Using Eye Tracking to Confirm Usability Issues

with Forced-Choice Response Options and Branching Designs

Elizabeth Nichols, Shelley Feuer, Kathleen Kephart
Center for Behavioral Science Methods
U.S. Census Bureau

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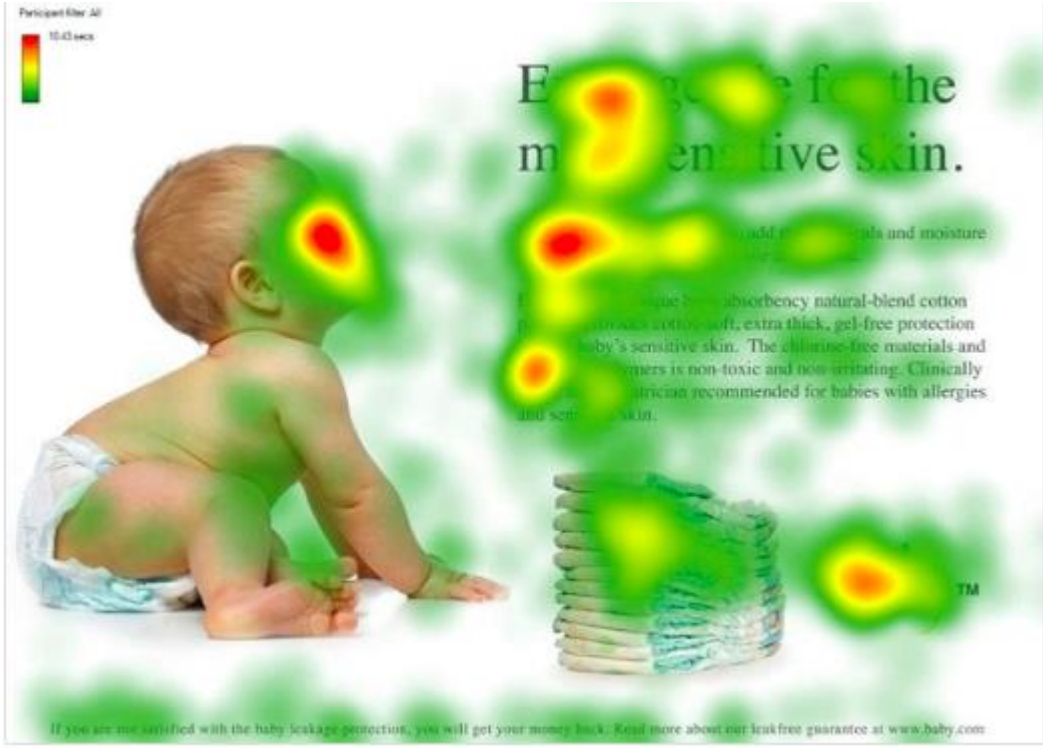
Typical web survey usability test at the Census Bureau

- Collects eye tracking data from PC users using X2-60 Tobii eye tracker
- Does not collect eye tracking data from mobile phones or tablet
  - When we collected these data in the past, the screen is so small that people look everywhere
  - Collapsing across participants is not straightforward
- Some surveys are designed in such a way that the data are not collected because the computer programming is incompatible with the eye tracker

What do we use from eye tracking: Heat maps and number of fixations



https://neilpatel.com/blog/eye-tracking-studies/

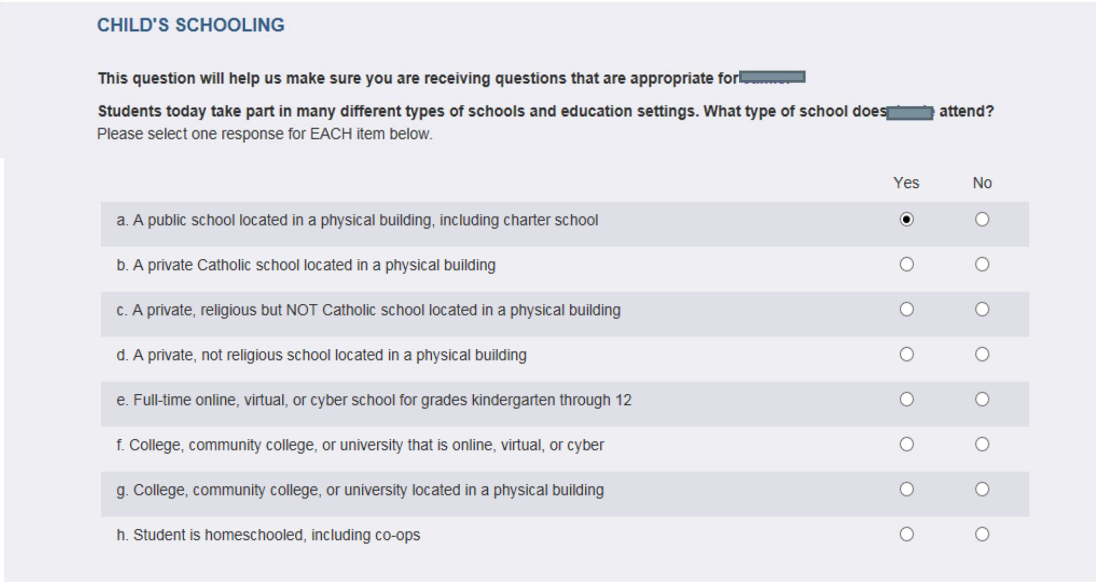
What do we do with the eye tracking data for these surveys?

