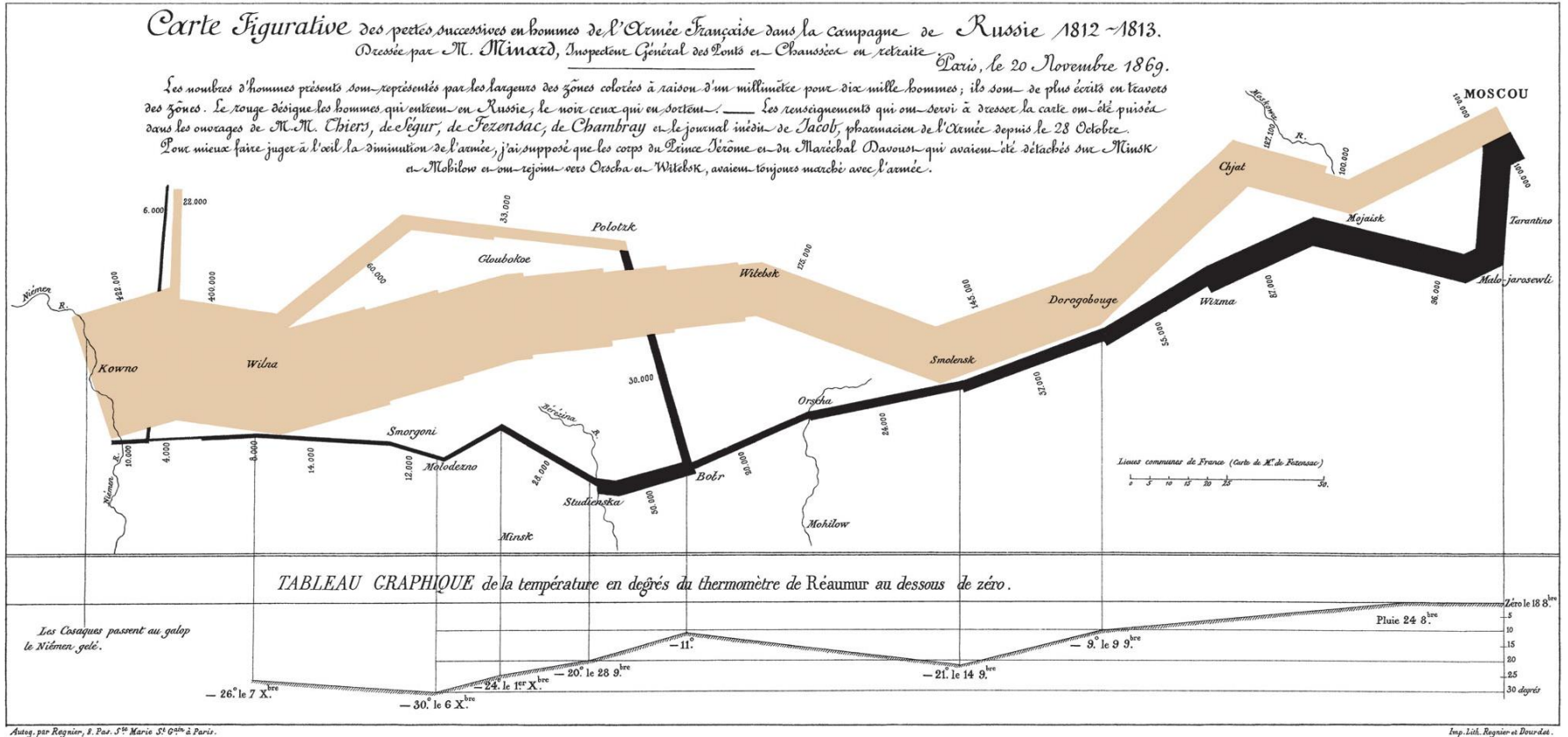


# Data Visualization



# What makes for good DataViz?

*Carte Figurative* des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.  
Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui ont été en Russie, le noir ceux qui en sont sortis. Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M.M. Chiers, de Légué, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre. Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Jérôme et du Maréchal Davout qui avaient été détachés sur Minsk et Mohilow et qui rejoindront vers Orscha et Witebsk, avaient toujours marché avec l'armée.

