

An Admin's Guide to Data Visualization

Caskey L. Dickson

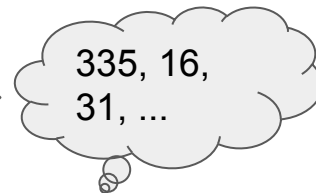
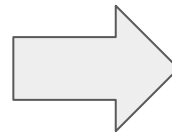
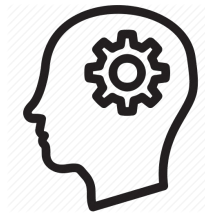
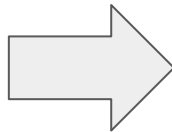
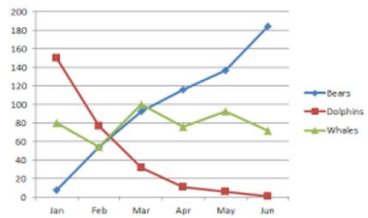
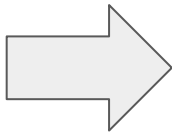
caskey@{microsoft,gmail,twitter,github,...}.com

[citation needed]

- Tufte, Visual Display of Quantitative Information (1983)
- Cleveland, The Elements of Graphing Data (1968, 1994)
- Cleveland, Visualizing Data (1994)
- Robinson, The Psychology of Visual Illusion (2013)
- Huff, How to Lie with Statistics (1954)
- Kahneman, Thinking Fast and Slow (2011)
- Csíkszentmihályi, Flow (1990)
- Robbins, Creating More Effective Graphs (2009)
- Zumel, Good Graphs (2009)

What is Visualization

123, 456, 13
335, 16, 31
301, 78, 984



Humans suck at pretty much everything,
especially estimation.

Perception and Thought

Types of Memory

- Iconic
(super fast, instinctual)
- Short Term
- Long Term

Types of Thought

- Preattentive
- Type 1 (instinctive)
- Type 2 (deliberative)

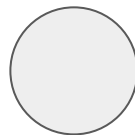
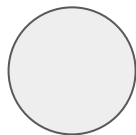
Kahneman 2011, Csíkszentmihályi 1990

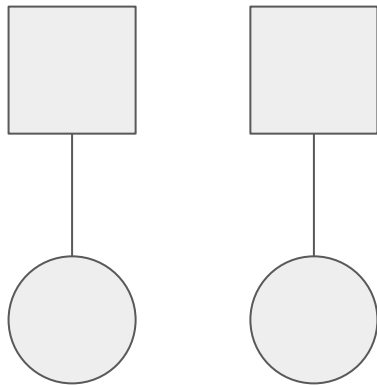
Preattentive Thought

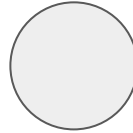
- Size
- Position
- Orientation
- Curvature
- Gray Value
- Hue
- Shape
- Enclosure
- Number (up to four)

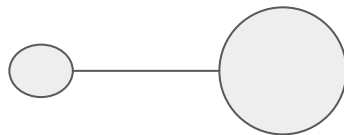
- **Grouping**
 - Proximity
 - Similarity
 - Connectedness
 - Continuity
 - Symmetry
 - Closure
 - Size
 - Enclosure

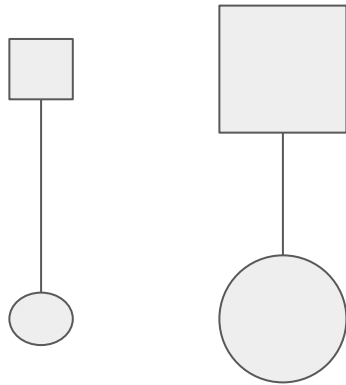
Csikszentmihályi 1990

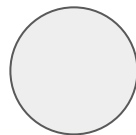
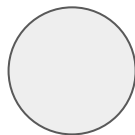


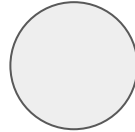
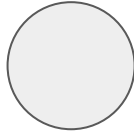