- Good question:
  - Often there is no a priori question other than if the pattern is typical
  - Almost always there is no A/B design
- Collapse across participants and look for any unusual patterns
- During usability testing we observe behaviors and then we look for support from the eye tracking data
  - Today will share two examples

Example 1 – Forced choice questions

- Shows how heat maps can confirm usability findings

Forced-choice questions

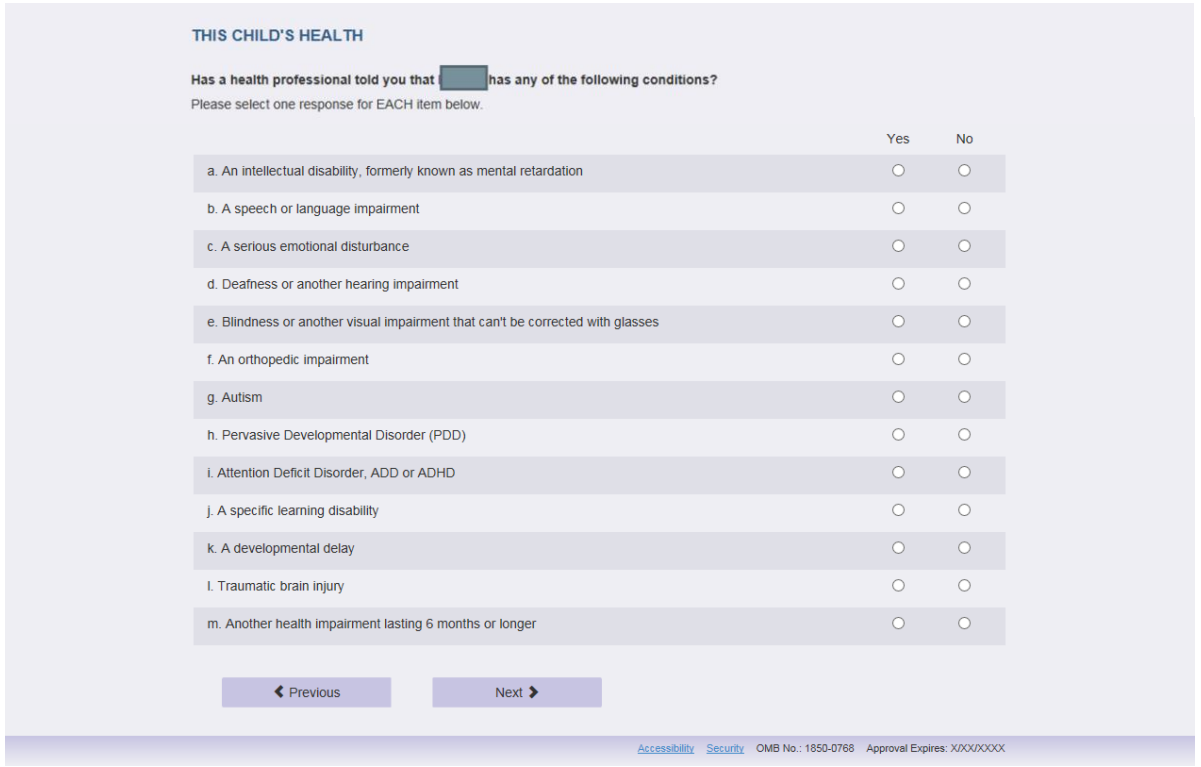


CHILD'S SCHOOLING

This question will help us make sure you are receiving questions that are appropriate for [redacted].

Students today take part in many different types of schools and education settings. What type of school does [redacted] attend?
Please select one response for EACH item below.

	Yes	No
a. A public school located in a physical building, including charter school	◉	○
b. A private Catholic school located in a physical building	○	○
c. A private, religious but NOT Catholic school located in a physical building	○	○
d. A private, not religious school located in a physical building	○	○
e. Full-time online, virtual, or cyber school for grades kindergarten through 12	○	○
f. College, community college, or university that is online, virtual, or cyber	○	○
g. College, community college, or university located in a physical building	○	○
h. Student is homeschooled, including co-ops	○	○



THIS CHILD'S HEALTH

Has a health professional told you that [redacted] has any of the following conditions?
Please select one response for EACH item below.