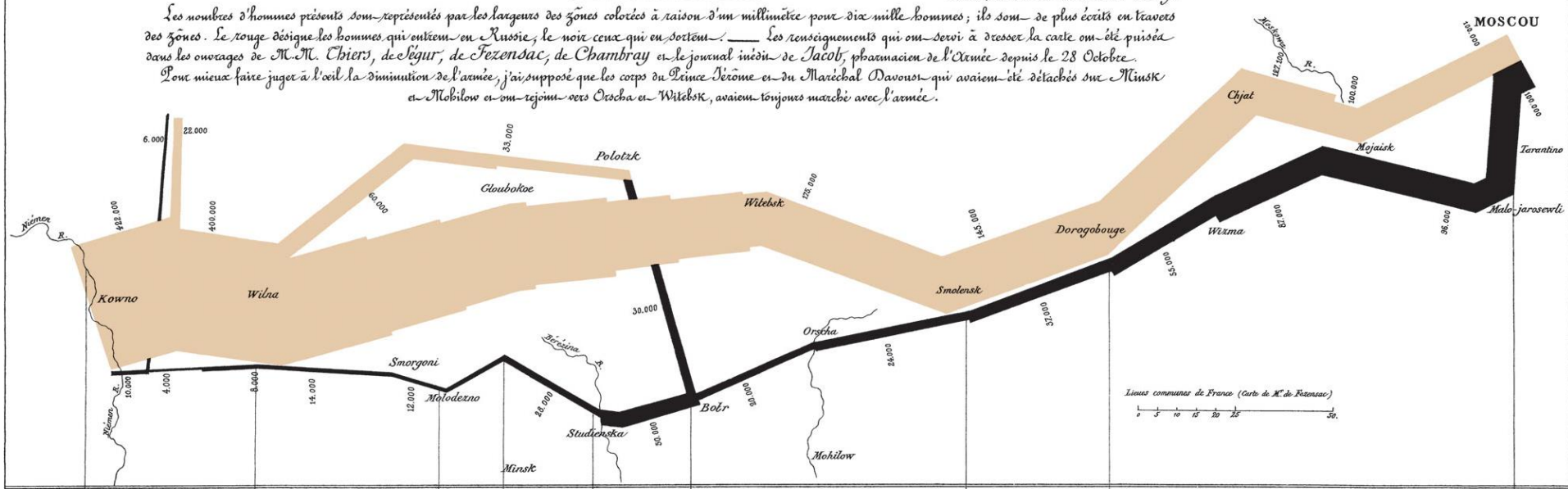
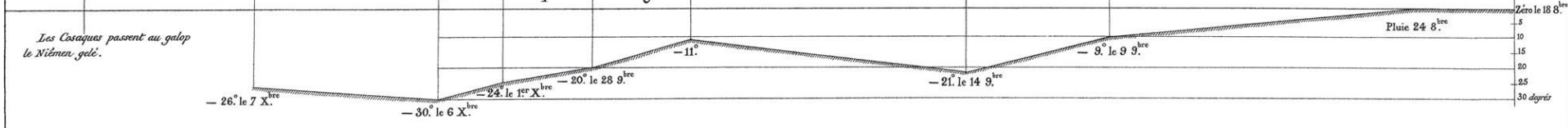


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



Auty, par Regnier, 8. Par. J<sup>de</sup> Marie 5<sup>de</sup> 0<sup>de</sup> à Paris.

Imp. Lith. Regnier et Doucet.

**Charles Joseph Minard**

- Presents information in a comprehensible, non-misleading, and memorable way
- A creative process

