

Appendix: The interaction techniques [1] instantiated in each visualization (the extension of Figure 2)

This appendix is part of the following paper: Fan, M., Wang, Y., Xie, Y., Li, F. M., & Chen, C. (2022). Understanding How Older Adults Comprehend COVID-19 Interactive Visualizations via Think-Aloud Protocol. *International Journal of Human–Computer Interaction*, 1-17.

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Distributions of the interaction techniques in five visualizations

	Source	Type	Select	Explore	Reconfigure	Encode	Abstract/Elaborate	Filter	Connect
A	WHO 1 [44]	Map	✓	✓	✓	✓	✓	✓	✓
B	WHO 2 [44]	Bar			✓	✓	✓		✓
C	1Point3Acres [1]	Line	✓		✓		✓		
D	Reuters 1 [51]	Map		✓		✓	✓	✓	
E	Reuters 2 [50]	Line	✓		✓		✓	✓	

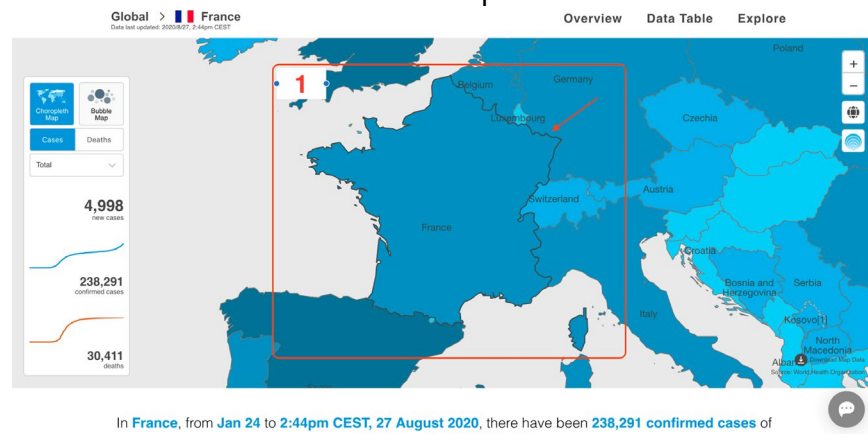
A: WHO 1

Link: <https://covid19.who.int/>

Interaction Technique: Select

Select & Highlight:

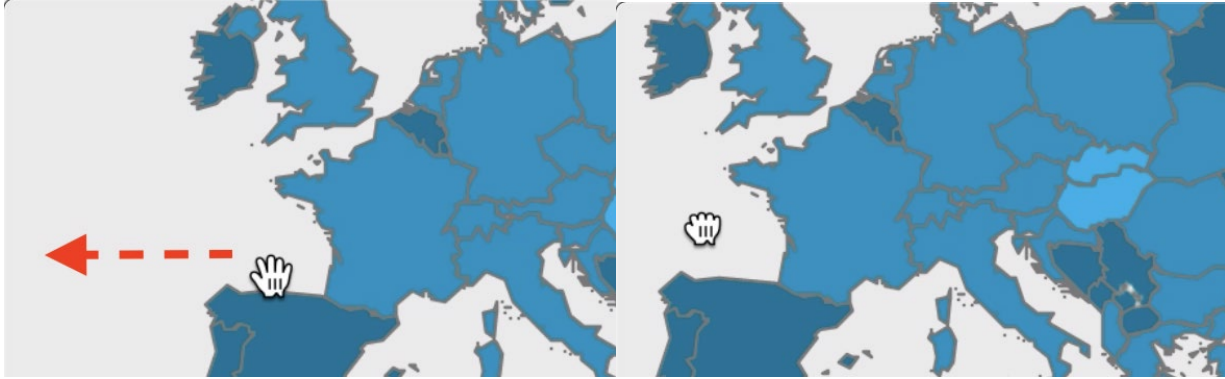
When the user clicks any country on the map, the border of the country will be highlighted and stay highlighted even when the user moves the map.



Interaction Technique: Explore

Pan & Direct-walk:

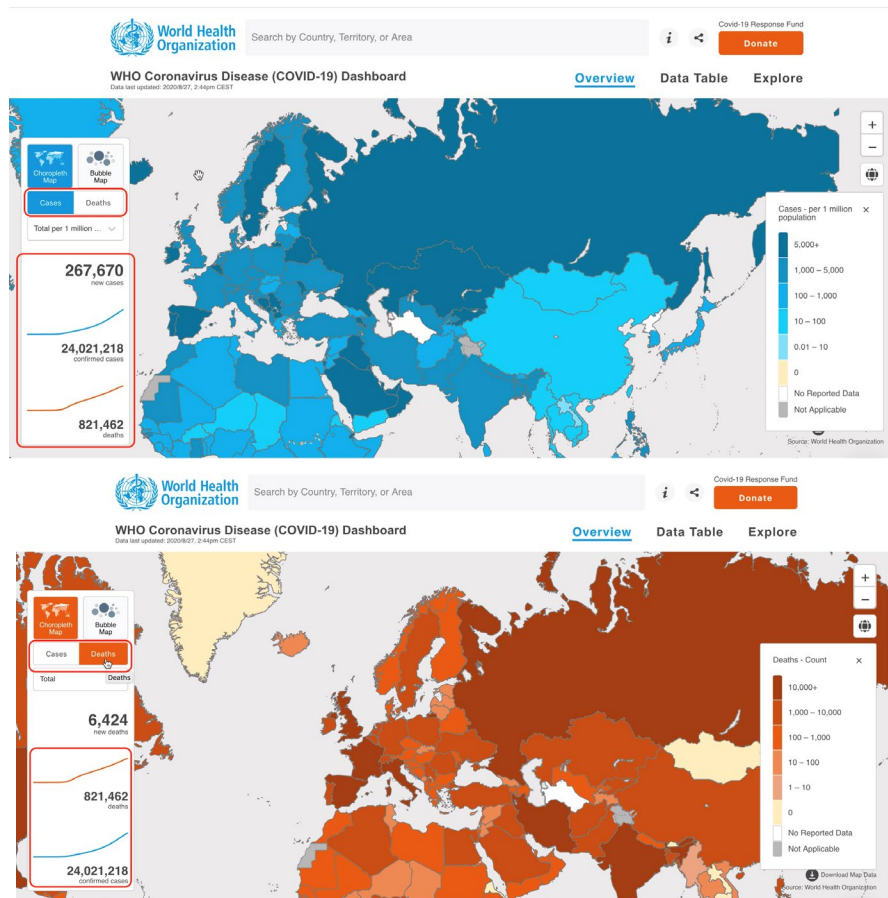
When the user holds the left mouse button and drags the map, it pans and a new area of the map appears in the view.