	Yes	No
a. An intellectual disability, formerly known as mental retardation	○	○
b. A speech or language impairment	○	○
c. A serious emotional disturbance	○	○
d. Deafness or another hearing impairment	○	○
e. Blindness or another visual impairment that can't be corrected with glasses	○	○
f. An orthopedic impairment	○	○
g. Autism	○	○
h. Pervasive Developmental Disorder (PDD)	○	○
i. Attention Deficit Disorder, ADD or ADHD	○	○
j. A specific learning disability	○	○
k. A developmental delay	○	○
l. Traumatic brain injury	○	○
m. Another health impairment lasting 6 months or longer	○	○

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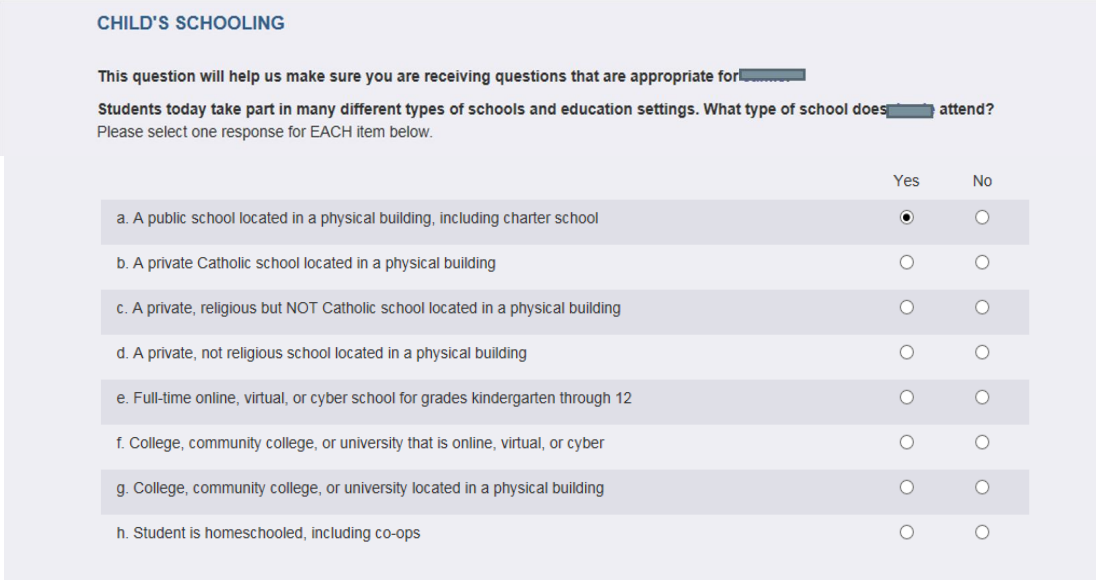
Forced-choice questions

- Increases the number of “yes” answers compared to when that same question is check-all or mark-all that apply
  - (Smyth, Dillman, Christian, & Stern, 2006; Rasinski, Mingay, & Bradburn, 1994)
  - Assume respondents spend more time on them and therefore response is more accurate
- Eye tracking study found differences for factual and opinion questions
  - (Neuert, 2006)
  - They conclude that the difference in “yes” responses between designs must be caused by something else for factual questions

Factual forced-choice questions



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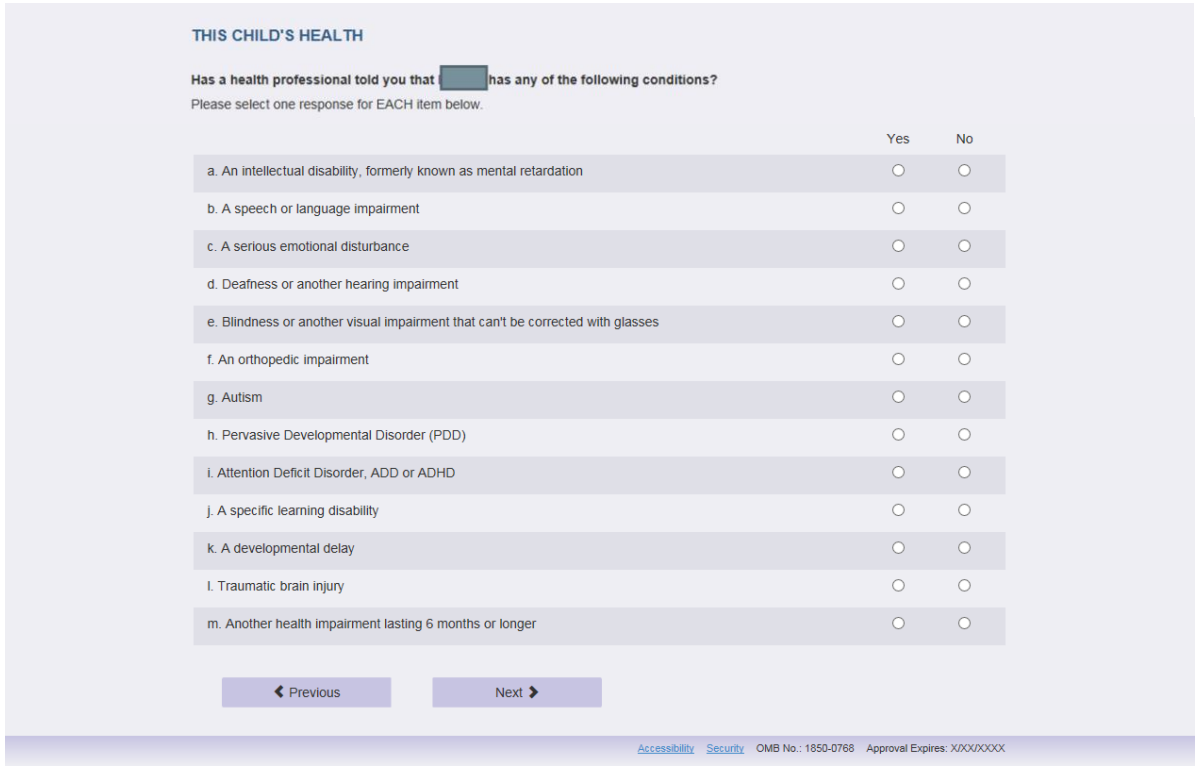
c. A private, religious but NOT Catholic school located in a physical building	○	○
d. A private, not religious school located in a physical building	○	○
e. Full-time online, virtual, or cyber school for grades kindergarten through 12	○	○
f. College, community college, or university that is online, virtual, or cyber	○	○
g. College, community college, or university located in a physical building	○	○
h. Student is homeschooled, including co-ops	○	○

