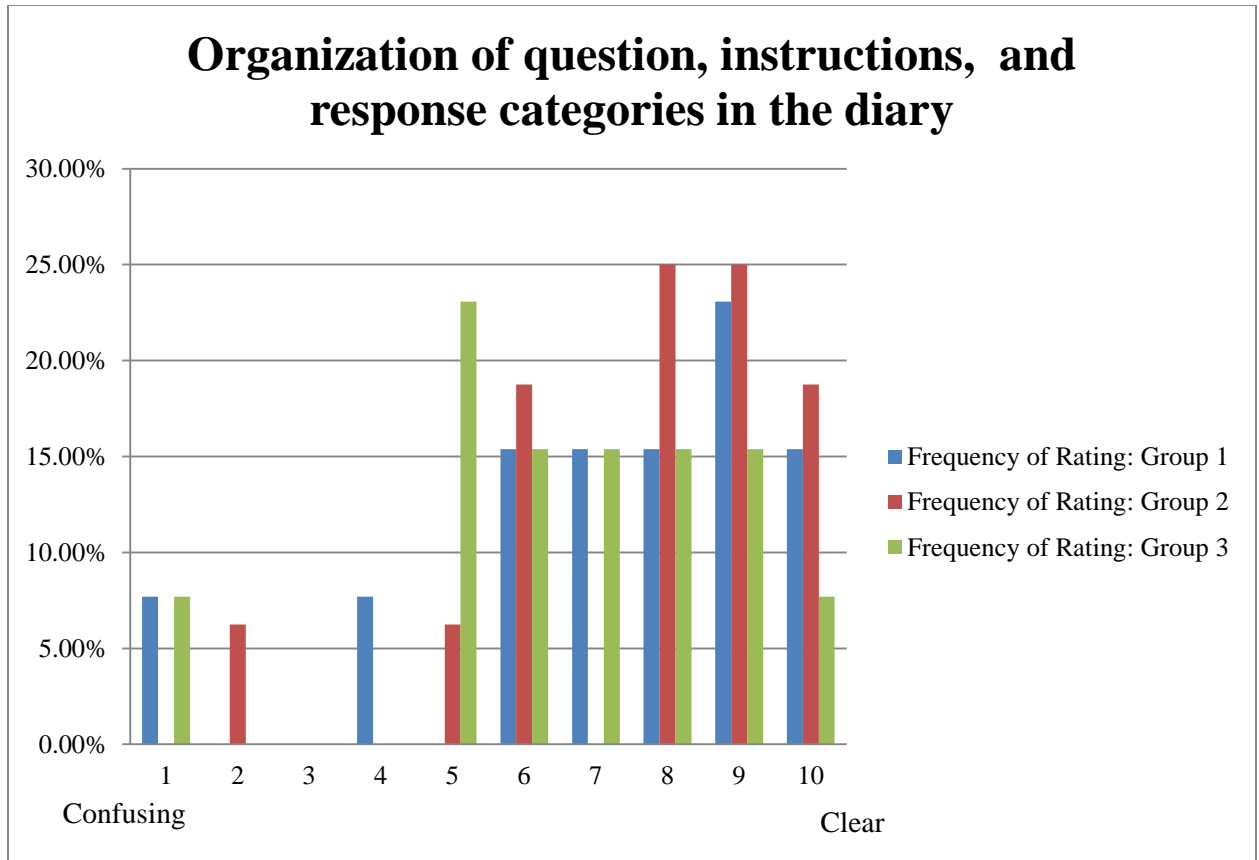
Figure 34: Frequency Spread for "Organization of question, instructions, and response categories in the diary" question, By Group, (*n*=42)

4.   Results from Usability Testing on an iPad

Two participants completed the CE Diary on an Apple iPad 2 before completing it on a desktop computer. Although we had originally planned to have more participants complete the CE Web Diary on the iPad, we discontinued this aspect of the test plan after two participants. It became obvious that it was extremely difficult to complete the tasks on the smaller screen and that the instrument was not optimized for mobile devices.

4.1   The keyboard covers over half the screen, occluding text entry fields and response options

When the keyboard pops up, it covers the majority of the screen (Figure 27), and both participants commented that this was frustrating. One participant noted right away that this survey must not have been optimized for mobile devices.
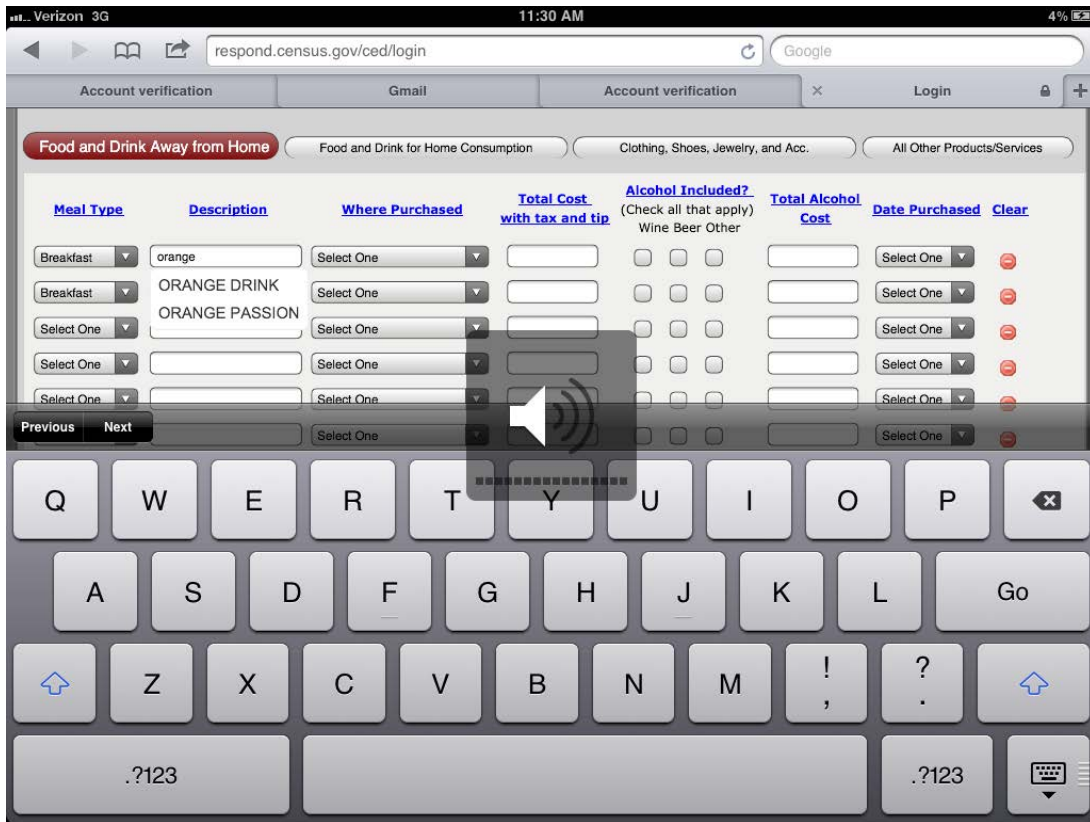
Figure 35: The keyboard covers over half of the screen.

Recommendation: Use native programming to control the size and location of the keyboard, if possible.

4.2   Auto-capitalization interferes with password entry

The first participant who completed the diary on the iPad had trouble logging into the instrument because the password entry fields were auto-capitalizing what he typed. Since the entry cannot be seen as the participant is typing (i.e., bullet dots are shown instead of the characters being typed for security reasons), he did not realize what the problem was until he tried it a few times.

Recommendation: Disable the auto-capitalization feature on password field.

4.3   Date entry is not in native language (Apple wheel)

The date selection fields and pre-fill suggestions are obviously not programmed to be used on a mobile device. They do not allow the iPad's Apple wheel (like the example in Figure 28) and other native features to be utilized. Since more and more people complete surveys on mobile devices in current times, it is important to optimize each Census Bureau survey for mobile completion, especially those that must be completed over a longer period of time like the CE Diary. The survey diary completion should be as convenient as possible for Respondents.

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Figure 36: Example Apple Wheel

Recommendation: Allow the use of the Apple Wheel and other native features for mobile devices.

4.4 The data entry "Clear" icons do not line up with the rows – even more pronounced

The second participant who completed the survey on an iPad commented that he had trouble telling which "Clear" icon went with each row because they did not line up correctly (Figure 29).

Figure 37: The "Clear Button" Misalignment with the Associated Rows on the iPad

Recommendation: Align the centers of the "Clear" icons with the centers of the drop-down fields.

4.5   Blank Space (Vertical Orientation) and Content Cut-Off (Horizontal Orientation)

When the instrument is held in the vertical/portrait orientation, there is a great deal of blank space at the bottom of the screen (Figure 30). For the login screen shown in Figure 30, the right side of the page is also cut off in the vertical orientation, requiring horizontal scrolling to see the rest of the content.

Figure 38: Vertical Orientation of the Login Screen on the iPad

When held horizontally, the bottom of the data entry screen is cut off, and the right side of the screen is still cut off (Figure 31). Both of these design aspects made it obvious that this survey was not optimized for mobile devices.

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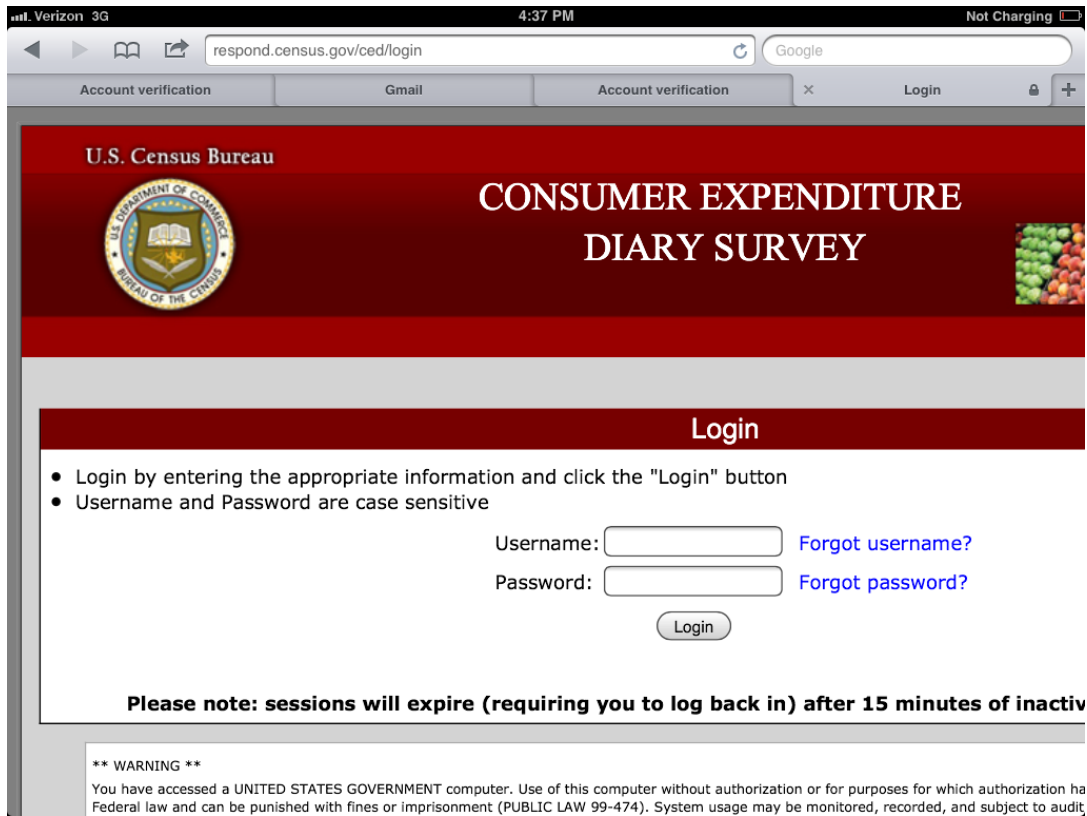
Figure 39: Horizontal Orientation of the Login Screen on the iPad

However, when the participant touched the text entry fields, the screen zoomed out when the keyboard appeared and the horizontal scrolling problem disappeared (Figure 32 and Figure 33).
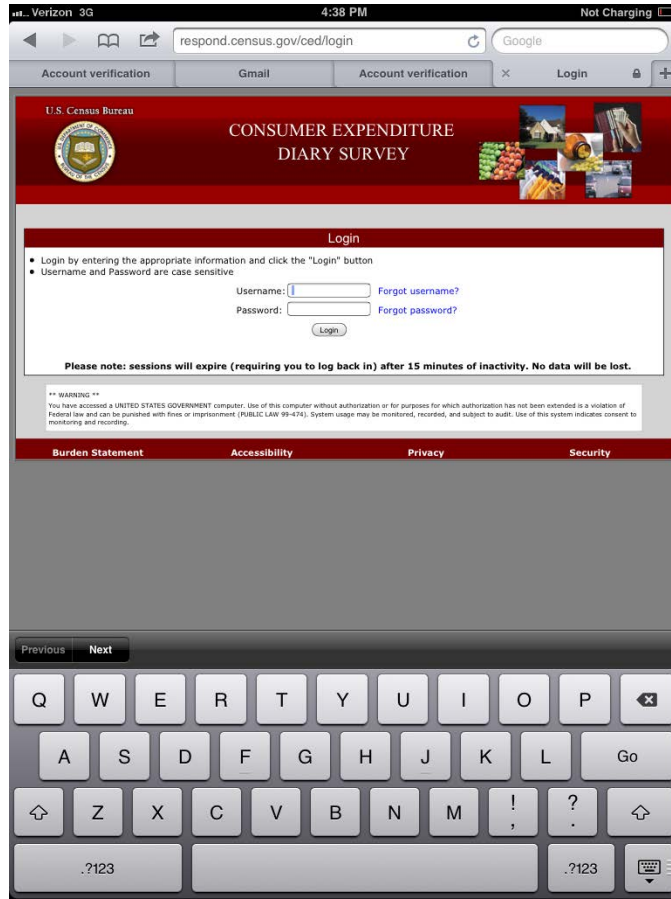
Figure 40: Vertical Orientation of the Login Screen with Keyboard

The header was still occluded in the horizontal orientation, however (Figure 33).
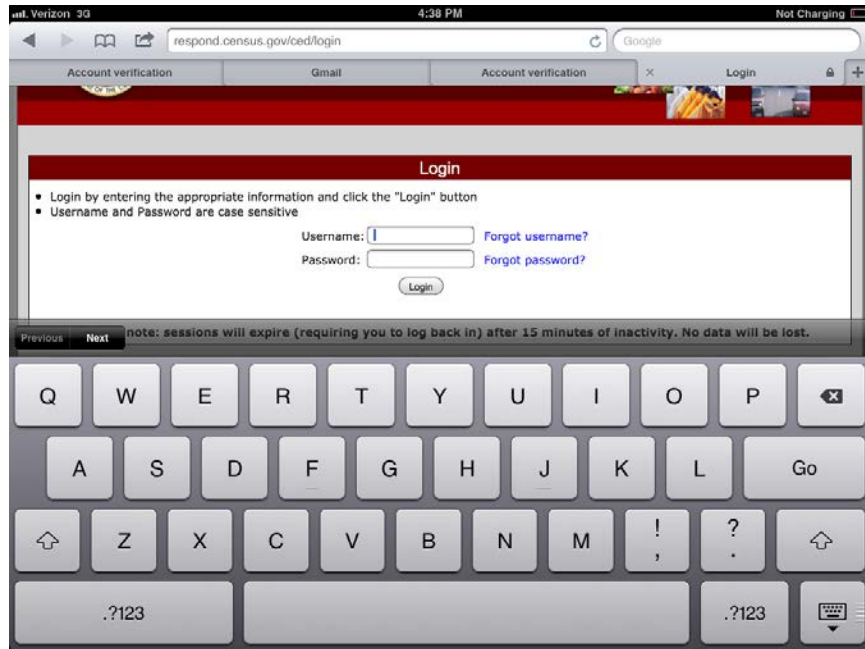
Figure 41: Horizontal Orientation of the Login Screen with Keyboard

Recommendation: Optimize the screen dimensions and keyboard position for mobile devices.

