

General schedule for 90 minute session (15 min buffer time) = 75 min

- 10 min: Introduction
 - Consent form
 - Turn on recording
 - Tech check
- 10 min: Past experience with visualizations [10:00]
 - Short interview
- 10 min: Table [20:00]
 - Short interview and Likert survey (testing usability of prototypes)
- 15 min: Multiview prototype [30:00]
 - Short interview and Likert survey (testing usability of prototypes)
 - Task
- 5 min: Break [45:00]
- 15 min: Random access prototype [50:00]
 - Short interview and Likert survey (testing usability of prototypes)
 - Task?
- 10 min: Overall takeaways [65:00]
 - Short semi-structured interview
 - Post-study survey (demographics, overall takeaways about visualizations)
 - Turn off recording

Intro and check-in points (10 min)

- Hello! Self-introduction, brief overview about the study
 - How do you make data visualizations screen reader friendly?
 - What kinds of new interactions are possible for exploring data?
 - Do you have any questions for us before we begin?
- **Introduce structure of the session:** consent form, tech check, talk a little about your experiences with data, prototypes, BREAK, and then post-study survey
 - We'll ask you to share screen and walk through prototypes
- **Consent form and turn on recording**
 - What made you interested in participating in this study? → should we ask this question before recording just to build rapport first before putting people on the spot? (if so, make sure to take detailed notes here)
- **Ask participants to share screen, tech check:**
 - Share full screen, not just window. Don't share computer audio.
 - If we can hear VO, ask them to wear headphones
 - Verify we can see their visual cursor and see voiceover box
 - Visual cursor toggle: VoiceOver utility // Settings

- Screen share issue: sometimes the SR focus is still on zoom but it says it's on Safari. Give them time to change focus over to Safari.

[10:00] Semi-structured interview

Possible questions to ask based on initial chat:

- What made you interested in participating in this study?
- Could you tell me a little about your background? How often do you interact with, make, or read data visualizations, and in what contexts?
- Where do you usually encounter data visualizations?
 - How do you currently go about interacting with data tables or visualizations (especially on the web)?
 - What kinds of information do you want to get from them?
 - What do you like about your current interactions? What do you do when faced with obstacles / what do you do to make this easier?
 - What are ways that you manipulate a data table to make it less overwhelming?
- When you hear “explore the data” or “discover insights in the data,” what does that mean for you? How would you go about doing this, or what would you want to get out of an article saying that they did this?
- **Relational questions:** How do you get COVID related data right now and how do you talk about it with other people? (Flatten the Curve? Spikes?)
 - What kinds of conversations do you have, in any, about how to use data to make decisions?
 - When people are talking about a certain dataset (say, fluctuation in population over time, temperature and global warming),
 - How do you use data to participate in conversations about X
 - How does X influence how you interpret data

[20:00] Table

Click on the “table” link in your email, which will take you to a standard HTML table with a dataset about cars. There's a text description at the top.

- Could you show us your process for making sense of a new data table?
- Please talk out loud about your thought process as you go.
- What kind of patterns do you see and what would make it easier for you to surface those more quickly?
- What's the relationship between fuel efficiency and horsepower? Is there a big difference between the different countries?

LIKERT SURVEY

Transition to prototypes: We'll transition now to showing you some prototypes we made of screen reader-accessible data visualizations. <tell them to navigate in their email etc>. These prototypes require some specific SR settings, which we'll go over once you've pulled up the webpage. For this prototype, we need to make sure quick nav is off, and that you're not using trackpad navigation. These prototypes use the arrow keys, so we want to make sure the key commands don't conflict with Voiceover.

- VoiceOver: Quick nav toggle (press left/right at the same time).
- Trackpad commander: hold VO keys and rotate two fingers on the trackpad
- Windows Narrator: Scan mode off (CapsLock + Spacebar)
- NVDA: Focus mode (Insert + Spacebar). Sometimes CapsLock instead of Insert!
- JAWS: Forms mode (press enter on the description; exiting forms mode: esc)

[30:00] Multiview

Multiview prototype: First, you'll encounter a prototype that helps you explore small multiples of dot plots. The one we're using today shows the output of ten different varieties of barley across six cities from 1931 to 1932. A "small multiple" is a series of similar graphs that use the same scale and axes so that you can easily compare between them (e.g., how much does the Trebi variety of barley yield in one city compared to another?).

You can navigate these visualizations using the **arrow keys**. There are different layers to the visualization that have different levels of detail, that you move between using **up** and **down**. You are starting at the top layer — the big picture — so the first thing you want to do is press "down". At each layer, you can press **left** or **right** to explore different parts that are the same level of detail. This layer right below the top layer contains locations for the X axis, Y axis, legend, and X-Y grid.

When you're navigating in the grid or over individual data points, you can also use **WASD** keys to move around spatially. Unlike UDLR, which navigates you up/down in the layer structure, WASD moves you in 2D space on the graph itself. So "W" on a data point takes you to the nearest data point that's above it.

And as you navigate through the layers, you can use **shift-left** and **shift-right** to move across the different graphs. So if you're looking at the x axis for a chart representing "university farm", pressing "shift-right" takes you to the x axis for the next chart.

Open-ended prompts

- What aspects of the data were you able to understand here that you couldn't get from the raw data table?

- What are some of the overall takeaways? What did you want out of the different prototypes?
- What did you learn?
- Did you notice things like the outliers, min/max values? Do you have a sense of what the overall shape of the data were, like any clusters?

Tasks

- Was any site an outlier in terms of how barley production increased or decreased between the two years?
- Which site had the highest barley production in 1931?

LIKERT SURVEY

[45:00] Break

[50:00] Targeted navigation (15 min)

Targeted navigation prototype: Now we're going to transition into the next visualization, which is a single scatterplot that compares a penguin's flipper length and body mass by species. Similar to the last one, you can also use **UDLR** to move between layers. **WASD** spatial navigation also works here. What's new is that if you press **R**, it opens up a different mode that has some dropdown menus where you can pick different locations in the visualization to jump to. For example, you could decide that you want to look specifically and see how many Chinstrap penguins there are. If you select that location in the list, it'll move you directly to that part of the graph and you can explore data in that region after you press **Escape**, which closes the menu. You can then continue to navigate using arrow keys (to move between layers) and WASD navigation (to move spatially through the data).

Open-ended prompts

- What aspects of the data were you able to understand here that you couldn't get from the raw data table?
- What are some of the overall takeaways? What did you want out of the different prototypes?
- What did you learn?
- Did you notice things like the outliers, min/max values? Do you have a sense of what the overall shape of the data were, like any clusters?
- What situations do you think this would be useful for?

Tasks

- What is the relationship between flipper length and body mass?
- In general, what species of penguin has the largest body mass?

- Could you generalize about the size of each species of penguin (and contextualize it with the other species)? For example, “chinstrap penguins are generally larger than gentoo penguins.”

LIKERT SURVEY

[65:00] Post-study survey (10 min)

- Stop recording and screen share
- Thanks so much for doing this with us, we have a final survey that shouldn't take much more than 10 minutes