

# Using Eye Tracking to Confirm Usability Issues

with Forced-Choice Response Options and Branching Designs

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

## 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	<input type="radio"/>	<input type="radio"/>
b. A speech or language impairment	<input type="radio"/>	<input type="radio"/>
c. A serious emotional disturbance	<input type="radio"/>	<input type="radio"/>
d. Deafness or another hearing impairment	<input type="radio"/>	<input type="radio"/>
e. Blindness or another visual impairment that can't be corrected with glasses	<input type="radio"/>	<input type="radio"/>
f. An orthopedic impairment	<input type="radio"/>	<input type="radio"/>
g. Autism	<input type="radio"/>	<input type="radio"/>
h. Pervasive Developmental Disorder (PDD)	<input type="radio"/>	<input type="radio"/>
i. Attention Deficit Disorder, ADD or ADHD	<input type="radio"/>	<input type="radio"/>
j. A specific learning disability	<input type="radio"/>	<input type="radio"/>
k. A developmental delay	<input type="radio"/>	<input type="radio"/>
l. Traumatic brain injury	<input type="radio"/>	<input type="radio"/>
m. Another health impairment lasting 6 months or longer	<input type="radio"/>	<input type="radio"/>

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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

## 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	<input checked="" type="radio"/>	<input type="radio"/>
b. A private Catholic school located in a physical building	<input type="radio"/>	<input type="radio"/>
c. A private, religious but NOT Catholic school located in a physical building	<input type="radio"/>	<input type="radio"/>
d. A private, not religious school located in a physical building	<input type="radio"/>	<input type="radio"/>
e. Full-time online, virtual, or cyber school for grades kindergarten through 12	<input type="radio"/>	<input type="radio"/>
f. College, community college, or university that is online, virtual, or cyber	<input type="radio"/>	<input type="radio"/>
g. College, community college, or university located in a physical building	<input type="radio"/>	<input type="radio"/>
h. Student is homeschooled, including co-ops	<input type="radio"/>	<input type="radio"/>

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

## 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	<input type="radio"/>	<input type="radio"/>
b. A speech or language impairment	<input type="radio"/>	<input type="radio"/>
c. A serious emotional disturbance	<input type="radio"/>	<input type="radio"/>
d. Deafness or another hearing impairment	<input type="radio"/>	<input type="radio"/>
e. Blindness or another visual impairment that can't be corrected with glasses	<input type="radio"/>	<input type="radio"/>
f. An orthopedic impairment	<input type="radio"/>	<input type="radio"/>
g. Autism	<input type="radio"/>	<input type="radio"/>
h. Pervasive Developmental Disorder (PDD)	<input type="radio"/>	<input type="radio"/>
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l. Traumatic brain injury	<input type="radio"/>	<input type="radio"/>
m. Another health impairment lasting 6 months or longer	<input type="radio"/>	<input type="radio"/>