5.   Expert Review on the iPhone 4S

We also tested the screens on an iPhone 4S as an ad hoc expert review for this report.

5.1   The keyboard occludes most of the screen during data entry (Figure 34). The problem
       was even more pronounced on the iPhone than on the iPad.

Figure 42: The Keyboard Occludes Most of a Data Entry Screen on the iPhone

Recommendation: Optimize the screen dimensions and keyboard position for mobile devices.

5.2   Lack of screen size optimization

This text entry field and other associated text is extremely small on the iPhone's 3.5 inch (diagonally measured) screen. As with the iPad, when held in the vertical orientation position, there was a great deal of blank grey space beneath the screen itself (Figure 35).

Figure 43: The ID Number Entry Screen on an iPhone: Vertical Orientation

In the horizontal orientation position, the bottom of the screen was cut off, obscuring all of the text below the entry field (Figure 36).

Figure 44: ID Number Entry Screen on the iPhone: Horizontal Orientation

Recommendation: Optimize the screen dimensions and keyboard position for mobile devices.

6.   High-Priority Accessibility Findings

This section presents accessibility findings and compliance with Section 508.

6.1   The programmed tabbing order makes this screen inaccessible to screen-reader users.

Since the tab order does not match the visual order as shown above in Figure 37, screen reader users never hear the instructions on how to enter names or details about the starting date prior to providing this data.   This behavior violates 1194.22 paragraph N of the Section 508 regulation.
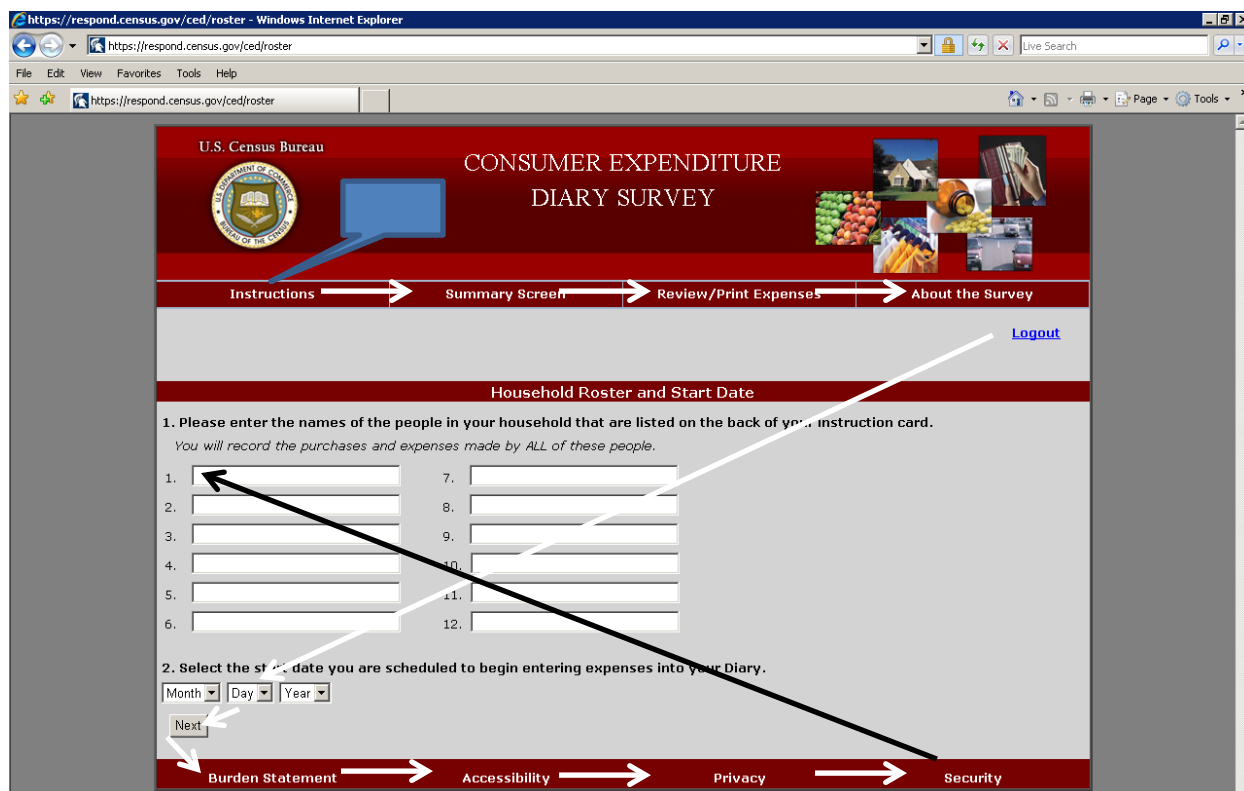
Figure 45: The tabbing order does not match the visual presentation.

Recommendation: Tag the question numbers as headers.   Tab order should proceed through the top links, logout, 12 data-entry fields for names, followed by the month, day, and year drop-down box.

6.2   The checkboxes for the "Alcohol Included?" option are not labeled.

The labels beer, wine, or other, respectively, are not associated with the checkboxes below the "Alcohol Included?" header link (Figure 38). That is, respondents using screen readers will not hear the response options as it reads across the row.   This implementation violates 1194.22 paragraph N of the Section 508 regulation.
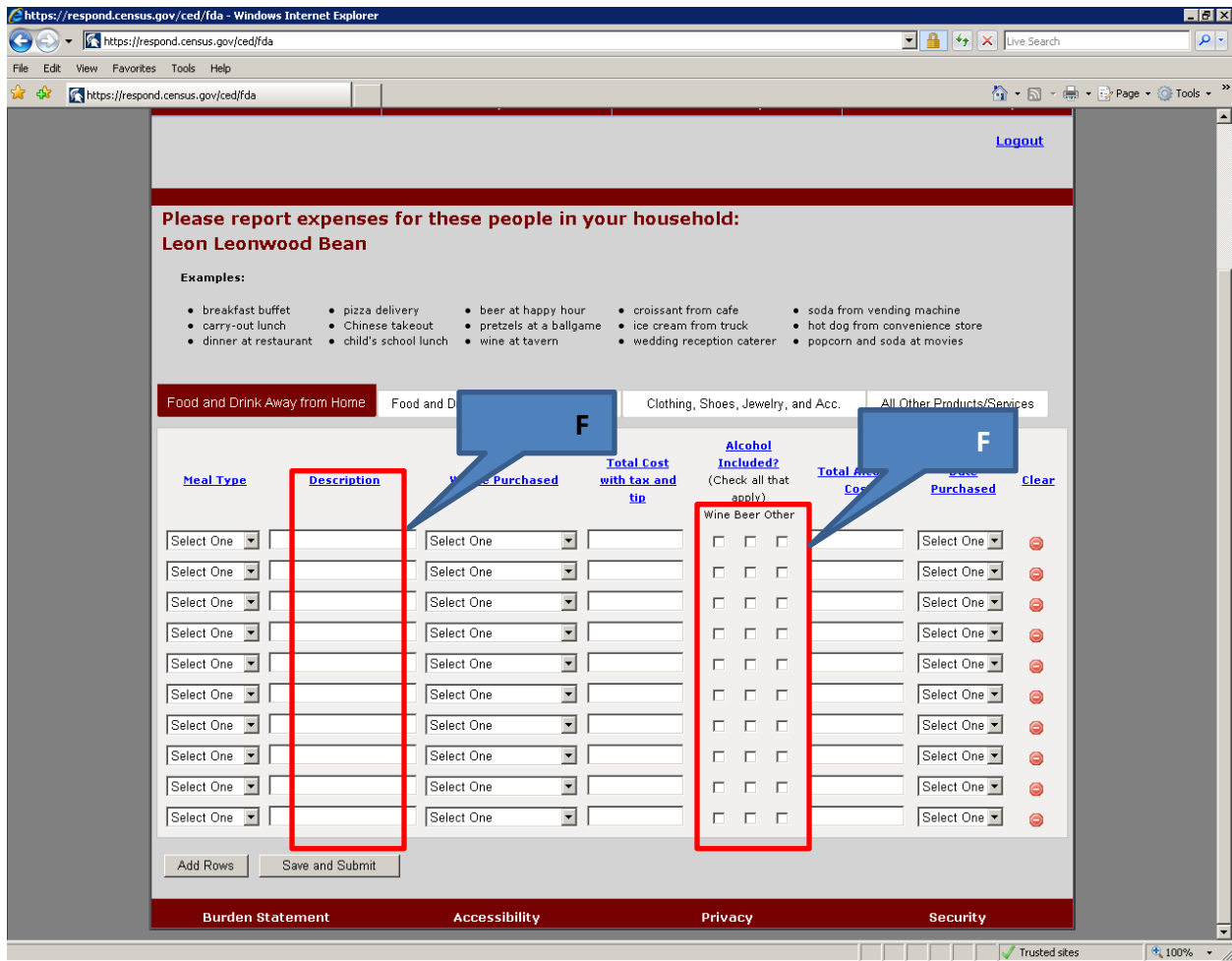
Figure 46: The "Food and Drink Away from Home" screen checkboxes are inaccessible.

Recommendation: The checkboxes do not need to have explicit labels, but they should be vocalized using title text matching the visible column headings of beer, wine, or other.

6.3   Screen-reader users are not informed of the presence of predictive text that appears after typing in the first three letters of a description.

A drop-down list appears below the data-entry field with suggested descriptions of food (Figure 39).   The user can use arrow keys to select the correct item.   This implementation violates 1194.22 paragraphs L and N of the section 508 regulation because the text is not vocalized by the screen-reader.
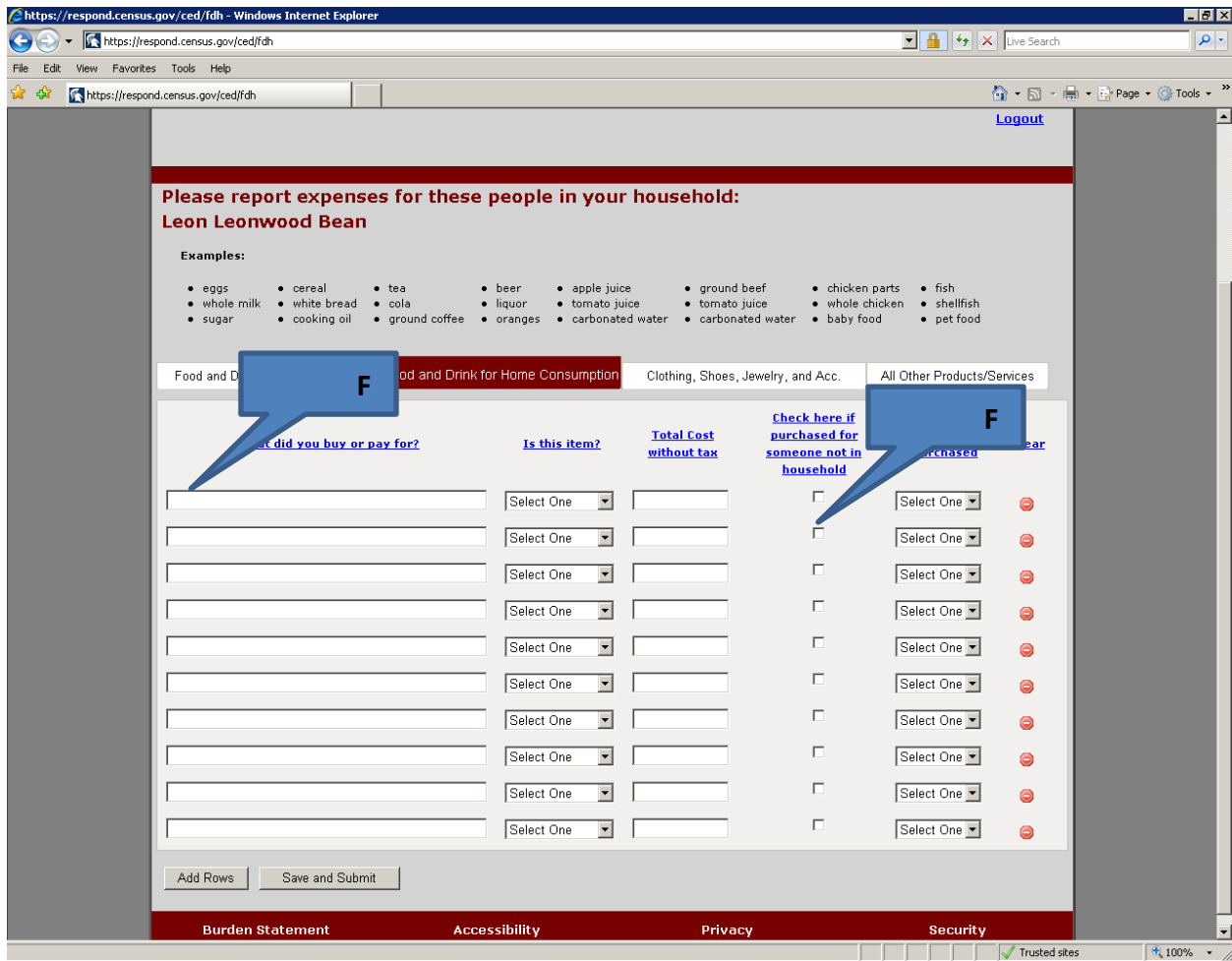
Figure 47: The "Food and Drink for Home Consumption" screen has two accessibility violations.

Recommendation: Associate title text with the Description data-entry field stating "key in the first 3 letters of your food item and press the down arrow until you hear the name of your item, then press enter to select it."

6.4   Screen-reader users are not informed about the predictive text that appears after typing in the first three letters of a description on the data entry pages.

A drop-down list appears below the data-entry field with suggested descriptions of the item that was bought or paid for.   The user can use arrow keys to select the correct item.   This implementation violates 1194.22 paragraphs L and N of the section 508 regulation because the text is not vocalized by the screen-reader.

Recommendation: We recommend removing the predictive text altogether. If it is kept, associate title text with the "What did you buy or pay for?" data-entry field stating "key in the first 3 letters of your food item and press the down arrow until you hear the name of your item, then press enter to select it."

6.5 The checkbox for the "Check here if purchased for someone not in household" is not labeled on the Clothing, Jewelry, and Accessories and Other data entry pages.

