

The Impact of Question Format on Reading Behaviors

Jean E. Fox

U.S. Bureau of Labor Statistics

FedCASIC

April 16, 2019



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)
 - ▶ Smyth, Dillman, Christian, and Stern (2006)
- 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
 - ▶ Tourangeau, Couper, and Conrad (2004)
- 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?

	Yes	No
Games	<input type="radio"/>	<input type="radio"/>
News services	<input type="radio"/>	<input type="radio"/>
Banking services	<input type="radio"/>	<input type="radio"/>
Social media	<input type="radio"/>	<input type="radio"/>
Weather	<input type="radio"/>	<input type="radio"/>
Email	<input type="radio"/>	<input type="radio"/>
Mapping / Navigating	<input type="radio"/>	<input type="radio"/>
Streaming video	<input type="radio"/>	<input type="radio"/>
Web Browser	<input type="radio"/>	<input type="radio"/>
Streaming music	<input type="radio"/>	<input type="radio"/>
Camera	<input type="radio"/>	<input type="radio"/>
Podcast player	<input type="radio"/>	<input type="radio"/>

Prev

Next

Mark All 1

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

Prev

Next

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



Grid 1

How often do you do the following?

	Every day	Several times a week	Several times a month	Several times a year	Never
Spend an evening with friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Play a computer game	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Watch TV	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Exercise	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attend a class of any kind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Read a book for pleasure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Volunteer for charity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cook a meal	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Go to the library	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attend a sporting event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Prev

Next

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

Prev

Next

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

	Yes / No vs Mark All
Group 1	5
Group 2	10
Total	15

	Grid vs Individual
Group 1	6
Group 2	9
Total	15

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

Yes/No 1

Question		
	Responses	
Games	<input type="radio"/> <input type="radio"/>	
News services	<input type="radio"/> <input type="radio"/>	
Banking services	<input type="radio"/> <input type="radio"/>	
Social media	<input type="radio"/> <input type="radio"/>	
Weather	<input type="radio"/> <input type="radio"/>	
Email	<input type="radio"/> <input type="radio"/>	
Mapping / Navigating	<input type="radio"/> <input type="radio"/>	
Streaming video	<input type="radio"/> <input type="radio"/>	
Web Browser	<input type="radio"/> <input type="radio"/>	
Streaming music	<input type="radio"/> <input type="radio"/>	
Camera	<input type="radio"/> <input type="radio"/>	
Podcast player	<input type="radio"/> <input type="radio"/>	

Row Labels

Data Entry

Prev

Next

AOIs for Mark All Questions

Survey Format Study Part 1

Mark All 1

Which of the following cell phone apps (select all that apply)

- Web browser
- Games
- Banking services
- Camera
- News services
- Social media
- Podcast player
- Streaming video
- Weather
- Email
- Mapping / Navigating
- Streaming music

Data Entry

Row Labels

Question

Prev

Next

AOIs for Grid Questions

Survey Format Study Group 1

Grid 1

How often do you do the following?

Question

Response Options

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

Spend an evening with friends

Play a computer game

Watch TV

Exercise

Attend a class of any kind

Read a book for pleasure

Volunteer for charity

Cook a meal

Go to the library

Attend a sporting event

Row Labels

Data Entry

Prev

Next

AOIs for Individual Questions

Survey Format Study Group 2

Non-Grid 1-1

How often do you spend an evening with your spouse?
Question

Data Entry
Every day
Several times a week
Several times a month
Several times a year
Never
Response Options

