The Impact of Question Format on Reading Behaviors

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FedCASIC
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Agenda

- Goal of this study
- Method
- Challenges of eye tracking
- Some results
Goal

- Explore how question format affects reading behaviors
- Comparisons:
  - Yes/No vs Mark All
  - Grid vs Individual
Yes/No vs Mark All

- Respondents can take longer with Yes/No questions
  - Dykema, Schaeffer, Beach, Lein, and Day (2011)
- Respondents can give more “yes” responses with Yes/No Questions
  - Smyth et al. (2006)
- There can be deeper mental processing with Yes/No questions
  - Smyth et al. (2006)
Grid vs Individual

- Grids can lead to faster response times, but also more straightlining and higher item non-response
- Grids are more complex and may take more time to navigate
  - Couper (2000)
Survey Format Study Part 1

Yes/No 1

Do you use the following cell phone apps?

<table>
<thead>
<tr>
<th>App</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Games</td>
<td></td>
<td></td>
</tr>
<tr>
<td>News services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banking services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social media</td>
<td></td>
<td></td>
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<tr>
<td>Weather</td>
<td></td>
<td></td>
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<tr>
<td>Email</td>
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<td></td>
</tr>
<tr>
<td>Mapping / Navigating</td>
<td></td>
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</tr>
<tr>
<td>Streaming video</td>
<td></td>
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</tr>
<tr>
<td>Web Browser</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Streaming music</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camera</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Podcast player</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Which of the following cell phone apps do you use? (Mark all that apply)

- Web browser
- Games
- Banking services
- Camera
- News services
- Social media
- Podcast player
- Streaming video
- Weather
- Email
- Mapping / Navigating
- Streaming music
Yes/No and Mark All Questions

Topics

1. Cell phone apps used
2. Languages understood at even a basic level
3. Purchases (infrequent)
4. Purchases (frequent)
5. Types of exercise
6. Sports enjoyed watching

12 items per question

Participants answered 3 in each format
### Survey Format Study Group 1

**Grid 1**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Every day</th>
<th>Several times a week</th>
<th>Several times a month</th>
<th>Several times a year</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spend an evening with friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Play a computer game</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Watch TV</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Attend a class of any kind</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Read a book for pleasure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Volunteer for charity</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Cook a meal</td>
<td></td>
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</tr>
<tr>
<td>Go to the library</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Attend a sporting event</td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Survey Format Study Group 2

Non-Grid 1-1

How often do you spend an evening with friends?

- Every day
- Several times a week
- Several times a month
- Several times a year
- Never
Grid and Individual Questions

- **Topics**
  1. How often do you <activity>? (e.g., go to the library, watch TV)
  2. How important is <benefit> at work? (e.g., time off, good location)
  3. How much do you enjoy listening to <music genre>? (e.g., jazz, pop)
  4. How often do you travel by <mode>? (e.g., car, boat)
  5. For good health, how important is it to <activity>? (e.g., exercise, laugh)
  6. How much do you enjoy <movie genre>? (e.g., comedy, western)
Grid and Individual Questions

- 10 items and 5 response options per question
- Individual questions were one per page
- Participants answered 3 in each format
Participants

40 Participants

- General population
- Recruited from our participant database
- Mix of age, gender, race, educational background
- Did not wear glasses to use the computer
Method

- Test session
  - Introduce participants to eye tracking
  - Participant signs informed consent
  - Calibrate participants
  - Participant completes survey in SurveyMonkey
  - Complete two other studies
  - Pay participants $40 incentive

- Data collected July – September 2018
Eye Tracking Data Quality

- Not all participants tracked well
- Ended up with usable data from 15 participants out of 40
  - Proper counterbalancing impossible
  - Limited ability for quantitative analysis

<table>
<thead>
<tr>
<th></th>
<th>Yes / No vs Mark All</th>
<th>Grid vs Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>15</td>
<td></td>
</tr>
<tr>
<td><strong>Group 1</strong></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td></td>
<td>9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>15</td>
</tr>
</tbody>
</table>
So...what will we look at today

- Exploratory results
  - General trends of the concepts
  - Areas to explore further
So...what will we look at today

- Time
- Total Fixation Duration – the total amount of time participants were looking at that AOI
### AOIs for Yes/No Questions

#### Survey Format Study Part 1

**Question:** Do you use the following cell phone apps?

<table>
<thead>
<tr>
<th>Row Labels</th>
<th>Responses</th>
<th>Data Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Games</td>
<td></td>
<td></td>
</tr>
<tr>
<td>News services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Banking services</td>
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<tr>
<td>Weather</td>
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<td>Streaming music</td>
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<td>Camera</td>
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<td></td>
</tr>
<tr>
<td>Podcast player</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**Prep**

- [ ] Yes
- [ ] No

**Next**
### AOIs for Mark All Questions

#### Survey Format Study Part 1

Mark All 1

<table>
<thead>
<tr>
<th>Row Labels</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Web browser</td>
<td></td>
</tr>
<tr>
<td>Games</td>
<td></td>
</tr>
<tr>
<td>Banking services</td>
<td></td>
</tr>
<tr>
<td>Camera</td>
<td></td>
</tr>
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</tr>
<tr>
<td>Mapping / Navigating</td>
<td></td>
</tr>
<tr>
<td>Streaming music</td>
<td></td>
</tr>
</tbody>
</table>
AOIs for Grid Questions

