

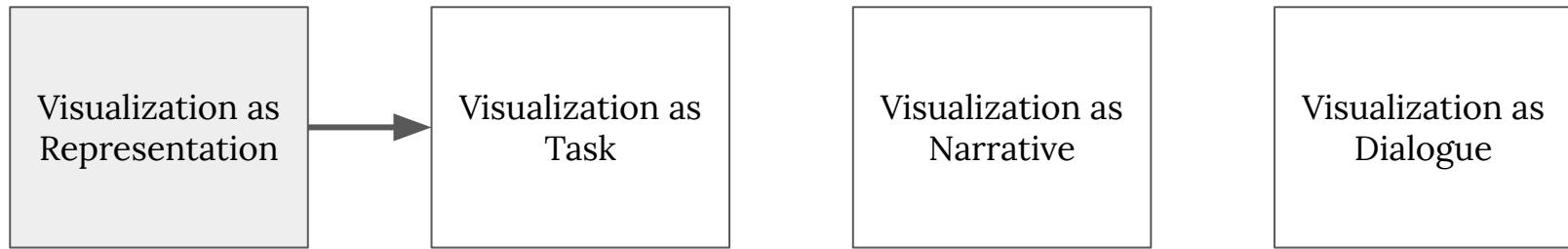
New Languages Complex Types

A Samuel Pottinger

Stat 198: IDSV

Mar 10, 2025

Context Setting



Today

> **Charts without names:** Using dimensions, measures, and encodings to read a graphic.

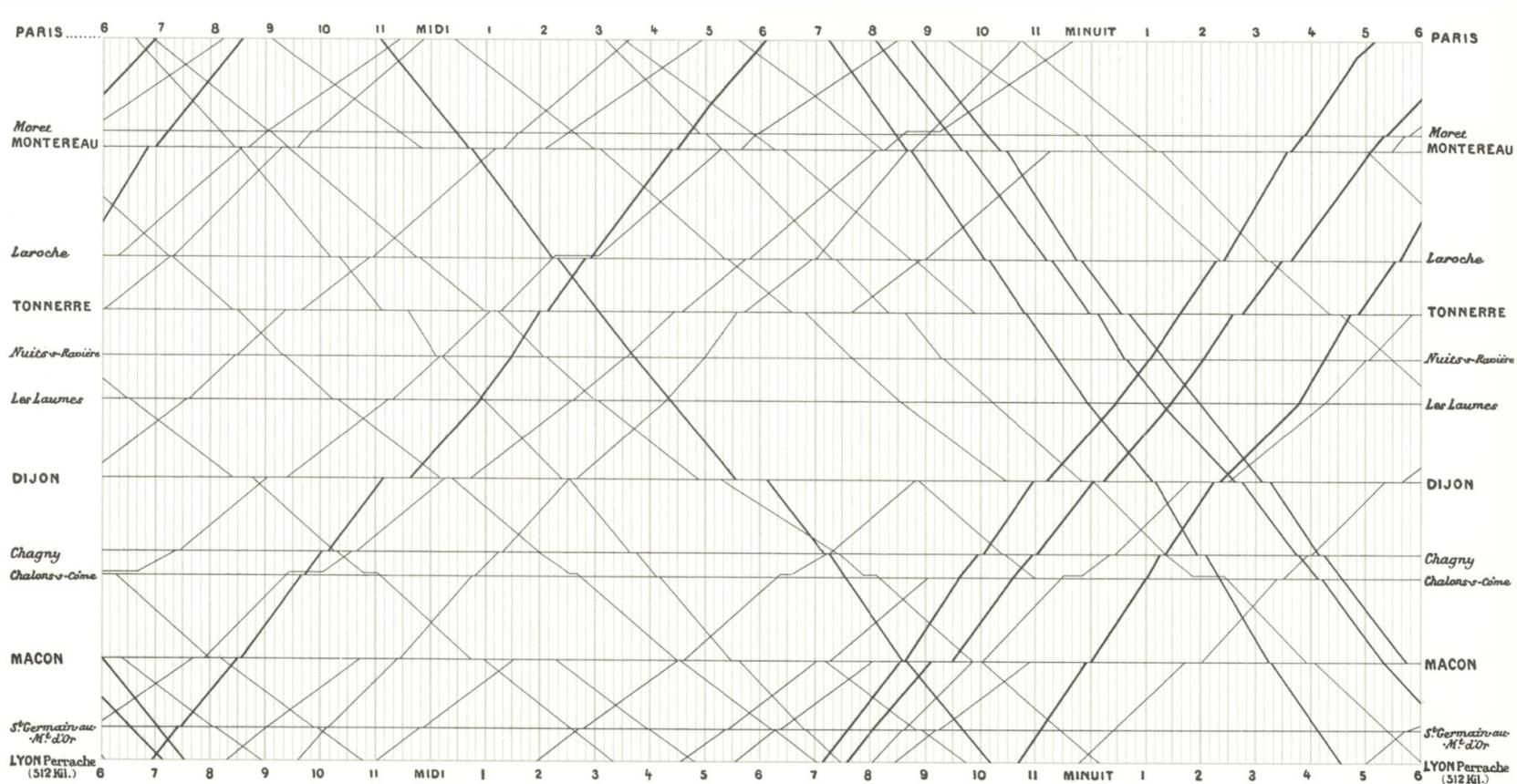
More tips for complexity: Movements and levels

Group activity: Homework 11 in class!