Prev

Next

Yes/No vs Mark All

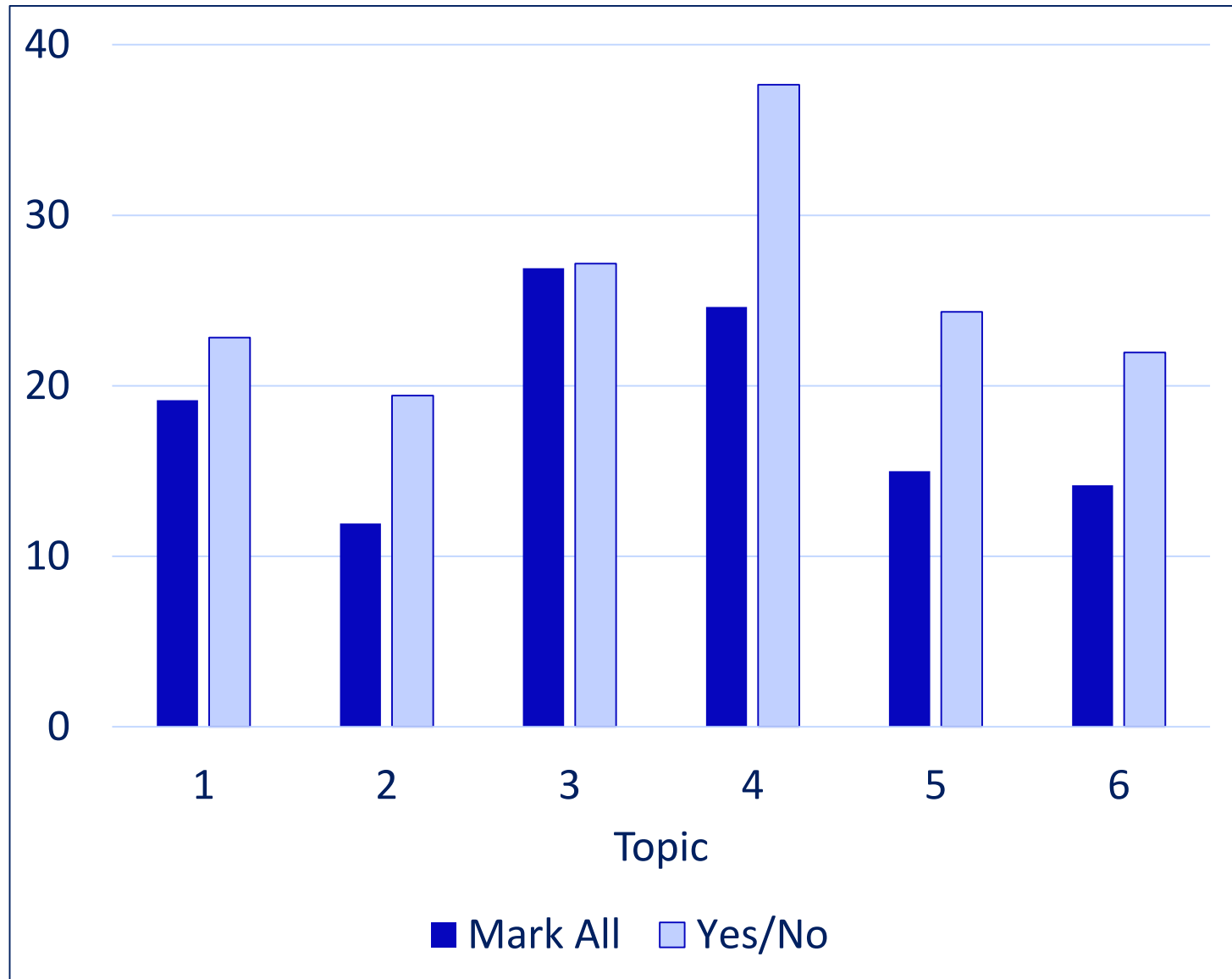


Study Questions

- 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)

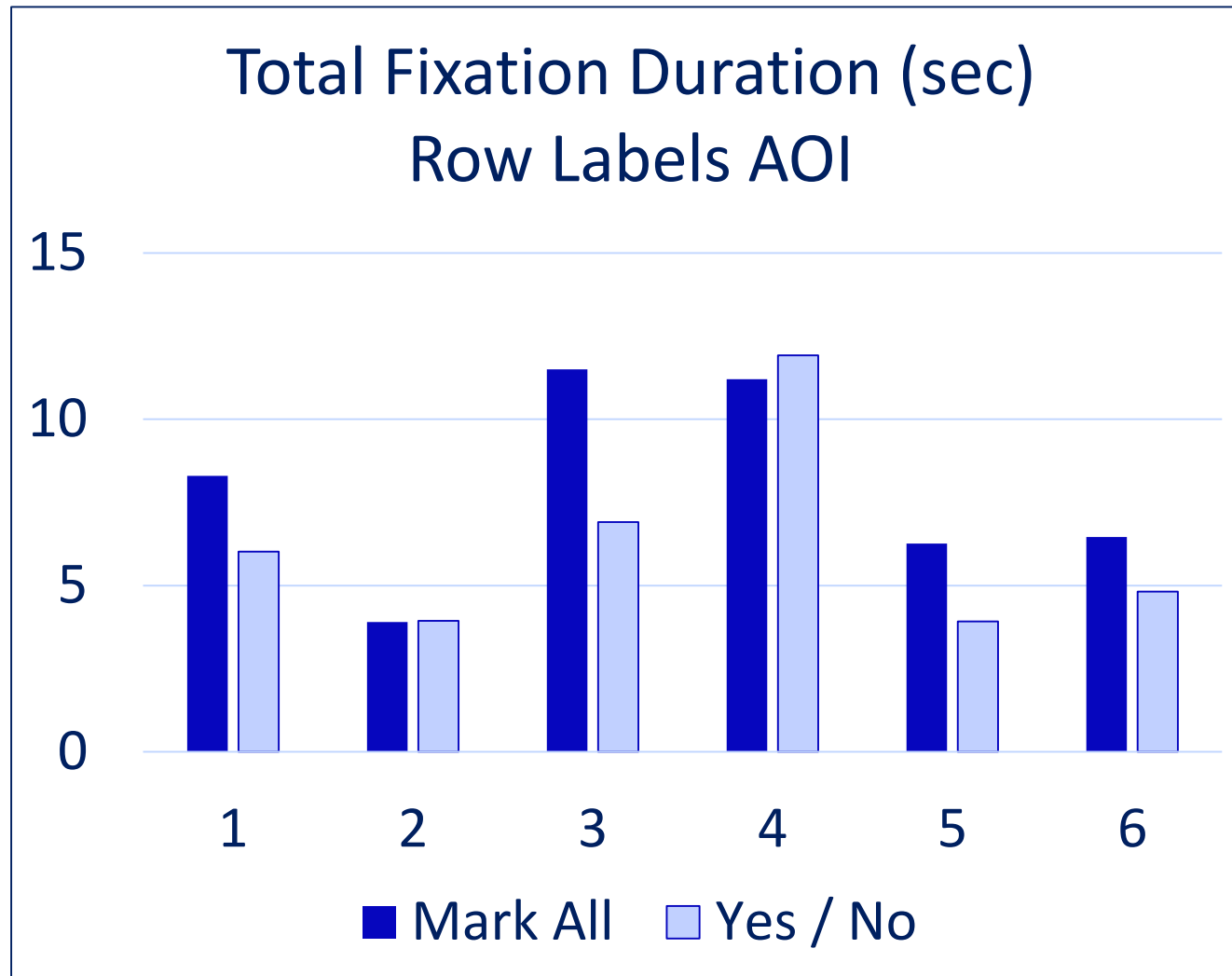
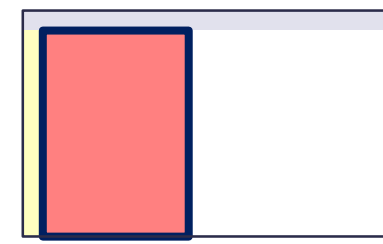
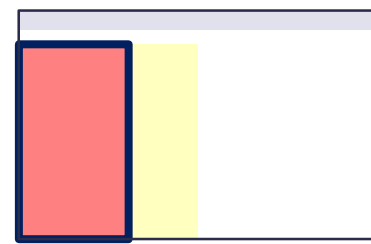