# Good DataViz?

- Memorable
- Not misleading
- (Probably) comprehensible



*Monstrous Costs* by Nigel Holmes

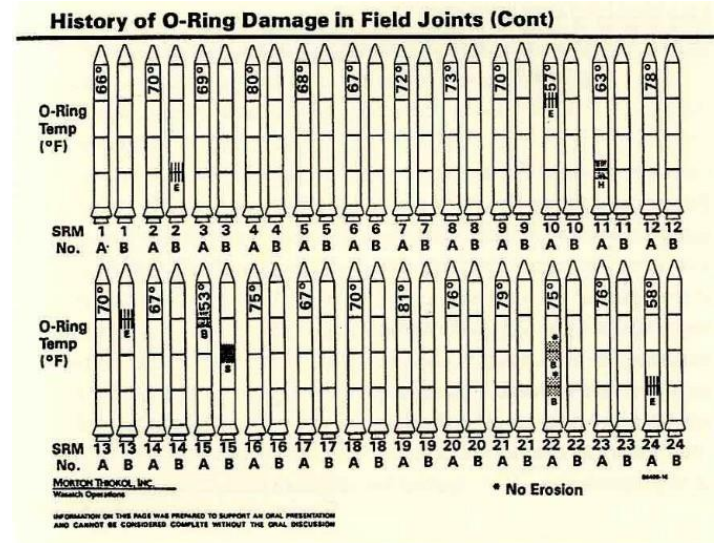
# Bad DataViz: Bad Taste

- Not as easy to read as it could be
- Tacky
- “Chart junk”
- Not so terrible

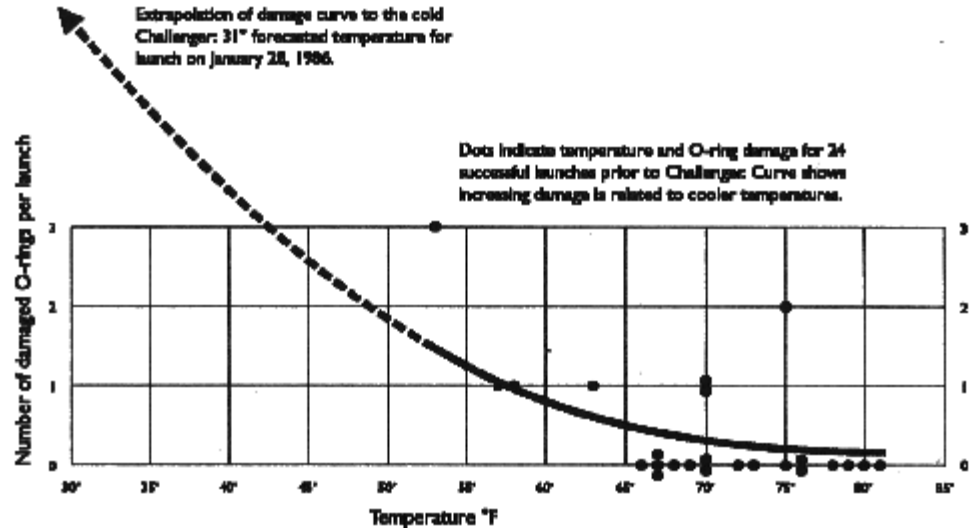


# Bad DataViz: Bad Taste

Number of o-rings damaged depending on temperature: the figure in the report



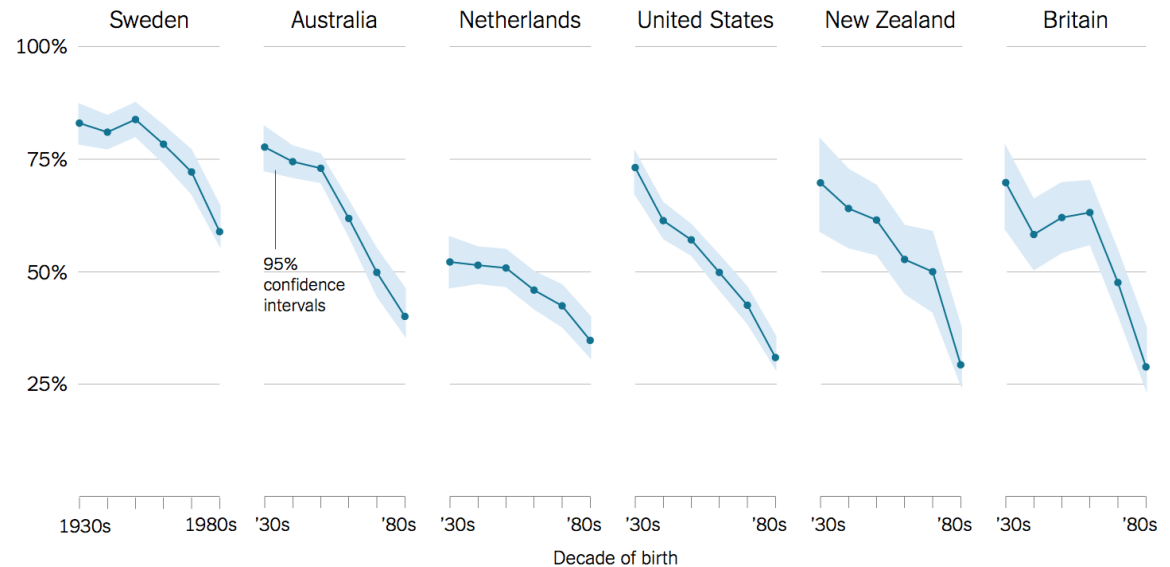
A much better figure



# Bad DataViz: Bad Data

- Looks nice