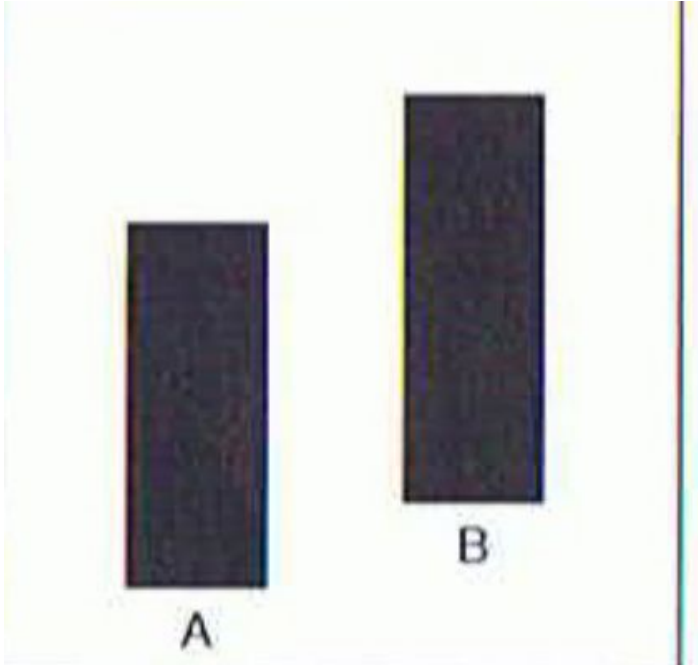


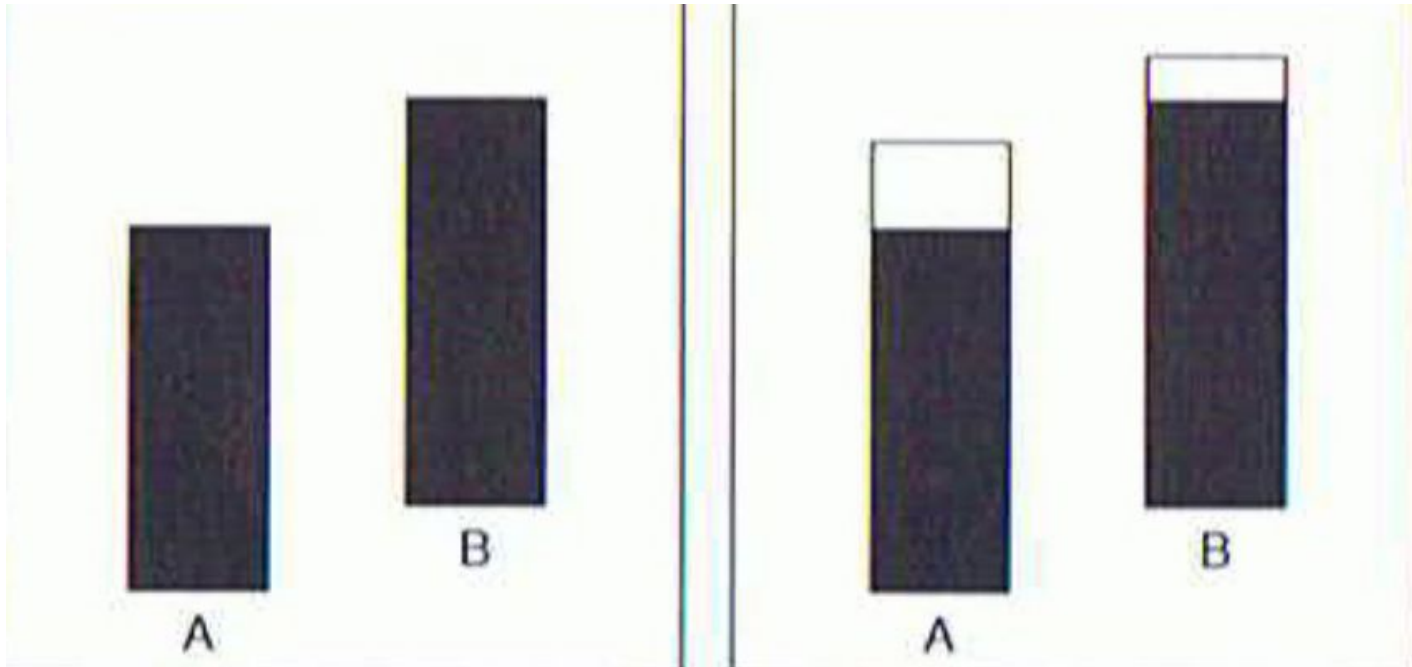


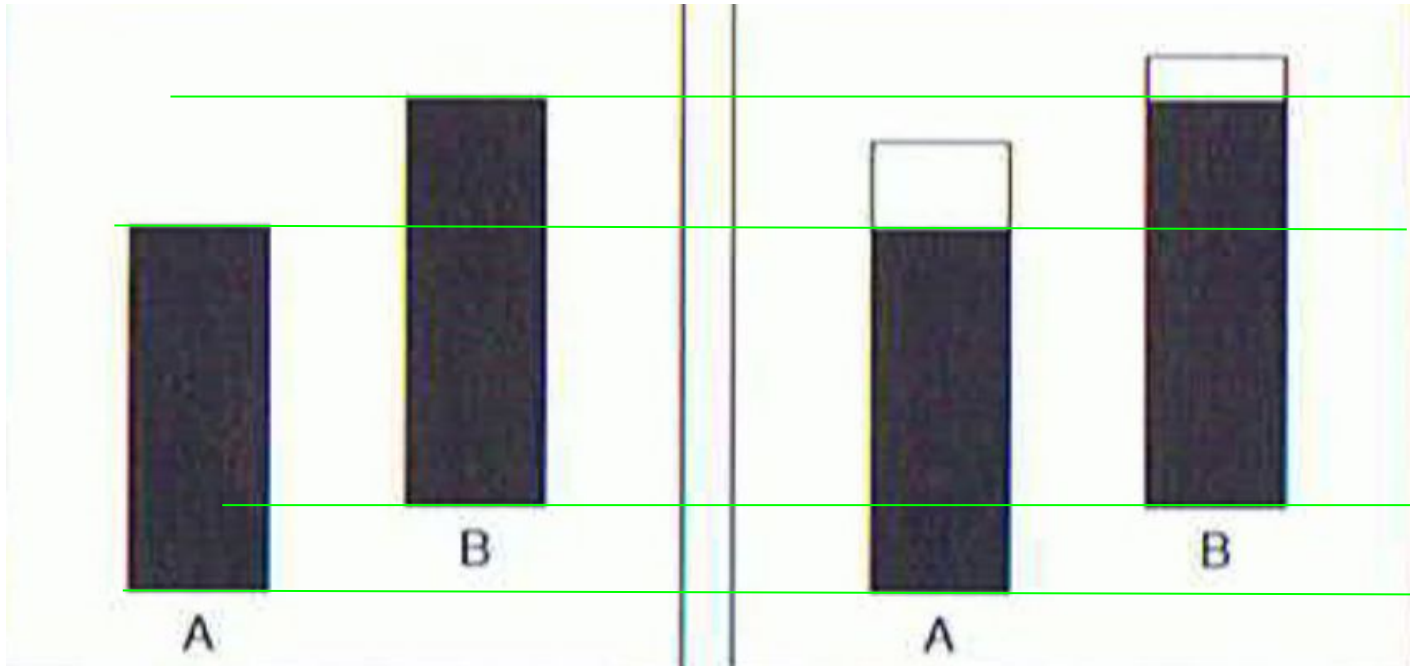


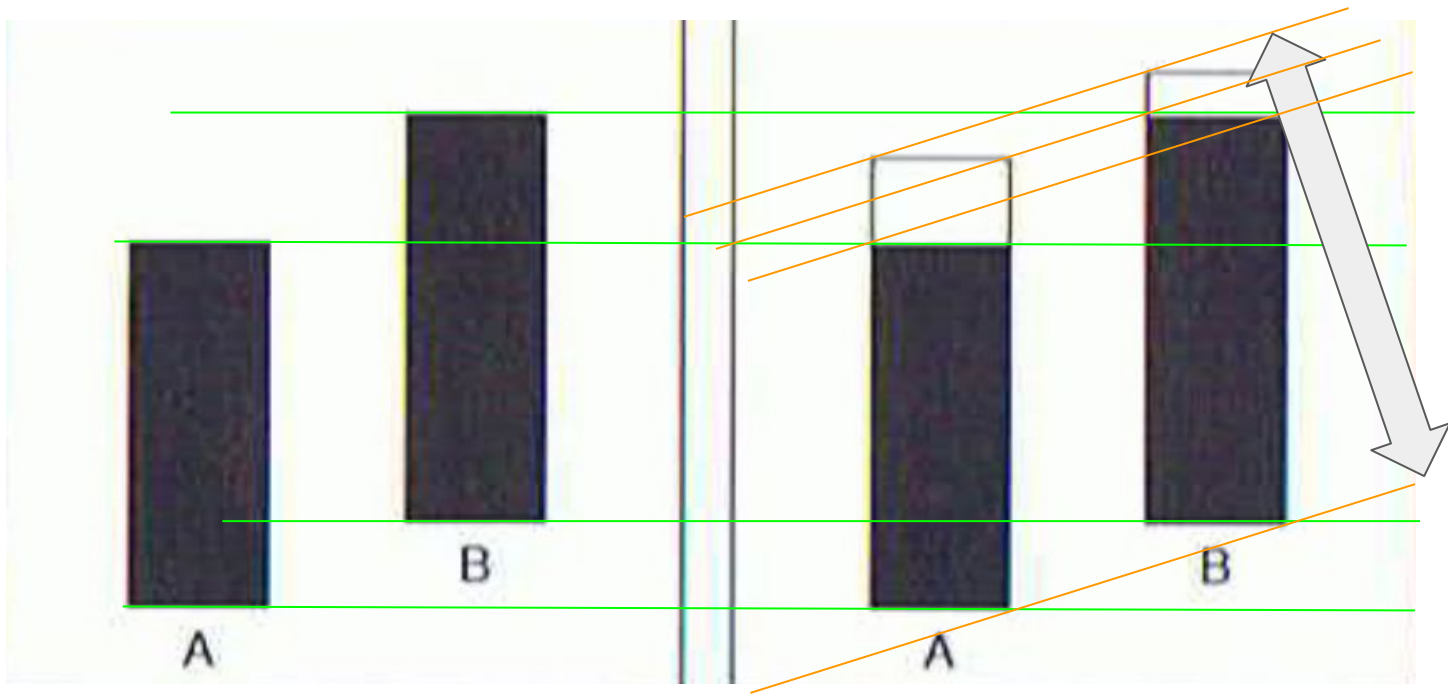


Long Distances

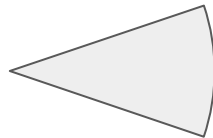
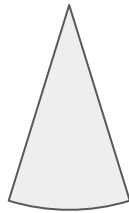