Study Questions

- 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?



Row Labels



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

Mark All 2

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

- | | Yes | No |
|------------|-----------------------|-----------------------|
| Spanish | <input type="radio"/> | <input type="radio"/> |
| Hindi | <input type="radio"/> | <input type="radio"/> |
| English | <input type="radio"/> | <input type="radio"/> |
| Urdu | <input type="radio"/> | <input type="radio"/> |
| Japanese | <input type="radio"/> | <input type="radio"/> |
| Italian | <input type="radio"/> | <input type="radio"/> |
| Chinese | <input type="radio"/> | <input type="radio"/> |
| Filipino | <input type="radio"/> | <input type="radio"/> |
| Korean | <input type="radio"/> | <input type="radio"/> |
| German | <input type="radio"/> | <input type="radio"/> |
| Swahili | <input type="radio"/> | <input type="radio"/> |
| Portuguese | <input type="radio"/> | <input type="radio"/> |

Prev

Next

Survey Format Study Part 1

Mark All 2

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

- Spanish
- Hindi
- English
- Urdu
- Japanese
- Italian
- Chinese
- Portuguese
- Filipino
- Korean
- Japanese
- English

Prev

Next

Fixation Duration

Survey Format Study Part 1

Yes/No 4

Have you purchased any of the following items in the last month?

- | | Yes | No |
|--|-----------------------|-----------------------|
| Books or magazines (including digital and print editions) | <input type="radio"/> | <input type="radio"/> |
| Household cleaning supplies (e.g., cleaners, paper goods) | <input type="radio"/> | <input type="radio"/> |
| Over-the-counter medicine | <input type="radio"/> | <input type="radio"/> |
| Long distance travel (not local commuting) | <input type="radio"/> | <input type="radio"/> |
| Dry cleaning or coloring | <input type="radio"/> | <input type="radio"/> |
| Personal care products (e.g., hair or skin care products) | <input type="radio"/> | <input type="radio"/> |
| Gas | <input type="radio"/> | <input type="radio"/> |
| Charitable donations | <input type="radio"/> | <input type="radio"/> |
| Household services (e.g., cleaning, maintenance, or yard work) | <input type="radio"/> | <input type="radio"/> |
| First aid products | <input type="radio"/> | <input type="radio"/> |
| Entertainment (e.g., movies, music, tickets to events) | <input type="radio"/> | <input type="radio"/> |
| Hardware or other home maintenance supplies | <input type="radio"/> | <input type="radio"/> |