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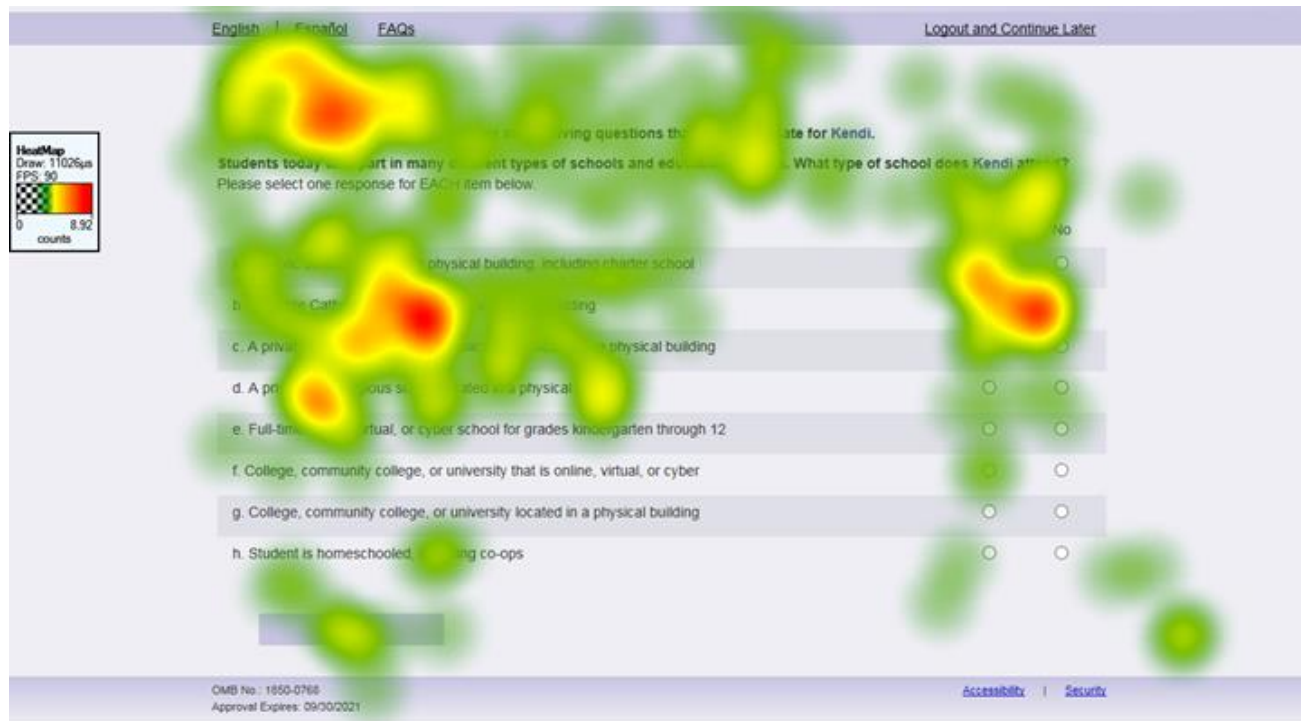
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We observed participants answering each question.



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



N=5



N=4

# Recommendation

## CHILD'S SCHOOLING

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

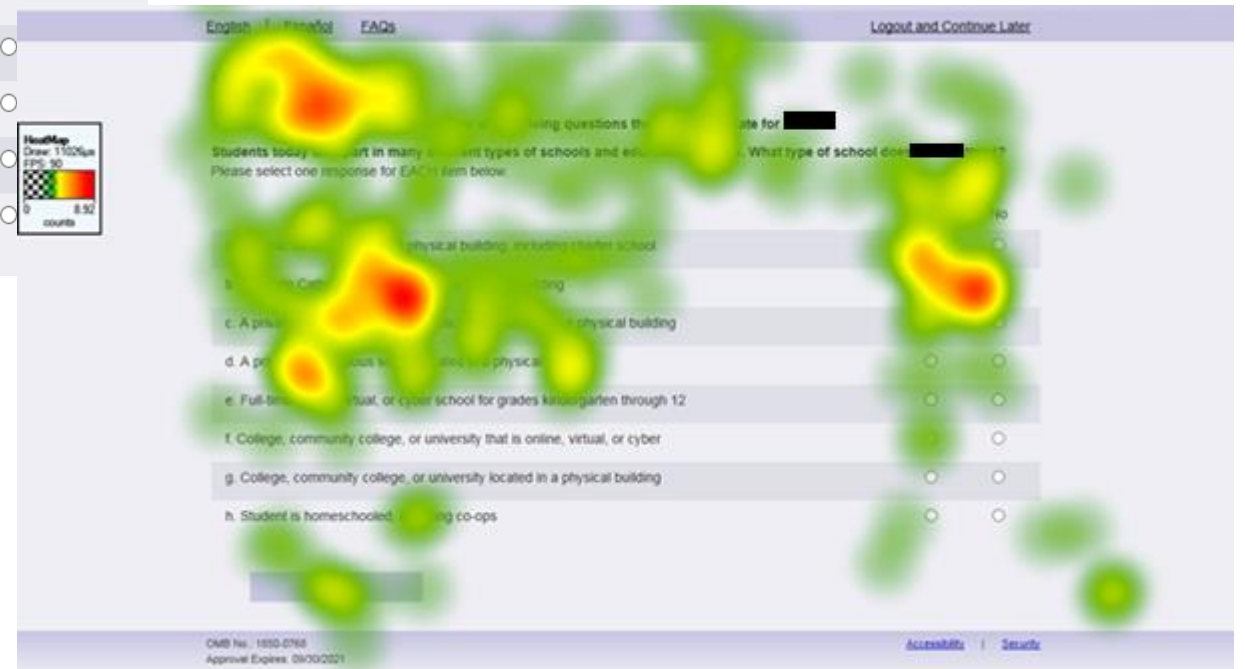
Students today take part in many different types of schools and education settings. What type of school does [redacted] attend?  
Please select one response for EACH item below.