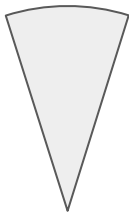
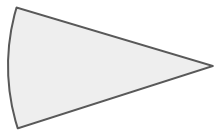


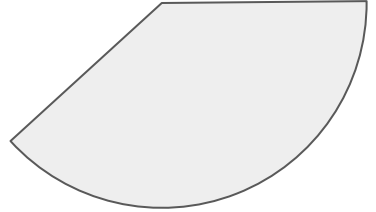
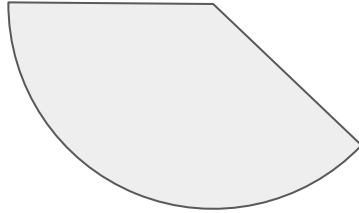
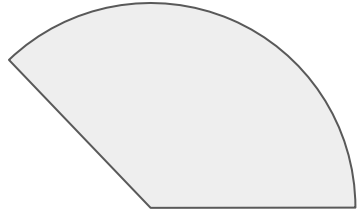
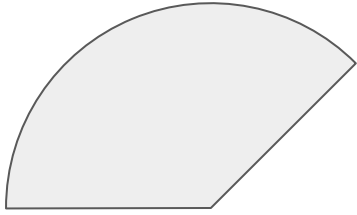