Interaction Technique: Reconfigure

Change Attributes:

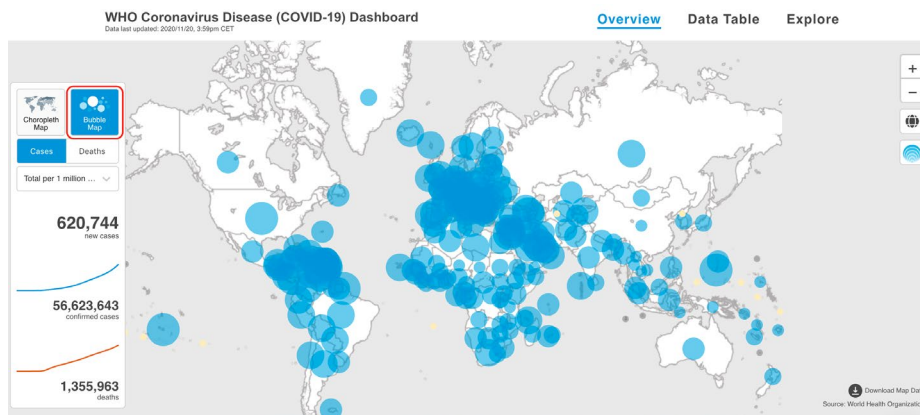
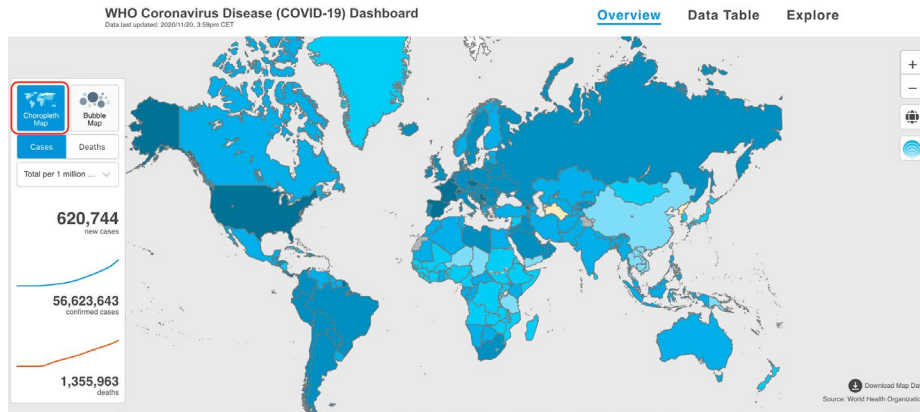
Users can change attributes being visualized on the axes of a plot, in this case, from Cases to Deaths.



Interaction Technique: Encode

Switch between graph type:

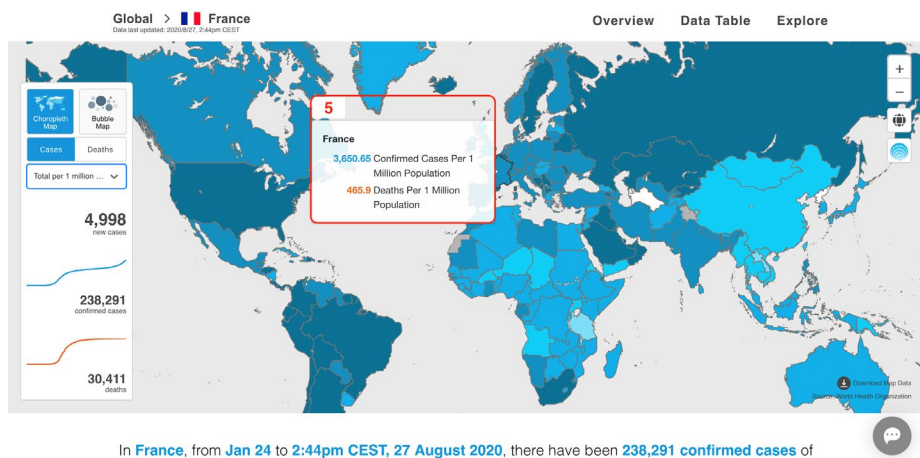
Users can change how the data is represented (i.e., visual encoding), in this case, from Choropleth Map to Bubble Map.



Interaction Technique: Abstract/Elaborate

Hover over:

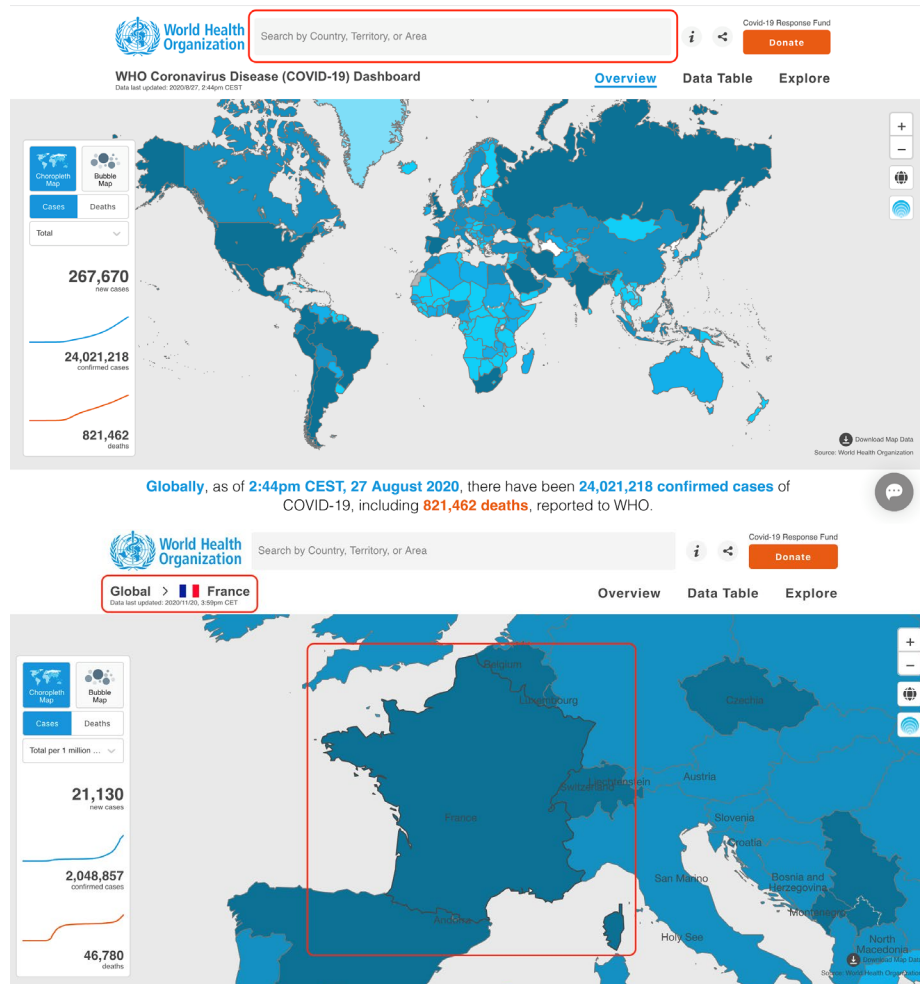
When users hover over the map, additional information about the hovered point shows up.