- Implies people were asked “Is it important to live in a democracy,” and we are plotting the percentage of “yes” responses
- Actually, we are plotting # of people who answered 10/10 to “On a scale of 1-10, how important is it to live in a democracy”

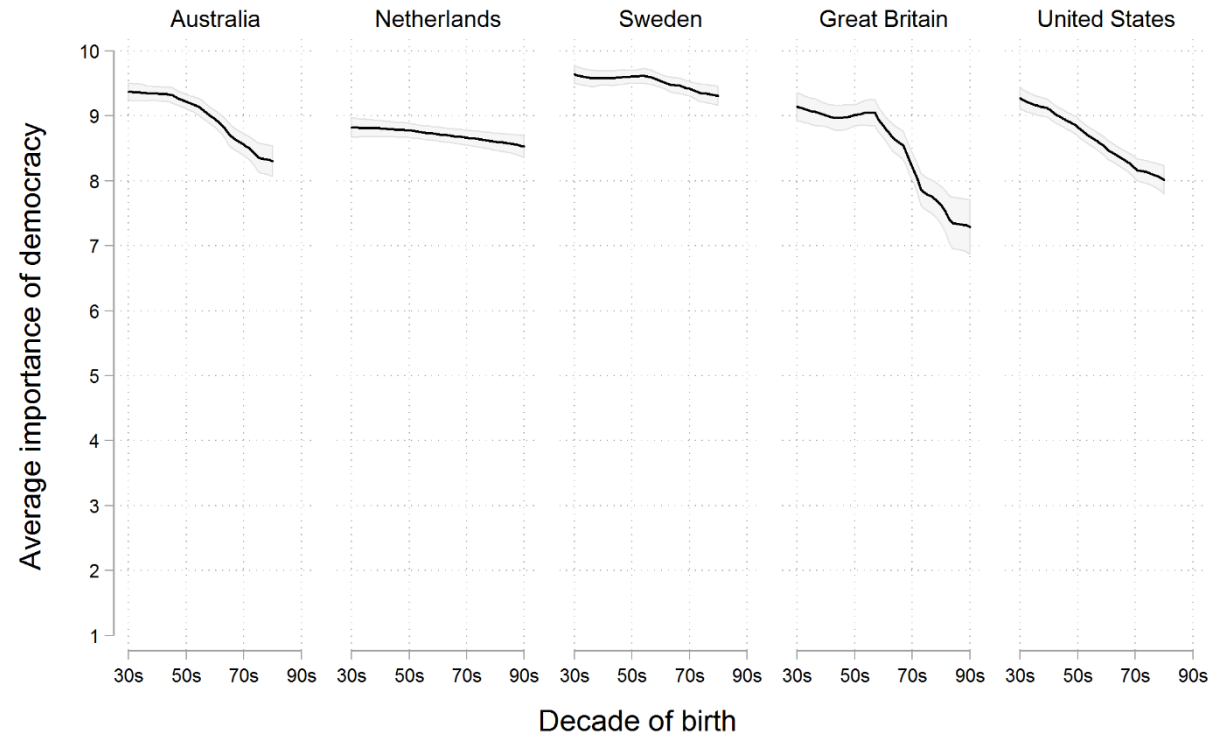
Percentage of people who say it is “essential” to live in a democracy



Source: Yascha Mounk and Roberto Stefan Foa, “The Signs of Democratic Deconsolidation,” Journal of Democracy | By The New York Times