We observed participants not answering each question, but only answering Yes to one or more questions.



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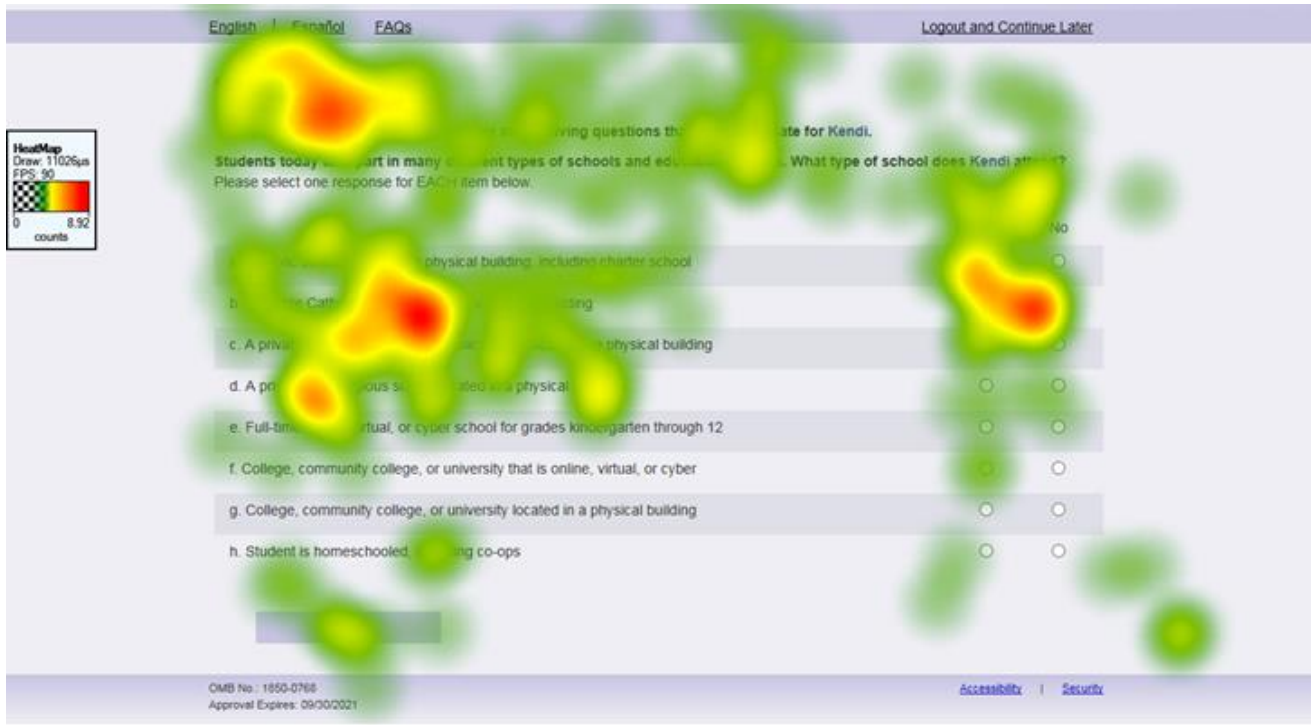
We observed participants answering each question.

