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**Results of Image Optimization Research (IOR)
Wave 1 Tests, Washington DC Interviews**

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Disclaimer: This report is released to inform interested parties of research and to encourage discussion of work in progress. Any views expressed on the methodological issues are those of the authors and not necessarily those of the U.S. Census Bureau.

Abstract

This paper is a draft report documenting the methods and results of 15 one-on-one interviews conducted as part of the Image Optimization Research (IOR) for the decennial census. The IOR team was charged with designing a census questionnaire that was both user-friendly and capable of being data captured using current optical imaging and data scanning technologies. Development and testing of the new questionnaire was divided into three components: two waves of small-scale tests and one mailout/mailback test. This report documents results from the Wave 1 component.

Keywords: image optimization research, census, data capture

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January 30, 1995

MEMORANDUM FOR: Carol Miller,
Decennial Management Division

From: Cleo Jenkins ^{CEJ} and Nancy Bates ^{NAB},
Center for Surveys Methods Resesarch

Subject: Results of Image Optimization Research (IOR)
Wave I Tests, Washington D.C. Interviews

Attached is a draft report documenting the methods and results of 15 one-on-one interviews conducted for Wave I of the Image Optimization Research. This report reflects the interviews conducted in the Washington D.C. area.

The recommendations contained in the report should be viewed as preliminary. Final recommendations will be made by the IOR working group and will take into account findings from the other 15 interviews being conducted in Washington state by Don Dillman.

If you have any questions about this report please contact either Cleo Jenkins or Nancy Bates (x4894, room 3127-4).

cc: IOR Working Group Members
D. Dillman (DIR)
T. DeMaio (CSMR)
J. Moore "

Image Optimization Research:
Methods and Results of Wave I Testing (Washington, D.C. Area)

Wave I Research Objectives

The Imaging Optimization Research (IOR) team is charged with designing a census questionnaire that is both user-friendly and capable of being data captured using current optical imaging and data scanning technologies. Development and testing of the new questionnaire has been divided into 3 components: 2 waves of small-scale tests and one mailout/mailback test. This memorandum documents results from the first component, Wave 1.

The primary test objective in Wave I was to determine whether a new all-in-one format was problematic for respondents to complete. The secondary objective was to test which of three answer space formats (open, partially segmented, or fully segmented) worked best in keeping write-in characters separated and additionally, which was preferred most by respondents.

Wave I also included a test of questionnaire color preferences. The three colors, (chosen for their imaging "drop-out" capacity) were light brown, green and peach. Wave I also included testing of questionnaire format preferences. The new all-in-one page design was tested against an unstapled version of a booklet style questionnaire.

Methodology

We contracted with a marketing research company to recruit 15 respondents from the Washington, D.C. area. Federal and military employees were excluded from participation. See Table 1, attachment A for the age, education, gender, and race distribution of the participants.

One-on-one interviews were conducted with the respondents. Interviews were conducted at the Census Bureau's cognitive laboratory located at the Center for Survey Methods Research. Each respondent was given an envelope containing the new all-in-one form accompanied by a return envelope and a cover letter. Five respondents received the questionnaire with open answer spaces, 5 received the partially segmented answer spaces, and the remaining 5 were given the questionnaire with fully segmented answer spaces. All 15 respondents were given light brown colored questionnaires to complete.

Participants were asked to complete the form as if they had received it in the mail at home. Respondents were left alone as they completed the form but were videotaped (with their permission) and observed from an adjacent room through a one-way mirror. After completing the form, respondents were debriefed by a researcher using a standardized protocol (see attachment B). The protocol asked about problems and/or confusion areas in the questionnaire, suggestions for improvement and an overall appearance rating.

Preference for the three answer space formats were evaluated by laying all three versions side-by-side and asking about respondent preference. The three different colors were similarly placed side-by-side and respondents were again asked if they had a preference and why. Finally, respondents were shown the booklet style questionnaire next to the all-in-one format and asked about preference, if any. The order in which the questionnaires were presented to respondents was varied for all three test components (answer spaces, color, and format). Respondents were also asked, hypothetically, whether receiving one form over another might have affected their likelihood of mailing the questionnaire back (e.g., receiving the all-in-one form or the booklet; a beige form or a green one).