# Bad DataViz: Bad Data

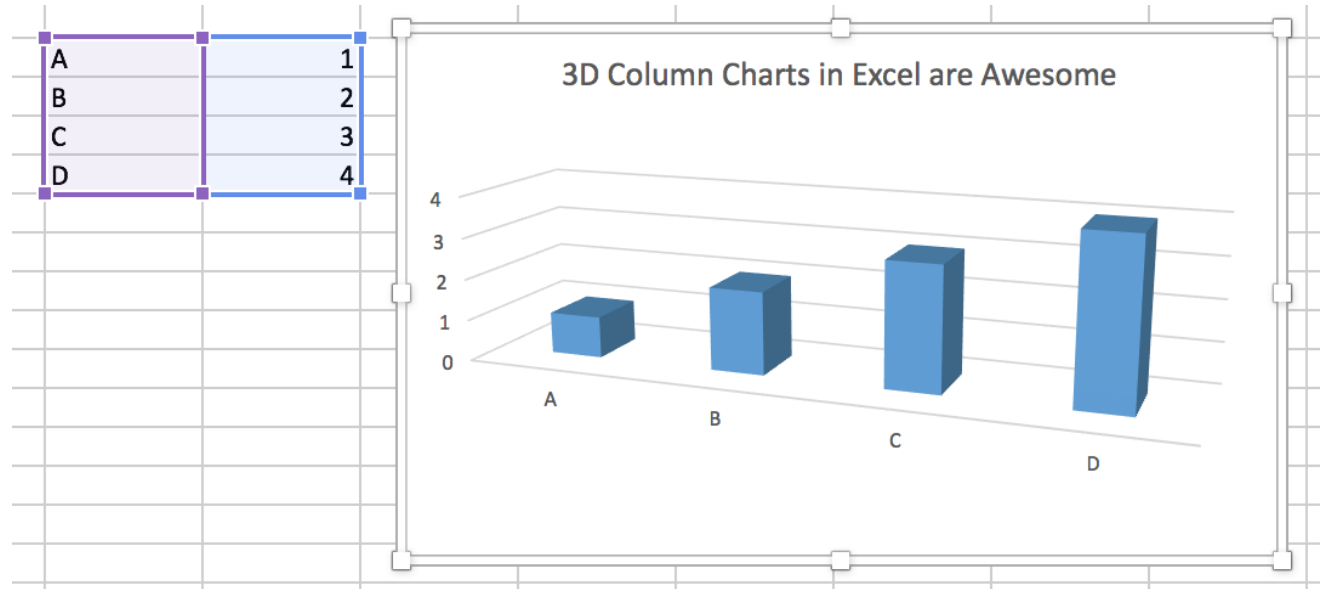
There is a decline, but this is not NYT material anymore, now that we measure the average rating



Graph by Erik Voeten, based on WVS 5

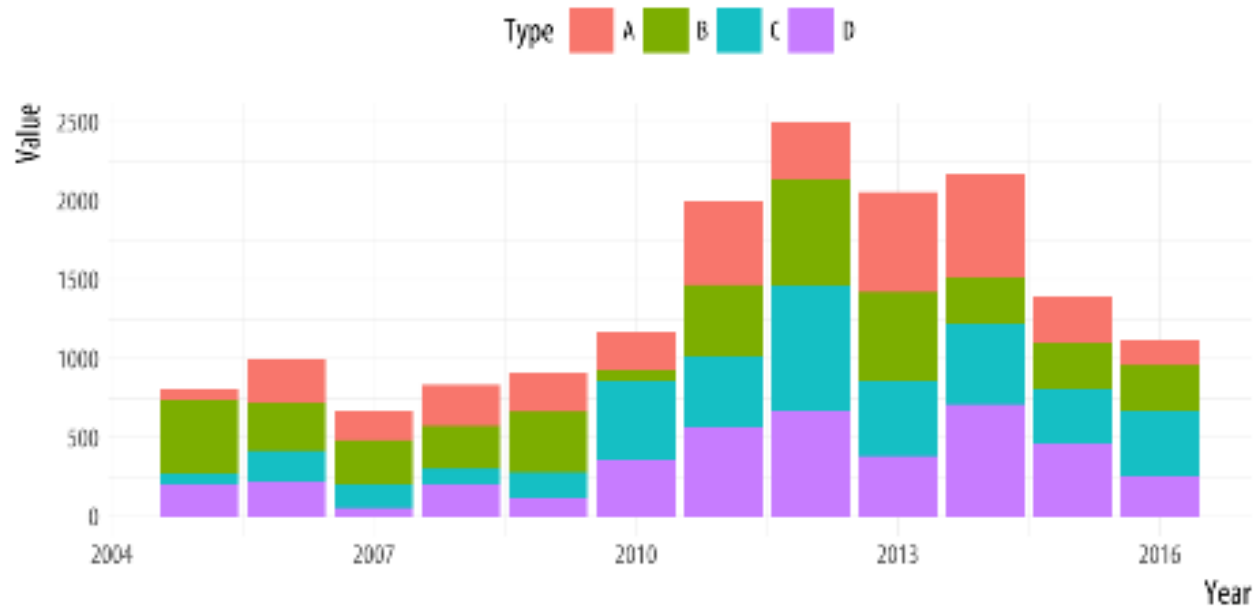
# Bad DataViz: Perception- Unfriendly design