Prev

Next

Survey Format Study Part 1

Mark All 4

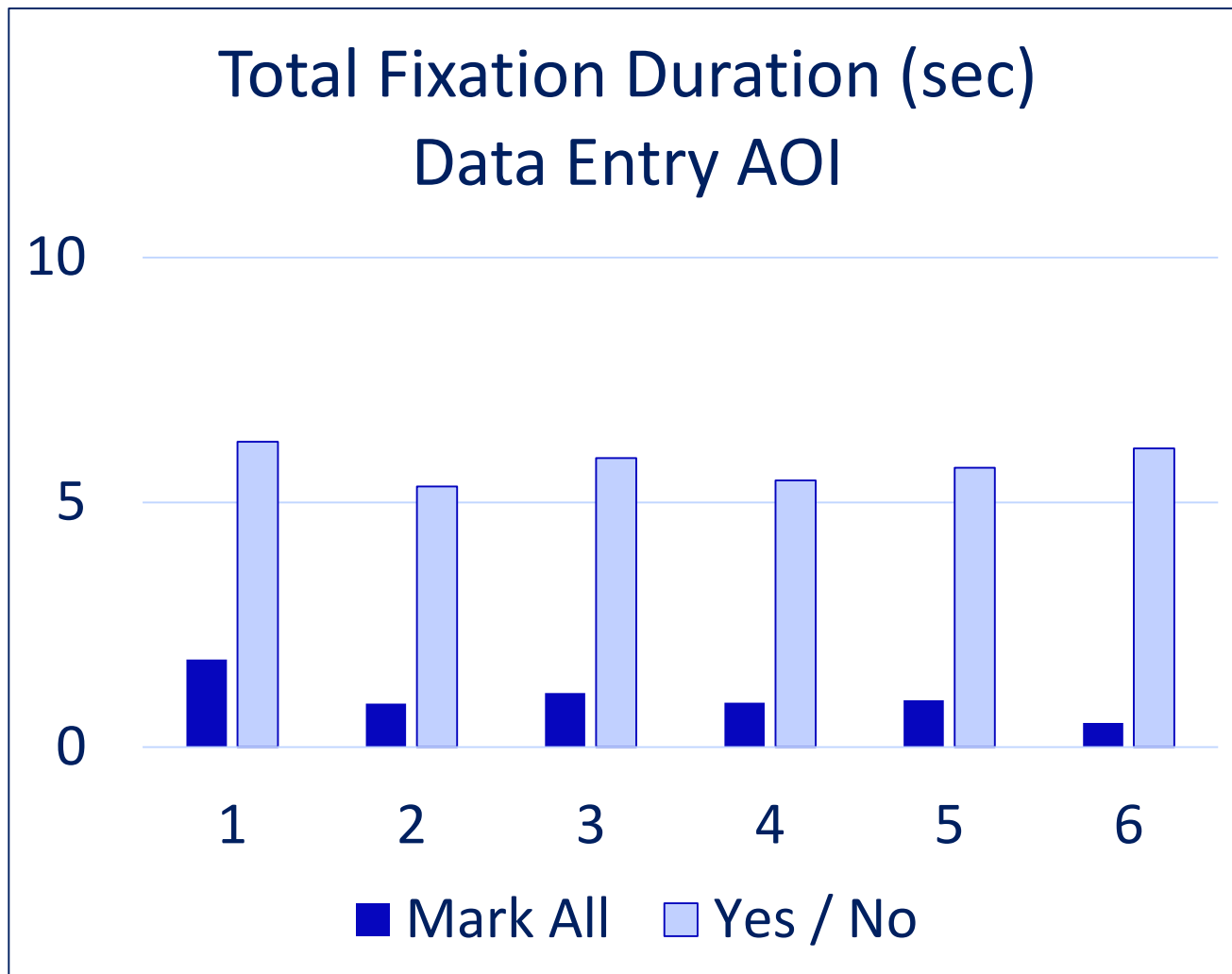
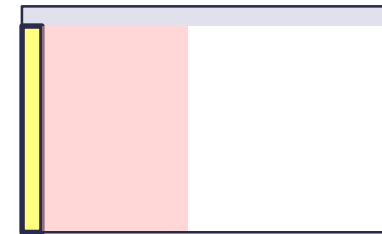
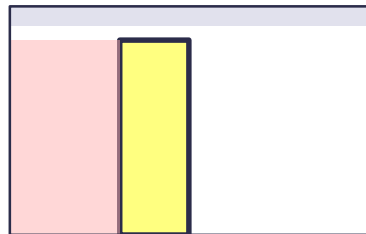
Which of the following items have you purchased in the last month? (Mark all that apply)

- Entertainment (e.g., movies, music, tickets to events)
- Books or magazines (including digital and print editions)
- Gasoline
- First aid products
- Dry cleaning or coloring
- Personal care products (e.g., hair or skin care products)
- Long distance travel (not local commuting)
- Over-the-counter medicine
- Household cleaning supplies (e.g., cleaners, paper goods)
- Household services (e.g., cleaning, maintenance, or yard work)
- Hardware or other home maintenance supplies
- Charitable donations