Eye tracking confirms that something is going on with the forced-choice questions



N=5

N=4

Recommendation

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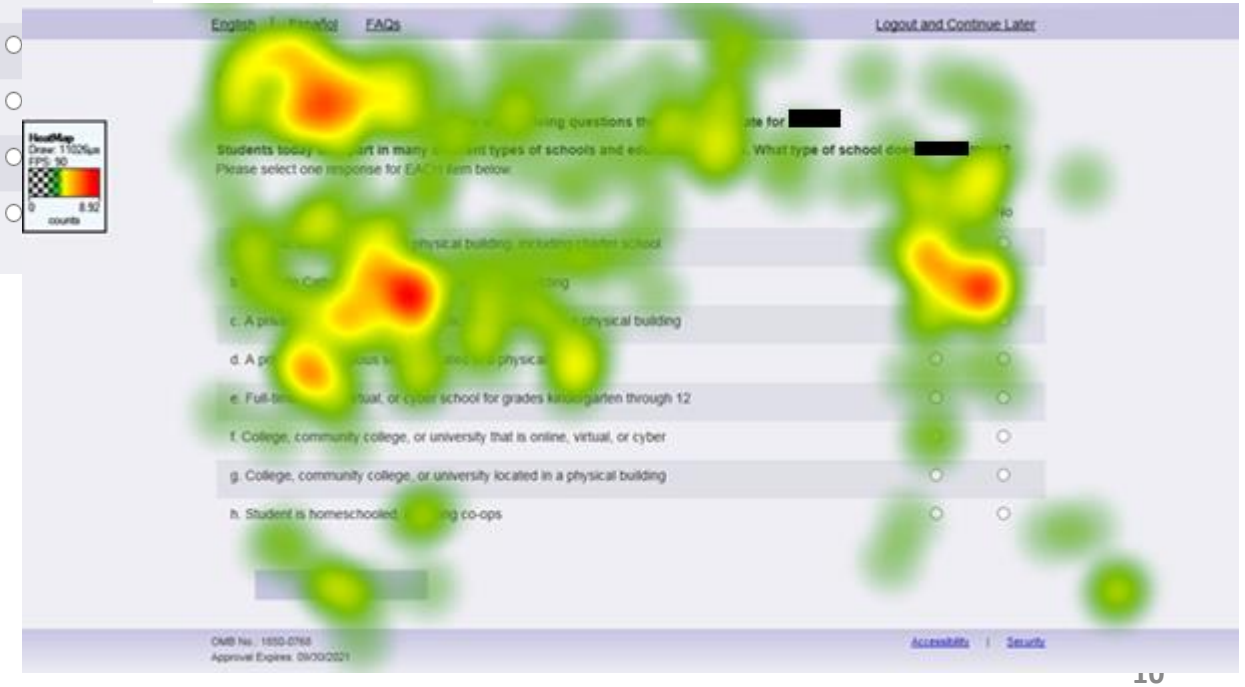
Make this screen a check all that apply instead of forced choice.