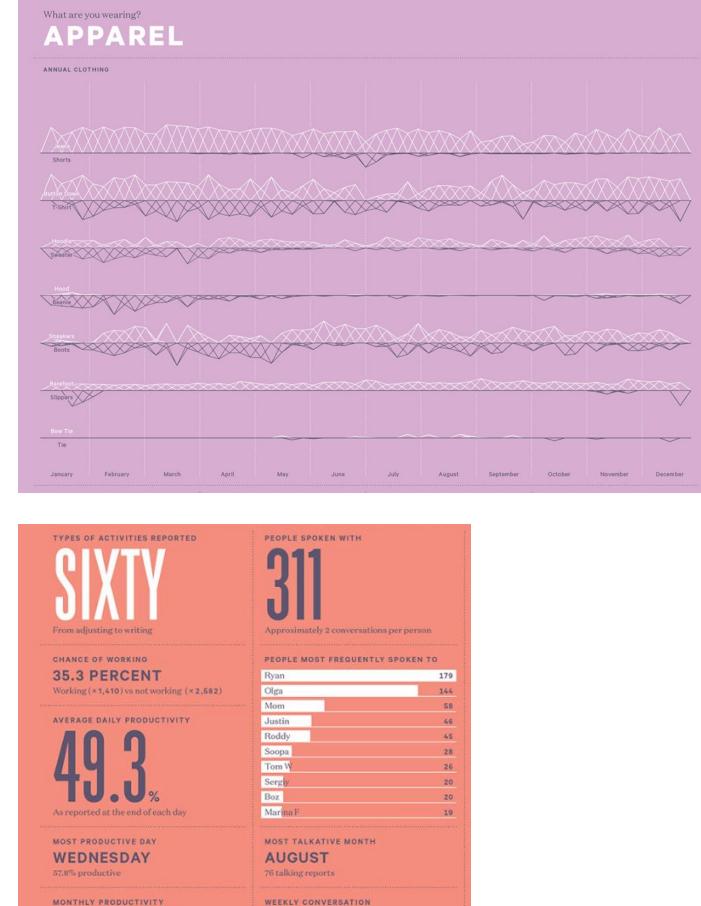
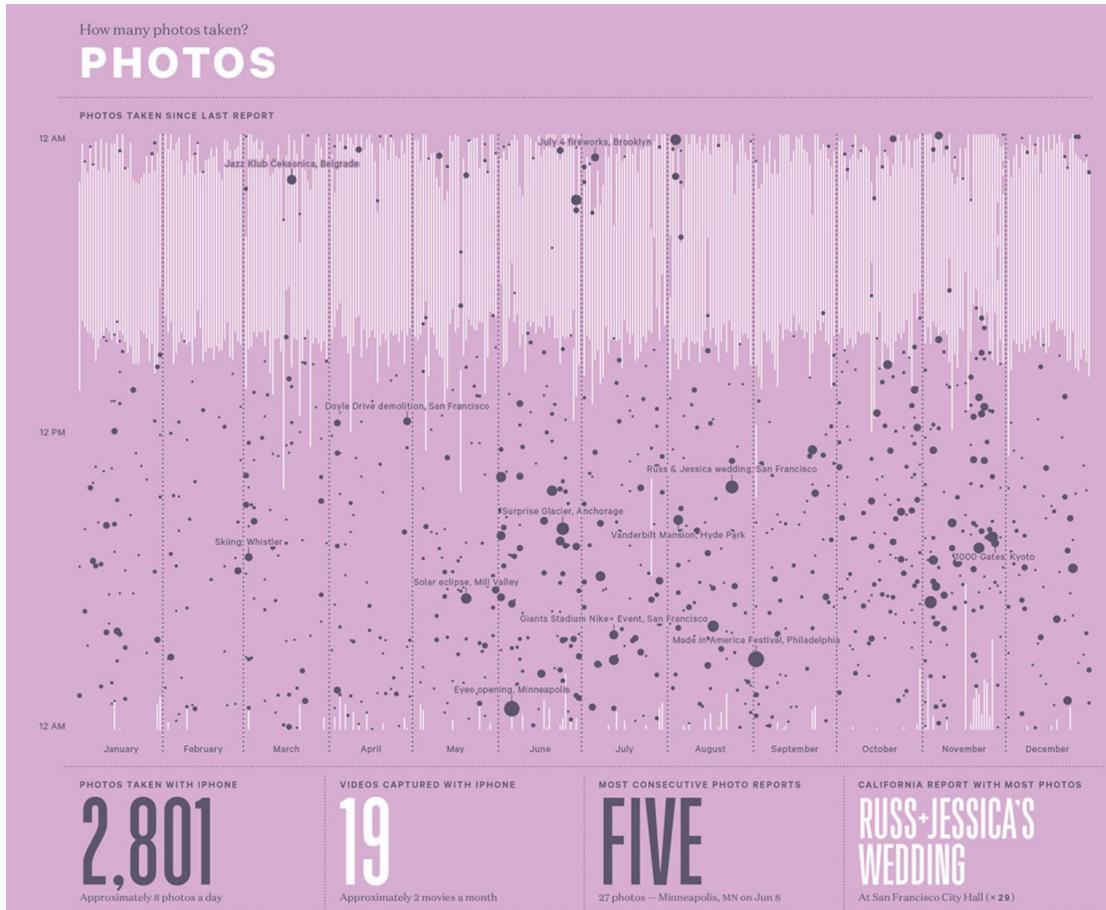
Complex data: what non-CSV data inputs might look like.

Advice for maps: using the first perspective to navigate maps.

Charts without names - Marey



Charts without names - Felton



Charts without names - Minard

Carte Figurative des pertes successives en hommes de l'Armée Française dans la Campagne de Russie 1812-1813.

Drawn by M. Minard, Inspecteur Général des Ponts et Chaussées en retraite.

Paris, le 20 Novembre 1869

Les nombres d'hommes présents sont représentés par les largures des zones colorées à raison d'un millimètre pour dix-mille hommes; ils sont de plus écrits en lettres dans les zones. Le rouge désigne les hommes qui restent en Russie, le noir ceux qui en sortent. — Les conséquences qui ont suivi à dresser la carte me déplaisent dans les œuvres de M.-M. Chiers, de Legut, de Tercandac, de Chambry ou du journal intitulé de Jacob, pharmacien de l'Armée depuis le 28 Octobre.

Pour mieux faire juger à l'œil l'annihilation de l'armée, j'ai supposé que les corps de l'Empereur et du Maréchal Davout qui avaient été détachés sur Moscou au Mobilis et son régime avec Orléans et Württemberg marchaient avec l'armée.

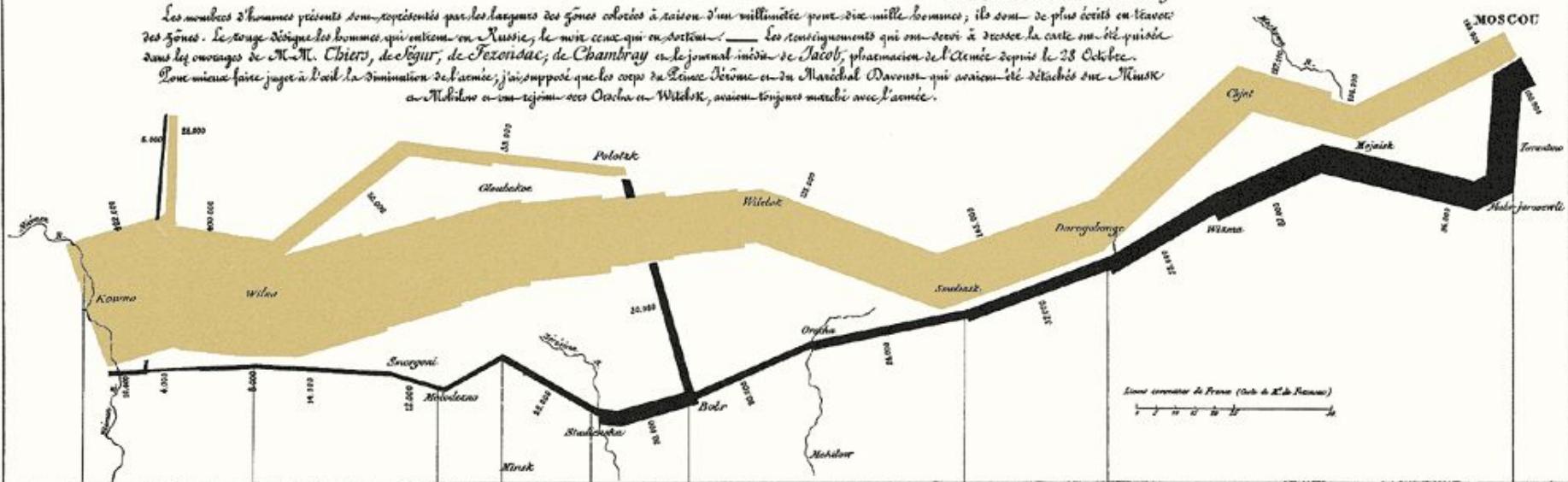


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les Cosaques passent au gelé
le Nizhniy gelé.