Hard to figure  
out the values!



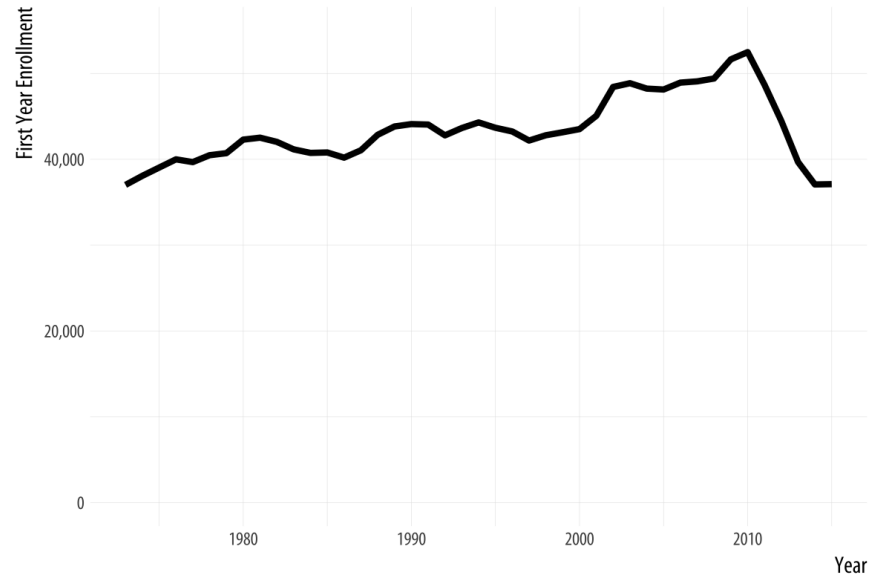
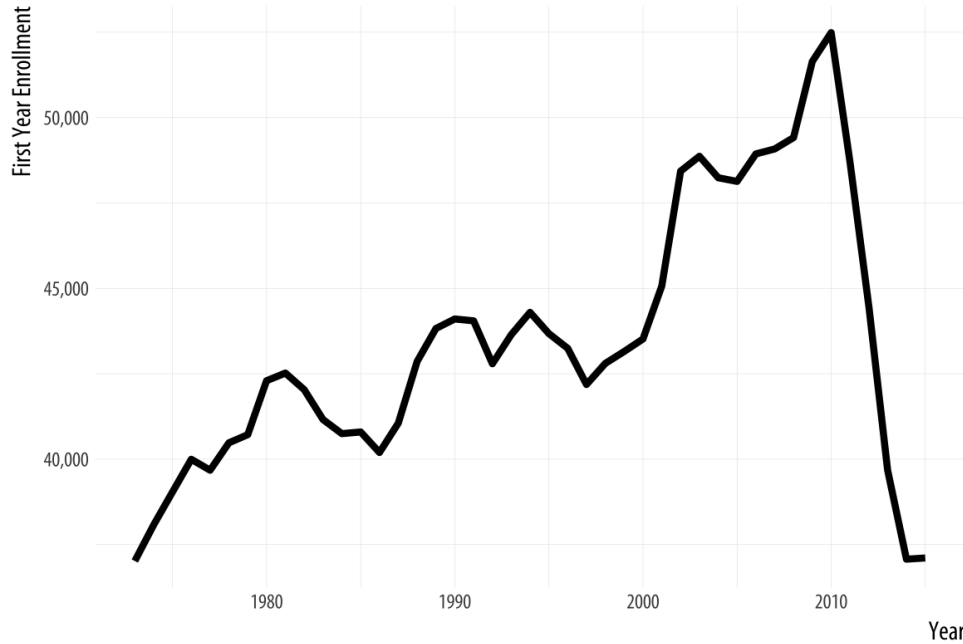