Yes No

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



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

English | Español | FAQs Logout and C

### CHILDHOOD CARE AND PROGRAMS: CARE YOUR CHILD RECEIVES FROM NON-RELATIVES

What is the easiest way for you to tell us the amount your household pays for this person to care for the household in January, 2016, currently in preschool? Do not include any money that you may receive from others to help pay for care.

Hourly

Daily

Weekly

Every 2 weeks

Monthly

Yearly

Other — Specify:

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### CHILDHOOD CARE AND PROGRAMS: CARE YOUR CHILD RECEIVES FROM NON-RELATIVES

What is the easiest way for you to tell us the amount your household pays for this person to care for the household member born in January, 2016, currently in preschool? Do not include any money that you may receive from others to help pay for care.

Hourly

Daily

Weekly

Every 2 weeks

Monthly

Yearly

Other — Specify:

How many children from your household is the weekly fee for, INCLUDING the household member born in January, 2016, currently in preschool?

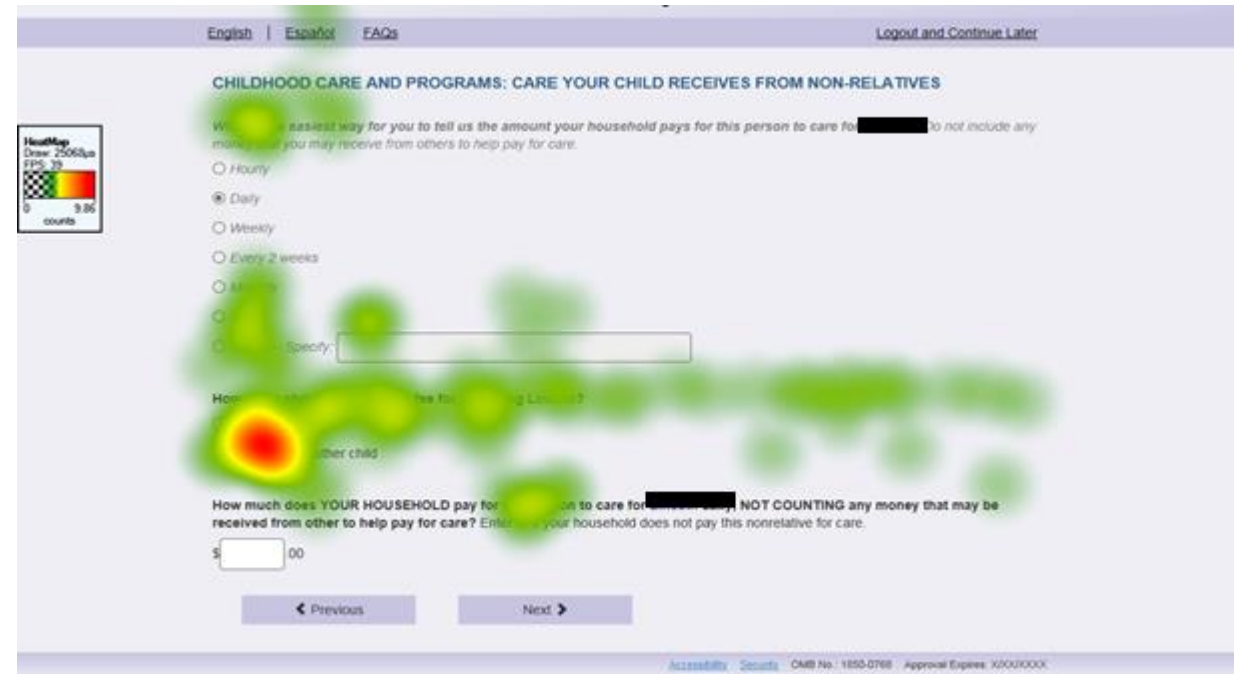
the household member born in January, 2016, currently in preschool only