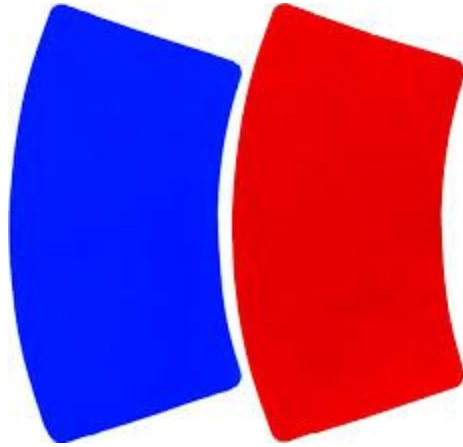


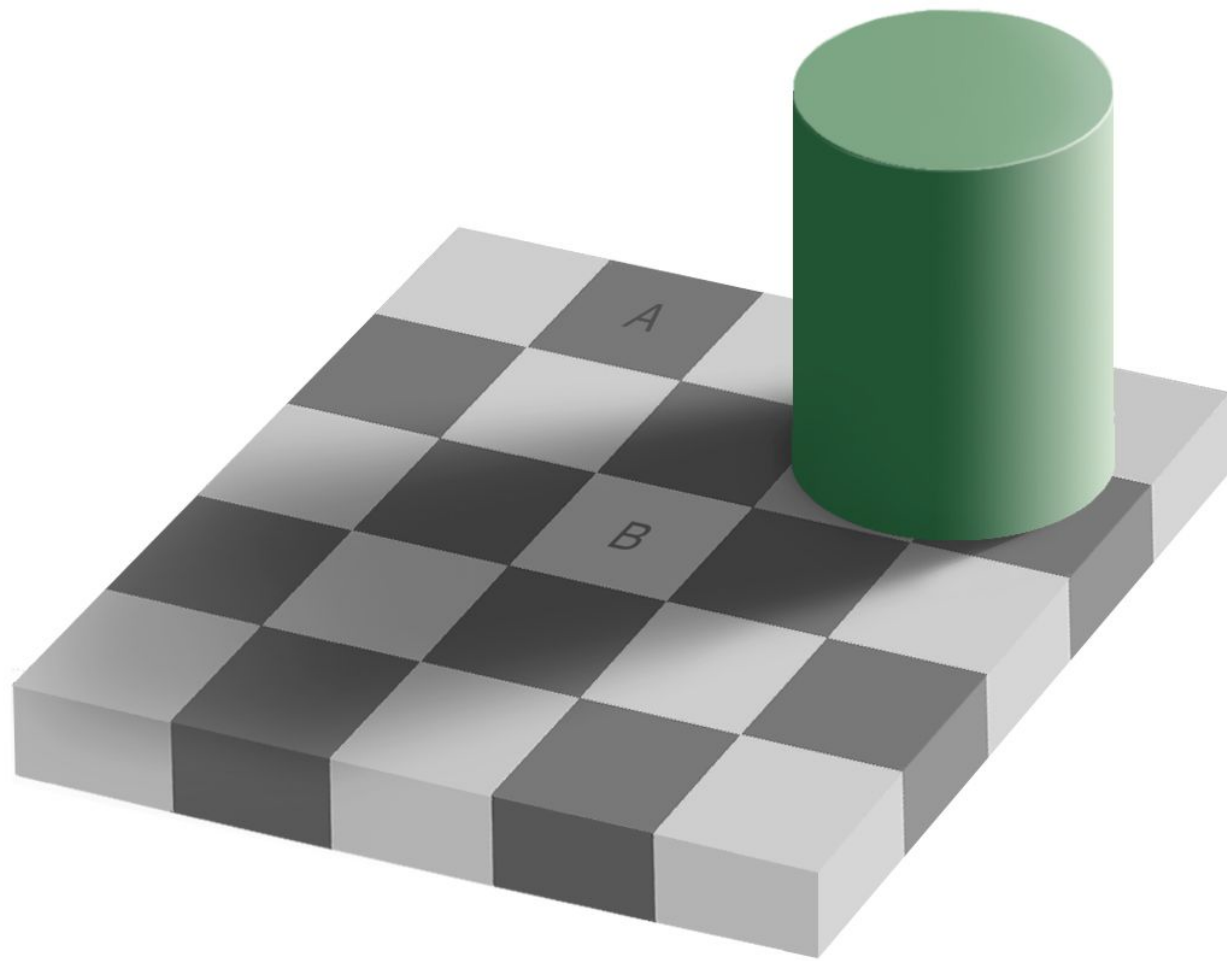


Angles

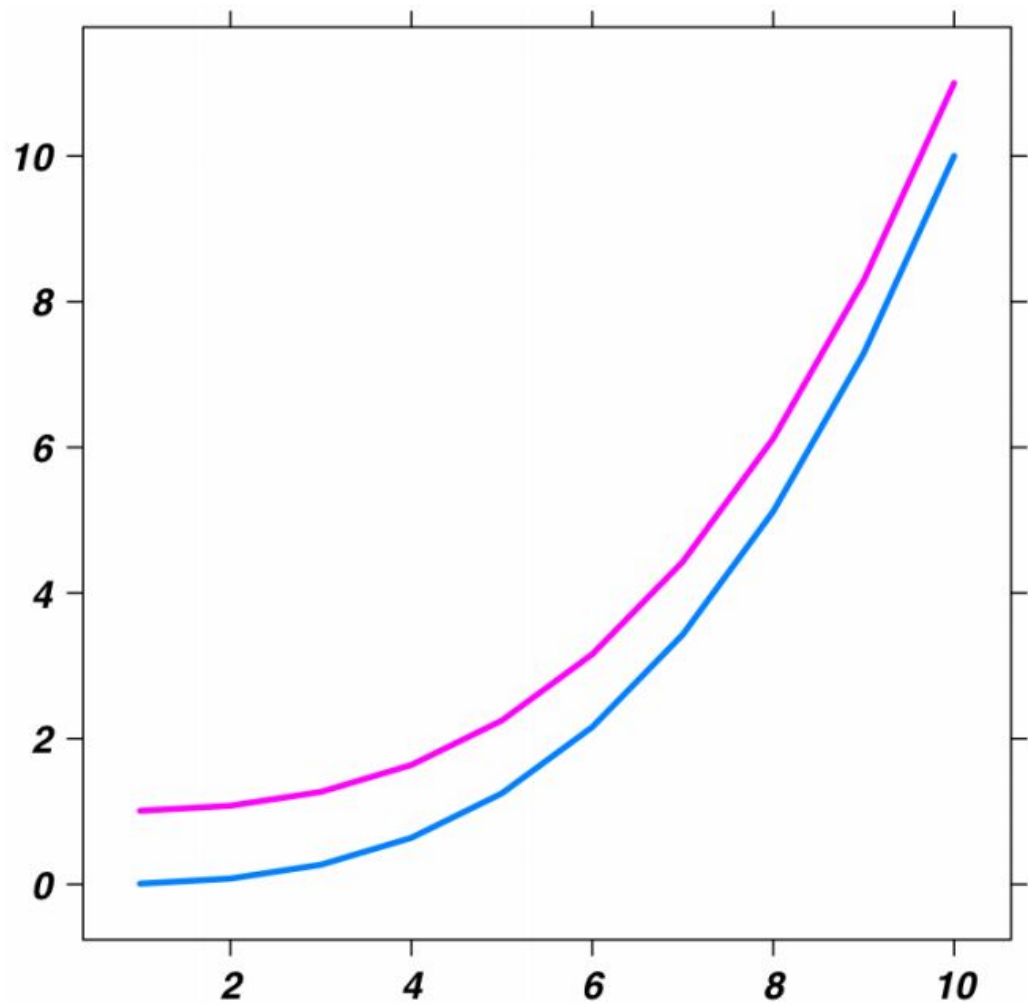