Limitations of the Research

Caution should be exercised in interpreting the results presented in this report. The respondents we interviewed may differ from the general population. Although we attempted to recruit a diverse group of respondents, ultimately we were dependent on respondents in the Washington DC area who were willing and able to come to our laboratory. Also, it should be noted that the respondents were paid \$30 for participating and they were drawn from a marketing research firm's database.

Furthermore, due to time and resource constraints, the research only included 15 respondents, 5 respondents per answer space treatment. Consequently, it may not be appropriate to draw conclusions about differences between treatments or subpopulations.

Findings/Recommendations

All-in-one design

In general, respondents did not have insurmountable problems completing the new questionnaire design. This is supported by the many positive comments respondents made immediately after having completed it:

"Don't see how it could be any more simple as long as you read it,"

"On the positive side, the form is more condensed than before,"

"[It's] easy, fine, not complicated, very clear and nice."

Furthermore, the questionnaire did quite well based on respondents' overall assessment of its appearance (Table 2). The vast majority of respondents rated the questionnaire's overall appearance as either excellent or good. When asked why they rated it this way, respondents said things like:

"[Because] it's set up according to the number of people,"

"The way it is laid out is excellent..."

"Background is a color that is soft, blocks are big enough to fill information in,"
and,

"Because it is color-coordinated. [The] beige matches the brown. [It has] bold print."

The one person who rated the questionnaire as fair said she did so because the color was drab and depressing. It should be noted that all of the above comments were made before the topic of color was introduced.

One mistake respondents repeatedly made, however, was that they started the questionnaire on the last page. Rather than starting with step 1 on the cover page, most of the respondents began by writing in their name and telephone number at step 6 on the back page. This occurred because of the way the questionnaire was placed in the envelope. When respondents took the form out of the envelope, the back page was facing them. Not realizing they were at the end of the form, they simply started with the first question they encountered.

Although we did not intend respondents to answer the questions in this order, it does not seem fatal, as all respondents turned to step 1 after completing step 6. One advantage of this path of completion is that it resulted in high response to Step 6 (name and telephone number), which we feared might be low given its location on the back page. A disadvantage is that from the respondent's perspective the questionnaire appears to begin with a personal question, rather than a substantive one pertaining to the questionnaire topic. Another disadvantage is that respondents do not understand (and commonly complained about) the fact that we placed the questionnaire in the envelope in such a way that it enticed them to begin in the wrong position. Some respondents suggested that we simply fold the questionnaire the other way, not realizing that we would lose the address label that way.

Segmentation preference

Overall, respondents preferred the fully segmented answer format by a small margin (see Table 3). Common reasons for favoring the fully segmented format were that it clearly created a constraint for keeping letters within certain areas, it encouraged people to print, and it made respondents write neater. A few respondents pointed out that these were our objectives based on the write-in example provided just above the roster. Common objections to the fully segmented format were that it might not allow

enough spaces for people with long names and that it might be harder for the elderly to stay within the boxes.

There were few strong objections to any answer space format in particular and in most cases, respondents indicated that receiving one over the other would not have any effect on their mailing back the form. Although there did not appear to be strong feelings regarding the appearance of the three answer space styles, the success of keeping characters separated did vary among the styles. The fully segmented style had letters that touched, on average, 0.25% of the time¹; the partially segmented style had an average of 0.58% touching characters; the open box had letters that touched 15.3% of the time.

Given these findings, we recommend that the fully segmented answer box be used in the design of questionnaires for further IOR testing stages, **provided that the width and shade of the segments does not change from the forms tested here.**

Color preference

Results of color preference were mixed (see Table 4). Before seeing the colored questionnaires, few respondents expressed an opinion about the beige questionnaire's color. We got the impression that for the most part respondents felt neutral towards the beige at this point.

After seeing the colored questionnaires, the majority of the respondents expressed strong preferences for either the green or the peach questionnaires, with the sample about equally split between the two. When asked why this was the case, most respondents cited choosing the colored questionnaires for their brightness. However, two respondents were fairly opposed to the green and peach questionnaires, favoring the beige questionnaire instead. These respondents saw the colored questionnaires as "less serious" than the beige.