Survey Format Study Group 1

Grid 1

<table>
<thead>
<tr>
<th>Row Labels</th>
<th>Data Entry</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spend an evening with friends</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
</tr>
<tr>
<td>Play a computer game</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
</tr>
<tr>
<td>Watch TV</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
</tr>
<tr>
<td>Exercise</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
</tr>
<tr>
<td>Attend a class of any kind</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
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<tr>
<td>Read a book for pleasure</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
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<tr>
<td>Volunteer for charity</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
</tr>
<tr>
<td>Cook a meal</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
</tr>
<tr>
<td>Go to the library</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
</tr>
<tr>
<td>Attend a sporting event</td>
<td><img src="dataentry_options.png" alt="Data Entry Options" /></td>
</tr>
</tbody>
</table>
AOIs for Individual Questions

Survey Format Study Group 2

Non-Grid 1-1

How often do you spend an evening with your spouse?

Data Entry

Question

Response Options

Every day
Several times a week
Several times a month
Several times a year
Never

Prev Next
Yes/No vs Mark All
Study Questions

- Do people complete questions more quickly with one format?
- Do people spend more time reading the Y/N list than the mark all list?
- Where do respondents spend most of their time looking?
Time per Question (sec)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Mark All</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Study Questions

- Do people complete questions more quickly with one format?
- Do people spend more time reading the Y/N list than the mark all list?
- Where do respondents spend most of their time looking?
Study Questions

- Do people complete questions more quickly with one format?
- Do people spend more time reading the Y/N list than the mark all list?
- Where do respondents spend most of their time looking?
Fixation Duration

Survey Format Study Part 1

What languages are you able to read or speak below a basic level? (Mark all that apply)

- Spanish
- French
- Greek
- Swedish
- Portuguese
- Chinese
- Russian
- Arabic
- Japanese
- English

Prev  Next
Data Entry

Total Fixation Duration (sec)
Data Entry AOI

Mark All

Yes/No

1 2 3 4 5 6

Mark All

Yes / No
Preliminary Findings

- With Yes/No questions, respondents may take more time looking at the data entry areas than with Mark All questions.
- Perhaps this accounts for some of the differences in the times for the two formats.
Grid vs Individual Questions
Study Questions

- Do people complete the questions more quickly with one format?
- Do people spend more time reading the question text with individual questions than with questions in a grid?
- Do they spend more time reading the response options more with individual questions?
- Where else do respondents look?
Time per Question (sec)

- Grid
- Individual

<table>
<thead>
<tr>
<th>Question</th>
<th>Grid</th>
<th>Individual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
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<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Study Questions

- Do people complete the questions more quickly with one format?
- Do people spend more time reading the question text with individual questions than with questions in a grid?
- Do they spend more time reading the response options more with individual questions?
- Where else do respondents look?
Question Text
Study Questions

- Do people complete the questions more quickly with one format?
- Do people spend more time reading the question text with individual questions than with questions in a grid?
- Do they spend more time reading the response options more with individual questions?
- Where else do respondents look?
Response Options

Total Fixation Duration
Response Labels AOI

[Bar chart showing total fixation duration for response options 1 to 6, comparing Grid and Individual response labels.]
Study Questions

- Do people complete the questions more quickly with one format?
- Do people spend more time reading the *question text* with individual questions than with questions in a grid?
- Do they spend more time reading the *response options* with individual questions?
- Where else do respondents look?
Fixation Duration

Survey Format Study Group 2

Non-Grid 2-1

At work, how important is it to have services such as a post office or bank?

- Very important
- Very important
- Somewhat important
- Somewhat important
- Not at all important

Survey Format Study Group 1

Grid 2

At work, how important is it to have the following?

- On-site parking
- Accessible
- Manageable commute
- A clean workplace
- Parking
- Music in the common area
- A place to eat
- Windows to your workplace
- Comfortable
- Services such as a post office or bank
- Time off
- Benefits other than time off

Prev | Next
Fixation Duration

Survey Format Study Group 1

Non-Grid 4-7

How often do you use the following service?

○ Daily
○ Several times a week
○ Sometimes
○ Rarely
○ Never

Previous Next

Survey Format Study Group 2

Grid 4

How often do you travel by the following modes?

<table>
<thead>
<tr>
<th>Mode</th>
<th>Everyday</th>
<th>Several times a week</th>
<th>Sometimes</th>
<th>Rarely</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airplane</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private plane</td>
<td></td>
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<td></td>
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<tr>
<td>Commercial plane</td>
<td></td>
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<tr>
<td>Airplane</td>
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<tr>
<td>Helicopter</td>
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<tr>
<td>Carpool</td>
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</tr>
<tr>
<td>Bus</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Motorcycle</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Bicycle</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boat</td>
<td></td>
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</tr>
</tbody>
</table>
Data Entry Area

Total Fixation Duration (sec)
Data Entry AOI

- Grid
- Individual

1. Data Entry Area
2. Total Fixation Duration (sec)
3. Data Entry AOI
4. Grid
5. Individual
Takeaways

- No evidence that any format is “better.”
- Some potentially interesting findings worth exploring more
  - Consider the role of navigating the response options in grids.
  - Without a grid, participants can stay focused on the question.
- Interesting complement to other studies of the question formats
Contact Information

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