Prev

Next

Data Entry



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

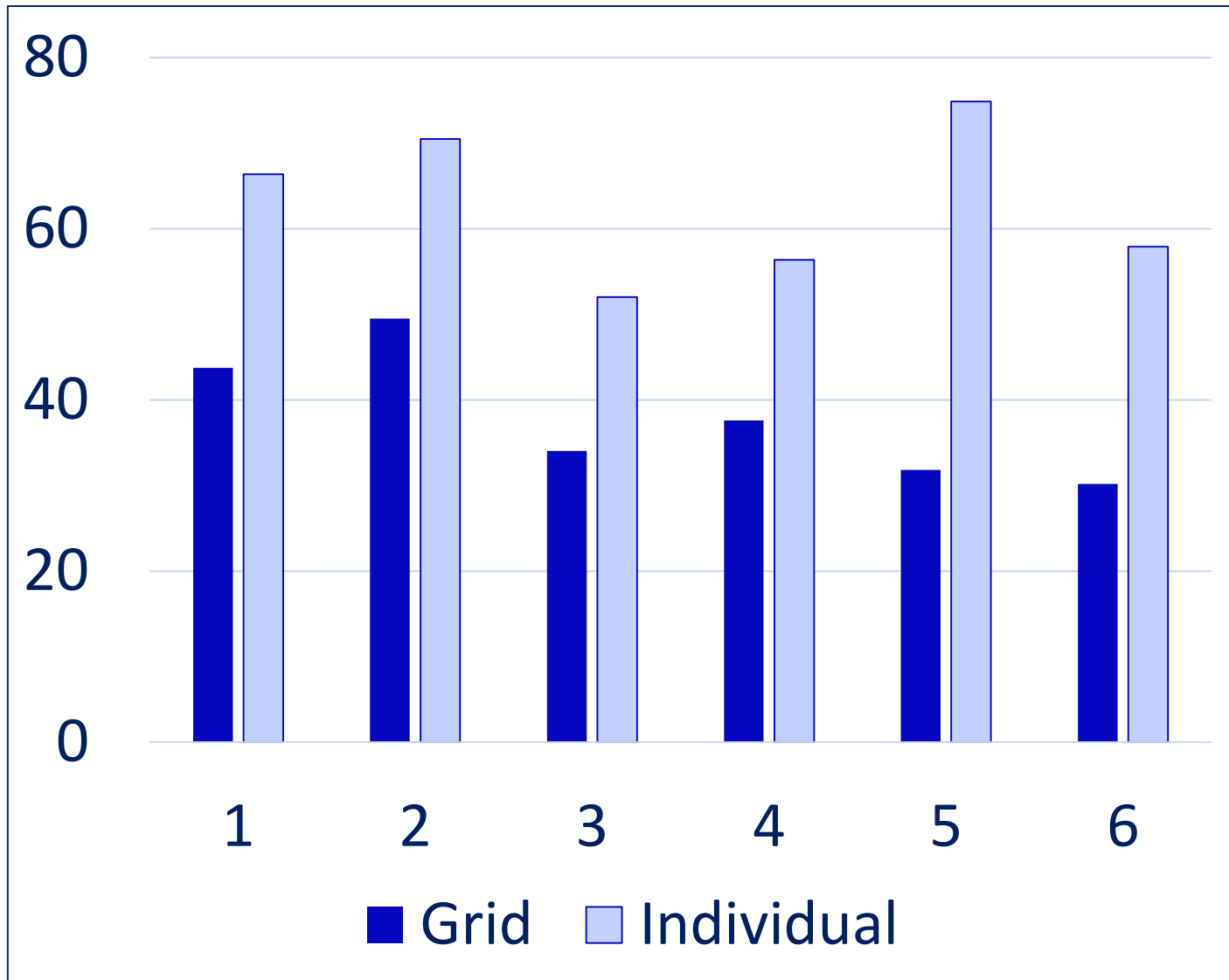


Study Questions

- 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)

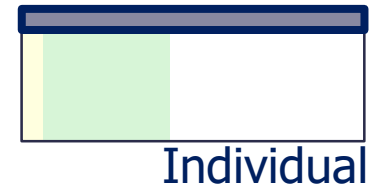
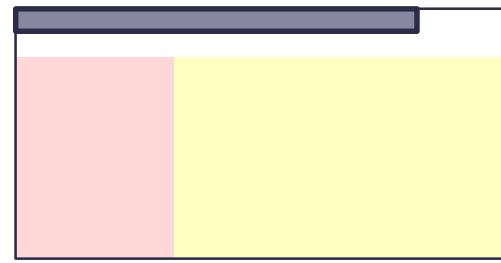


Study Questions

- 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?