-26° le 7 X.^{me}
-30° le 6 X.^{me}

-24° le 1^{er} X.^{me}

-20° le 28 D.^{me}

-11°

-21° le 14 D.^{me}

-8° le 9 D.^{me}

-4° le 8 D.^{me}

2 degrés

10

15

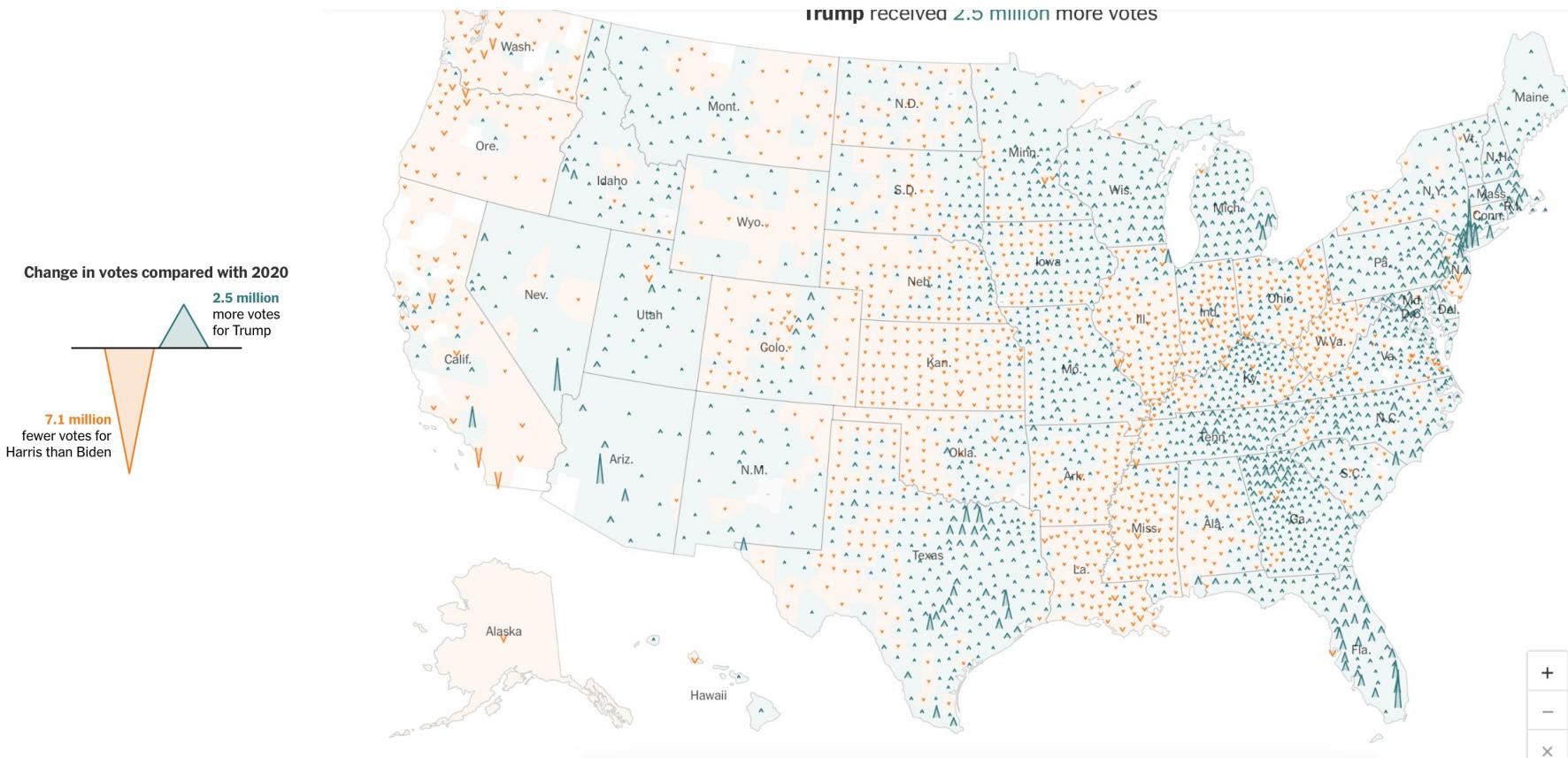
20

25

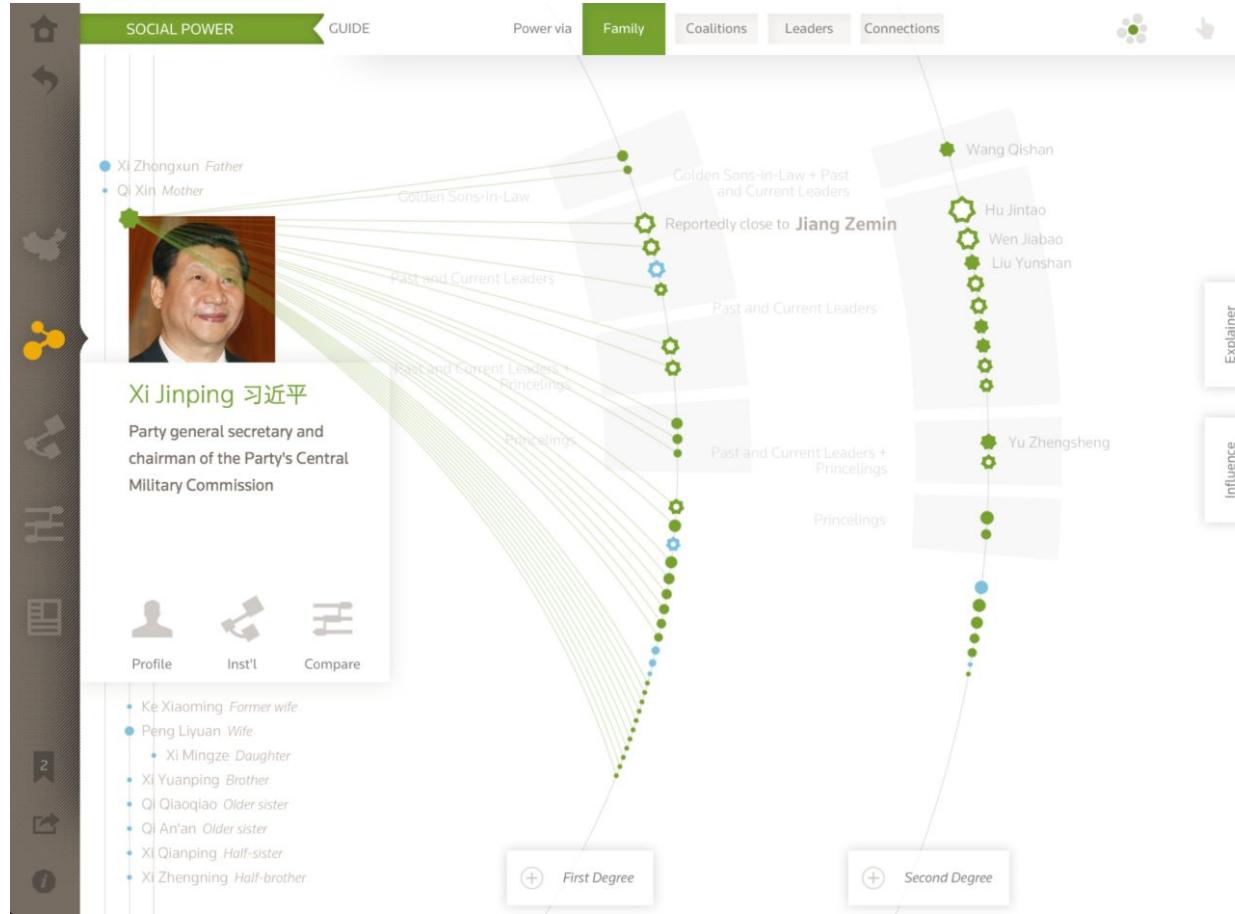
30

35 degrés

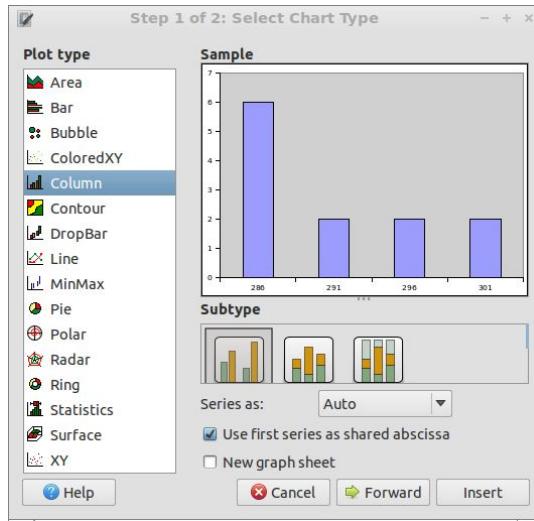
Charts without names - NYT



Charts without names - Fathom



Charts without names