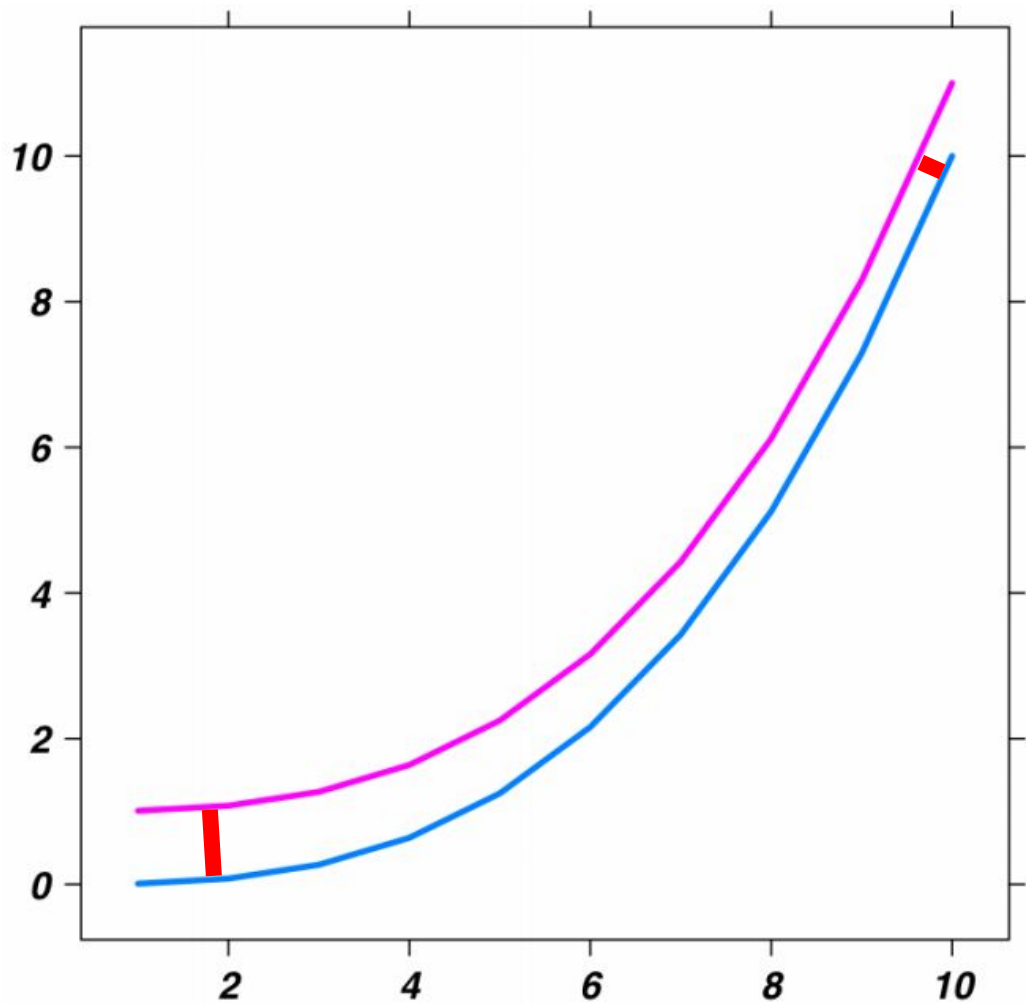


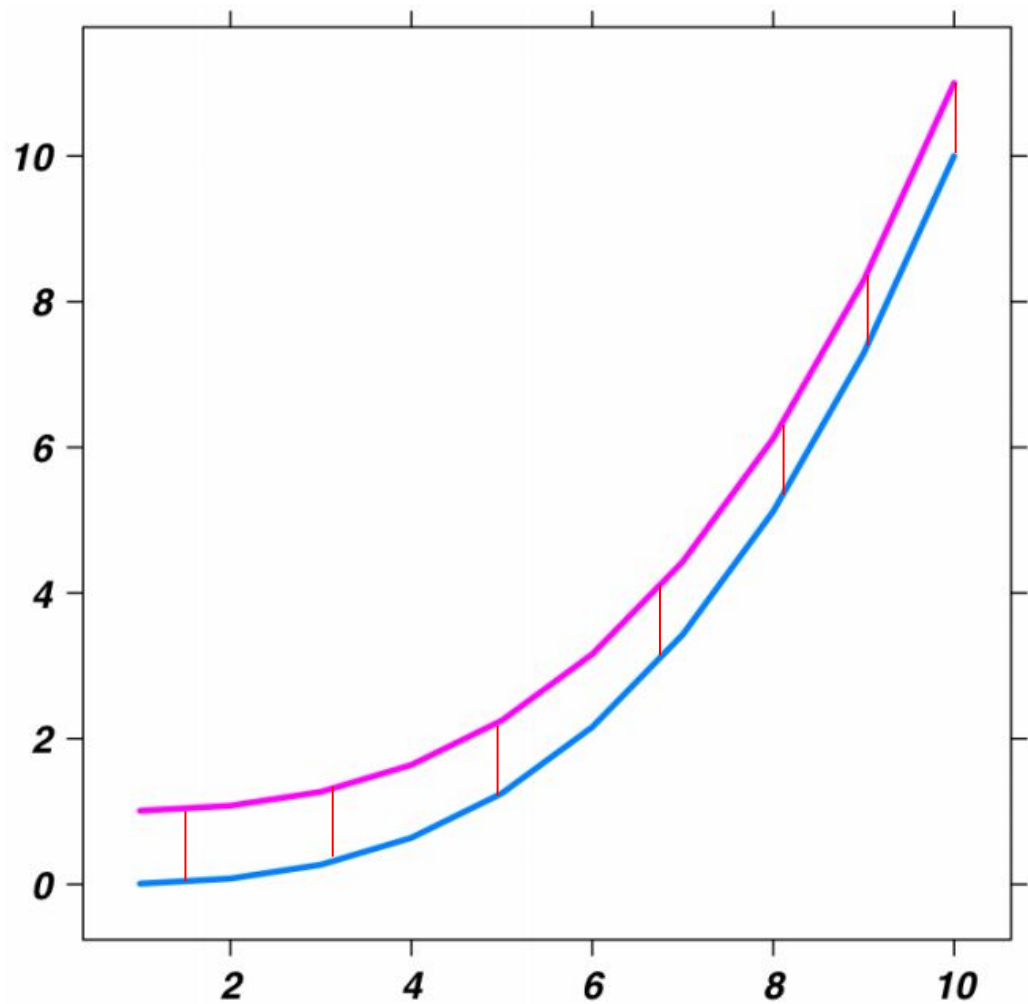


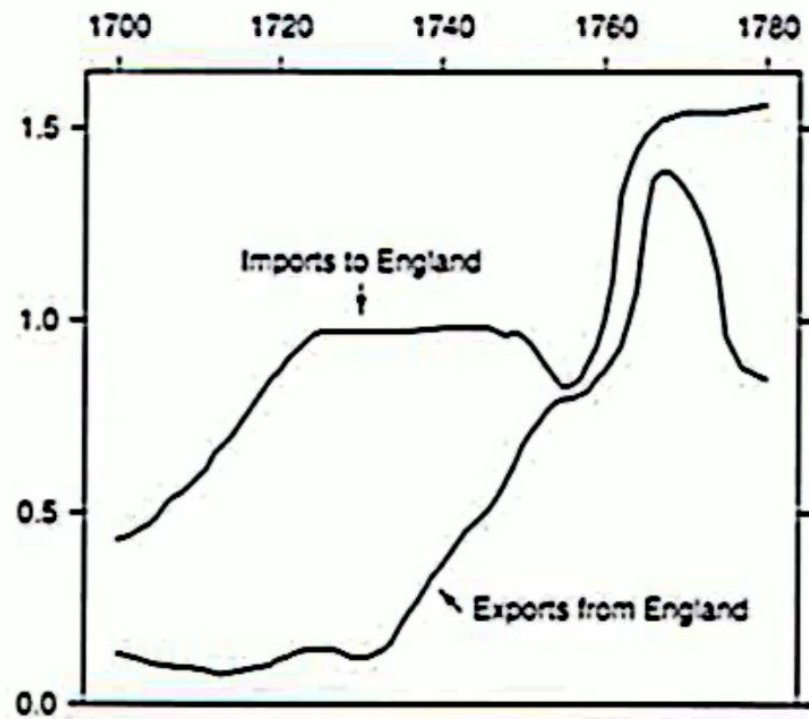