Interaction Technique: Filter

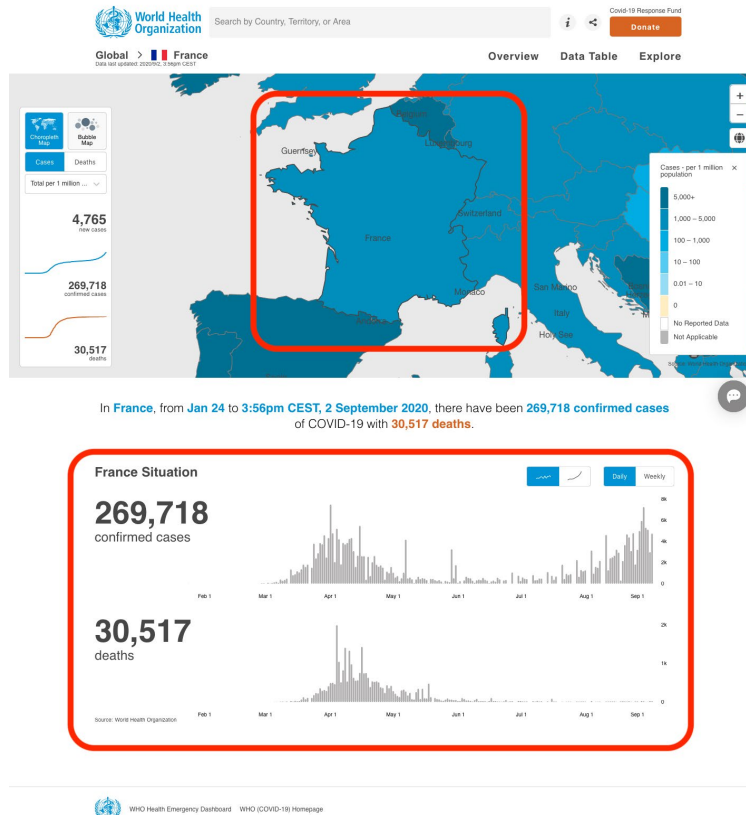
Search bar:

Users can focus on a specific country's data by searching the country, in this case France, and filtering out other irrelevant countries' data.



Interaction Technique: Connect

When users operate in one view, the other view that connects with it will change accordingly. In this case, the user highlights one country (e.g., French) in one view and the data shown in the other view will be updated accordingly.



B: WHO 2

Link: <https://covid19.who.int/>

Interaction Technique: Reconfigure

Attributes:

Users can change attributes visualized on the axes of a plot, in this case, from Cases to Deaths.



Interaction Technique: Encode

Switch between graph type:

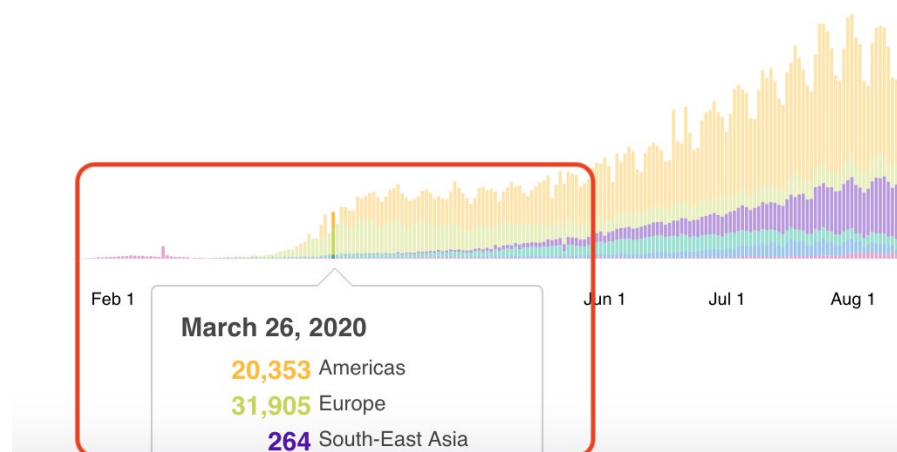
Users can change how the data is represented, in this case, from the Daily Change to Cumulative.