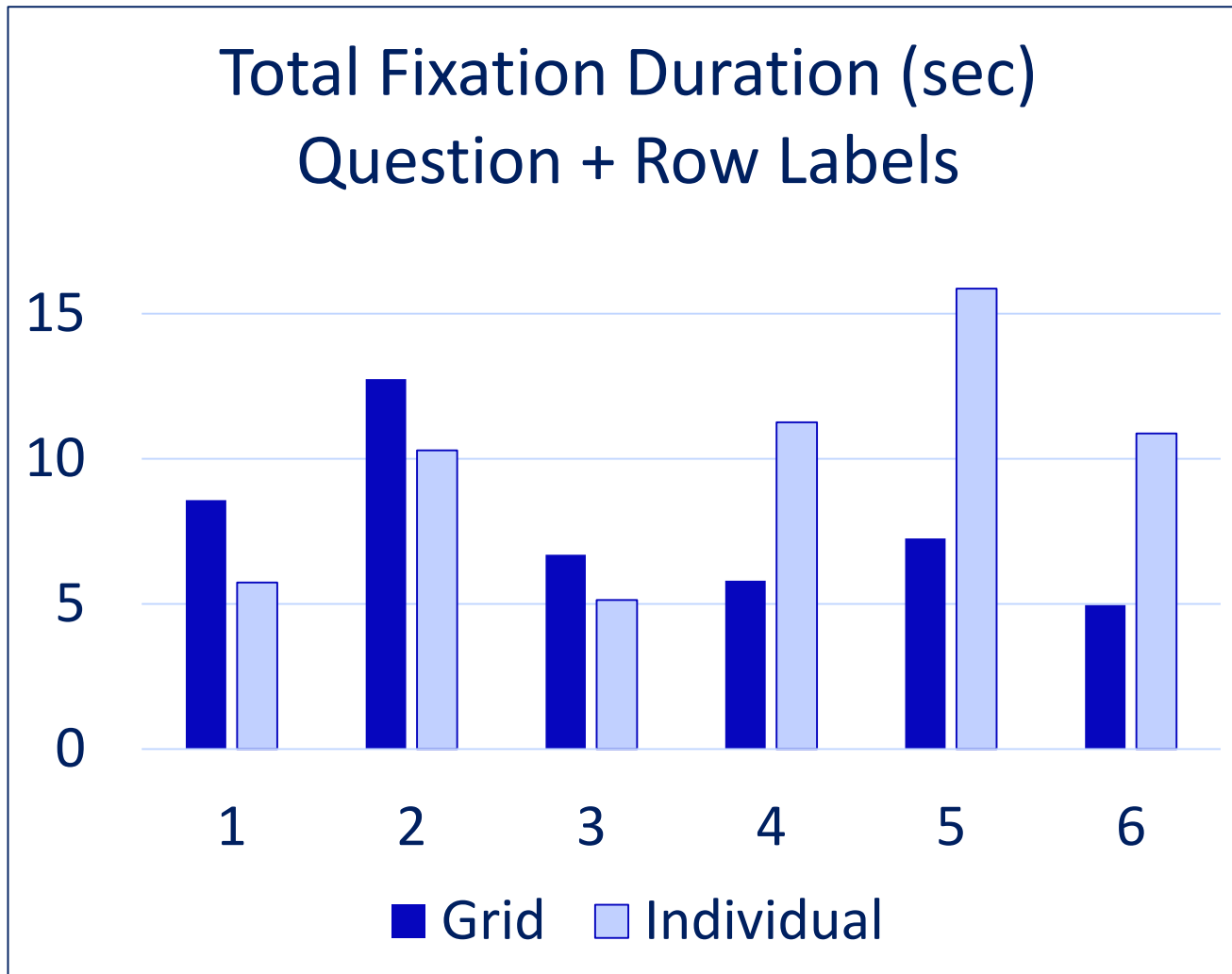
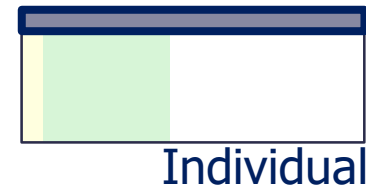
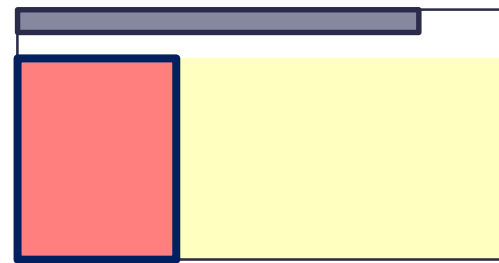


Question Text



Question Text

For Grid – Totals from Question and Row Labels
For Individual – Totals from Question AOI only