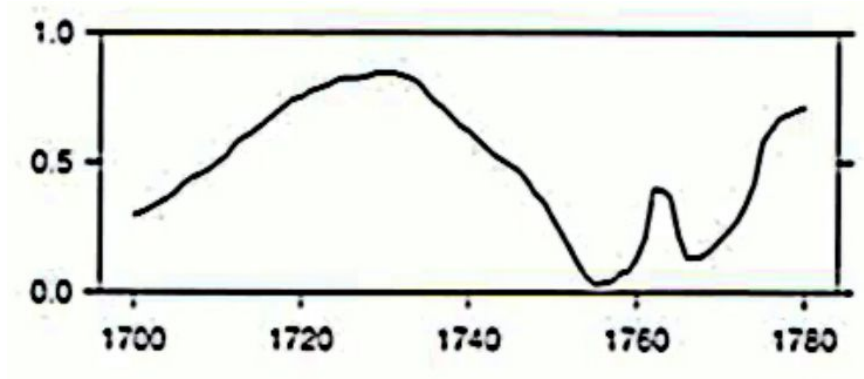
Perpendicular Distance





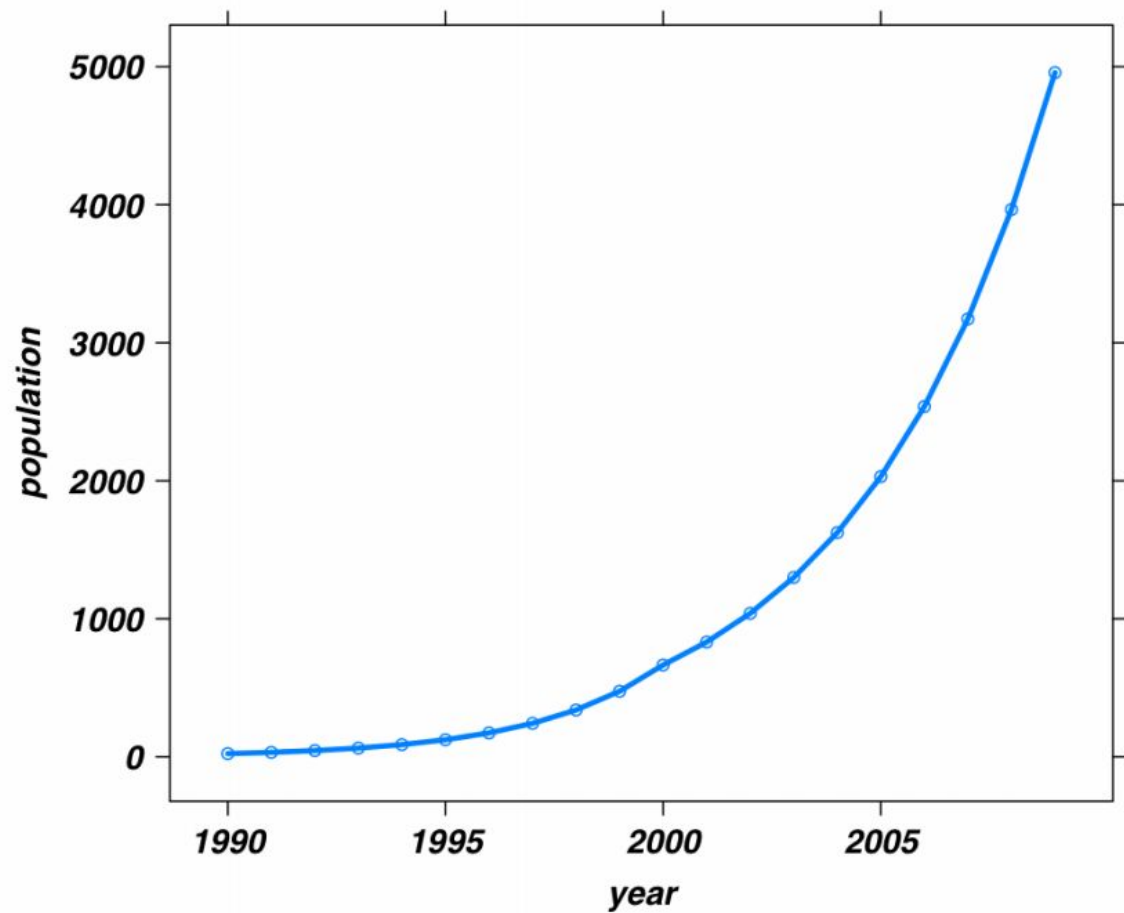