Instead of thinking in chart names, think in encodings.

What are the dimensions and measures?

How can I map those to encoding devices?

Today

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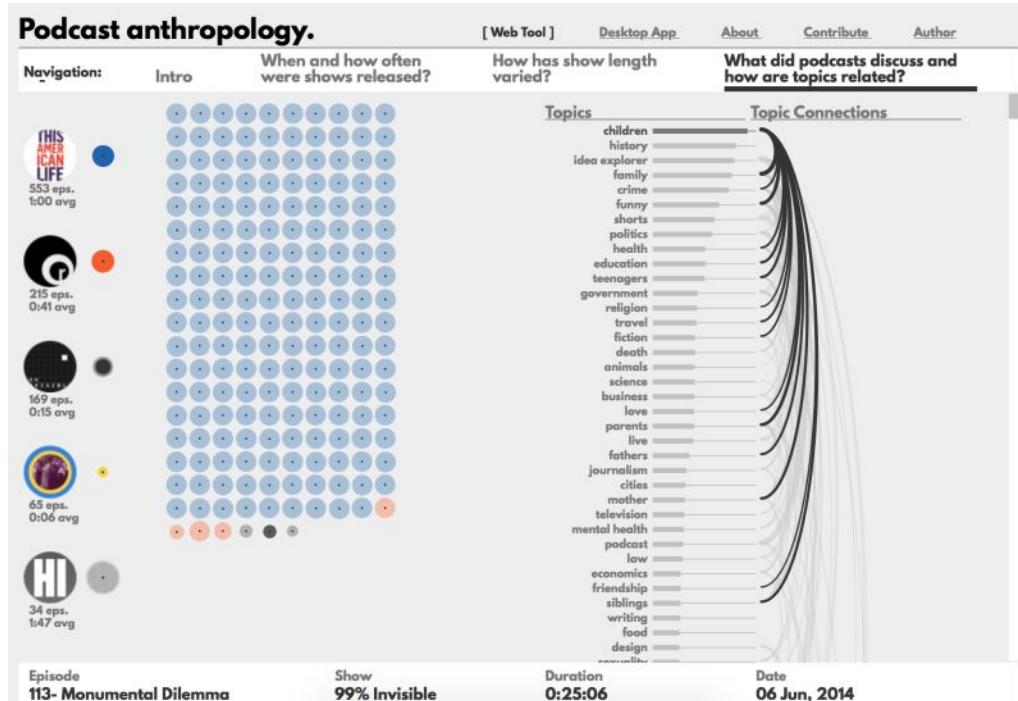
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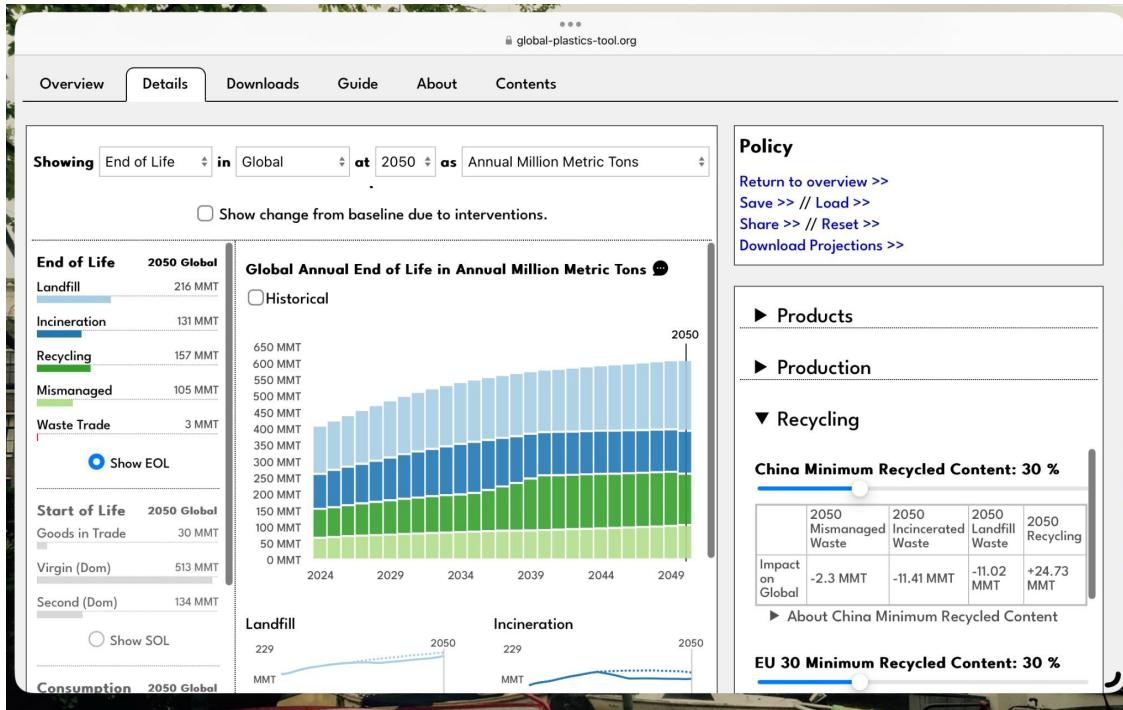
Advice for maps: using the first perspective to navigate maps.