When a screen-reader user tabs to the checkbox all they hear is "checkbox not checked" (Figure 40). This implementation violates 1194.22 paragraph N of the Section 508 regulation.
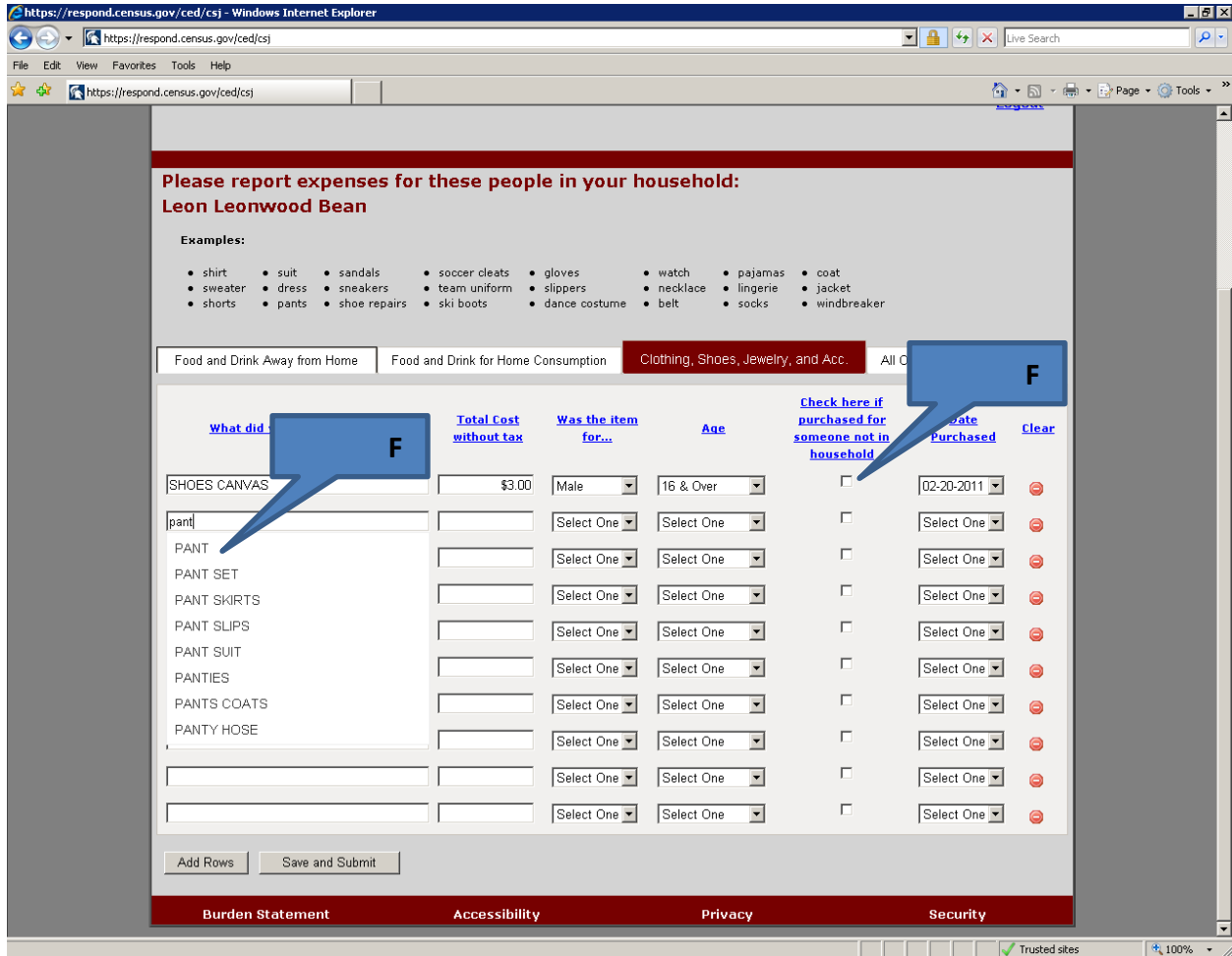
Figure 48: The "Clothing, Shoes, Jewelry and Accessories" screen has two accessibility violations.

Recommendation: The checkboxes do not need to have explicit labels, but they should be vocalized using the header link text.

6.6 Screen-reader users are not informed about the predictive text that appears after typing in the first three letters of a description of apparel purchased.

A drop-down list appears below the data-entry field with suggested descriptions of apparel. The user can use arrow keys to select the correct item. This implementation violates 1194.22 paragraphs L and N of the section 508 regulation because the text is not vocalized by the screen-reader.

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Recommendation: Associate title text with the "What did you buy or pay for?" data-entry field stating "key in the first 3 letters of your purchased item and press the down arrow until you hear the name of your item, then press enter to select it."

6.7   The table corresponding to the first category of expenses is not tagged as a table.

Screen reader users cannot access this table, "Food and Drink Away From Home", which reads as plain text, from left to right, and top to bottom (Figure 41).   Tables 2-4 are accessible for the other CED topics: Food and Drinks for Home Consumption;   Clothes, Shoes, Jewelry, and Accessories;   and All Other Products, Services, and Expenses.   This lack of access violates 1194.22 paragraph G of the section 508 regulation, which describes proper markup of tables.
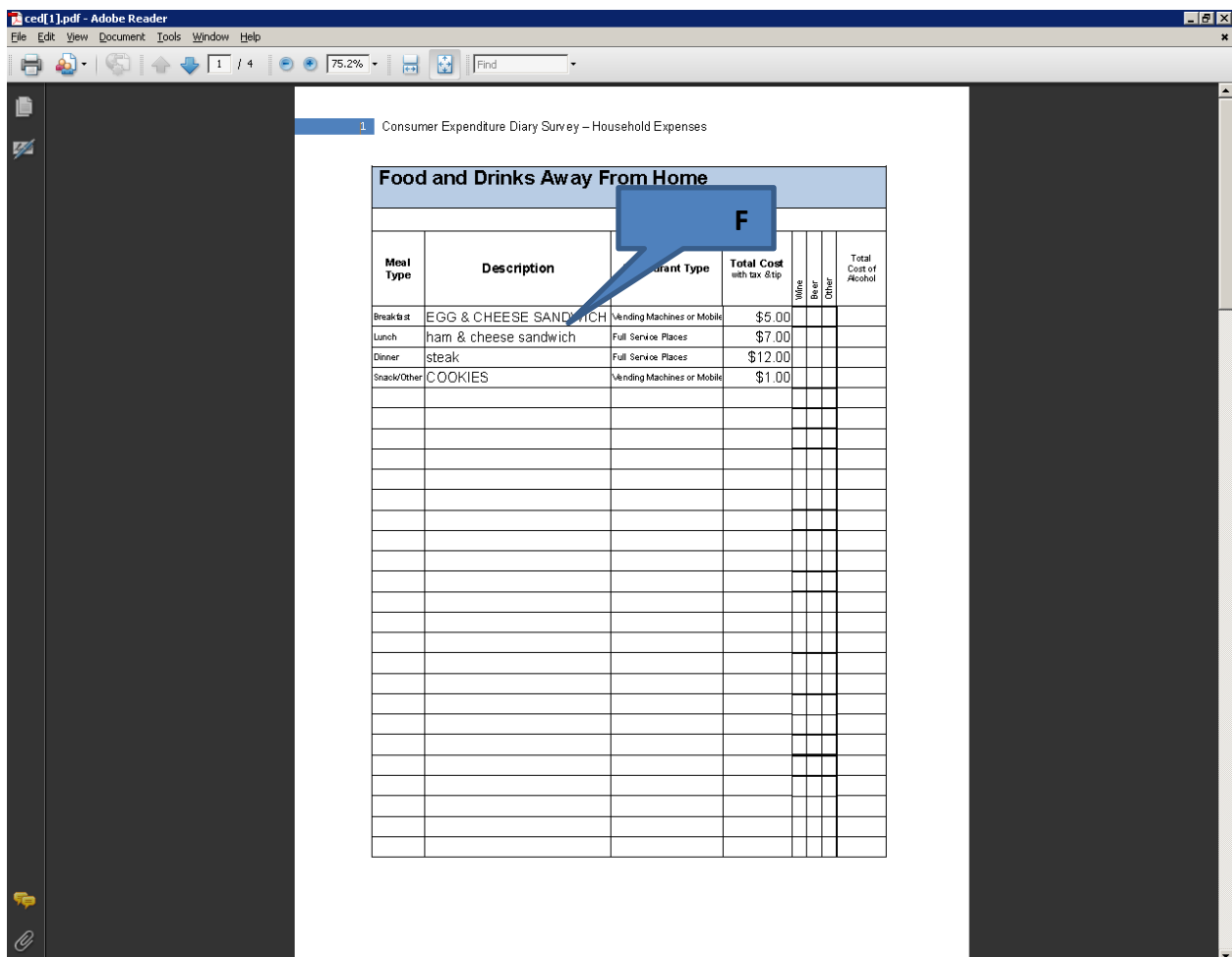
Figure 49: The Review/Print Expenses button generates one table that is incorrectly formatted.

Recommendation: Examine the table markup code used for tables 2-4 and apply it to table 1 to make it accessible.

6.8   Sighted users cannot see the current focus when using the tab key.

There is a dotted rectangle around the "About the Survey" link, which is only visible if the screen is magnified (Figure 42).
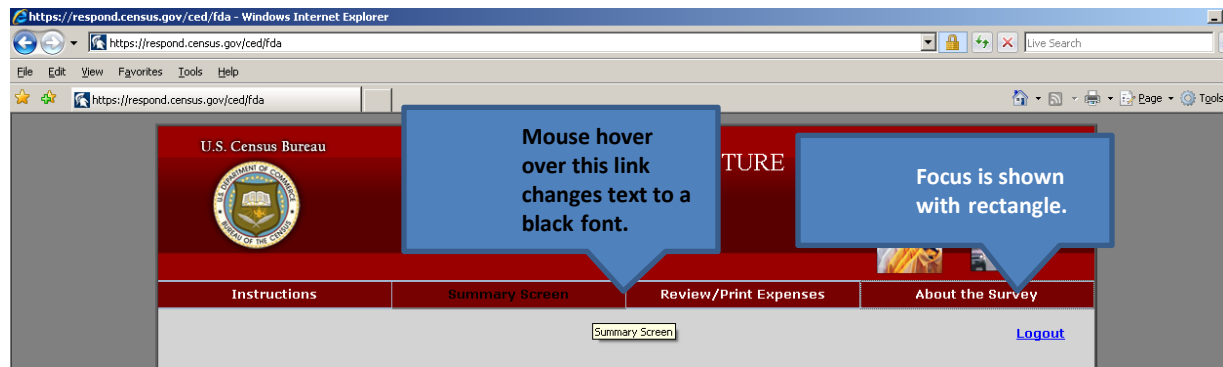
Figure 50: The display of the current focus needs improvement.

Recommendation: WebAim (webaim.org) recommends that the keyboard focus style and the mouse hover style be identical for better visibility of the current focus.   This means as the user is tabbing through the links, the white text should turn black.

References

Ashenfelter, K.T., Holland, T, Quach, V., Nichols, E., and Lakhe, S. (2011). ACS Internet 2011 Project: Report for Rounds 1 and 2 of ACS Wireframe Usability Testing and Round 1 of ACS Internet Experiment. *Center for Statistical Research & Methodology Study Series (Survey Methodology #2012-01)*. U.S. Census Bureau. Available online at <http://www.census.gov/srd/papers/pdf/ssm2012-01.pdf>.

Ashenfelter, K.T., Holland, T, Quach, V., and Nichols, E. (2011). Final Report for Rounds 1 and 2 of Usability Testing of the 2010 Census Quality Survey Online Instrument in Conjunction with the 2010 Decennial Census.*Center for Survey Measurement, Research and Methodology Directorate (Survey Methodology #2011-08)*. U.S. Census Bureau. Available online at <http://www.census.gov/srd/papers/pdf/ssm2011-08.pdf>.

Brysbaert, M. and New, B. (2009). Moving beyond Kučera and Francis: A critical evaluation of current word frequency norms and the introduction of a new and improved word frequency measure for American English. *Behavior Research Methods, 41*(4), 977-990.

Merriam-Webster (2013). Definition of accessory. 2013. In *Merriam-Webster.com*. Retrieved July 13, 2013, from http://www.merriam-webster.com/dictionary/accessory

Schloss, K. B. and Palmer, S. E. (2009). An Ecological Valence Theory of Human Color Preferences. *Journal of Vision, 9* (8), pg. 2663-2668.

Date_____; Participant #_____; Researcher: _____

General Introduction: Consumer Expenditure Diary Instrument

Thank you for your time today. My name is XX and I work here with the Human Factors and Usability group. I will be working with you today. If you have a cell phone, please turn it off or put it on vibrate. We will be evaluating the design of the online Consumer Expenditure Diary Survey by having you interact with it. The diary helps us learn about the buying habits of people in the United States. People who complete the diary helps us understand more about the products and services that are bought by people in this country. Your experience with the survey is an essential part of our work. I did not create the diary, so please feel free to share both your positive and negative reactions to it. We are not evaluating you or your skills. Rather, you are helping us see how well the survey works. The entire session should last about an hour. Your comments and feedback will be used to improve the online diary.

First, I would like to ask you to read and sign this consent form (Attachment B).

Hand the participant the consent form; give time to read and sign; sign your own name and date it if you have not already done so.

It explains the purpose of today's session and informs you of your rights as a participant. It also tells you that we would like to videotape the session, with your permission. Only those of us connected with the project will review the tape and any other data collected during the session, and the information will be used solely for research purposes. We may use clips from the tape to illustrate key points about the survey to the online diary design team. In addition, observers from the project team may observe this session in another room.

I would like you to tell me your impressions and thoughts about the diary screens as you look at them. In other words, I would like you to ``think aloud'' and talk to me about your impressions. If anything was confusing on the screen, please let me know. If you expect to see some item of information let me know if you see it or not.

Pull up www.wtop.com in Firefox.

Before we get started, let's practice thinking aloud, since it's not something that you would normally do while working online. Pretend that you have a minute or two to kill at your desk at work or at home and talk me through your thought process as you try to find something interesting to read on this news site.

Ok, that's exactly what I would like for you to do throughout the session. If at any time during the session you get quiet, I may remind you to talk to me. This is not to interrupt your thought process, but simply to remind you to keep talking to me. Please focus on verbalizing what you are thinking as you complete the survey.

Start the tape.

While you are completing the diary, we will record the movements of your eyes with our eye-tracking monitor to get a record of where you are looking on the screen.

Now I am going to calibrate your eyes for the eye-tracking.

Do Calibration

Now that we have your eyes calibrated, we are ready to begin. Please respond to the survey online as you would at home.

Please imagine that you received this packet from me, a Census Bureau field representative, at your home. Please use the training and the packet materials to access the online Consumer Expenditure diary. I will tell you when to begin the tasks, which are printed on the sheets of paper on the left-hand side of your desk. Please be sure to take a moment to read the training handout (Attachment C) on how to use the diary.

First, you will need to log into the system using the information provided in the handout. You will need access to an email account to complete the login process. You may use your own email account, or you may use an account created by our team for this study. Please let me know which option you prefer.

Pull up Internet Explorer.

If they choose the lab account, it is cediary@yahoo.com and the password is census.

Please complete the login process and remember to think aloud as you proceed.

I am going to go around to the other room to do a sound check. While I am doing that, please take a moment to complete this questionnaire. [*Hand Participant questionnaire on Computer experience and demographics (Attachment D)]*

 I'm going to leave but we will still be able to communicate through a series of microphones and speakers. Do you have any questions before we begin?

Leave room. Once in control room do a sound check and start the eye-tracking software: Tobii Studio.

Allow the participant to proceed through the entire instrument without probing. You may answer their questions if they have trouble, but hold all probes until debriefing.

Consent Form

Usability Study of the Consumer Expenditure Diary

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

You have volunteered to take part in a study to improve the usability of the Consumer Expenditure Diary. In order to have a complete record of your comments, your usability session will be videotaped. We plan to use the tapes to improve the design of the product. Staff directly involved in the usable design research project will have access to the tapes. We also plan to perform an eye-tracking analysis of your session. Your participation is voluntary and your answers will remain strictly confidential.

This usability study is being conducted under the authority of Title 13 USC. The OMB

control number for this study is 0607-0725. This valid approval number legally certifies this information collection.

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

Participants Name: _____

Participants Signature:_____ Date:_____

Researcher's Name:_____

Researcher's Signature:_____Date:_____

A-3

Appendix C: Participant Instructions and Data Lists

Participant Instructions

Consumer Expenditure Diary Survey Web Guide

Thank you for agreeing to participate in the Consumer Expenditure Survey (CE). We understand that this task takes time; however, your information is very important to us and will be used for many purposes that affect all Americans. Among the most important, it is used to help calculate the Consumer Price Index, or CPI, which is a basic measure of the rate of inflation. For more information about the survey, visit: http://www.bls.gov/cex and http://www.census.gov.

By law (Title 13, U.S. Code), we must keep your information confidential; we use it for statistical purposes only. If you have comments regarding this survey, please send them to the Division of Consumer Expenditure Surveys, 2 Massachusetts Avenue N.E., Room 3985, Washington, DC 20212.