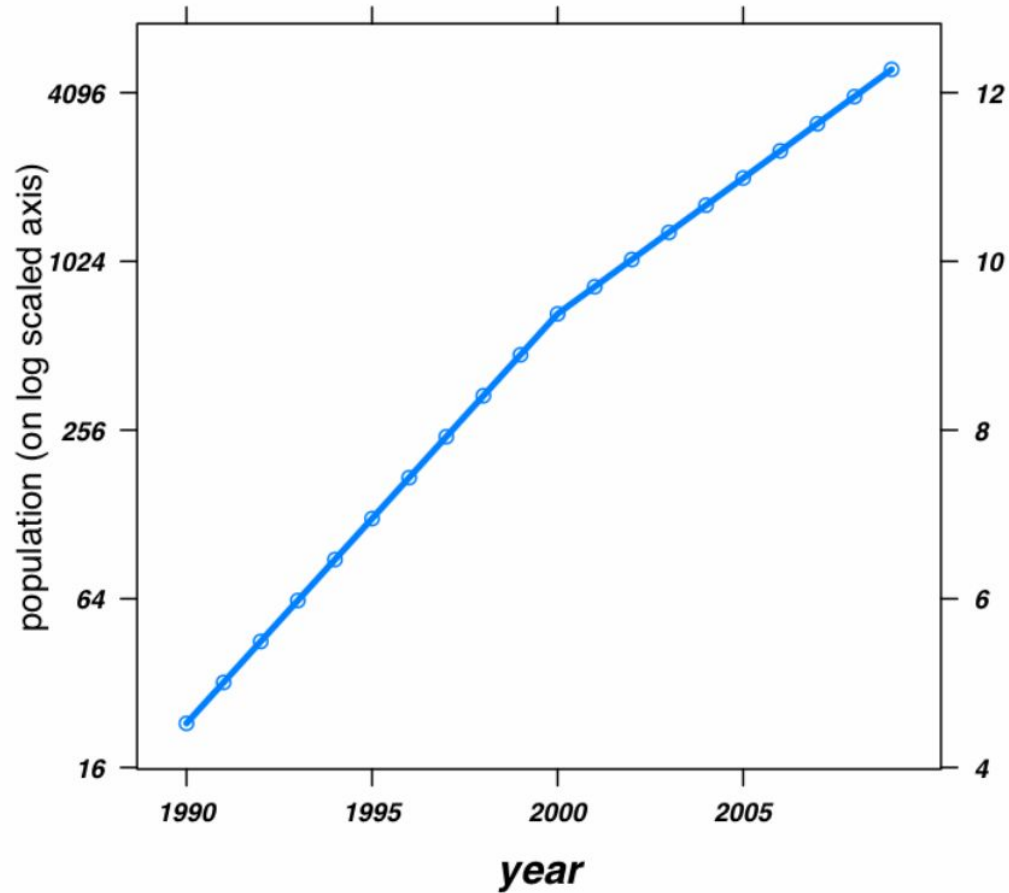


Graph The Message

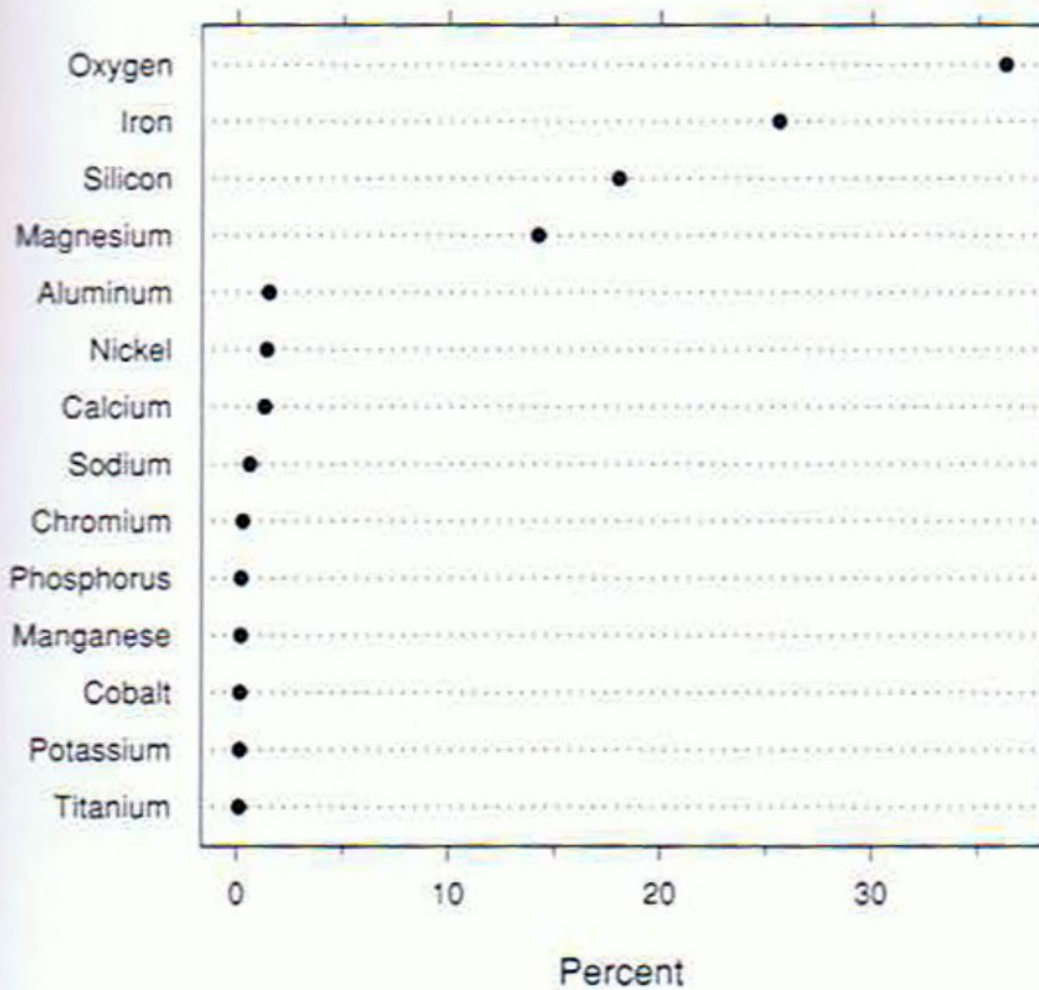
Population growth