Interaction Technique: Abstract/Elaborate

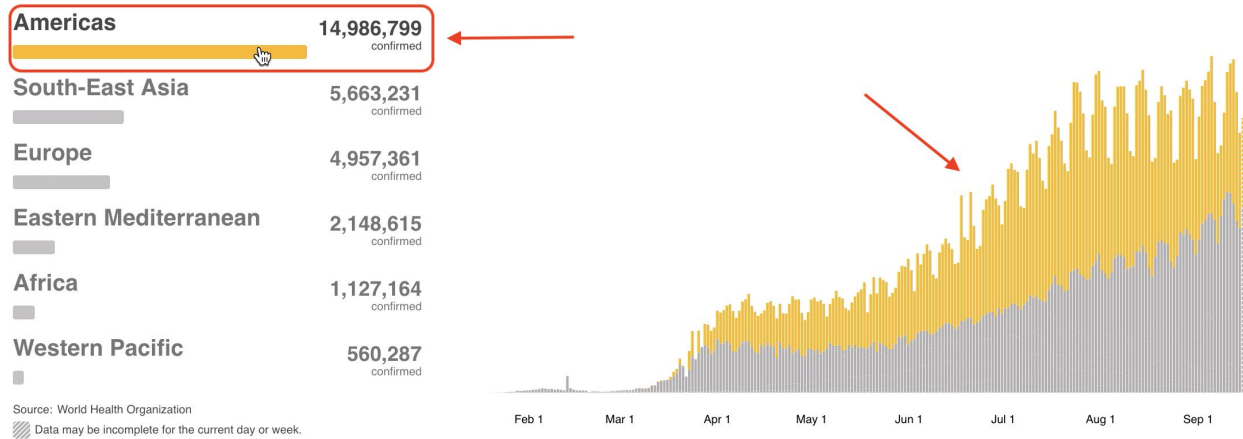
Hover over:

When users hover over the chart, the information about the region under the cursor shows up.



Interaction Technique: Connect

When users highlight any region on the left side, the corresponding points on the right side view are highlighted at the same time.



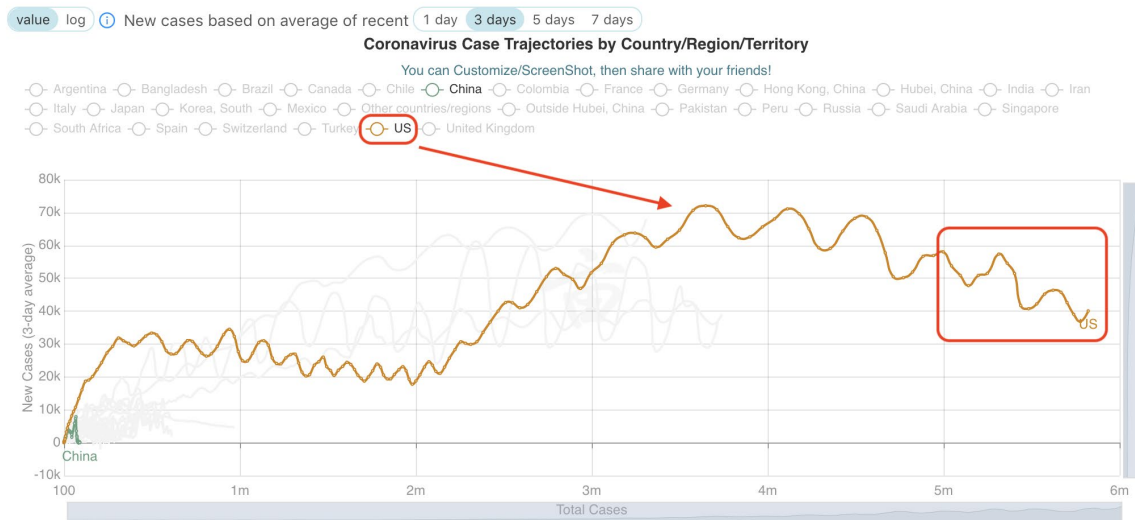
C: 1point3

Link: <https://coronavirus.1point3acres.com/>

Interaction Technique: Select

Select & Highlight:

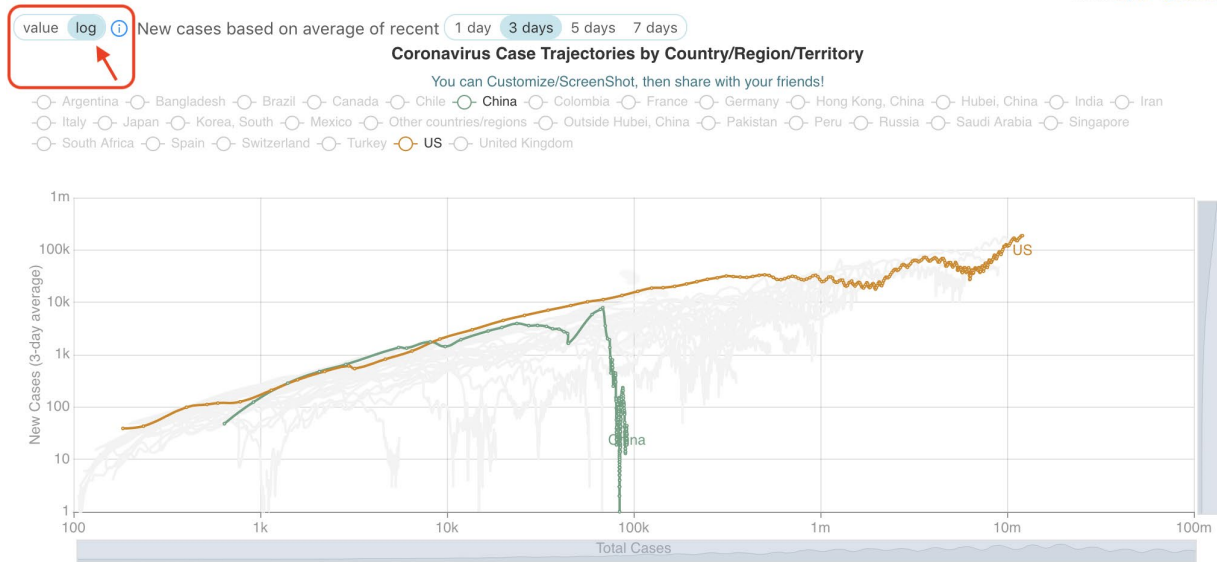
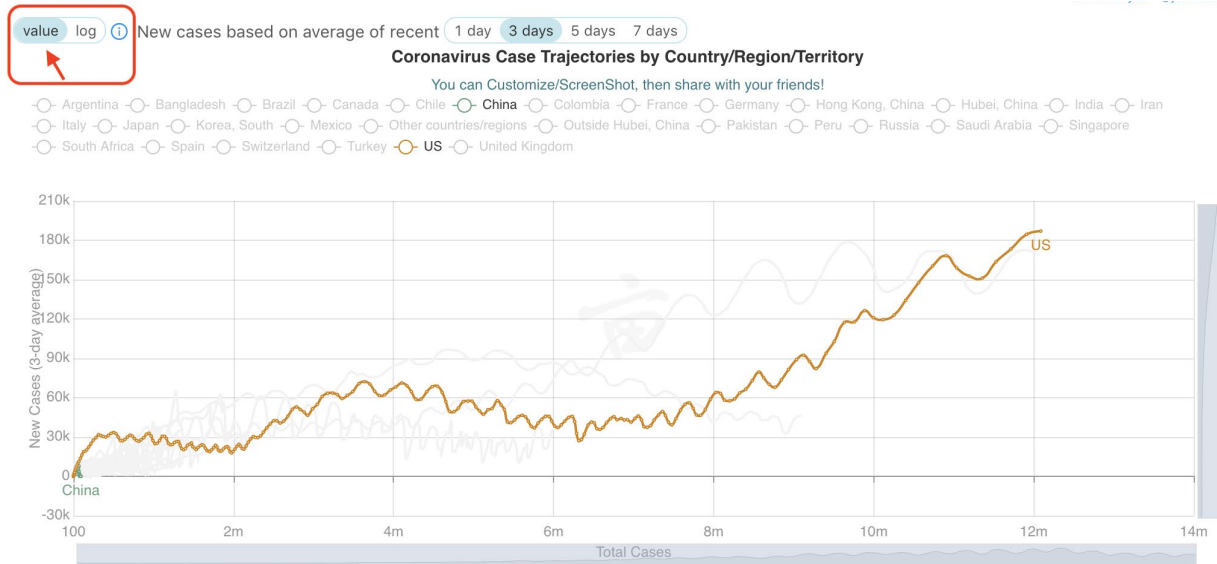
When users click any country's button, the trend of that country will be highlighted and stay highlighted even when users scroll the page.