The implication of these findings is that in the absence of a comparison, the beige questionnaire neither positively incited nor negatively provoked people's passions. However, when compared with the more brightly colored questionnaires, the beige questionnaire was least favored. One explanation for this may be that we did not ask respondents for their reactions to the beige questionnaire at first, but we did ask for their reactions to the peach and green when they first saw them.

Approximately half of the respondents indicated that color would impact their likelihood of mailing the form back. This finding differs from the previous one in

¹ Average touches calculated by: (# of times 2 letters touched/# of opportunities to touch) X 100. This estimate averaged over each answer space style.

which the majority of respondents reported that segmentation would not affect their decision to return the questionnaire.

Since our findings do not strongly support one particular color, but they do suggest that color may affect respondents' willingness to answer the questionnaire, we recommend pooling the results of the Washington State tests with ours before any conclusions concerning color are reached. It is our opinion that color's impact on mail response can only be assessed with a statistically valid sample. Consequently, we recommend that color be tested in a nationally representative mailout/mailback.

Format preference

Overall, there was a slight preference for the all-in-one page format (Table 5). However, this may have been a result of having completed this format first. Some participants expressed preference for the all-in-one form because it was "more complete" and "altogether." Many expressed fear that the unstapled page in the booklet form could get separated and lost before being completed and returned. However, several respondents argued for the booklet style because they liked the way the roster page and roster questions opened out together. And at least one respondent expressed frustration with having to flip back and forth in order to check her list on the all-in-one form. Others liked the idea of having the cover letter right on the front, while others noticed and liked the "thank-you" area on the booklet form.

As with color, approximately half of the respondents indicated that format might have an impact on their likelihood to mail back the form. And again, it is our opinion that a true preference for format and its impact on mail response can only be assessed with a statistically valid sample. Consequently, we recommend that both formats be tested against one another in a nationally representative mailout/mailback.

Redesign of the form

Respondents tend to begin on the back page of the all-in-one form because it faces them when they take it out of the envelope. This placement is unavoidable because the address must show through the envelope window. Despite this minor sequencing problem, we do not suggest any forms redesign to correct for it. The flaw does not appear fatal and it is our opinion that the potential data processing advantages of the all-in-one form far outweigh any sequencing errors we observed.

The coverage questions (in Step 3 and 4) presented some problems. Several participants read the first question (Step 2) answered "yes," and then fell into a response set and answered "yes" to the next two questions, even though their correct response was "no" and "none". One interpretation of these false positives is that the respondent's "yes" meant: yes my list includes all college students and armed forces people (since I don't have any). Another interpretation is that respondents may not

have paid close attention to who they were being asked to include. Perhaps they only read as much of the question as they deemed necessary to answer it. Perhaps they read "Does your list include" and quickly decided, "Yes, of course my list includes everyone it is supposed to, so of course it includes whoever you ask about." Either way, the context for this interpretation was set up by the previous question where they had just answered "yes" about including all live-in employees, roommates, foster children, etc.

In addition, a number of respondents had difficulty with step 5. This was especially evident by the amount of time respondents spent reading and re-reading this instruction before moving on to person 1. Finally, some participants commented that the coverage questions were redundant if you had read the "include/exclude" lists on the roster page.

We believe that the coverage questions at Step 3 and 4 will elicit a relatively large number of false positives and consequently, need some improvement. Also, consideration should be given to simplifying the instruction in Step 5. However, since this is not a test of content, we do not propose any changes for the purposes of the IOR tests.

Next Steps

Originally, the testing design for the IOR calls for a second Wave of one-on-one tests to incorporate design changes based on Wave 1. Since we are not recommending any design changes, we believe that Wave 2 can be eliminated.

For the mailout/mailback, we recommend testing format and color (although we need to see the Washington State results before conclusively deciding which colors to test). We propose 4 panels that would test the direct mail response effect of both color and format, as well as allow for a test of interaction between color and format. We do not recommend a test of answer spaces segmentation and suggest that the fully segmented style be used for all panels.

The 4 proposed panels are: 1) fully segmented, X color, all-in-one format, 2) fully segmented, X color, booklet format, 3) fully segmented, Y color, all-in-one format, and 4) fully segmented, Y color, booklet format.

Attachment A

Table 1. Demographics of Wave I Participants

AGE		GENDER		EDUCATION		
< 50	50+	Male	Female	< H.S.	H.S.	> H.S.
9	6	7	8	3	6	6

Table 1 (continued).