the household member born in January, 2016, currently in preschool and 1 other child

# 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

Instructions Frequently Asked Questions Survey Information Logout  
Help Telephone: 1-888-368-3598  
(9:00 a.m. - 9:00 p.m. ET Mon-Sat, 11:00 a.m.-9:00 p.m. ET Sun)

### Eligibility and Education

Did you earn any **additional** academic degrees **after** acquiring your first RN degree?  
Do not include degrees you are currently working towards.

Yes  
 No

Please select any **additional** academic degrees earned **after** acquiring your first RN degree.  
Do not include degrees you are currently working towards.

**Nursing Degrees**

- Associate in nursing
- Bachelor's in nursing
- Master's in nursing
- Another Master's in nursing
- Doctorate in nursing (PhD, ScD, DNS, ND, DNP)

**Non-nursing Degrees**

- Associate in non-nursing field
- Bachelor's in non-nursing field
- Master's in non-nursing field
- Another Master's in non-nursing field
- Doctorate in non-nursing field (PhD, JD, MD, EdD)

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### Eligibility and Education

Did you earn any **additional** academic degrees **after** acquiring your first RN degree?  
Do not include degrees you are currently working towards.

Yes  
 No

Please select any **additional** academic degrees earned **after** acquiring your first RN degree.  
Do not include degrees you are currently working towards.

**Nursing Degrees**

- Associate in nursing
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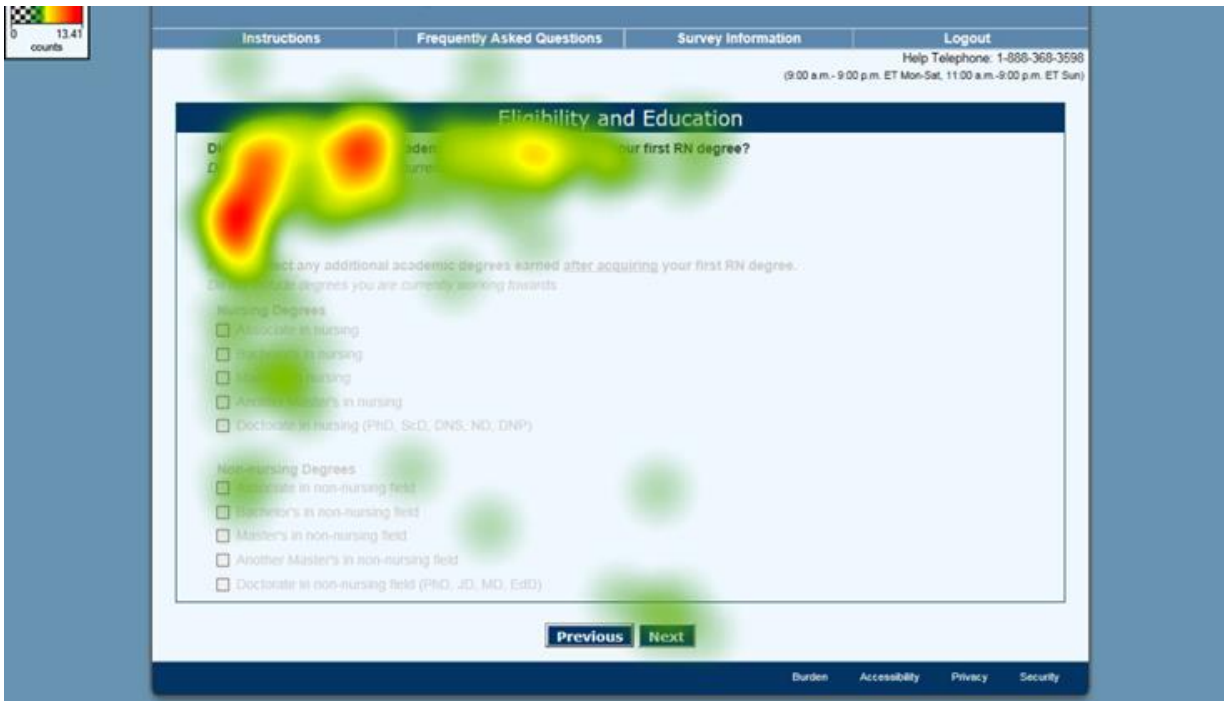
**Non-nursing Degrees**