Interaction Technique: Reconfigure

Attributes:

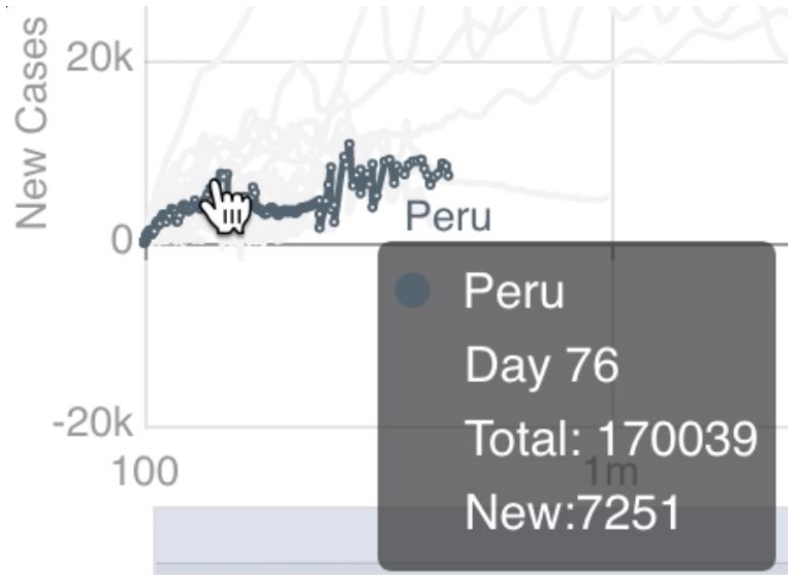
Users can change the line chart representation from linear scale to log scale by changing between “value” to “log”.



Interaction Technique: Abstract/Elaborate

Hover over:

When users hover over on a line, the information of the corresponding country shows up.



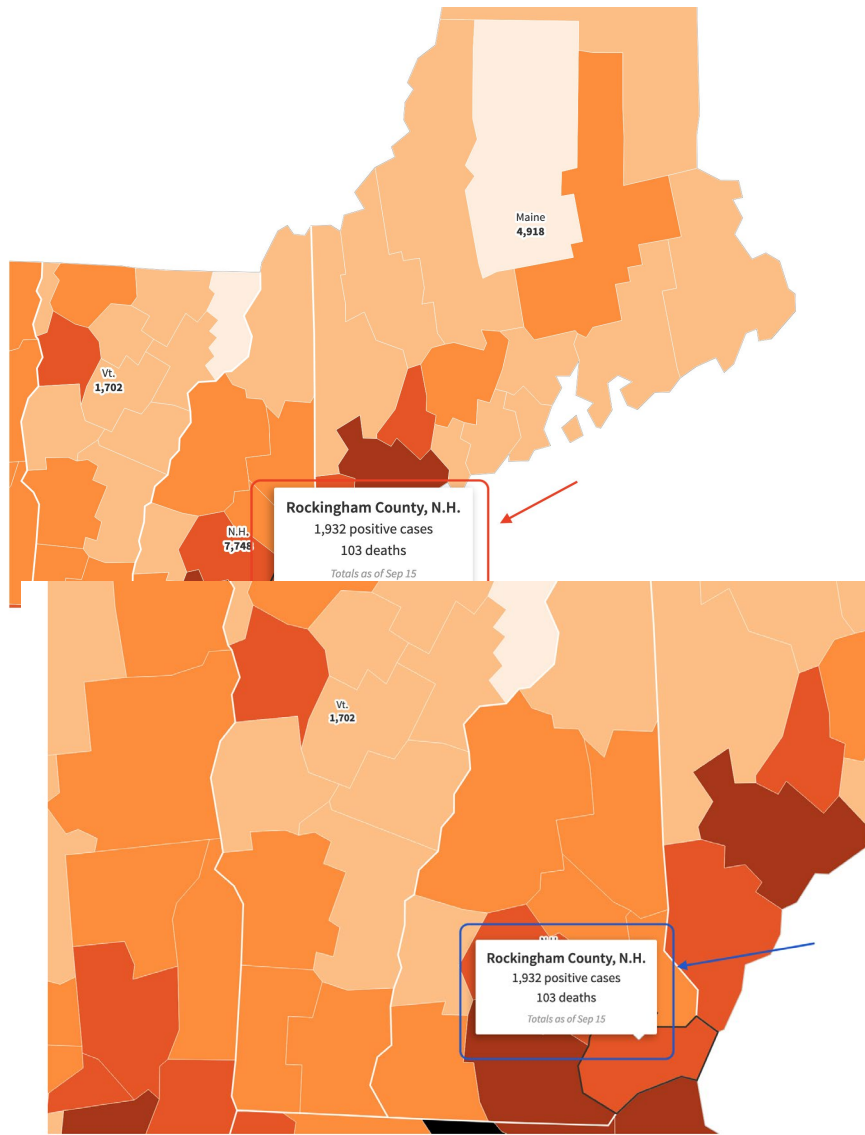
D: Reuters 1

Link: <https://graphics.reuters.com/HEALTH-CORONAVIRUS-USA/0100B5K8423/index.html>