Movements



Podcast Anthropology

Levels



Global Plastics Tool

Two new tools

Movements: Reuse visual motifs or graphical representations across multiple plots to create a story between them. ([Jonathan Harris](#))

Levels: Start with very simple graphics but, as the user spends more time interacting, add in more sophistication ([Ben Fry](#))

Today

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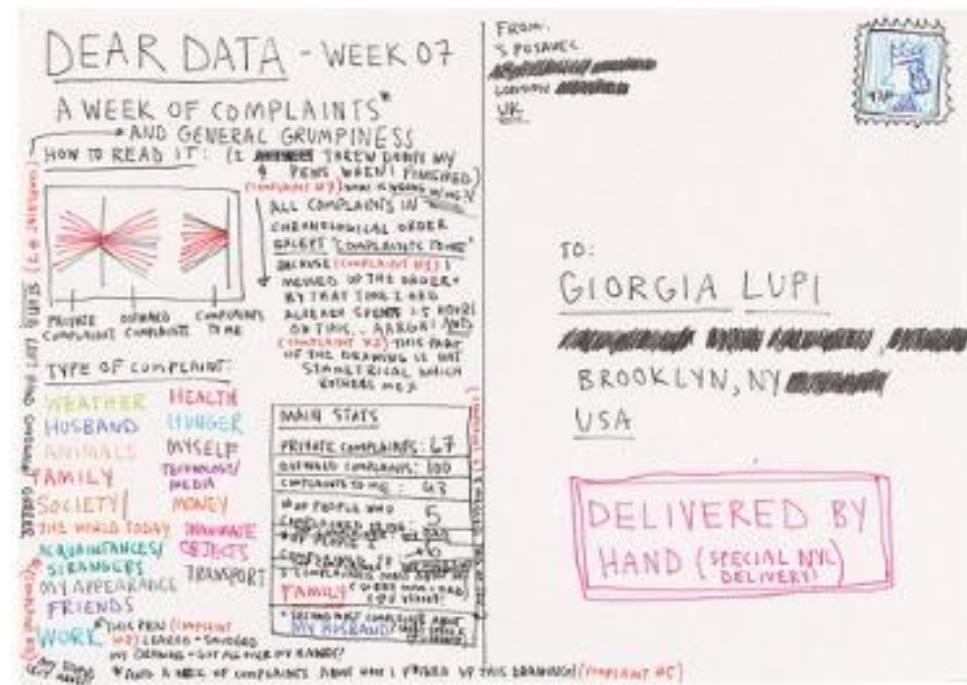
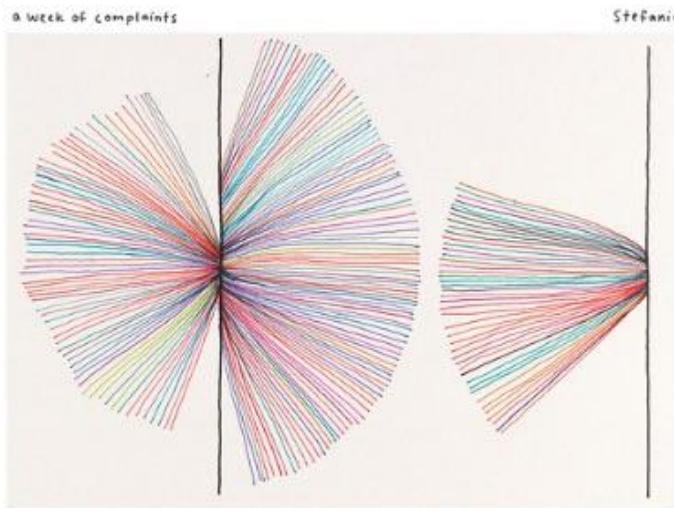
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Dear Data

Draw (by hand with a pen, no code) your last five years and your next five years.



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Text formats

CSV

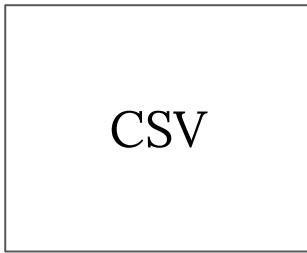
JSON

YAML

GeoJSON

We will do some work with GeoJSON

Name	Age	Friends
John Doe	25	Jane Doe, Jack Smith
Jane Doe	27	John Doe, Mary Sue



CSV

We will do some work with GeoJSON

JSON

```
{  
  "people": [  
    {  
      "age" : 25,  
      "name": "John Doe",  
      "friends": ["Jane Doe", "Jack Smith"]  
    },  
    {  
      "age" : 27,  
      "name": "Jane Doe",  
      "friends": ["John Doe", "Mary Sue"]  
    }  
  ]  
}
```

We will do some work with GeoJSON

GeoJSON

The screenshot shows the geojson.io interface. On the left is a map of California with various geographical features like roads, rivers, and national parks. A red rectangular selection box highlights the San Francisco Bay Area. On the right is a code editor displaying a portion of a GeoJSON file. The JSON structure is as follows:

```
1 ▾ {  
2   "type": "FeatureCollection",  
3   "features": [  
4     {  
5       "type": "Feature",  
6       "properties": {},  
7       "geometry": {  
8         "coordinates": [  
9           [  
10            [-121.84792412763511,  
11              37.24061239054306  
12            ],  
13            [-121.84792412763511,  
14              38.03923070198135  
15            ],  
16            [-122.9465902436149,  
17              38.03923070198135  
18            ],  
19            [-122.9465902436149,  
20              37.24061239054306  
21            ],  
22            [-122.9465902436149,  
23              37.24061239054306  
24            ]  
25          ]  
26        }  
27      }  
28    ]  
29  }  
30 }  
31 }
```

Mapbox, OSM

Binary formats

Protobuf

Avro

Arrow

Geotiff

Geobuf

GeoArrow

COG

Today

Charts without names: Using dimensions, measures, and encodings to read a graphic.

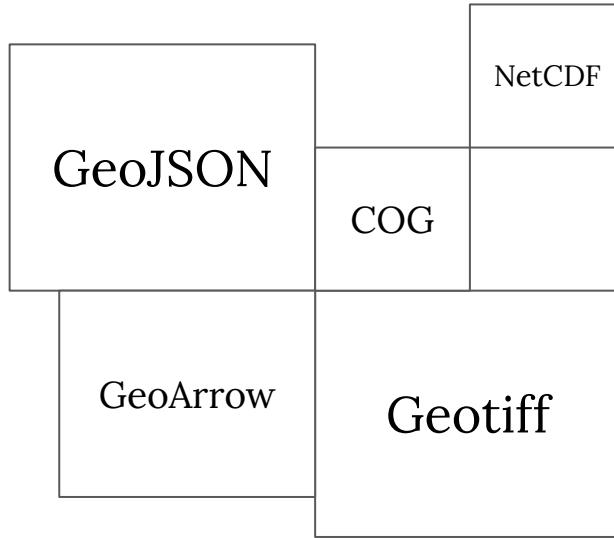
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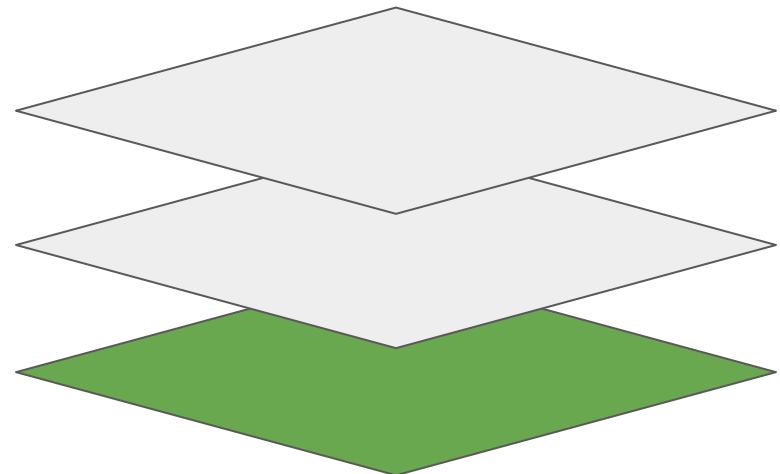
> **Advice for maps:** using the first perspective to navigate maps.