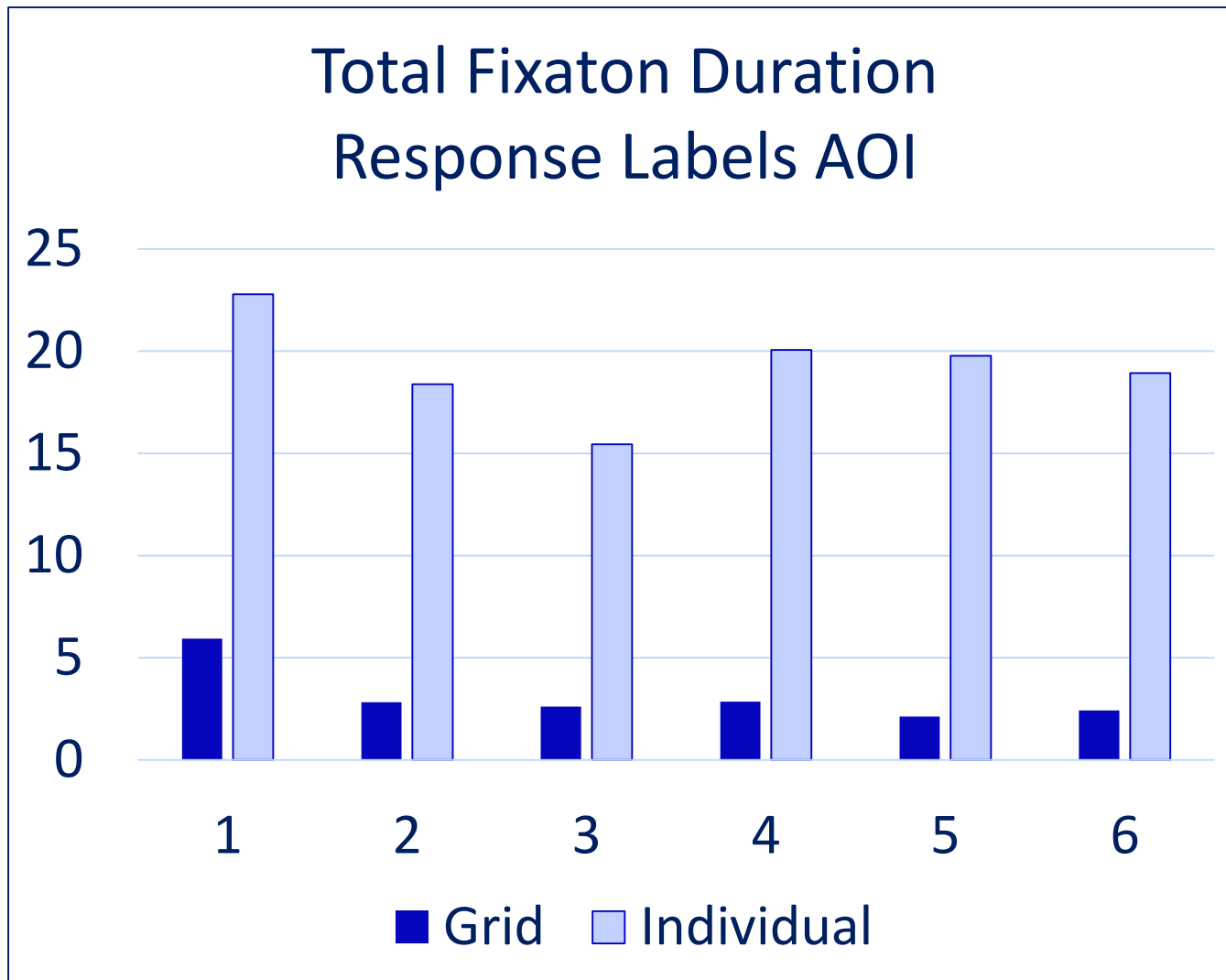
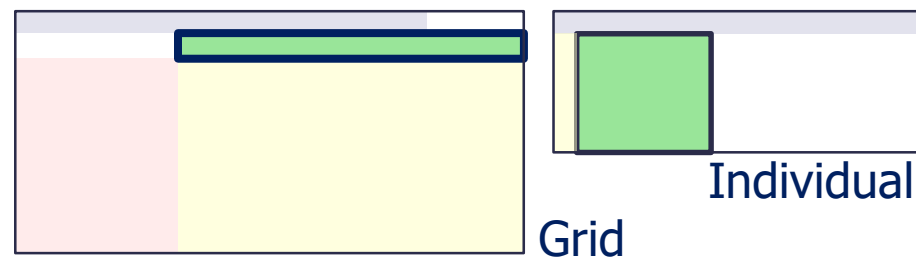


Study Questions

- 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



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?

Extremely important
 Very important
 Moderately important
 Slightly important
 Not at all important

Prev Next

Survey Format Study Group 1

Grid 2

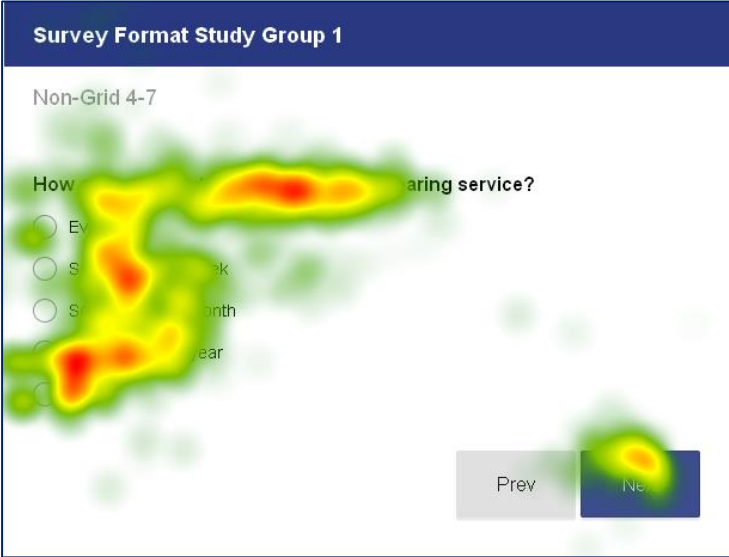
At work, how important is it to have the following?