- Associate in non-nursing field
- Bachelor's in non-nursing field
- Master's in non-nursing field
- Another Master's in non-nursing field
- Doctorate in non-nursing field (PhD, JD, MD, EdD)

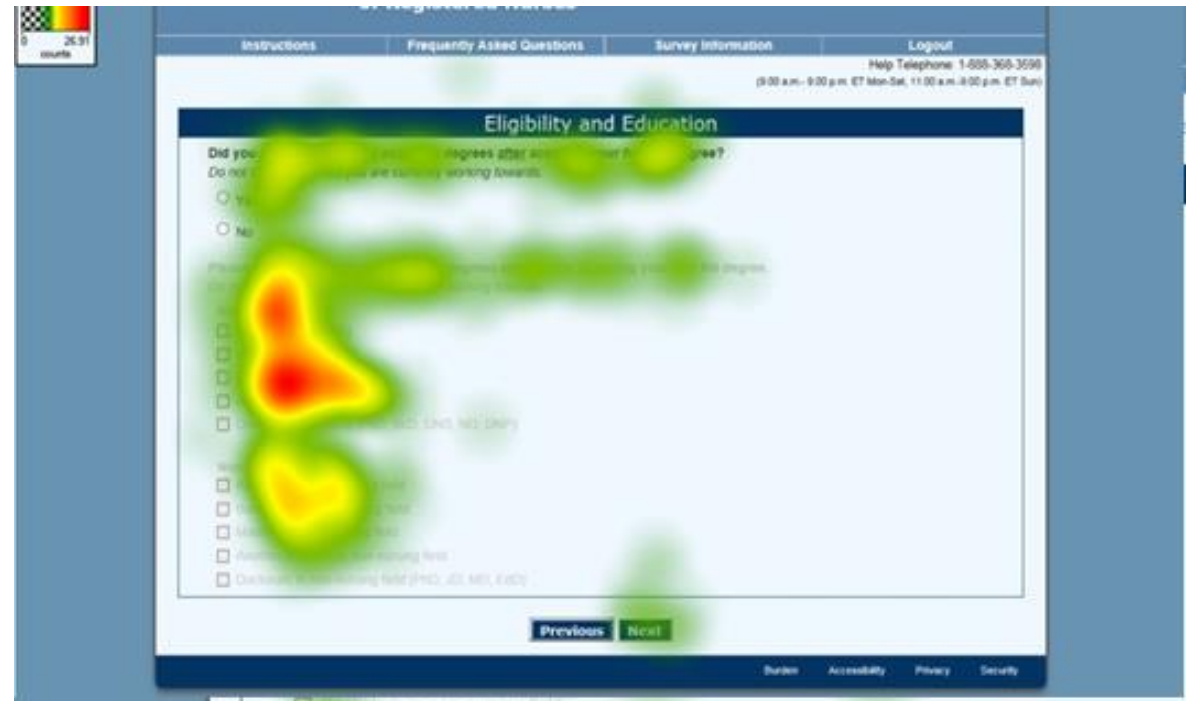
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# Eye tracking shows some fixations in the disabled part of the questionnaire



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

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