The CE Web Diary can be accessed at: https://respond.census.gov/ced/ (Please note the "s" after http.)

Your survey ID number: ___ced1055_____

Create your unique username and password. After creating your account, you will receive an email from the Centurion Electronic Data Collection System that will provide a link for you to click on to verify your CE Web Diary account.

A-4

Enter the names of the people in your household and your start date _____

Complete the online diary for the entire two weeks, enter EVERYTHING you and the people on your list spend money on each day – the products you buy, the services you use, the household expenses you have during the week – no matter how large or small they are.

I will return on : _____

If you have any questions, please call:

Field Representative: _____   Telephone: _____

Regional Office: _____   Telephone: _____

Task 1

The members of your household are Dan Smith, Amanda Smith, Ben Smith, and Catherine Smith. You are either Dan or Amanda.

Each member of the family gave you their receipts and lists of purchases for the past two weeks. Enter all the following purchases into the Consumer Expenditure online diary. Please remember to 'think aloud' as you work through this task.

On Day 5, Dan Smith purchased:

1.   Newspaper $1.50

2.   Fishing Magazine $3.75

3.   Egg and cheese McMuffin from McDonald's for breakfast for $2.99 (including tax)

4.   Coffee from Starbucks for $4.00 (including tax)

5.   Taxi Fare and tip $20.00

6.   Sneakers for his 6 year old niece $29.99

7.   Sweatshirt for 18 year old nephew $25.99 On Day 1, Dan and Amanda Smith went out to dinner. They each spent:

1. $35 on lobsters, baked potatoes and green beans. (including tax and tip)

2. $20 on a bottle of wine. (including tax)

3. $7 on dessert. (including tax)

Dan alone spent:

4. $65.43 on gas for their car (including tax)

On Day 2, Ben Smith purchased:

1.   Computer game for friend's birthday present, $50.85

2.   Roast beef sandwich and a soda from a deli for lunch for $9.54 (including tax)

3.   Candy bar from vending machine for $0.75 (including tax)

4.   A slice of pizza at the mall for $2.50 (including tax)

5.   A pack of cigarettes $6.00 (excluding tax)

On Day 3, Catherine Smith purchased:

1.   Stuffed animal for $15.99

2.   Ice cream sandwich from ice cream truck $3.00

3.   A DVD from Amazon.com for $15.76 (including tax)

Amanda Smith went grocery shopping on Day 4, and purchased:

1.   White bread $12.50 (excluding tax)

2.   Frozen orange juice $1.25 (excluding tax)

3.   3 apples $1.99 (excluding tax)

4.   Skim milk $3.34 (excluding tax)

5.   5 TV dinners $10.50 (excluding tax)

6.   Pepsi six-pack $3.99 (excluding tax)

7.   Chicken wings, frozen $5.99

8.   Men's deodorant $2.99 (excluding tax)

Dan Smith paid the bills on Day 1, and made the following payments:

1.   Mortgage payment $4,000
2.   Health Insurance bill $375
3.   Wrote a check for a church contribution $50.00

Task 2

After you finished entering all the purchases the Smith household made for the week, you review the entries to make sure you entered every entry listed, and the correct price.

As you are doing this, you notice that Catherine made a mistake on her list. The stuffed animal she purchased did not cost $15.99, it cost $25.99. Please make this correction now.

Remember to think aloud as you work.

Task 3

Ben Smith remembers that his friend actually purchased the computer game (and Ben did not). Please make this correction now.

Remember to think aloud as you work.

Task 4

Dan Smith notes that the coffee from Starbucks on [INSERT DATE] actually cost $4.57. Please make this correction now.

Task 5

Please submit your data for the week.

Group 2 Purchase/Task List:

Task 1

The members of your household are Dan Smith, Amanda Smith, Ben Smith, and Catherine Smith. You are either Dan or Amanda.

Each member of the family gave you their receipts and lists of purchases for the past two weeks. Enter all the following purchases into the Consumer Expenditure online diary.

Please remember to 'think aloud' as you work through this task.

Food and Drink Away from Home

1.   Ice cream sandwich from ice cream truck $3.00 purchased by Catherine Smith on Day 3.

2.   Roast beef sandwich and a soda from a deli for lunch for $9.54 (including tax) purchased by Ben Smith on Day 2.

3.   Candy bar from vending machine for $0.75 (including tax) purchased by Ben Smith on Day 2.

4.   A slice of pizza at the mall for $2.50 (including tax) purchased by Ben Smith on Day 2.

5. $35 on lobsters, baked potatoes and green beans. (including tax and tip) purchased by Dan Smith on Day 1.

6. $35 on lobsters, baked potatoes and green beans (including tax and tip) purchased by Amanda Smith on Day 1.

7. $20 on a bottle of wine. (including tax) purchased by Dan and Amanda Smith on Day 1.

8. $7 on dessert. (including tax) purchased by Dan Smith on Day 1.

9. $7 on dessert (including tax) purchased by Amanda Smith on Day 1.

10.   Egg and cheese McMuffin from McDonald's for breakfast for $2.99 (including tax) purchased by Dan Smith on Day 5.

11.   Coffee from Starbucks for $4.00 (including tax) purchased by Dan Smith on Day 5.

Food and Drink for Home Consumption

1.   White bread purchased by Amanda Smith on Day 4for $12.50 (excluding tax)

2.   Frozen orange juice purchased by Amanda Smith on Day 4for $1.25 (excluding tax)

3.   3 apples purchased by Amanda Smith on Day 4 for $1.99 (excluding tax)

4.   Skim milk purchased by Amanda Smith on Day 4 for $3.34 (excluding tax)

5.   5 TV dinners purchased by Amanda Smith on Day 4 for $10.50

Clothing, Shoes, Jewelry, and Accessories

1.   Sneakers purchased by Dan Smith on Day 5 for his 6 year old niece for $29.99

2.   Sweatshirt purchased by Dan Smith on Day 5 for 18 year old nephew for $25.99

All Other Products/Services

1.   Newspaper purchased by Dan Smith on Day 5 for $1.50

2.   Fishing magazine purchased by Dan Smith on Day 5 for $3.75.

3.   Computer game for friend's birthday present, purchased by Ben Smith on Day 2 for $50.85

4.   Stuffed animal purchased by Catherine Smith on Day 3 for $15.99

5.   Taxi Fare and tip spent by Dan Smith on Day 5 for $20.00

6.   Gas for the family car purchased by Dan Smith on Day 1 for $65.43

7.   A pack of cigarettes purchased by Ben smith for $6.00 (excluding tax) on Day 2.

        8.   A DVD from Amazon.com purchased by Catherine Smith for $15.76 (including tax) on Day 3.

9.   Men's deodorant purchased by Catherine Smith for $2.99 (excluding tax) on Day 4.

10.   A mortgage payment made by Dan Smith for $4,000.00 on Day 1.

11.   A Health Insurance bill payment made by Dan Smith on Day 1 for $375.00

12.   A church contribution payment made by Dan Smith on Day 1 for $50.00

Task 2

After you finished entering all the purchases the Smith household made for the week, you review the entries to make sure you entered every entry listed, and the correct price.
As you are doing this, you notice that Catherine made a mistake on her list. The stuffed animal she purchased did not cost $15.99, it cost $25.99. Please make this correction now.
Remember to think aloud as you work.

Task 3

Ben Smith remembers that his friend actually purchased the computer game (and Ben did not). Please make this correction now.
Remember to think aloud as you work.

Task 4

Dan Smith notes that the coffee from Starbucks on [INSERT DATE] actually cost $4.57.   Please make this correction now.

Task 5

Please submit your data for the week.

Group 3 Purchase/Task List:

Task 1

The members of your household are Dan Smith, Amanda Smith, Ben Smith, and Catherine Smith. You are either Dan or Amanda.

Each member of the family gave you their receipts and lists of purchases for the past two weeks. Enter all the following purchases into the Consumer Expenditure online diary. Please remember to 'think aloud' as you work through this task.

1.   Stuffed animal for $15.99 purchased by Catherine Smith on Day 3.

2.   A church contribution payment made by Dan Smith on Day 1 for $50.00

3.   Coffee from Starbucks for $4.00 (including tax) purchased by Dan Smith on Day 5.

4.   Frozen orange juice $1.25 (excluding tax) purchased at grocery store by Amanda Smith on Day 4.

5.   5 TV dinners $10.50 purchased at grocery store by Amanda Smith on Day 4.

6. $35 on lobsters, baked potatoes and green beans. (including tax and tip) purchased at restaurant by Dan Smith on Day 1.

7. $35 on lobsters, backed potatoes and green beans (including tax and tip) purchased at restaurant by Amanda Smith on Day 1.

8.   Pepsi six-pack $3.99 (excluding tax) purchased by Amanda Smith on Day 4.

9.   Chicken wings, frozen $5.99 (excluding tax) purchased by Amanda Smith on Day 4.

10. $1.50 for newspaper purchased by Dan Smith on Day 5.

11.   Sneakers for Dan Smith's 6 year old niece for $29.99 purchased by Dan on Day 5.

12.   Men's deodorant $2.99 (excluding tax) (excluding tax) purchased by Catherine Smith on Day 4.

13.   A slice of pizza at the mall for $2.50 (including tax) on Day 2.

14.   Ice cream sandwich for $3.00 purchased by Catherine Smith from ice cream truck on Day 3.

15.   Fishing magazine purchased by Dan Smith on Day 5, for $3.75.

16.   3 apples for $1.99 (excluding tax) purchased by Amanda Smith on Day 4.

17.   Skim milk for $3.34 (excluding tax) purchased by Amanda Smith on Day 4.

18.   Roast beef sandwich and a soda for $9.54 (including tax) purchased from a deli for lunch by Ben Smith on Day 2.

19.   Computer game, $50.85 purchased for friend's birthday present by Ben Smith on Day 2.

20. $7 on dessert. (including tax) purchased by Dan Smith at restaurant on Day 1.

21. $7 on dessert (including tax) purchased at restaurant by Amanda Smith on Day 1

22.   A mortgage payment made by Dan Smith for $4,000.00 on Day 1.

23. $20 on a bottle of wine (including tax) purchased at restaurant by Amanda Smith on Day 1.

24. $20 on a bottle of wine (including tax) purchased by Dan Smith at restaurant on Day 1

25.   Sweatshirt purchased by Dan Smith for $25.99 for an 18-year-old nephew on Day 5.

26.   A Health Insurance bill payment made by Dan Smith on Day 1 for $375.00

27.   Taxi Fare and tip for $20.00 spent by Dan Smith on Day 5.

28.   Egg and cheese McMuffin from McDonald's for breakfast for $2.99 (including tax) purchased by Dan Smith on Day 5.

29.   A DVD from Amazon.com purchased by Amanda Smith for $15.76 (including tax) on Day 3.

30.   Candy bar from vending machine for $0.75 (including tax) purchased by Ben Smith on Day 2.

31.   Gas for the family car purchased by Dan Smith on Day 1 for $65.43

32.   A pack of cigarettes purchased by Ben smith for $6.00 (excluding tax) on Day 2.

33.   White bread purchased by Amanda Smith on Day 4 for $12.50 (excluding tax).

Task 2

After you finished entering all the purchases the Smith household made for the week, you review the entries to make sure you entered every entry listed, and the correct price.
As you are doing this, you notice that Catherine made a mistake on her list. The stuffed animal she purchased did not cost $15.99, it cost $25.99. Please make this correction now.
Remember to think aloud as you work.

Task 3

Ben Smith remembers that his friend actually purchased the computer game (and Ben did not). Please make this correction now.
Remember to think aloud as you work.

Task 4

Dan Smith notes that the coffee from Starbucks on [INSERT DATE] actually cost $4.57.   Please make this correction now.

Task 5

Please submit your data for the week.

CE Web Diary Usability Test

FR Talking Points (v. Feb *1, 2012*)

Logging In to the Web Diary

ID Number

Your first login to the CE Web Diary requires a unique secure ID Number that is assigned to each household in our study.

The ID Number assigned to you is: _____.

Enter your ID Number in the field found in the middle of the screen at the Web Diary welcome page.   Be sure to enter the ID Number exactly as it is written since it is case-sensitive.

1.   (*Point out the ID Number field on the user guide*).

2.   (*Write the ID Number in the space provided on the Web Diary user guide, if not already pre-printed*).
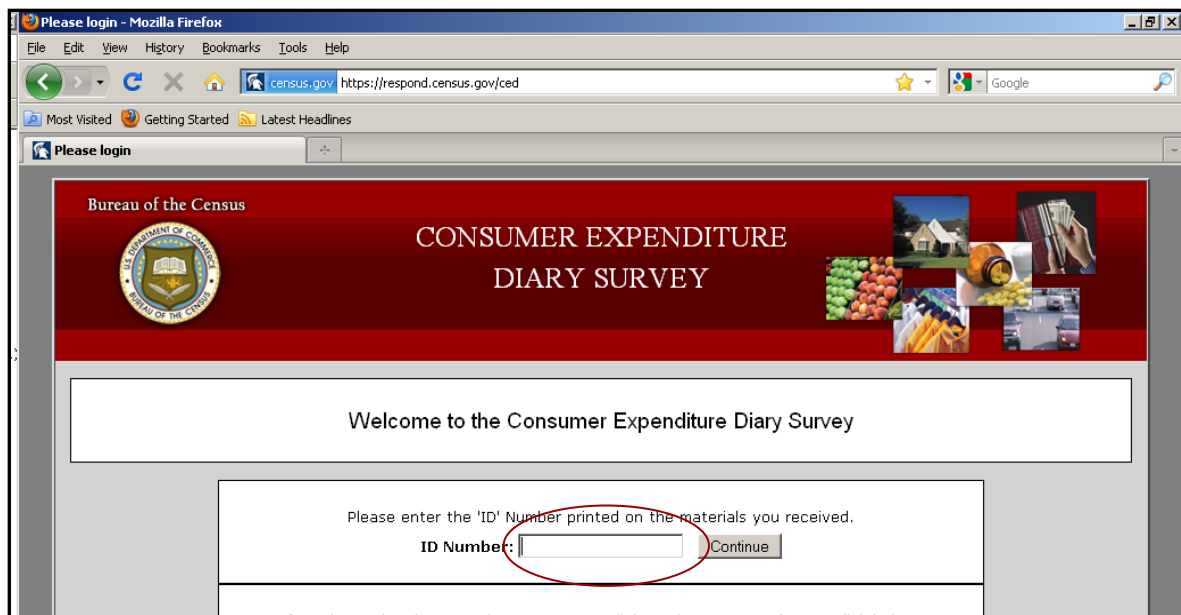
Setting Up Your Account

Once you've entered a valid ID Number, you will then be asked to create your own *username* and *password*.   Note that the password must contain:

• at least 8 characters, have at least 1 uppercase character,

• at least 1 lowercase character, at least 1 number, and

- at least 1 special character from the following: ! # $ * & ? ~. (*Point to list of acceptable special characters on user guide*)

You will also need to provide a current email address so that our IT security system can send you an email that contains a link that will be used to verify your account creation.

Validating Your Email, Future Log-in

After creating your account, you will receive an email from the Centurion Electronic Data Collection System that will provide a link for you to click on to verify your CE Web Diary account.

Clicking on the link will bring you to the CE Web Diary log-in screen. Here you'll enter the *username* and *password* created to set up your account. Be sure to check your *spam folder* if the email does not readily appear in your inbox.

Roster Creation

On this screen you will enter the names of all of the people in your household that don't have another residence where they usually stay. These names will then appear on the Web Diary data

entry page as a reminder of the people to keep in mind when recording purchases for all household members.