# Bad DataViz: Uninspired Design



Difficult to see the trends for the different types

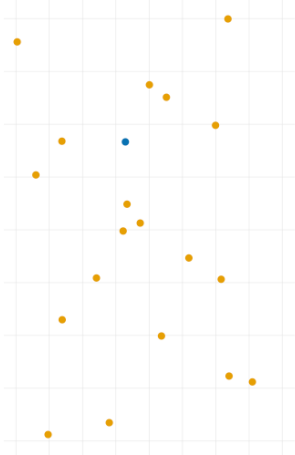
# Bad DataViz: Honesty Issues



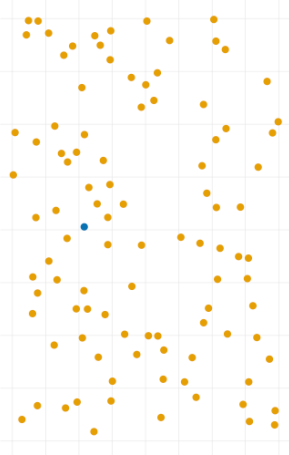
Same data, but the graph on the left is quite misleading

# Preattentive search

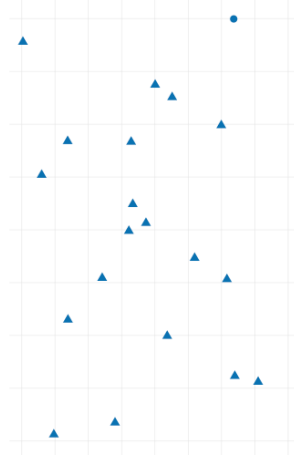
Color Only, N=20



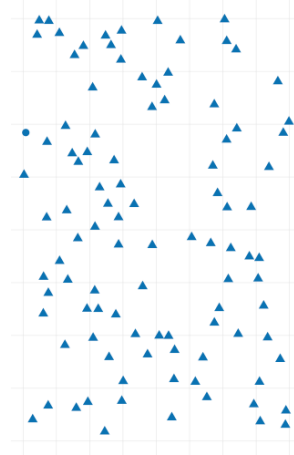
Color Only, N=100



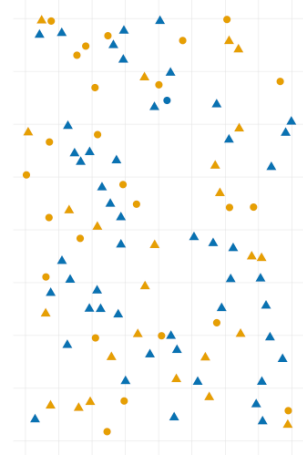
Shape Only, N=20



Shape Only, N=100



Color & Shape, N=100



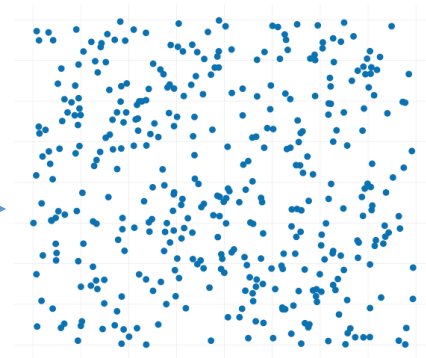
- Compare how much color “pops out” compared to shape
- More data makes things much more difficult
  - Searching for the blue circle on the right is very difficult

# Gestalt rules

- Humans readily perceive patterns (real or not) based on proximity, similarity, connection, continuity, closure, belonging to background/foreground, common movement

random

Poisson



Structured

Matérn