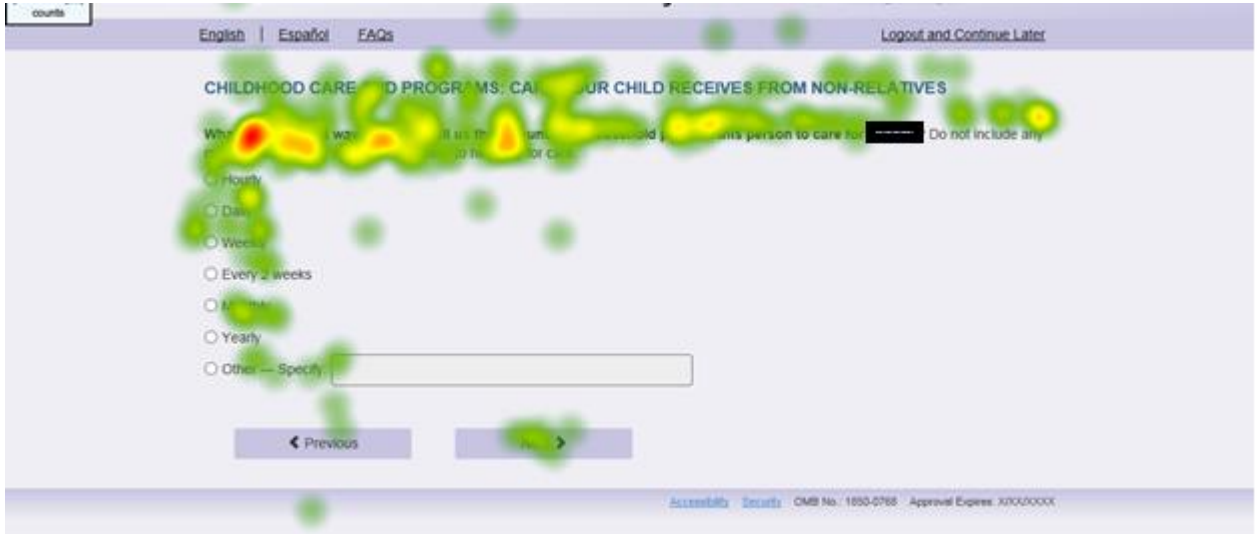


Example 2 – Within screen branching

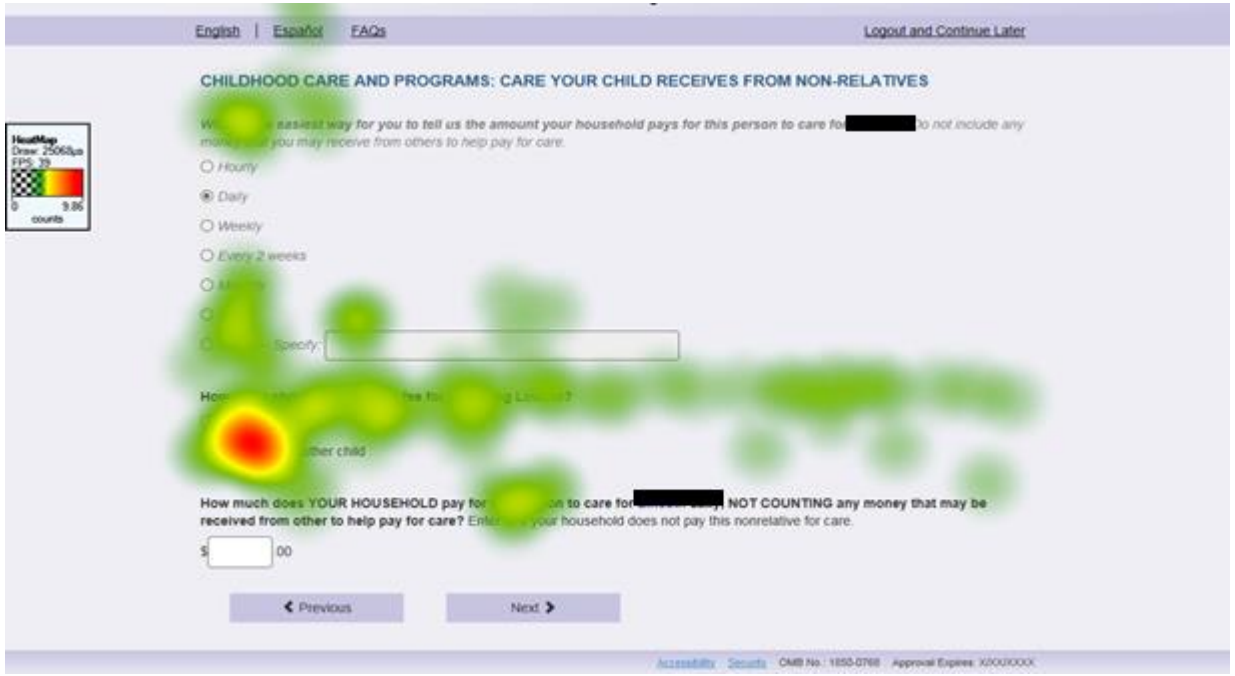
- Shows how the number of fixations can be used to compare designs