RACE	
Black	White
9	6

Table 2. Rating of Overall Appearance of All-in-One Form

Poor	0%
Fair	6.7%
Good	33.3%
Excellent	46.7%
Other	13.3%

Table 3. Segmentation Preference by Segmentation Treatment

Treatment	Open (n = 5)			Partial (n = 5)				Full (n = 5)			
	Open	Part.	Full	Open	Part.	Full	None	Open	Part.	Full	None
Preference*	3	1	2	0	2	3	1	1	0	2	2

* The sum of cells is greater than 5 where respondents indicated a preference for more than one treatment.

Table 4. Color Preference

Preference	Light Brown	Green	Peach	None
	2	5	6	2

Table 5. Format Preference

Preference	All-in-one	Booklet
	9	6

Fast Action Design Team
Protocol

Date: _____

Beginning Time: _____

Ending Time: _____

Respondent #: _____

Interviewer Name: _____

Hello. My name is _____. It is a pleasure to meet you. Did you have any trouble finding your way here (or some such small talk).

I am a questionnaire design researcher here at the Census Bureau, and we are trying to understand how people fill out census questionnaires that are sent to them in the mail. All that I'd like to ask you to do today is to fill out the questionnaire just like you would if you received it at home. We will video tape you while you are completing it, and then I'd like to ask you some questions, O.K.?

[If respondent objects or questions the need for being videotaped, then say: We are videotaping you because that helps us learn how our questionnaires get filled out by people. The only people who will see this videotape are people at the Census Bureau working on this project. We are required by federal law never to show the tapes to anyone who is not a sworn employee of the Census Bureau. Consequently, I need to have you sign this consent form, which I will also sign, that guarantees the confidentiality of the tape.]

OK, I need to have you sign this consent form, which I will also sign, that guarantees the confidentiality of today's session.

Now that we have finished that, all we have to do is for me to hand you this and ask you to complete it, just like you were at home, and I wasn't here. Then after you are finished let me know and I'll ask some questions. If you have any questions, you can ask them then, but while you are filling it our just pretend that I'm not here. Please don't think of this as a test. There are no right or wrong answers.

[Turn on video.]

Record:

Sex _____

Age _____

Hh # _____

POST-INTERVIEW PROBES

1. Ok, please tell me your reactions to the questionnaire.

2. Any other reactions?

3. Was there anything about the questionnaire that was confusing?

Yes -- Go to 4
 No -- Skip to 6

4. (If yes, then) What was confusing?

5. (If yes, then) What, if anything, do you suggest we do to improve the confusion?

6. Was there anything about the questionnaire that was frustrating?

Yes -- Go to 7
 No -- Skip to 9

7. (If yes, then) What was frustrating?

8. (If yes, then) What, if anything, do you suggest we do to improve the situation?

9. How would you rate the questionnaire's appearance?

Excellent
 Very good
 Good
 Fair
 Poor

10. Why do you say that?

11. What, if anything, do you suggest we do to improve the questionnaire's appearance?

12. What would you say you liked MOST about the questionnaire?

13. What would you say you liked LEAST about the questionnaire?

If respondent has not spontaneously said anything about the OCR boxes yet, then ask the following question.

14. OK, now I'd like to ask you a specific question about the answer boxes on the questionnaire. On the front page of the questionnaire and throughout the questionnaire, we asked you to write information in boxes that look like this. [Show the respondent what you are talking about.]

a. What, if any, reactions do you have to these boxes?

b. Here I have two more questionnaires with different style answer boxes. Any preference among the three?

c. If we sent these to you in the mail, do you think you would be more likely to respond to one than the others?

Ask of everyone:

15. OK, I'd like to end our session by having you look at some other questionnaires. Here I have two other questionnaires just like the one you filled out, except for their color.

a. Any preference among them?

b. Why is that?

c. Is there one you like least?

d. Why is that?

e. If we sent these to you in the mail, do you think you would be more likely to respond to one of these than the others?

f. Why is that?

16. There are two ways we could construct this questionnaire. Here's one way, and here's the other. They both contain the same information, but they are laid out differently. Please look them over.

a. Any preference between the two?

b. Why is that?

c. If we sent these to you in the mail, do you think you would be more likely to respond to one of these than the others?

d. Why is that?