Interaction Technique: Explore

Direct-walk technique:

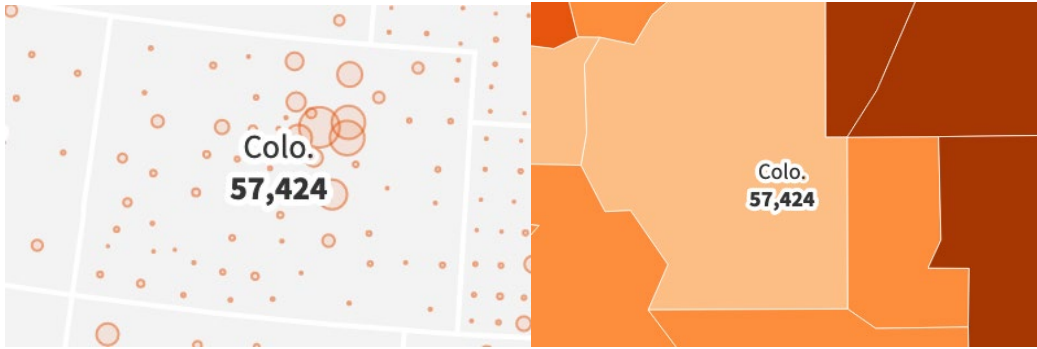
Direct-walk technique allows users to smoothly change the focus of the view. For example, when users click Rockingham county, the view will be zoomed in and position the county close to the center of the view.



Interaction Technique: Encode

Switch between graph type:

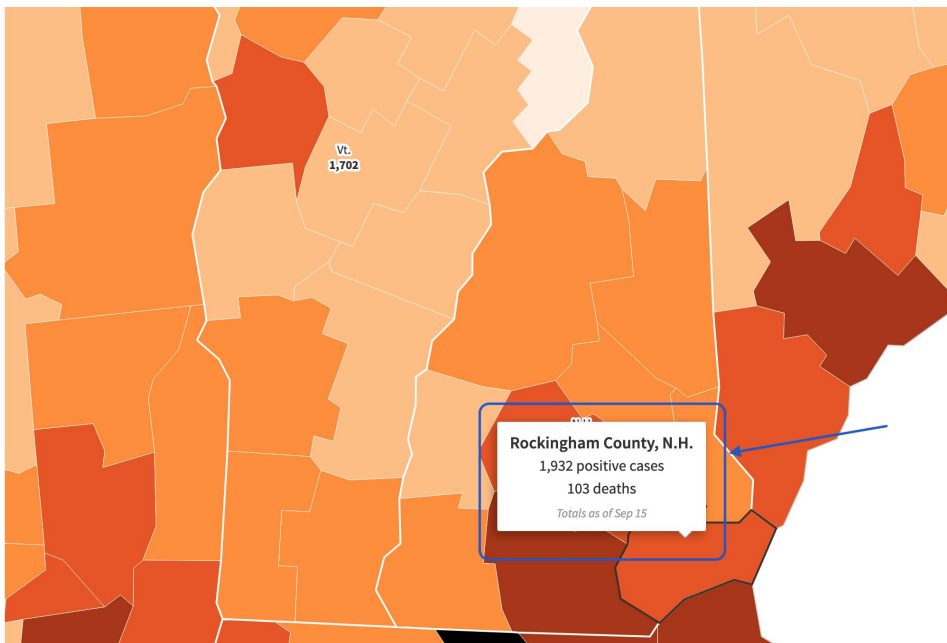
Users can change the visual encoding of the chart from the Bubble Map to Choropleth Map.



Interaction Technique: Abstract/Elaborate

Hover over:

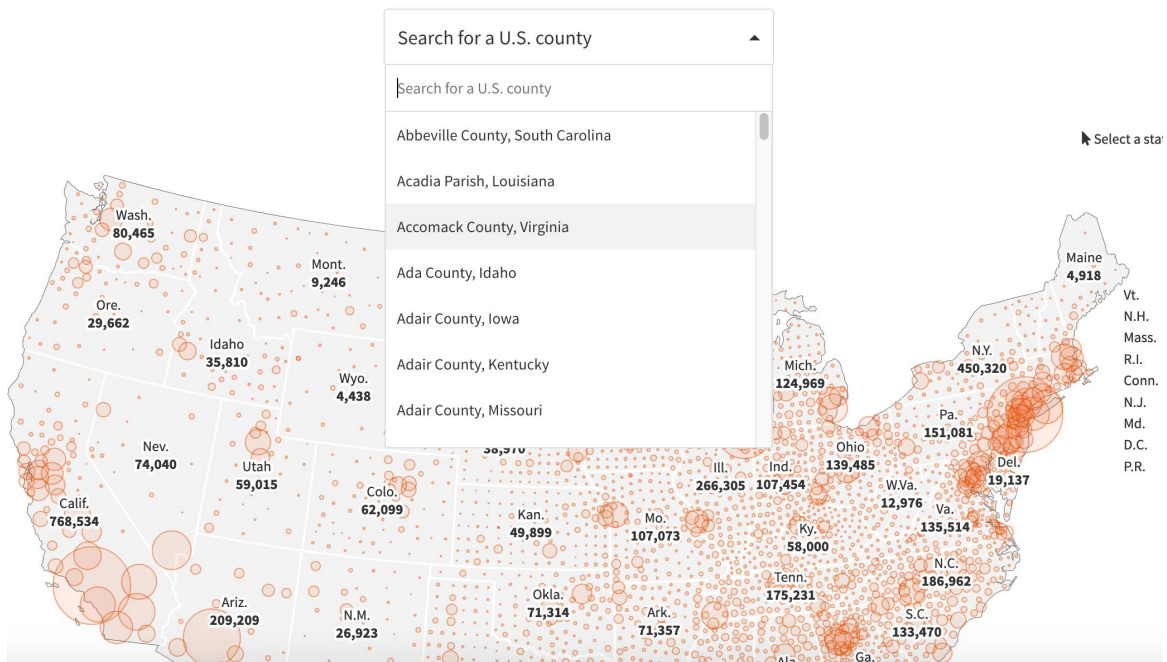
When users hover over a county, the information about that county shows up.