Note that you only have to do this <u>once</u>, and will not be able to change the roster once it is created.
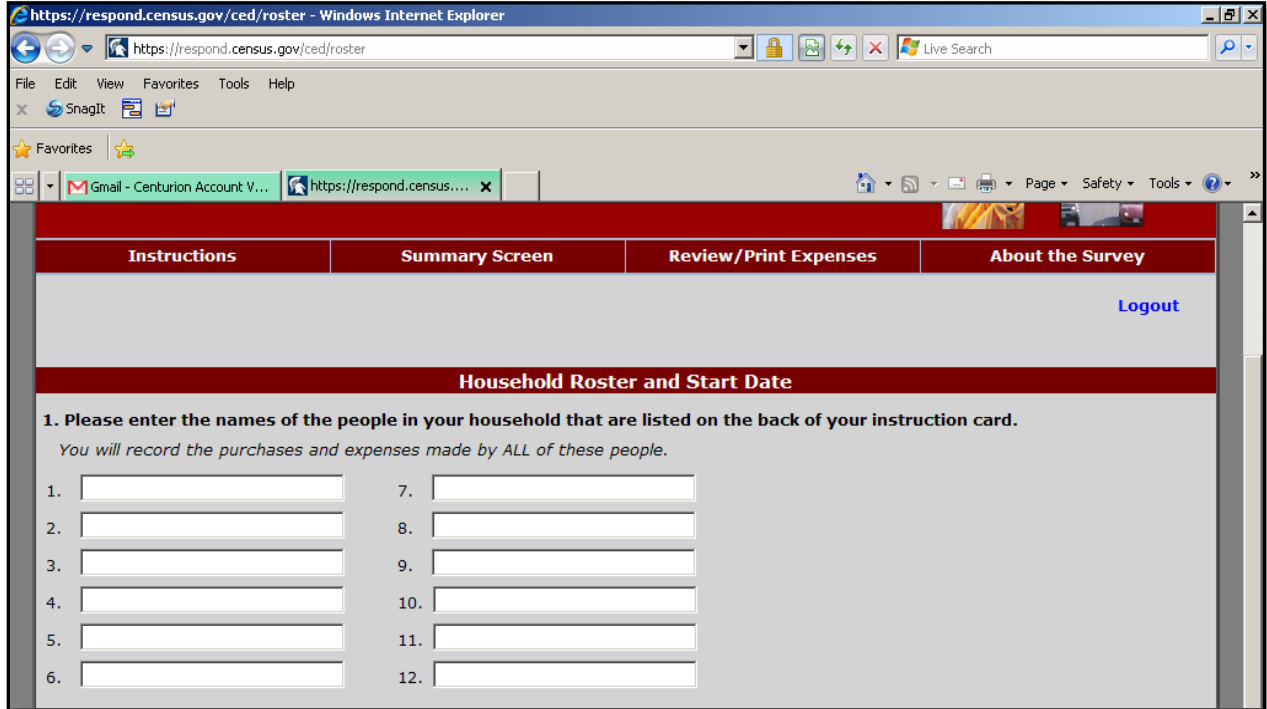
Start Date

This START DATE is the date that you begin enter all purchases during the two-week period that is unique to your household.

You enter the START DATE by using the dropdown boxes to select the month, day, and year.

The date for you to begin recording expenses into your Web Diary is _____.
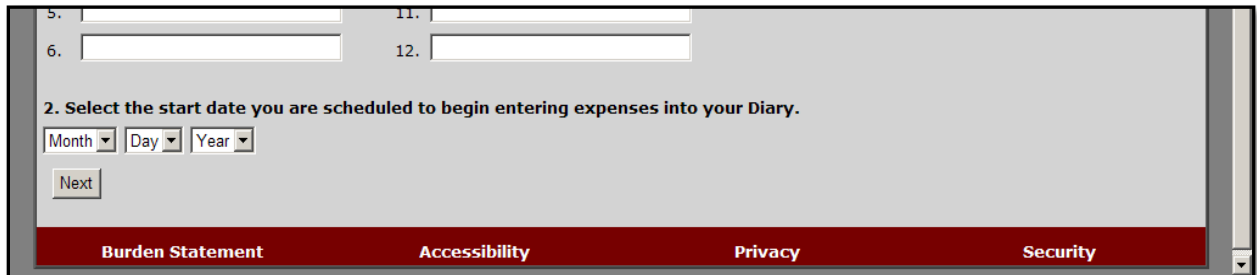
Navigation

The CE Web Diary is divided into four sections.

Purchases of:

- Food and Drink Away from Home,

- Food and Drink for Home Consumption,

- Clothing, Shoes, Jewelry, and Accessories, and

- All Other Products and Services
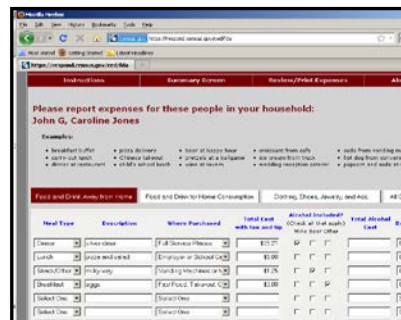
All of the data you'll be entering for the survey will be done on the *data entry* page.

(*Point out the data entry page on the user guide*).

To enter expenses for any of the four categories, simply click on the respective tab and begin entering the appropriate information in the data fields.

(*Explain how the data fields change for each tab*)

To move from field to field, you can use your mouse to click in the appropriate fields or use the TAB key on your keyboard.   If you're using a mobile device, you may have to use your device's prescribed method for entering web form data into the Web Diary application.

You can find examples of the types of items to enter, and the type detail required for each Diary section, in the area above the tabs.   These examples change according to the active Diary section.

(*Point out the examples area on the user guide*).

If you are ever unsure about what type of information to include in each field, you can click on the column heading to bring up more information and help screens.

(*Point out column-heading hyperlinks*).

Logging Out of the Web Diary

To help protect your privacy, the CE Web Diary will require you to log back in to the survey if the browser window has been inactive for more than 15 minutes.   You can also log out at any time by clicking on the "logout" link in the top-right corner of the data entry page.

(*Point out the 'logout' link on main dashboard page on the user guide*).

Resources

At any time, you may click on the "Instructions/FAQs" link at the top of the page to bring up detailed instructions for the Web Diary and answers to Frequently Asked Questions. (*Point out link*)

You may also print out a record of your expenses at any time by clicking on the "Print Expenses" link to produce a .pdf file that you may save or print for your reference. (*Point out link*)

Further, you may learn more about the CE Diary Survey by clicking on the "About the Survey" link at the top right of the page. (*Point out link*)

Entering Expenses

Section 1 – Food and Drink Away from Home

In Section 1, you will enter *food* and *drink* purchases made by anyone on your list that were consumed outside of the home. This does not include purchases, such as groceries, that were intended for home consumption then ultimately consumed outside of the home (e.g., bringing lunch from home).

First, select whether the food or drink purchase was for breakfast, lunch, dinner, or snack, by using the dropdown box in the "Meal Type" column. (*Point out the column on the user guide*).

Next, you enter the description of what you purchased in the "Description" column. (*Point out the column on the user guide*). An extensive list of items has been preloaded into the system so that once you start typing in this field a few suggested items will appear. You should select these pre-listed items by hitting ENTER on the item that matches the description of your purchase. However, you can type over the suggested item(s) and fully enter your specific purchase if the suggested item description(s) do not adequately describe your purchased item.

Note that you should use only one line for one item or meal. (*Point out the column on the user guide*).

Next, in the "Where Purchased" column, you select the place that best matches the description of where your purchase was made, such as: a full service restaurant place; fast food, take-out, or concession; vending machine; or employer or school cafeteria. (*Point out the column on the user guide*).

Next, you will enter the amount of the purchase in dollars and cents, including tax and tip, in the column labeled "Total Cost with Tax and Tip". (*Point out the column on the user guide*).

If alcohol was included with meal purchase, you may check any or all of the wine, beer, or other checkboxes in the "Alcohol Included?" column, as appropriate. Enter the separate cost of the alcohol in dollars and cents in the "Total Alcohol Cost" column, or simply leave blank if no alcohol was included with the meal purchase. (*Point out these columns on the user guide*).

Finally, in the "Date Purchased" column, use the dropdown box to select the date when your purchase was made. (*Point out the column on the user guide*).

Clearing Purchases

For <u>all sections</u> of the Web Diary, you have the option to clear all entries for a row if necessary. Under the "Clear" column, simply click on the red icon at the end of a given row to clear the data for that row.

(*Point out the column on the user guide*).

Section 2 – Food and Drink for Home Consumption

In Section 2, you will enter *food* and *drink* purchases made by anyone on your list that were intended for *home consumption* or storage. Usually these purchases are at places like grocery stores, farmers' markets, and similar stores.

First, you enter the description of your food or drink purchase in the "What did you buy or pay for?" column. (*Point out the column on the user guide*). An auto-fill feature is also available in this section, as it is for each section of the Web Diary.

Note that we'll need you to be specific when recording your purchases in this section. For example, for bread, we need to know the *type* of bread, such as: white, wheat, rye, etc. If you purchased meat, we need to know the cut of the meat, such as: whole chicken, chicken legs, chicken wings, ground beef, round roast, whole ham, spare ribs, bacon, etc.

Next, you will select whether the item purchased was either: *fresh*, *frozen*, or *bottled/canned*, using the dropdown box under the column "Is this item?". (*Point out the column on the user guide*).

Next, you will enter the amount of the purchase in dollars and cents, <u>without</u> tax, in the column labeled "Total Cost without tax". (*Point out the column on the user guide*).

Next, in the column "Check here if purchased for someone not in household", you will click in the checkbox if the purchase was as such.

Finally, in the "Date Purchased" column, use the dropdown box to select the date when your purchase was made. (*Point out the column on the user guide*).

Section 3 – Clothing, Shoes, Jewelry, and Accessories

In Section 3, you will enter all *clothing, shoes, jewelry, and accessories* purchases made by anyone on your list.

First, enter the description of what you purchased in the "What did you buy or pay for?" column. (*Point out the column on the user guide*). These descriptions should be similar to the ones in the examples found in the section header. (*Point out the section header on the user guide*).

Next, you will enter the amount of the purchase in dollars and cents, <u>without</u> tax, in the column labeled "Total Cost without tax". (*Point out the column on the user guide*).

Next, you will select whether the item purchased was for a *male* or *female*, using the dropdown box under the column "Was the item for…". (*Point out the column on the user guide*).

Next, you will select whether the items was purchased for someone: *under 2 years old*, *2 to 15 years old*, or *16 years and over*, using the dropdown box under the column "Age".

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Next, in the column "Check here if purchased for someone not in household", you will click in the checkbox if the purchase was as such.

Finally, in the "Date Purchased" column, use the dropdown box to select the date when your purchase was made.   (*Point out the column on the user guide*).

Section 4 – All Other Products and Services

In Section 4, you will enter all other purchases made by anyone on your list that are not included in the other three parts of the Diary.

First, enter the description of what you purchased in the "What did you buy or pay for?" column. (*Point out the column on the user guide*).   You can refer to the examples in the section header for the types of items we're looking for. (*Point out the section header on the user guide*).

Next, you will enter the amount of the purchase in dollars and cents, without tax, in the column labeled "Total Cost without tax". (*Point out the column on the user guide*).

Next, you will select whether the item purchased was for a *male* or *female*, using the dropdown box under the column "Was the item for…".   (*Point out the column on the user guide*).

Next, in the column "Check here if purchased for someone not in household", you will click in the checkbox if the purchase was as such.

Finally, in the "Date Purchased" column, use the dropdown box to select the date when your purchase was made.   (*Point out the column on the user guide*).

Saving Your Entries, Adding More Rows

The CE Web Diary system will automatically save your entries whenever you click on the "Save and Submit" button, or switch from tab to tab (section to section). (*Point out Save and Submit button*).
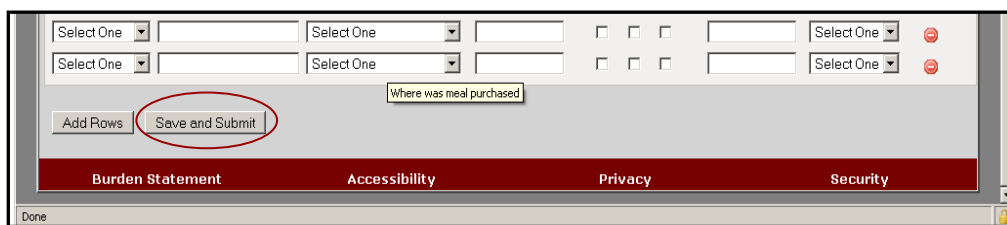
For each section of the Web Diary, you can add more expense rows as needed by clicking on the "Add Rows" button at the bottom of the screen. Five rows are added to the bottom of the Diary section each time this button is clicked. (*Point out Add Rows button*)

Appendix E: Demographic/Computer Background Questionnaire

Questionnaire on Statistical Background, Computer Use, Internet Experience

YOUR ANSWERS ARE CONFIDENTIAL

Demographics

1. What is your age? _____

2. Are you male or female?_____

3. What is your level of education?

    ___grade school

    ___some high school

    ___high school degree

    ___some college

    ___2-year college degree

    ___4-year college degree

    ___some postgraduate study (e.g., M.A., M.B.A., J.D., Ph.D., M.D., programs)

    ___postgraduate degree (e.g., M.A., M.B.A., J.D., Ph.D., M.D.)

Computer Experience

1. Do you use a computer at home, at work, or both?

   (Check all that apply.)

    ___Home

    ___Work

    ___Somewhere else, such as school, library, etc.

2. If you have a computer at home,

a. What kind of modem do you use at home?

       ___Dial-up

       ___Cable

       ___DSL

       ___Wireless (Wi-Fi)

       ___Other _____

       ___Don't know _____

b. Which browser do you typically use at home? Please indicate the version if you can recall it.

       ___Firefox

       ___Internet Explorer

       ___Netscape

       ___Other _____

       ___Don't know

c. What operating system does your home computer run in?

       ___MAC OS

       ___Windows 95

       ___Windows 2000

       ___Windows XP

       ___Windows Vista

       ___Other _____

       ___Don't know

3. On average, about how many hours do you spend on the Internet per day?

       ___0 hours

       ___1-3 hours

       ___4-6 hours

       ___7 or more hours

4. If you have a tablet PC like an iPad, how many hours do you use it per day?

_____ Don't have a tablet or iPad

___0 hours

___1-3 hours

___4-6 hours

___7 or more hours

5. Please rate your overall level of experience with the following:

Circle one number.

	No experience									Very experienced
Computers	1	2	3	4	5	6	7	8	9	10
Internet	1		2	4	5	5	6	7	8	9	10

6. What computer applications do you use?

Mark (X) for all that apply

___E-mail

___Internet

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

___Spreadsheets (Excel, Lotus, Quattro, etc.)

___Accounting or tax software

___Engineering, scientific, or statistical software

___Other applications, please specify_____

For the following questions, please circle one number.

	Not Comfortable				Comfortable
7. How *comfortable* are you in learning to navigate new Web sites?	1	2	3	4	5
8. Computer windows can be minimized, resized, and scrolled through. How *comfortable* are you in manipulating a window?	1	2	3	4	5

9. How *comfortable* are you using, and navigating through the Internet?

1   2   3   4   5

10. How *often* do you work with any type of data through a computer?

1   2   3   4   5

Never   Very Often

11. How *often* do you perform complex analyses of data using a computer?

1   2   3   4   5

12. How *often* do you use the Internet or Web sites to find information? (e.g., printed reports, news articles, data tables, blogs, etc.)

1   2   3   4   5

13. How *familiar* are you with the Census (terms, data, etc.)?

1   2   3   4   5

Appendix F: Participant Task List

Task 1:

- The members of your household are Dan Smith, Amanda Smith, Ben Smith, and Catherine Smith. The participant will be either Dan or Amanda Smith and will be referred to as YOU during the session and not "Dan" or "Amanda."
- Each member of the family gave you their receipts and lists of purchases for the past two weeks. Enter all the following purchases into the Consumer Expenditure online diary. Please remember to 'think aloud' as you work through this task.