Unfolding branching design

Eye tracking shows fixations in the disabled part of the screen

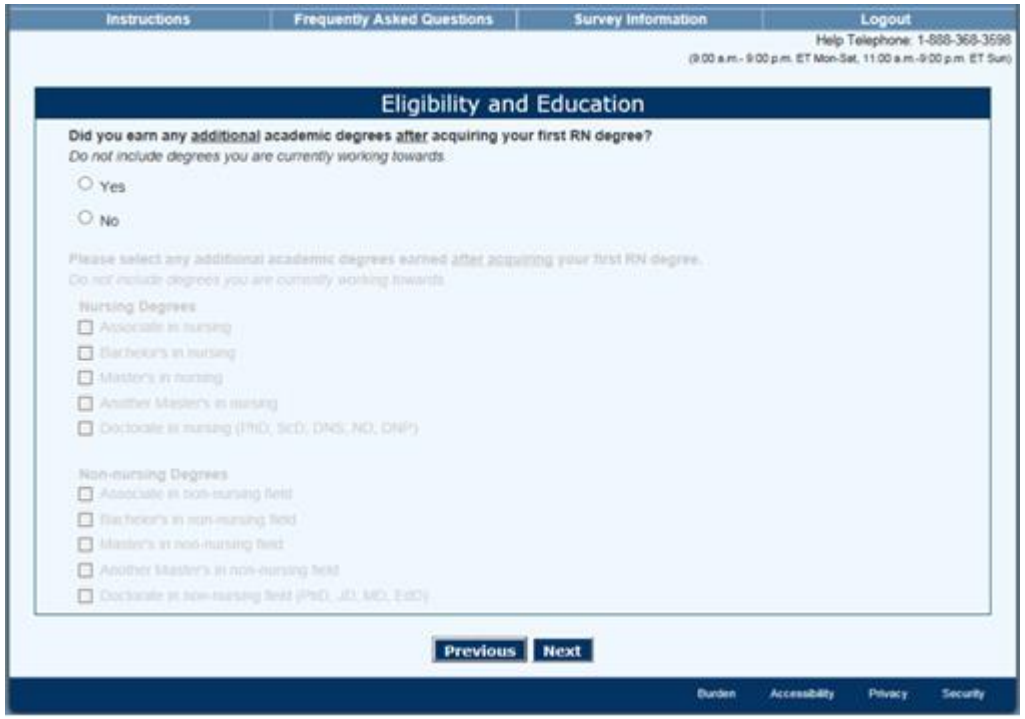


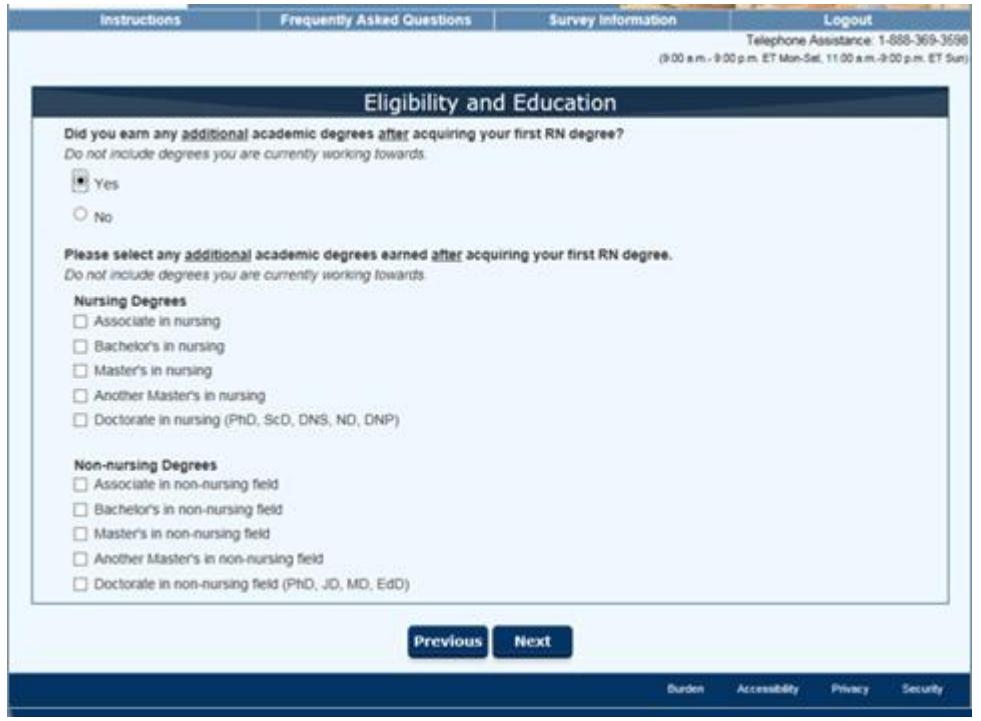
N=3



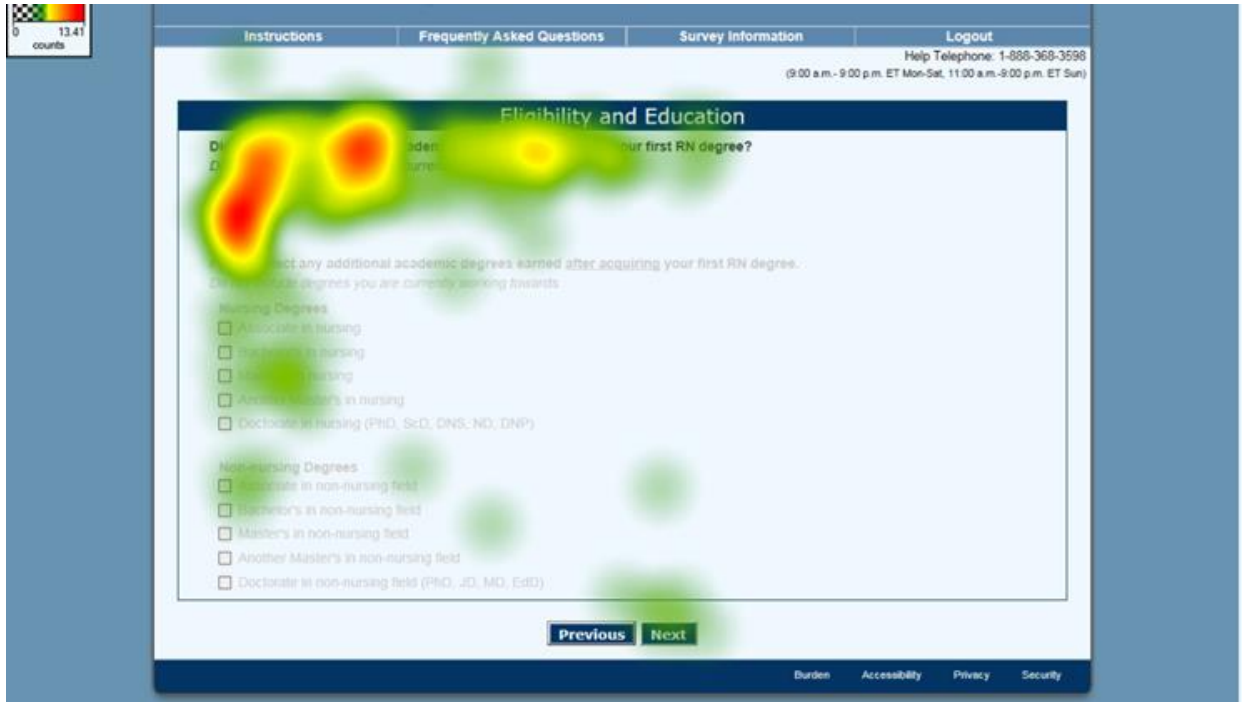
22 percent of the fixations were in the disabled area