Interaction Technique: Filter

Search bar:

Users can filter out the unwanted information by searching for the US. county. Once they search and select a county, the map is updated based on the selected county's name.



E: Reuters 2

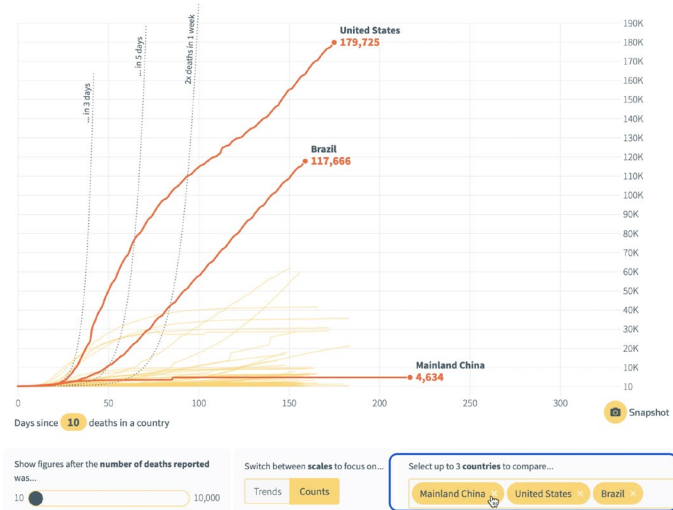
Link: <https://graphics.reuters.com/HEALTH-CORONAVIRUS/yxmvjookdpr/index.html>

Interaction Technique: Select

Select:

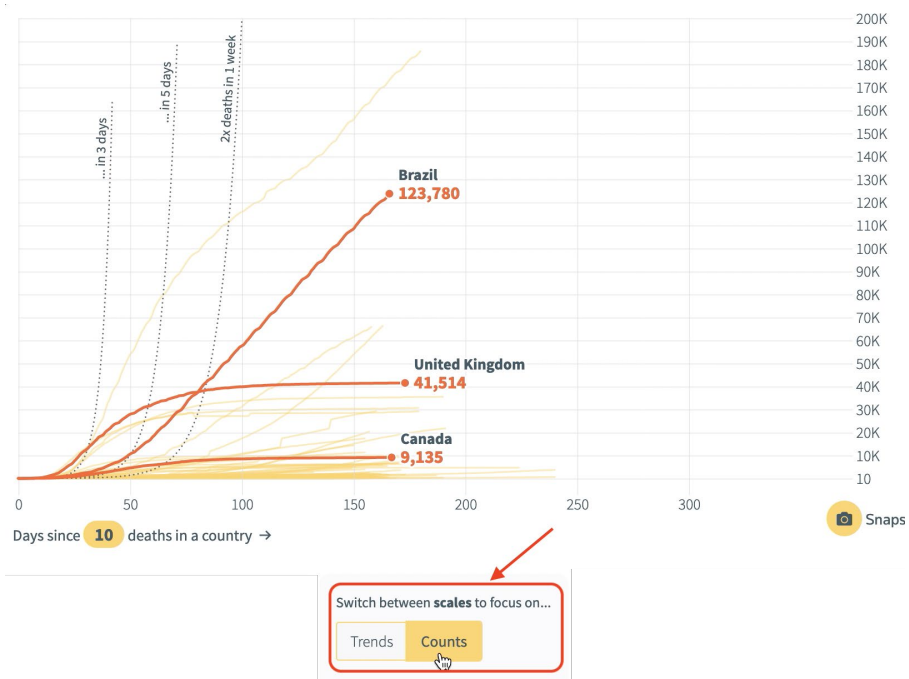
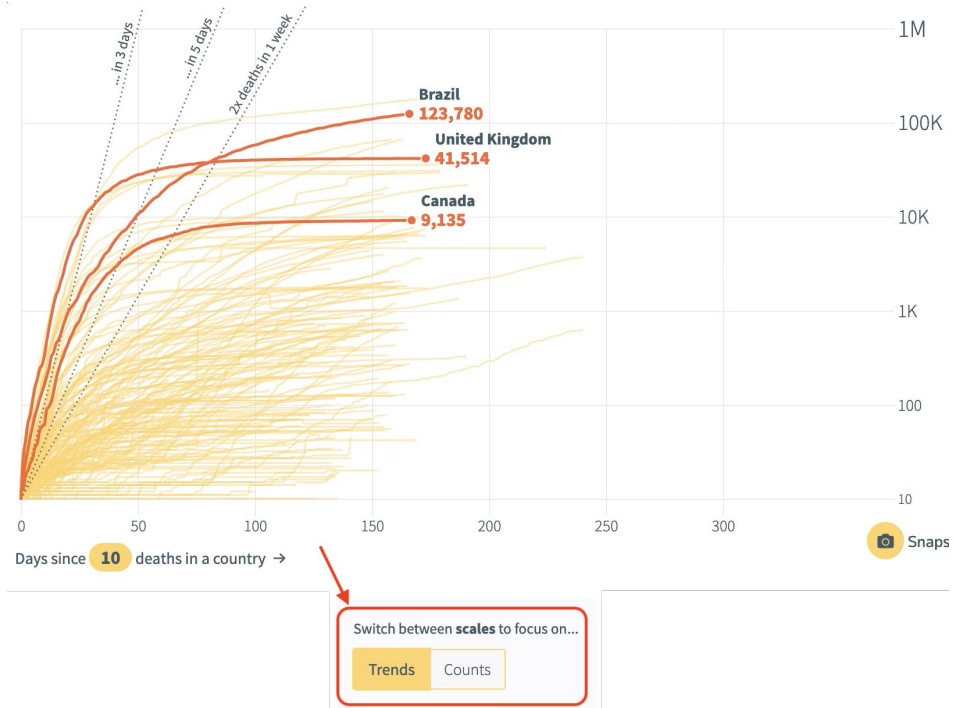
When users select a country, the line representing the country will be highlighted on the right side chart. The line will stay highlighted when users add more countries, which facilitates comparison.