Task 2:

- After you finished entering all the purchases the Smith household made for the week, you review the entries to make sure you entered every entry listed, and the correct price.

As you are doing this, you notice that Catherine made a mistake on her list. The stuffed animal she purchased did not cost $15.99, it cost $25.99. Please make this correction now.
Remember to think aloud as you work.

- Ben Smith remembers that his friend actually purchased the computer game (and he did not). Please make this correction now.

Remember to think aloud as you work.
Dan Smith notes that the coffee from Starbucks on [INSERT DATE] actually cost $4.57. Please make this correction now.

Task 3:

Please submit your data for the week.

Questionnaire for User Interaction Satisfaction (QUIS)

Please circle the numbers that most appropriately reflect your impressions about using the CE Web Diary.

terrible   wonderful

1. Overall reaction to the Web Diary: 1 2 3 4 5 6 7 8 9 10   not applicable

illogical   logical

2. Overall Appearance: 1 2 3 4 5 6 7 8 9 10   not applicable

Inconsistent   consistent

3. Use of terminology throughout the diary: 1 2 3 4 5 6 7 8 9 10   not applicable

Inadequate   adequate

4. Instructions displayed on the screens: 1 2 3 4 5 6 7 8 9 10   not applicable

difficult   easy

5. Ease with which you could move: 1 2 3 4 5 6 7 8 9 10   not applicable

confusing   clear

6. Knowing where you were in the form: 1 2 3 4 5 6 7 8 9 10   not applicable

confusing   clear

7. Organization of question, instructions, and response categories in the diary: 1 2 3 4 5 6 7 8 9 10 not applicable

difficult   easy

8. Forward navigation: 1 2 3 4 5 6 7 8 9 10   not applicable

difficult   easy

9. Overall experience of completing the diary: 1 2 3 4 5 6 7 8 9 10   not applicable

10. Additional Comments:

_____

_____

_____

Debriefing Questions:

1. How easy or difficult did you think the login process was?

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or difficult	Not Very Easy	Very Difficult

2. How secure did you think the login procedure was?

1	2	3	4	5
Very secure	Somewhat secure	Neither secure or insecure	Not Very Secure	Very Insecure

3. How easy or hard was it for you to log in and create your password?

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or hard	Not Very Hard	Very Hard

4. How easy or hard was it for you to find the email from the Census Bureau?

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or hard	Not Very Hard	Very Hard

5. Do you have comments regarding the email from the Census Bureau? (text)

6. How easy or hard was it for you to log on to the diary once you had your account and password?

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or hard	Somewhat Hard	Very Hard

7. Do you remember the email address that sent your login information?

No	Yes

8. What was your reaction to that email address, if any?

9. How easy or hard was it for you to select the correct dates for each purchase?"

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or hard	Somewhat Hard	Very Hard

10. Did you understand the difference between the sections of the diary?

No	Yes

11. How easy or hard was it for you to decide what section to put purchases in?

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or hard	Somewhat Hard	Very Hard

12. Once you decided which section to enter a purchase in, how easy or hard was it for you to enter each purchase?

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or hard	Somewhat Hard	Very Hard

13. How easy or hard was it for you to enter the dollars and cents into the purchase price?

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or hard	Somewhat Hard	Very Hard

14. If you had entered information about purchases that might be embarrassing to you, how comfortable or uncomfortable would you be to learn that your spouse or another household member, would also be able to access the information in the instrument?

1	2	3	4	5
Very Comfortable	Somewhat Comfortable	Neither comfortable or Uncomfortable	Somewhat Uncomfortable	Very Uncomfortable

15. Were there some purchases that were easier to enter than others? Which?

No	Yes, specify: _____

16. Were there some purchases that were more difficult to enter than others? Which?

No	Yes, specify: _____

17. Was it clear when you should submit data?

No	Yes

18. Was it clear when you were finished entering information for the Consumer Expenditure Diary Survey?

No	Yes

19. How clear was it that you had submitted your data to the Census Bureau?

1	2	3	4	5
Very Clear	Somewhat Clear	Neither clear or Unclear	Somewhat Unclear	Very Unclear

20. Is there any information that you would have like to have known while entering information into the online survey?

No	Yes, specify: _____

21. How would you find out more about what to include or exclude in certain expense categories? (*allow them to open up the page for this*)

Open the summary screen.

22a . Did you utilize the 'Summary' tab, which allows the user to see a total amount of their expenses by category?

No	Yes

22b. If YES, Is this a feature that you found useful?

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No	Yes

22c. If YES, How likely would you be use this information if you were completing this
survey at home?

1	2	3	4	5
Very Likely	Somewhat Likely	Neither Likely nor Unlikely	Somewhat Unlikely	Very Unlikely

23. Looking at the pie chart, how interesting is this to you?

1	2	3	4	5
Very Interesting	Somewhat Interesting	Neither Interesting or Uninteresting	Somewhat Uninteresting	Very Uninteresting

24. Would you use this to change any of your responses?

No	Yes

25. Do you think you would change your spending habits based on this information?

No	Yes

Open the Print Expenses Tab

26a. Did you utilize the 'Print Expenses' tab, which allows the user to see and print a table
showing all of the expenses they reported?

No	Yes

26b. If YES: Is this 'Print Expenses' tab a feature that you found useful?

No	Yes

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26c. If YES: How likely would you be to print and use this information if you were
      completing this survey at home?

1	2	3	4	5
Very Likely	Somewhat Likely	Neither Likely nor Unlikely	Somewhat Unlikely	Very Unlikely

27. How comfortable would you be with sharing this information with other members in
    your household if you were completing this with your own expenses?

1	2	3	4	5
Very Comfortable	Somewhat Comfortable	Neither comfortable or Uncomfortable	Somewhat Uncomfortable	Very Uncomfortable

28. If you have other people in your household, how would you share the login and
    password information or would you have one person doing the entering?

Open the Welcome Screen.

29. How easy or difficult was it locating the "Go to Login Page" link?

1	2	3	4	5
Very easy	Somewhat Easy	Neither easy or hard	Somewhat Hard	Very Hard

For the iPad participants in Group 2:

30. Was it easier to enter the information for the CE Diary on the computer or the iPad?

Computer	iPad

31. If you were completing this survey at home, would you be more likely to complete it using a computer or a tablet like an iPad?

Computer	iPad

32. Please describe overall experience with completing the survey on the iPad.

Hello, my name is _____. You have been selected to participate in the CE Web Diary Survey. The diary helps us learn about the buying habits of people in the United States. People who complete the diary helps us understand more about the products and services that are bought by people in this country.

Your first login to the CE Web Diary requires a unique secure ID Number that is assigned to each household in our study.

Your ID number is: _____.   The start date for you to enter expenses is _____, and the time period for the diary will continue for two weeks.

After creating your account, you will receive an email from the Centurion Electronic Data Collection System that will provide a link for you to click on to verify your CE Web Diary account. The email will also contain a short video containing instructions for how to complete the diary.
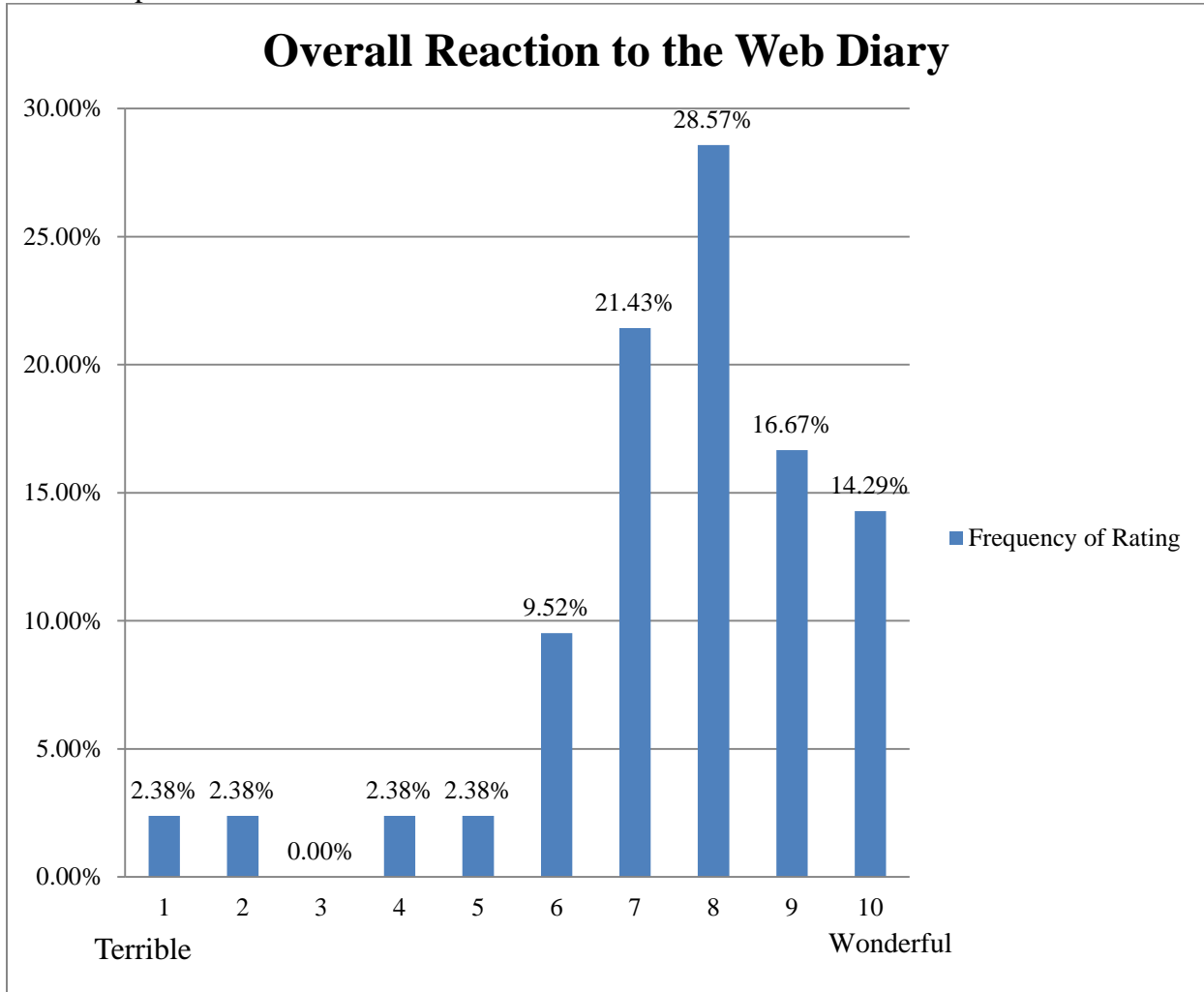
For two weeks, please record of all of the expenses for everyone in your household. Please enter all of the purchases and anything else that your household spent money on, like bills, contributions, auto-payme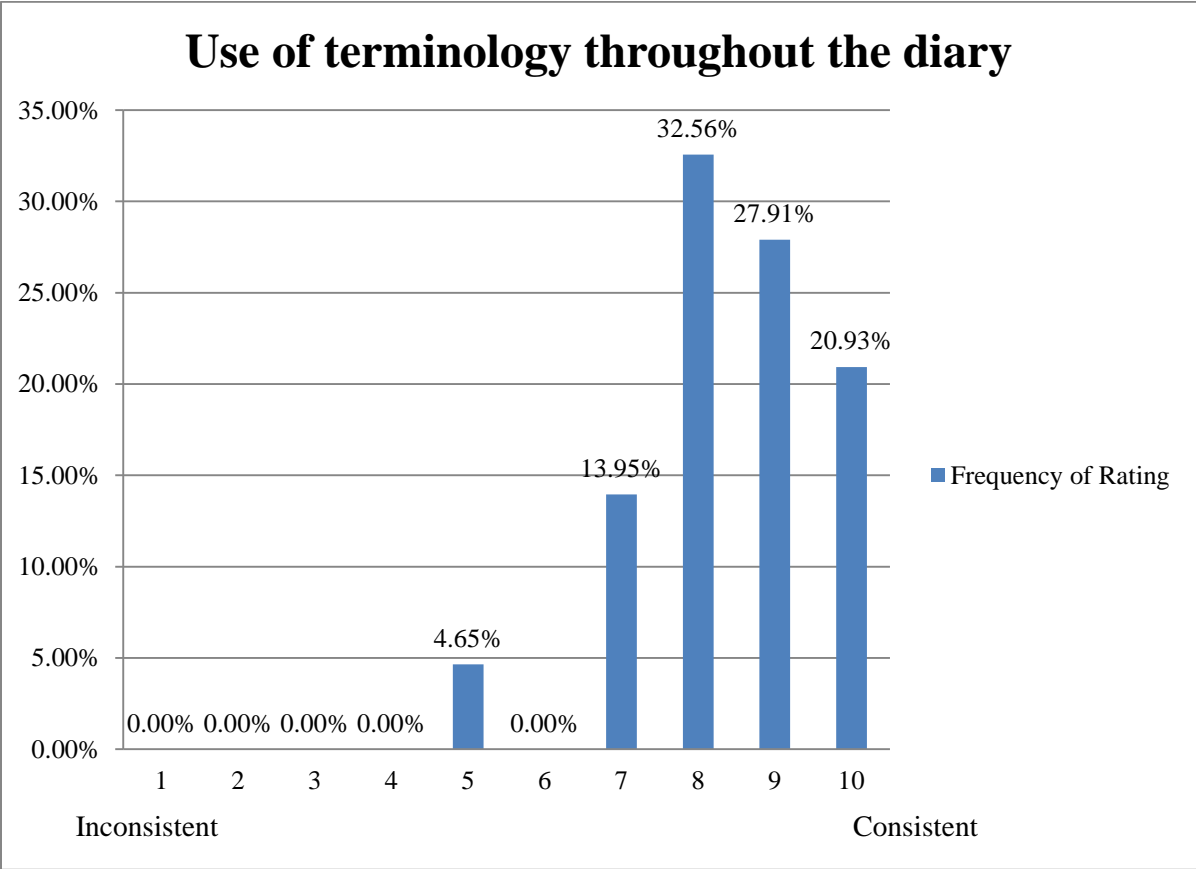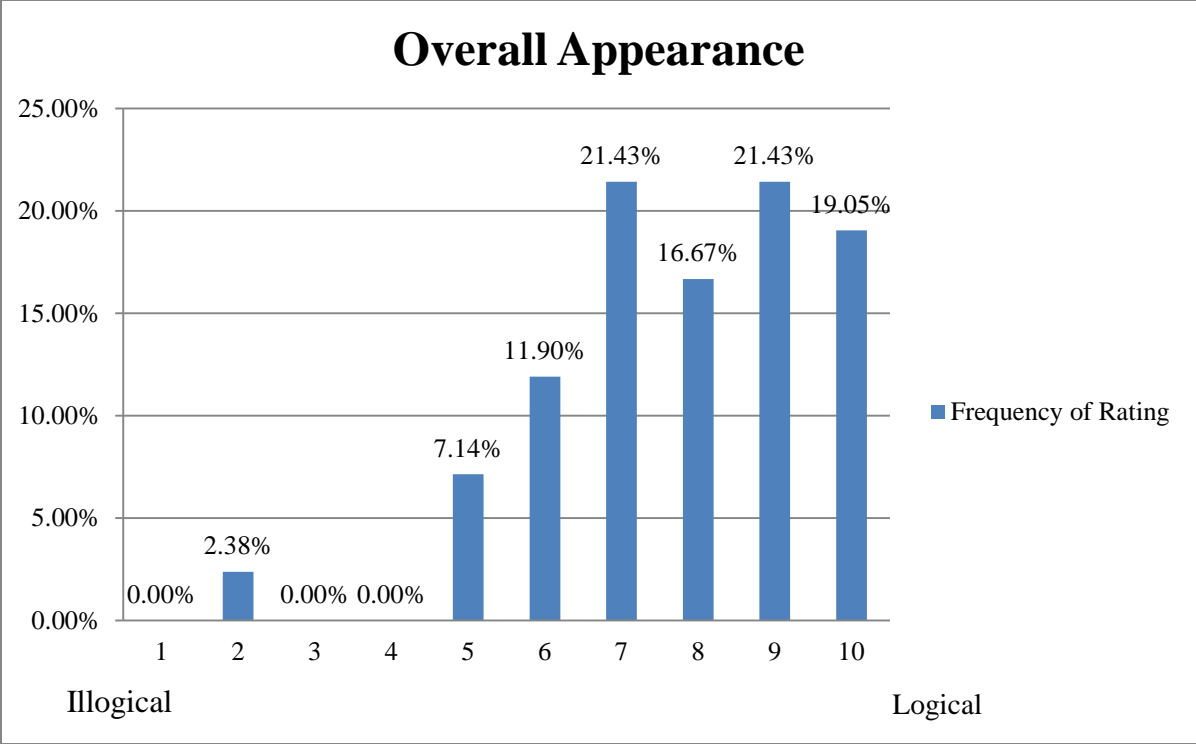nts, or anything else you can think of. Remember to include expenses for all members of your household, which is anyone that usually lives or stays here.