	Extremely important	Very important	Moderately important	Slightly important	Not at all important
Opportunities for advancement	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Managers who commute	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
A cafeteria	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parking	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Music (not common areas)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Windows in your workplace	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Good location	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Services such as a post office or bank	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time off	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Benefits other than time off	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

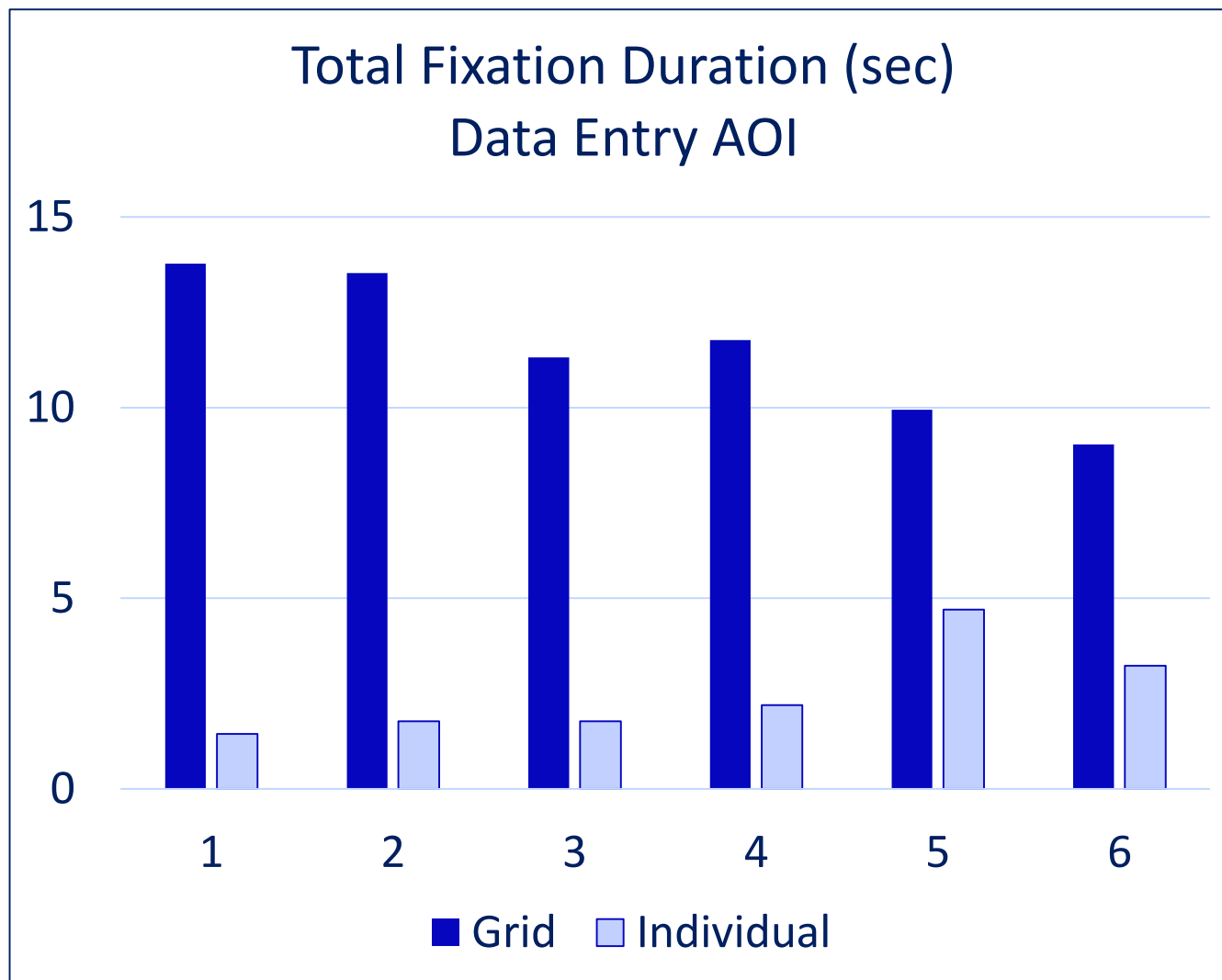
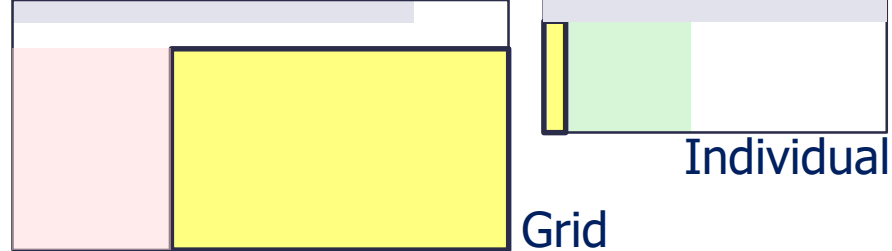
Prev Next



Fixation Duration



Data Entry Area



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

Jean E. Fox

US Bureau of Labor Statistics
Fox.Jean@bls.gov