Disable and enable branching design

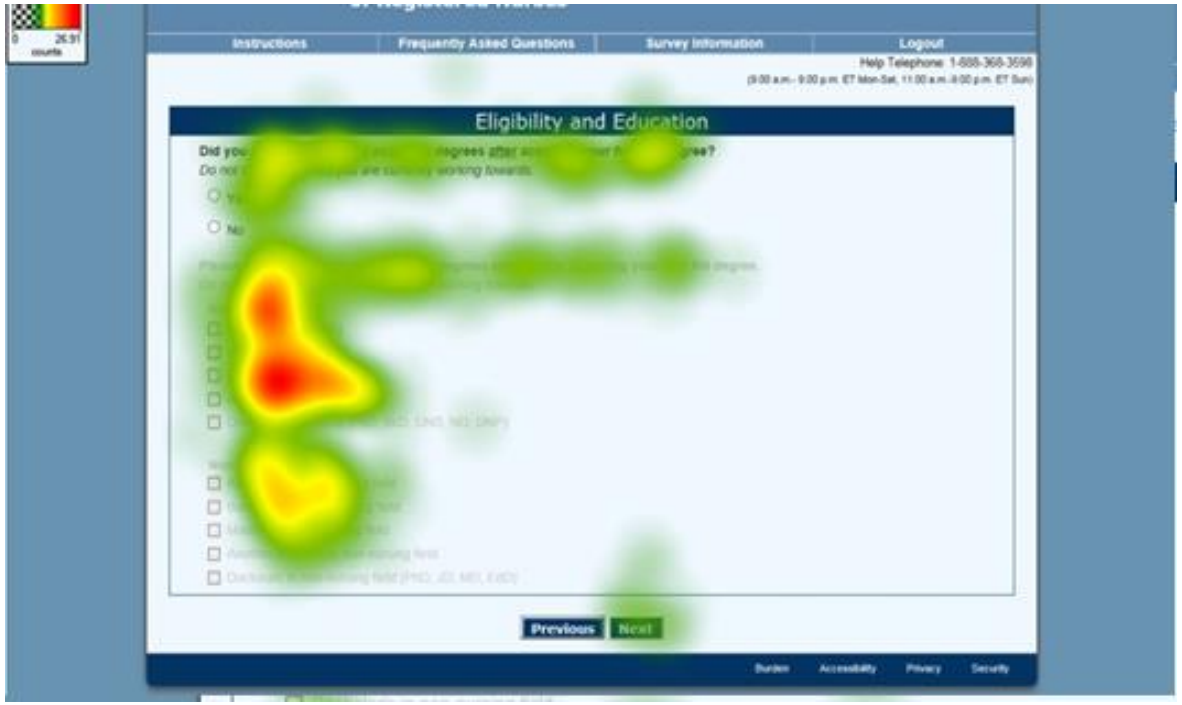




Eye tracking shows some fixations in the disabled part of the questionnaire



N=3 who selected no
16 to 18 percent of fixations were in the disabled area



N=4 who selected yes

Which branching design is better?

- Unclear from observations
- Unclear from heat maps
- Examined the percent of fixations in the disabled area compared to the entire area
  - Unfolding design: 22 percent of the fixations were in the disabled area
  - Disable/enable design: 16 to 18 percent of fixations were in the disabled area
- More research needs to be conducted to confirm the pattern

Takeaway for typical usability pretesting of web surveys

- Useful to collect eye tracking data during usability testing of surveys
- Look for typical patterns
- Think aloud and observation data are important and necessary complements to eye tracking data
- Eye tracking data can confirm findings from those data

Thank you

- Elizabeth Nichols
- elizabeth.may.nichols@census.gov