Please keep the letter that I have given you for your records because you will need your ID number and start date to access the online survey. Do you have any questions?
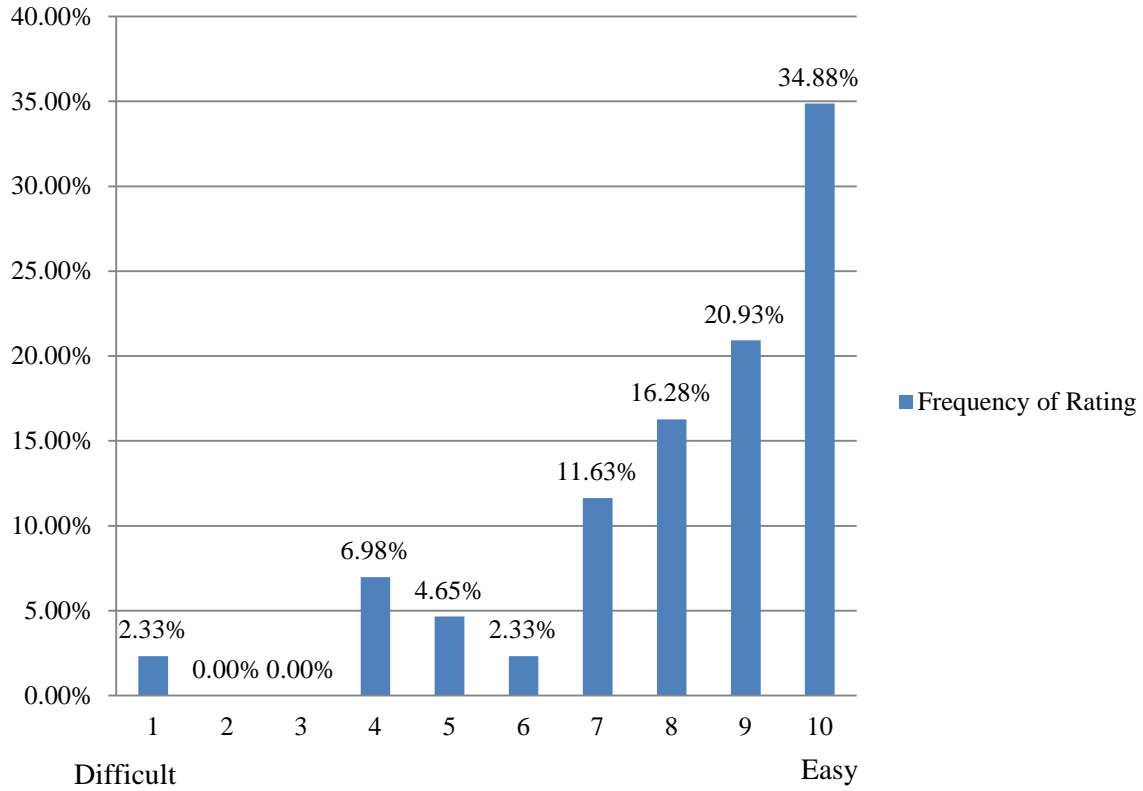
All Participants:

Overall Reaction to the Web Diary

Overall Appearance

Use of terminology throughout the diary

Ease with which you could move

- 40.00%
- 35.00%
- 30.00%
- 25.00%
- 20.00%
- 15.00%
- 10.00%
- 5.00%
- 0.00%

2.33% 0.00% 0.00% 6.98% 4.65% 2.33% 11.63% 16.28% 20.93% 34.88%

1 2 3 4 5 6 7 8 9 10

Difficult   Easy

Frequency of Rating

Instructions displayed on the screens

- 35.00%
- 30.00%
- 25.00%
- 20.00%
- 15.00%
- 10.00%
- 5.00%
- 0.00%

2.50% 0.00% 0.00% 5.00% 0.00% 10.00% 17.50% 30.00% 12.50% 22.50%

1 2 3 4 5 6 7 8 9 10

Inadequate   Adequate

Frequency of Rating

Knowing where you were in the form

Chart showing Frequency of Rating from 1 (Confusing) to 10 (Clear):

- 1: 2.33%
- 2: 0.00%
- 3: 0.00%
- 4: 4.65%
- 5: 6.98%
- 6: 4.65%
- 7: 11.63%
- 8: 18.60%
- 9: 27.91%
- 10: 23.26%

Legend: Frequency of Rating

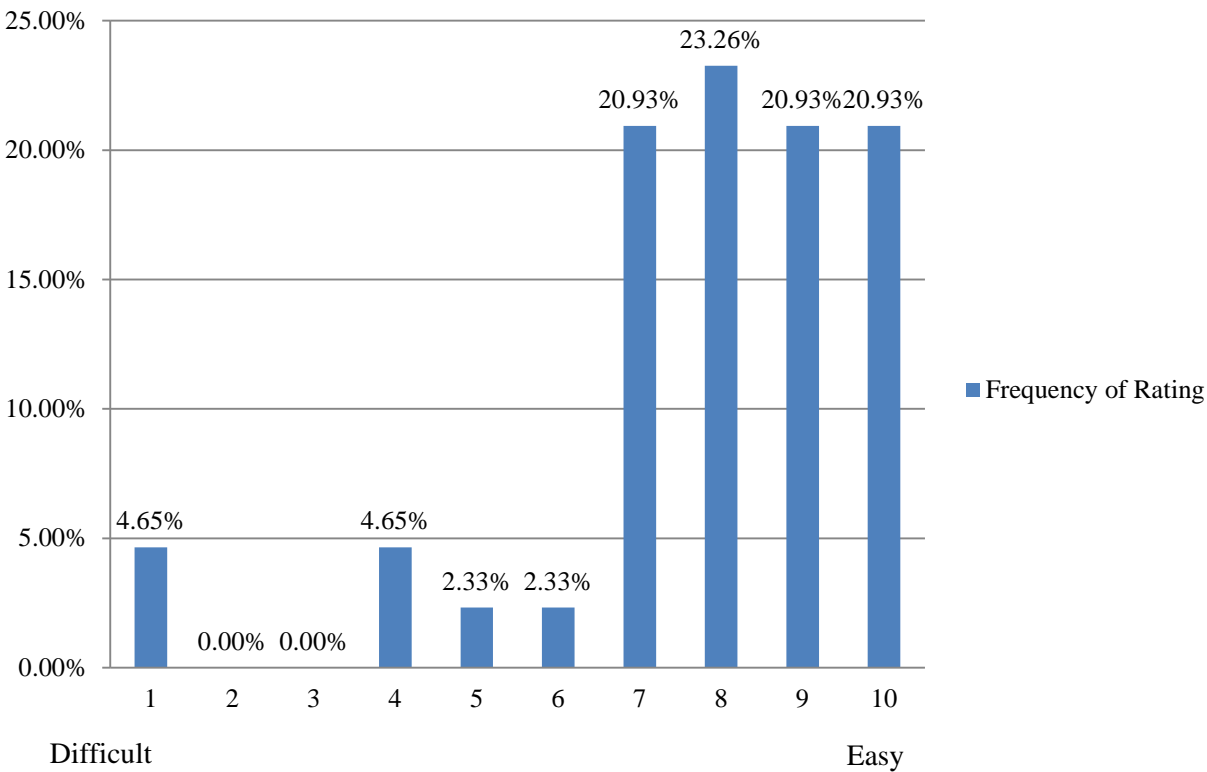1 = Confusing, 10 = Clear

Organization of question, instructions, and response categories in the diary:

Chart showing Frequency of Rating from 1 (Confusing) to 10 (Clear):

- 1: 4.76%
- 2: 2.38%
- 3: 0.00%
- 4: 2.38%
- 5: 9.52%
- 6: 16.67%
- 7: 9.52%
- 8: 19.05%
- 9: 21.43%
- 10: 14.29%

Legend: Frequency of Rating

1 = Confusing, 10 = Clear

Forward navigation

Frequency of Rating

Rating	Frequency
1	2.44%
2	0.00%
3	2.44%
4	4.88%
5	0.00%
6	7.32%
7	12.20%
8	19.51%
9	14.63%
10	36.59%

Difficult — Easy

Overall experience of completing the diary

Frequency of Rating

Rating	Frequency
1	4.65%
2	0.00%
3	0.00%
4	4.65%
5	2.33%
6	2.33%
7	20.93%
8	23.26%
9	20.93%
10	20.93%

Difficult — Easy

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Frequency Spreads (broken down by Group)
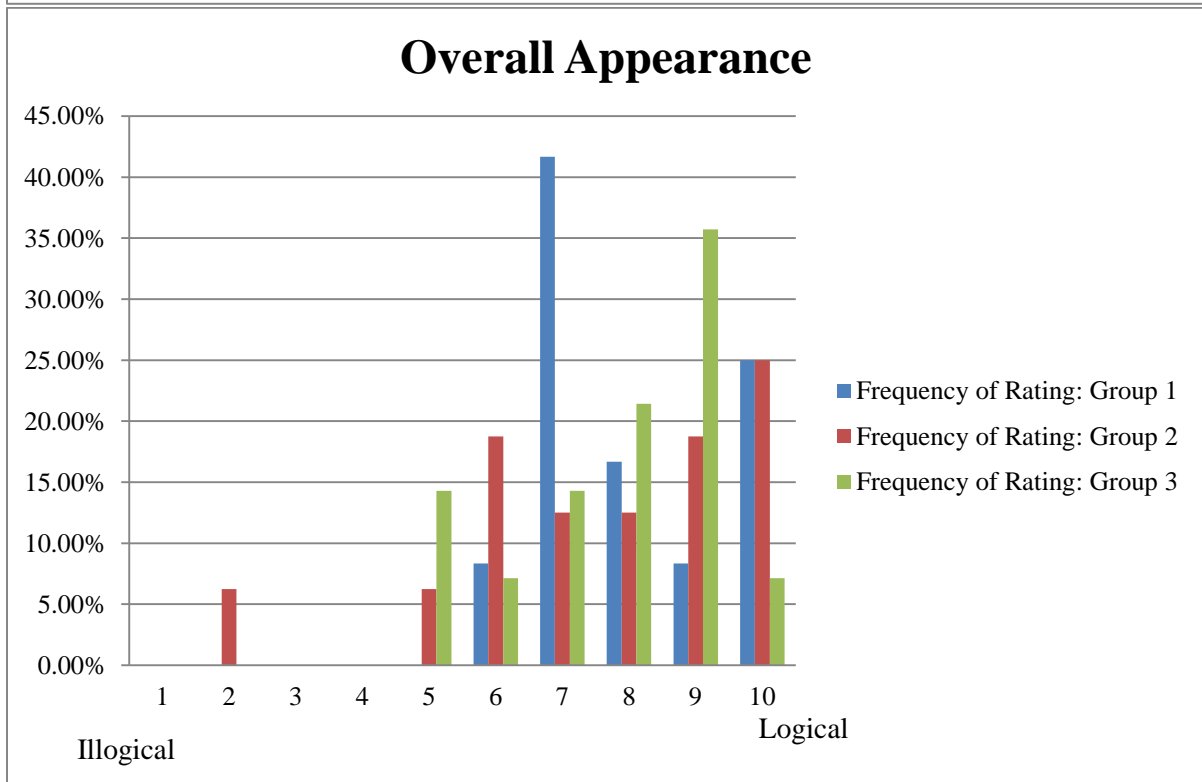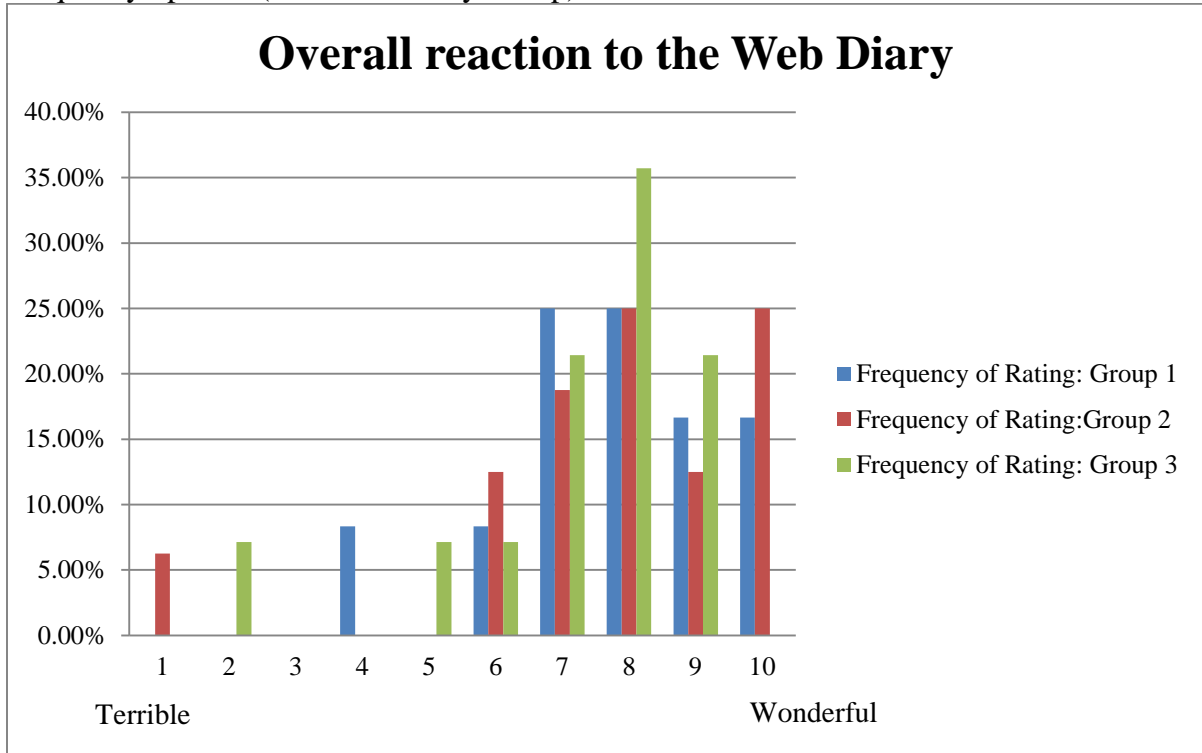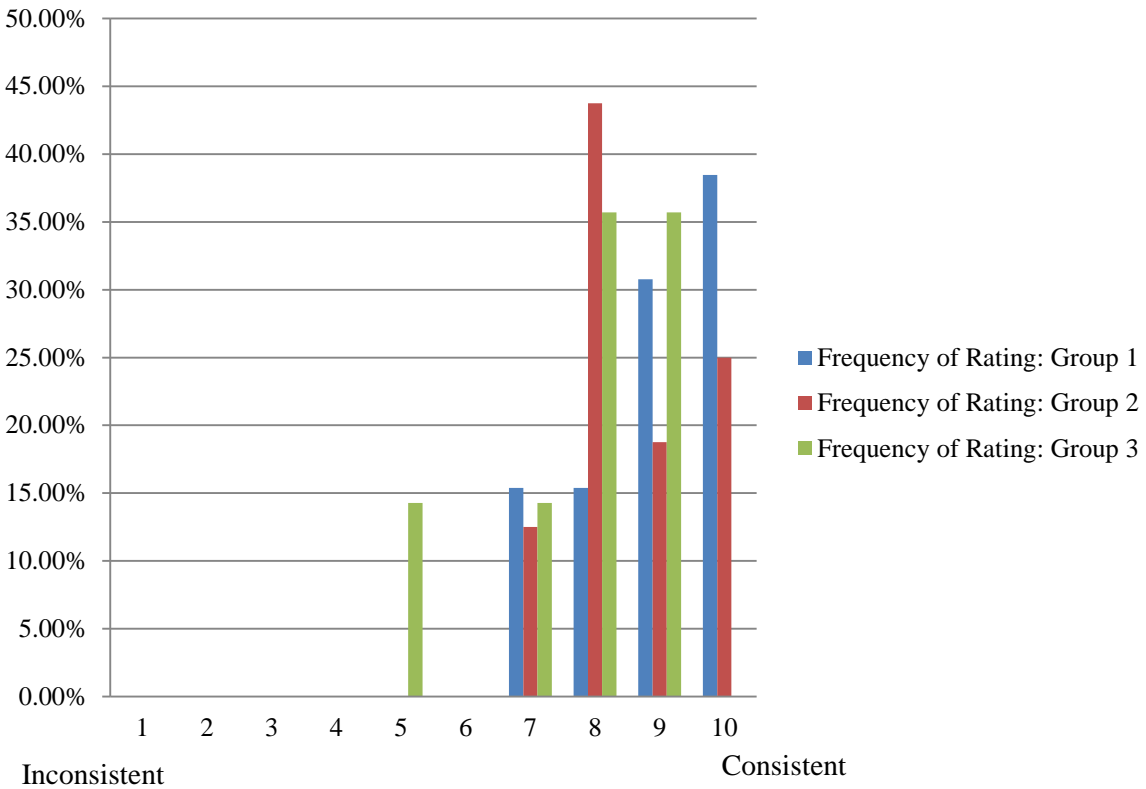
Overall reaction to the Web Diary