What makes maps hard - technically

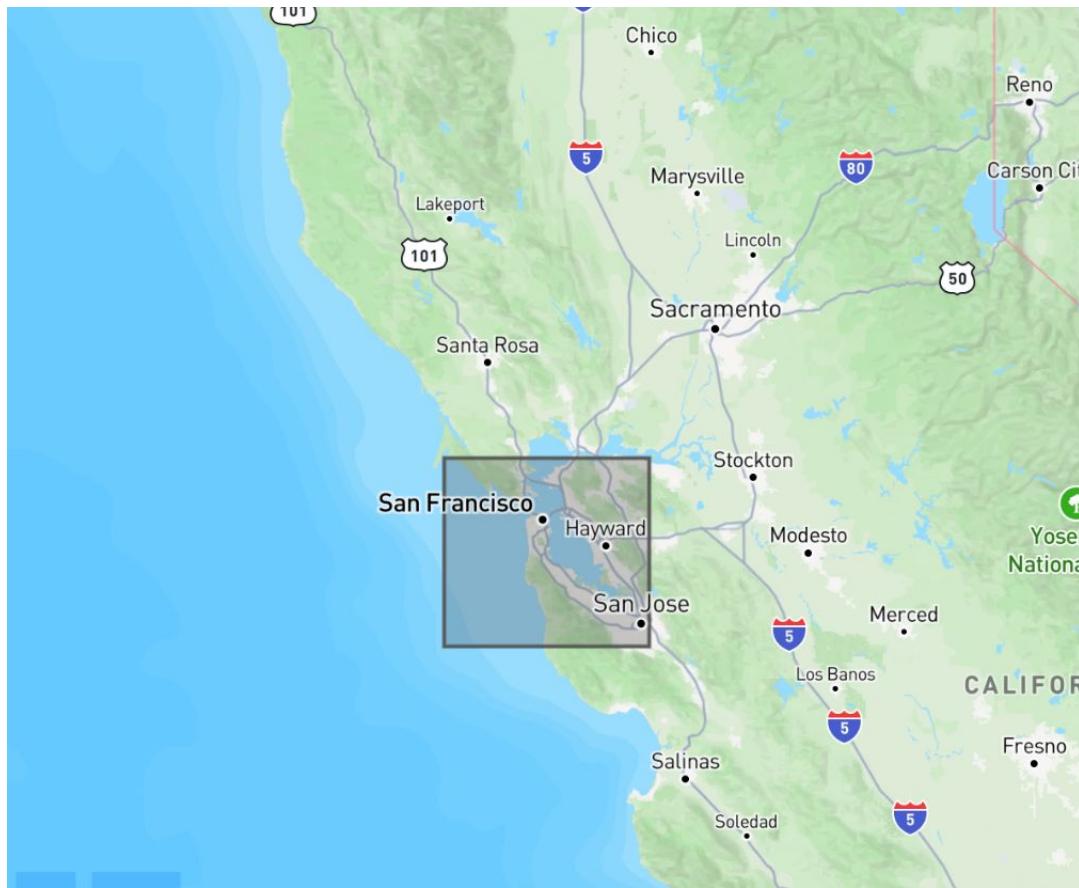


It is not uncommon to encounter geospatial datasets in the many gigabytes lots of formats

The “basemap” is also often very large.