- Afghanistan
 - Albania
 - Algeria
 - Andorra**
 - Angola
 - Argentina
 - Armenia
- Brazil × Canada ×



Interaction Technique: Reconfigure

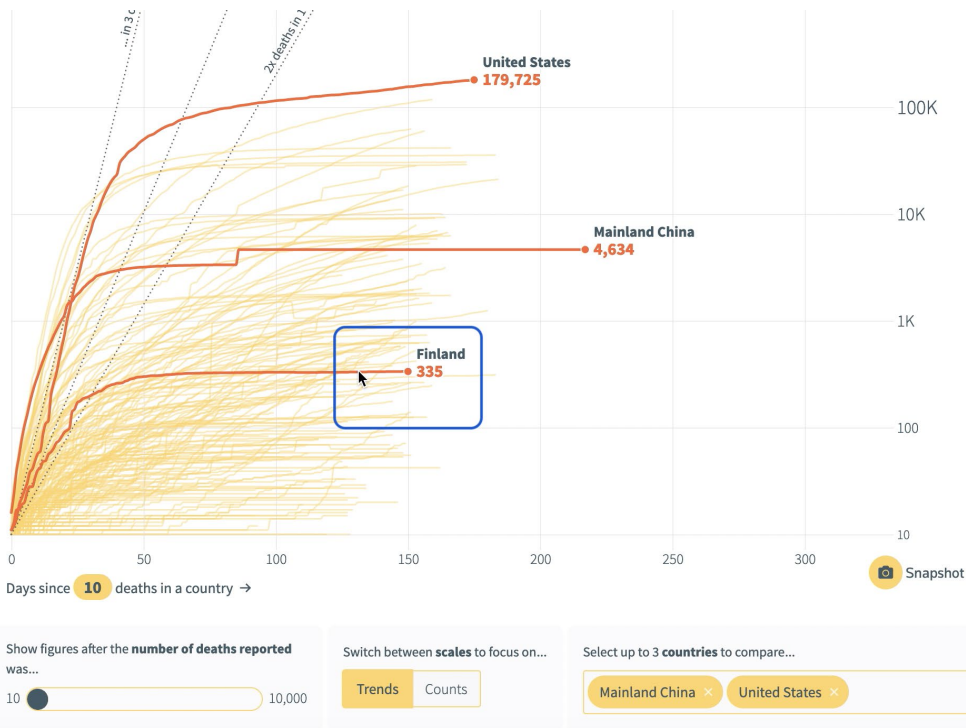
Users can reconfigure the map by changing the data shown on two axes, in this case, by changing from “Trends” to “Counts.”



Interaction Technique: Abstract/Elaborate

Hover over:

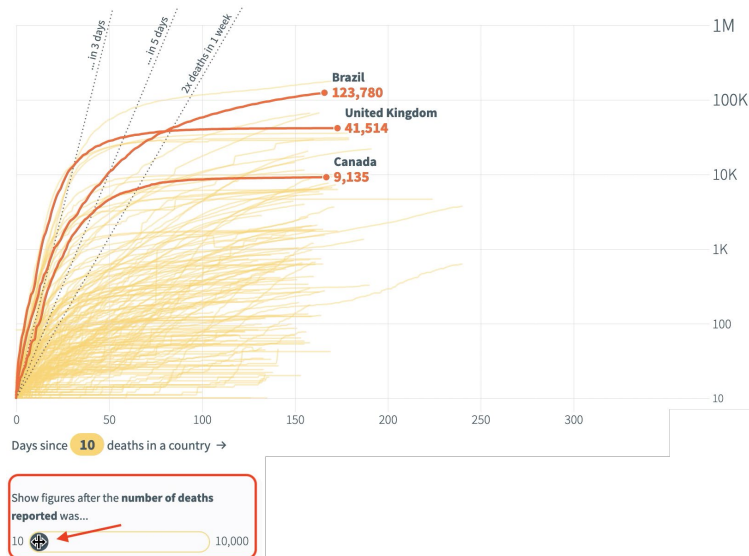
When users hover over a line, the information about the corresponding country shows up.

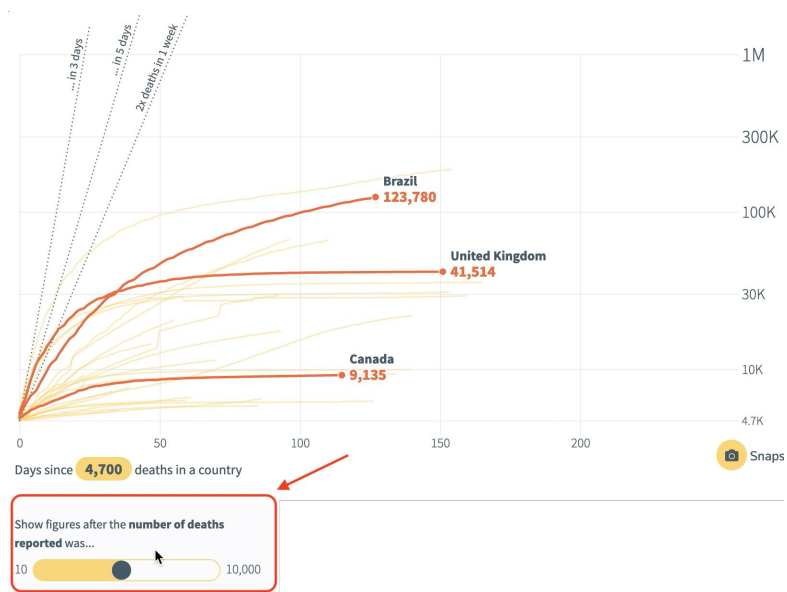


Interaction Technique: Filter

Scroll bar:

Filter can be realized via scroll bar as well. When users scroll the horizontal bar representing the number of deaths reported, the lines shown in the chart are updated based on the range shown on the bar.





Reference

[1] Ji Soo Yi, Youn ah Kang, John Stasko, and Julie A Jacko. 2007. Toward a deeper understanding of the role of interaction in information visualization. *IEEE transactions on visualization and computer graphics* 13, 6 (2007), 1224–1231.