Overall Appearance

Use of terminology throughout the diary

Inconsistent — Consistent

Legend: Frequency of Rating: Group 1, Frequency of Rating: Group 2, Frequency of Rating: Group 3

Instructions displayed on the screens

Inadequate — Adequate

Legend: Frequency of Rating: Group 1, Frequency of Rating: Group 2, Frequency of Rating: Group 3

Ease with which you could move

Difficult — Easy

- Frequency of Rating: Group 1
- Frequency of Rating: Group 2
- Frequency of Rating: Group 3

Knowing where you were in the form

Confusing — Clear

- Frequency of Rating: Group 1
- Frequency of Rating: Group 2
- Frequency of Rating: Group 3
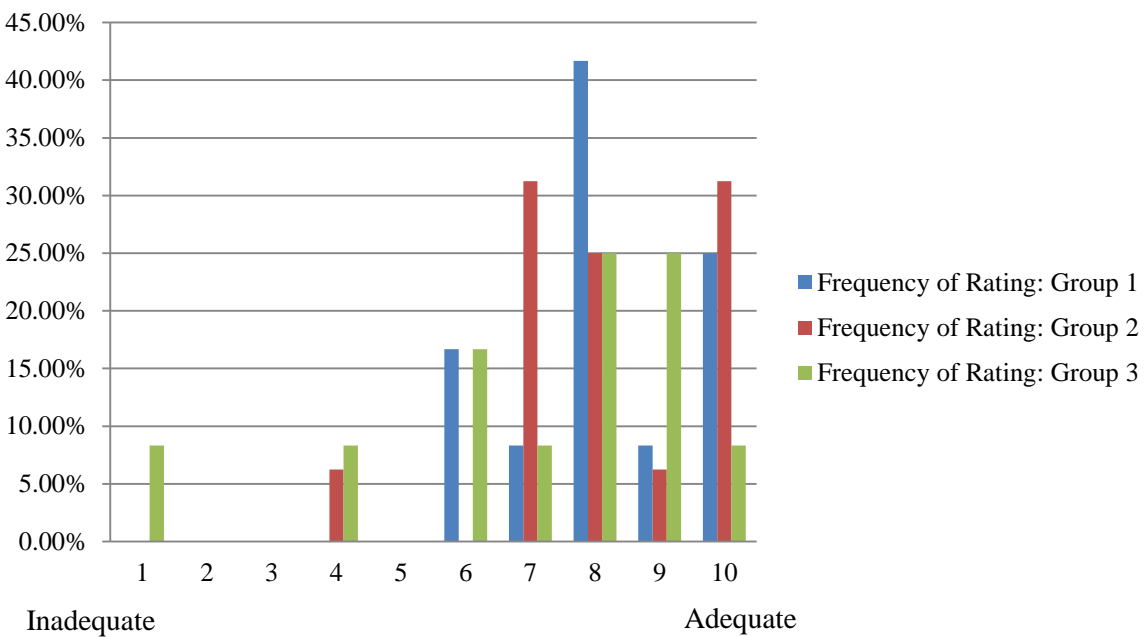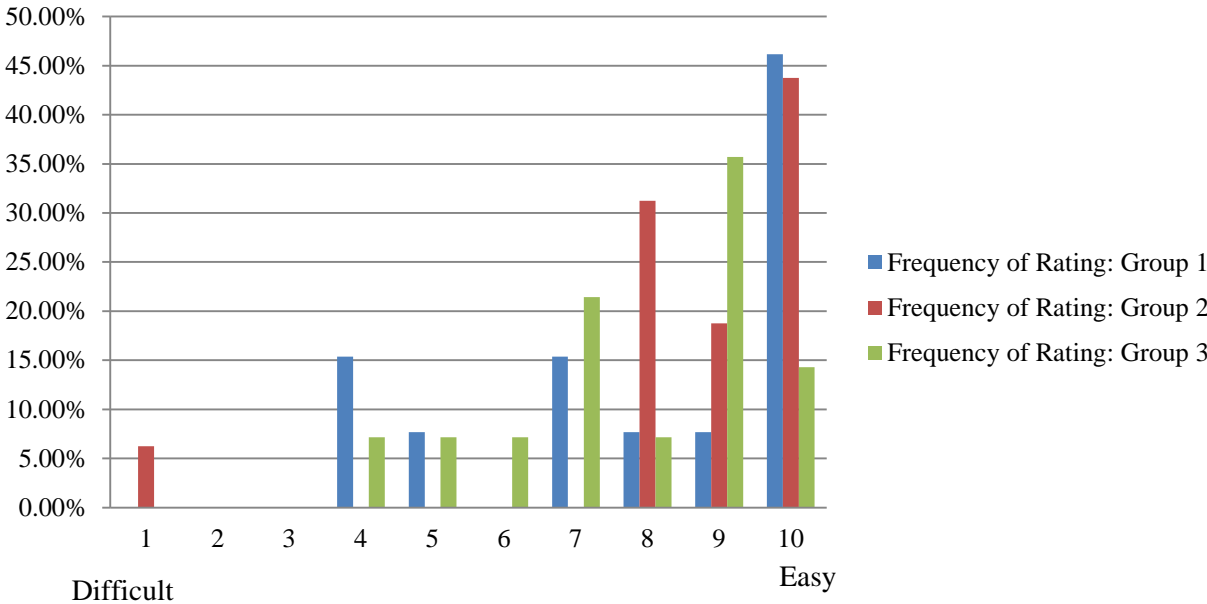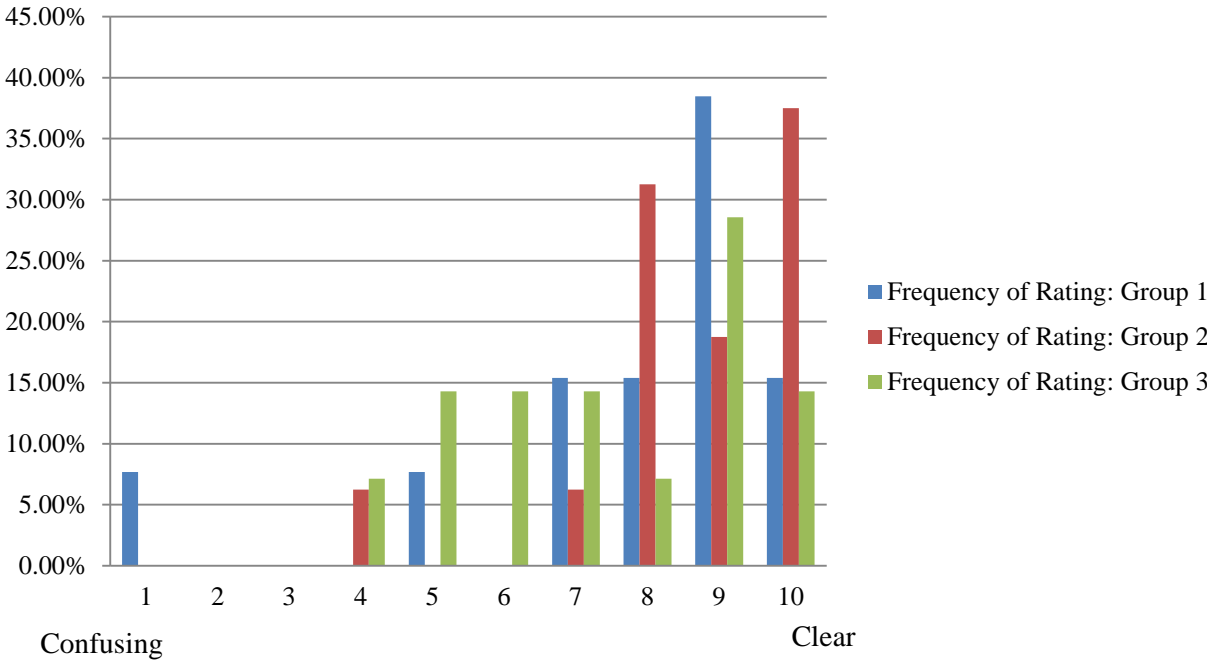
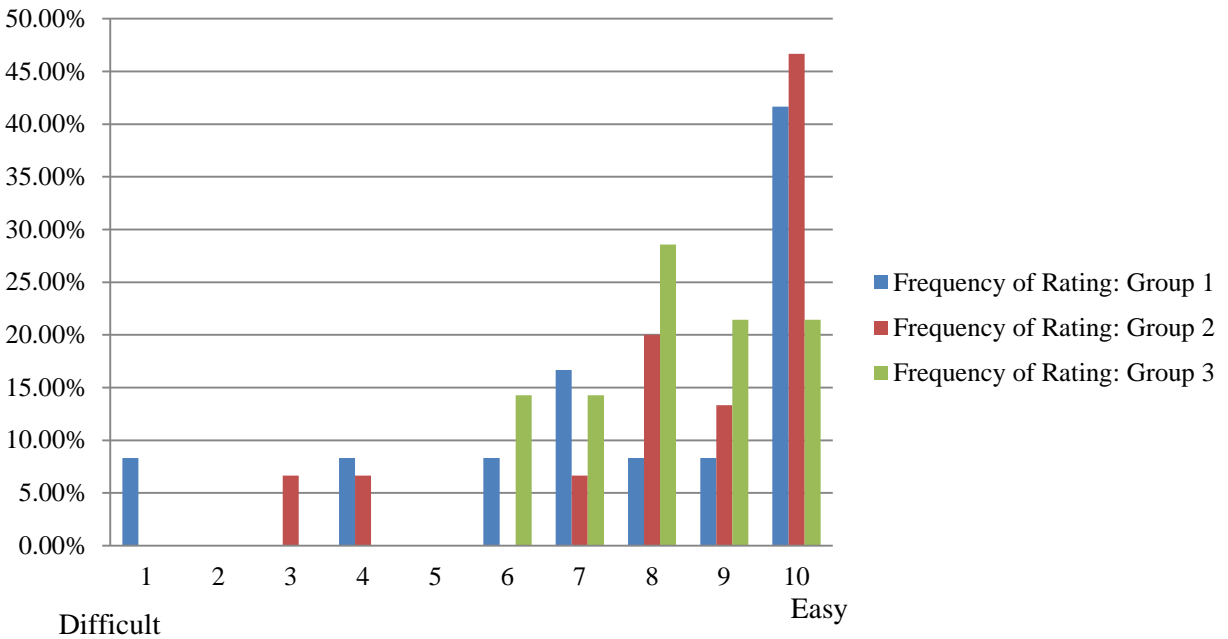**Organization of question, instructions, and response categories in the diary**
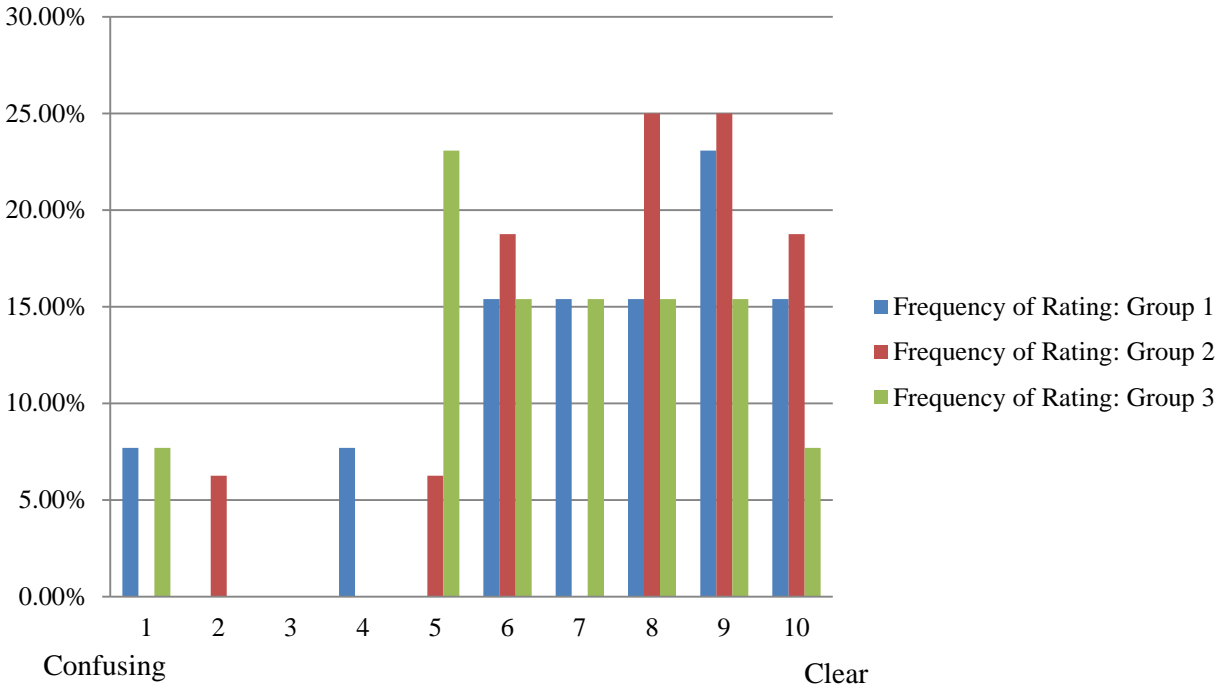
Forward navigation

Overall experience of completing the diary