What makes maps hard - from design

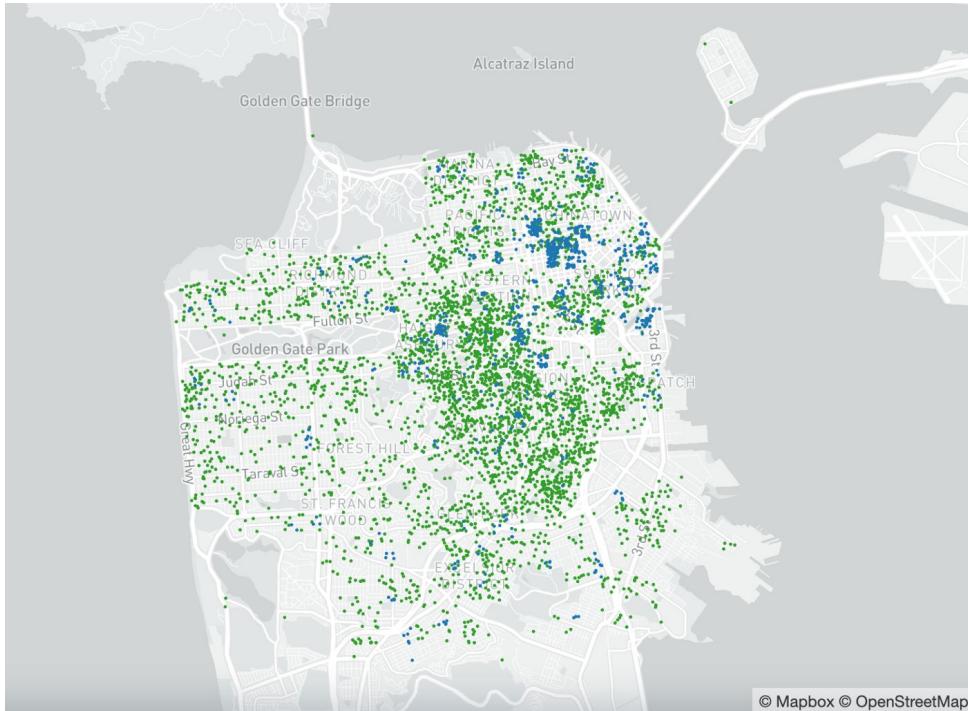


Mapbox, OSM

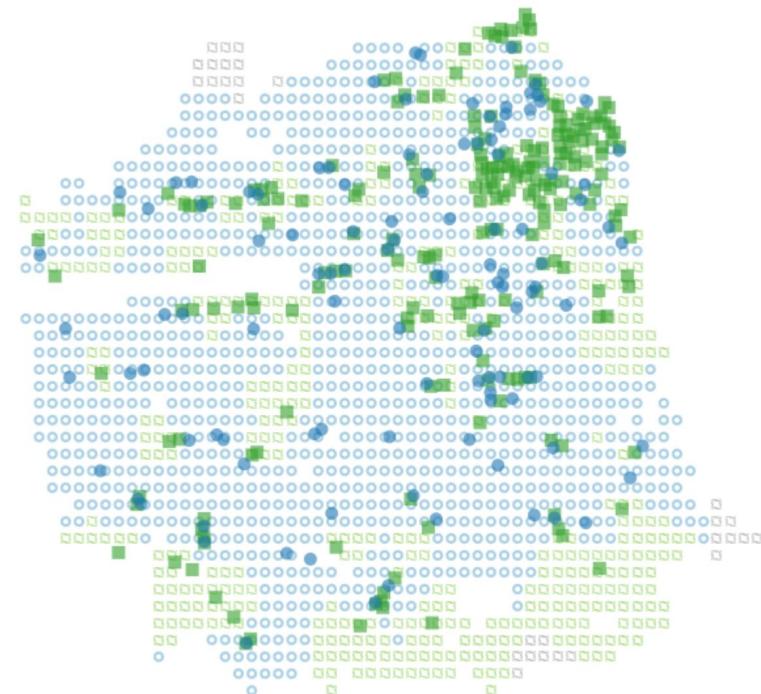
You almost always lose your best encoding device right away to vertical and horizontal position in space.

The basemap itself often includes substantial visual elements that can occlude the glyphs on top.

Applying our advice - preattentive features



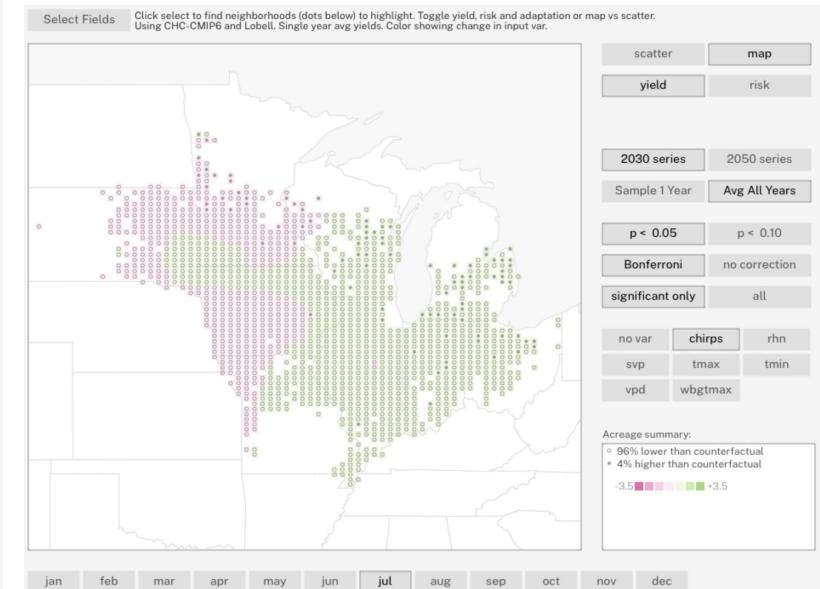
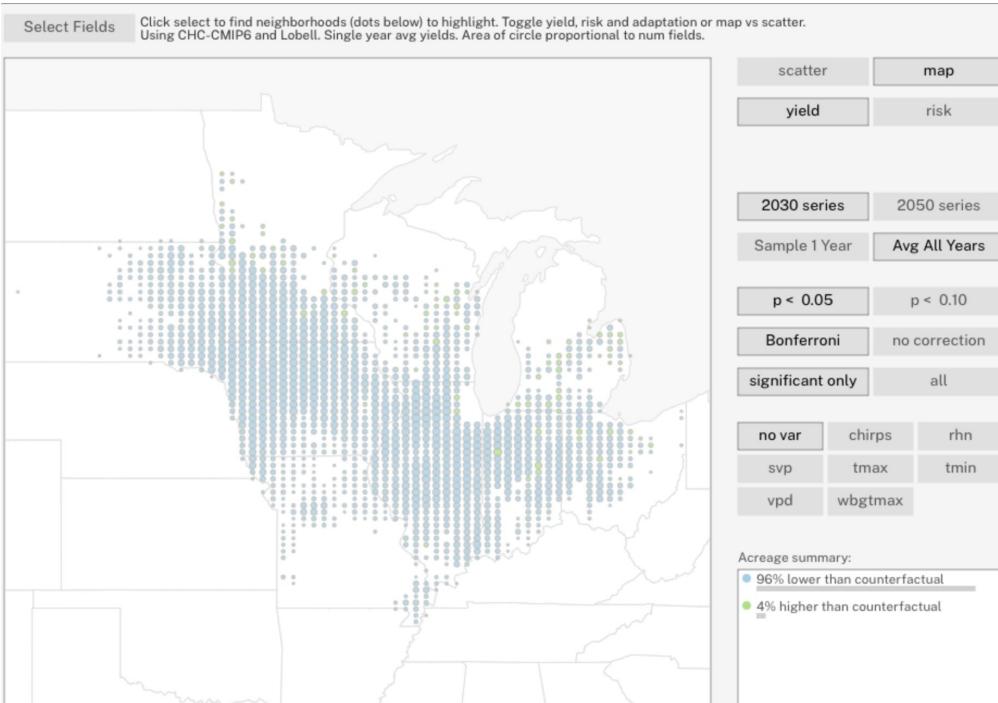
Keep a focus on things that will pop: shape, form, color.



Applying our advice - valuable encoding devices

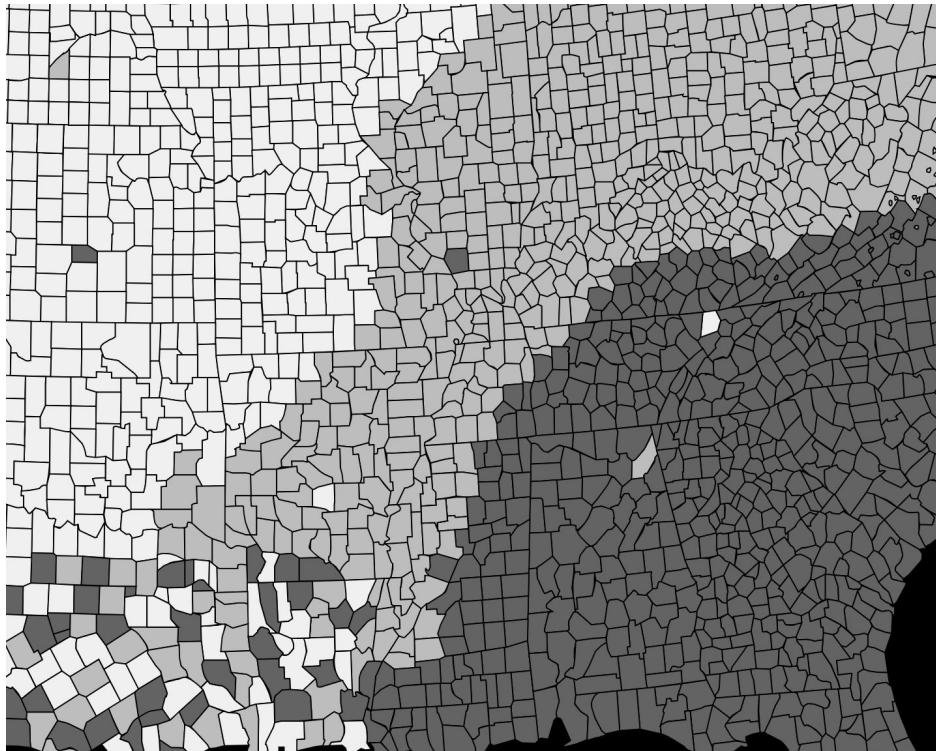
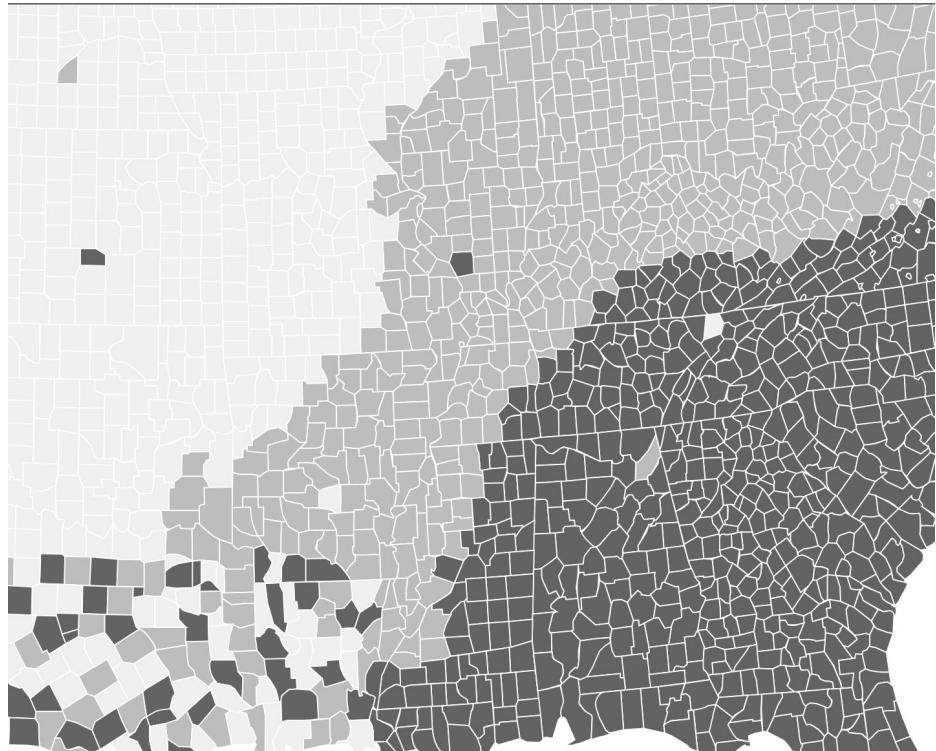
Consider area for depicting small details

Consider color for things where there are very large differences.

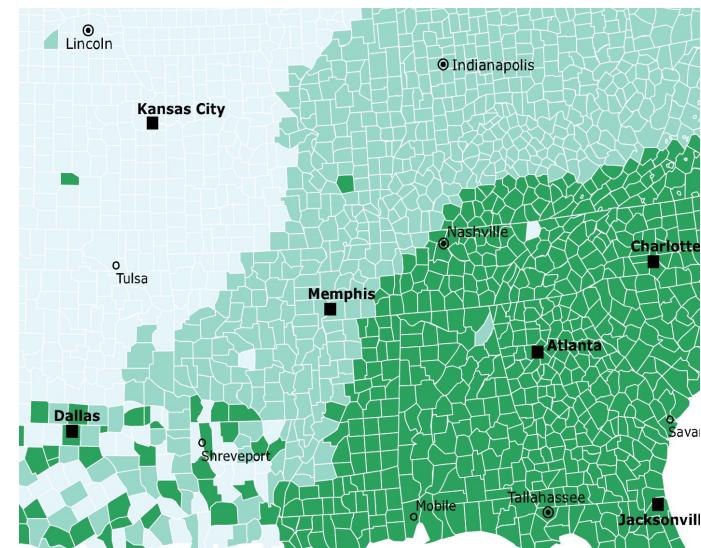
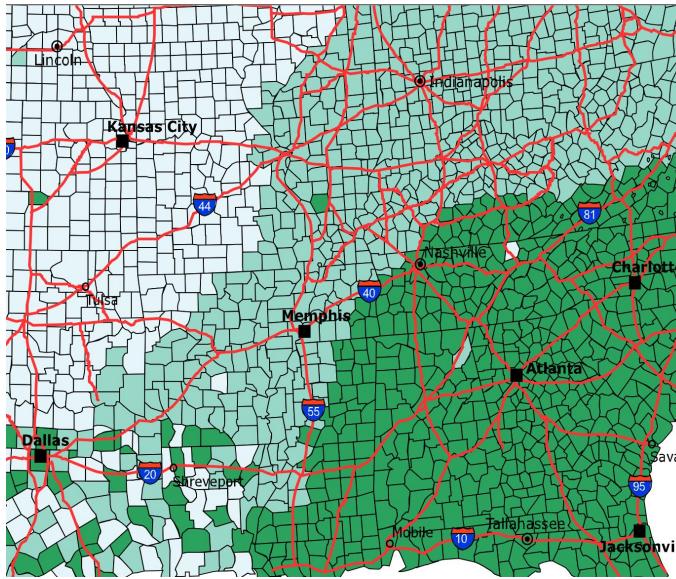
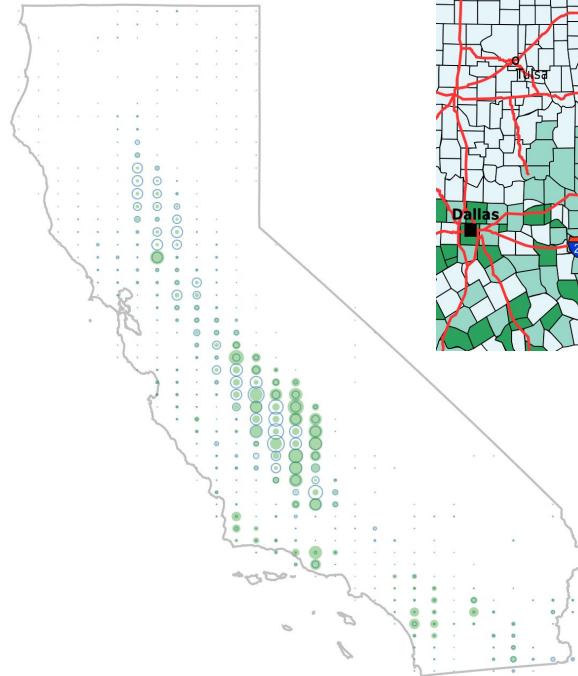


Applying our advice - quantitative color scales

Focus on contrast against background to create strong figure / ground.



Applying our advice - keep channels clear



Applying our advice - focus on the user

Teaser for the next lecture -

If we narrow our focus by understanding the user and their tasks, maybe not all of the data are relevant?

Other complex data: networks

There's more advice on networks. See the reading!

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