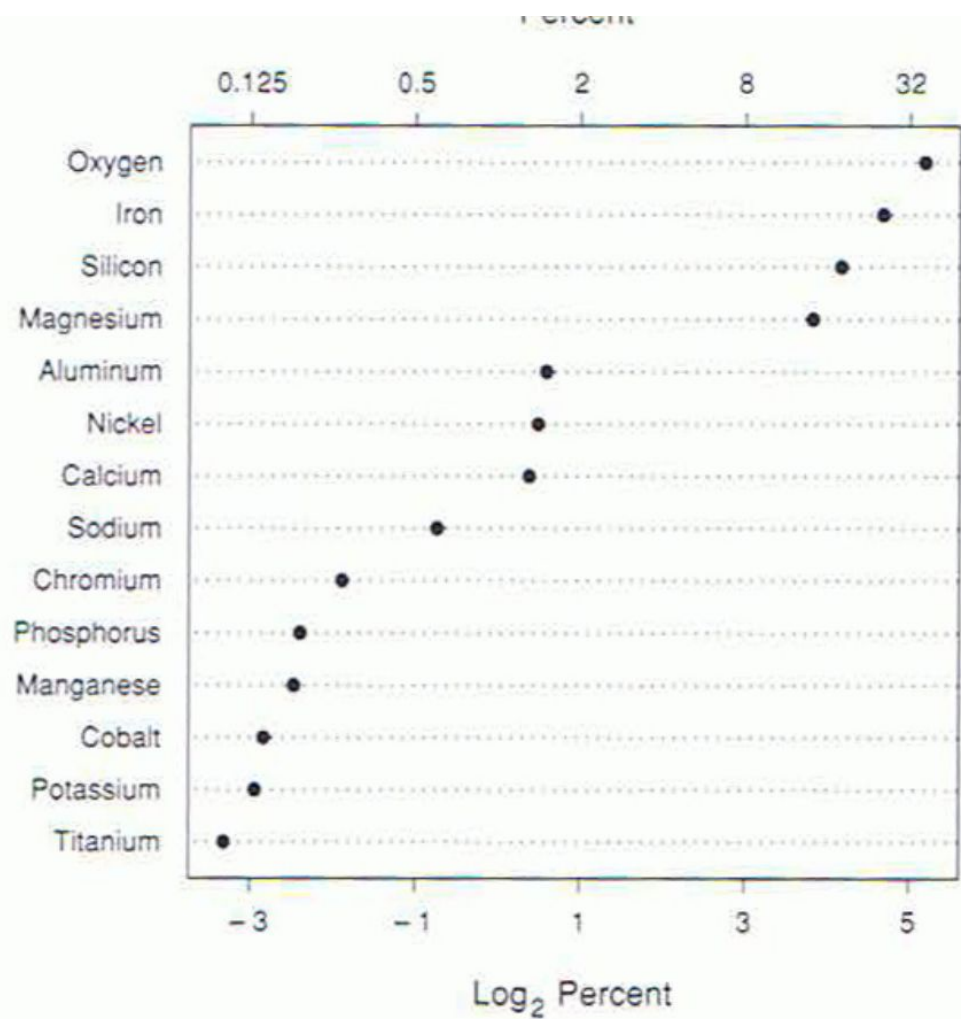


Log population growth (rate of change)

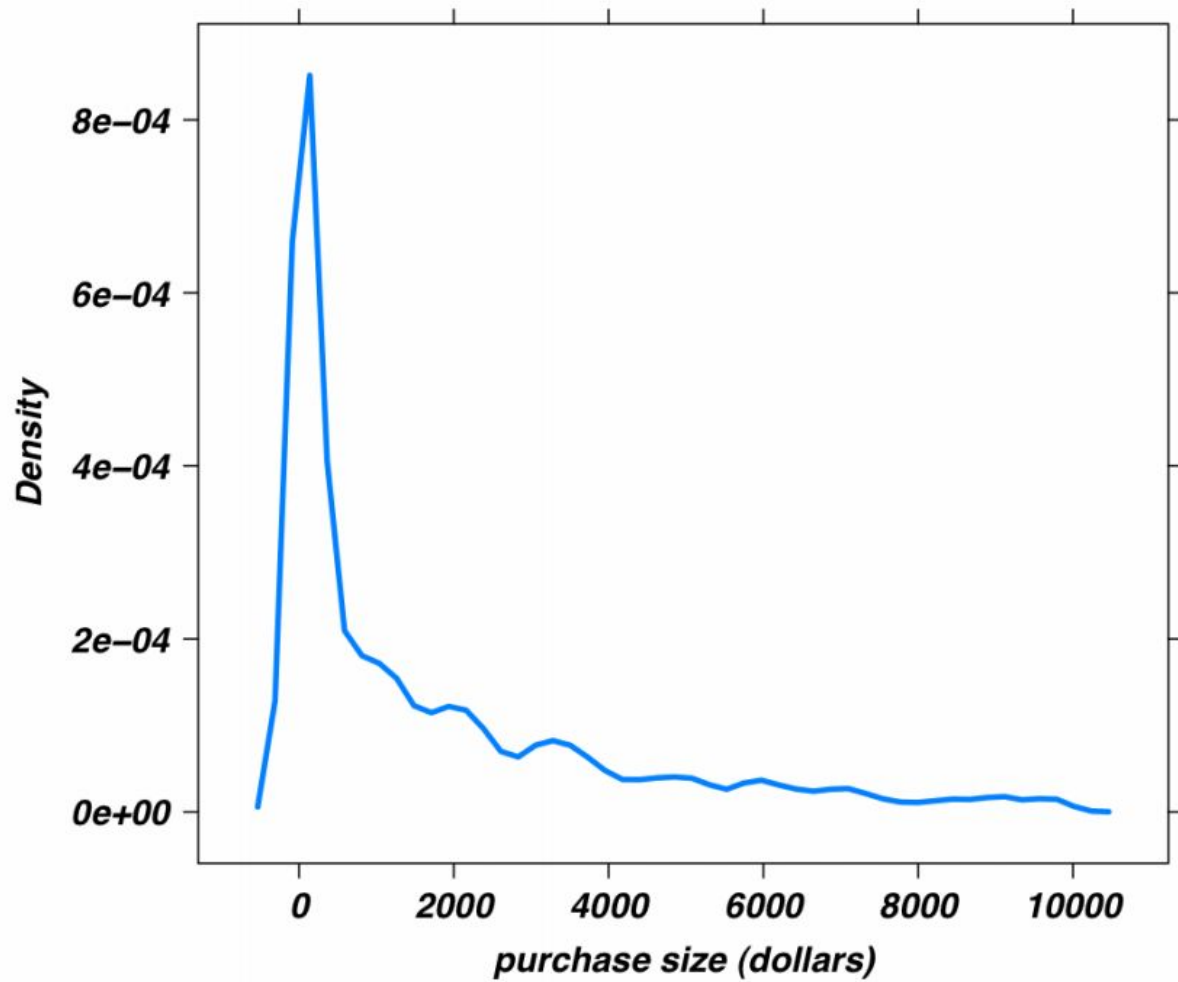


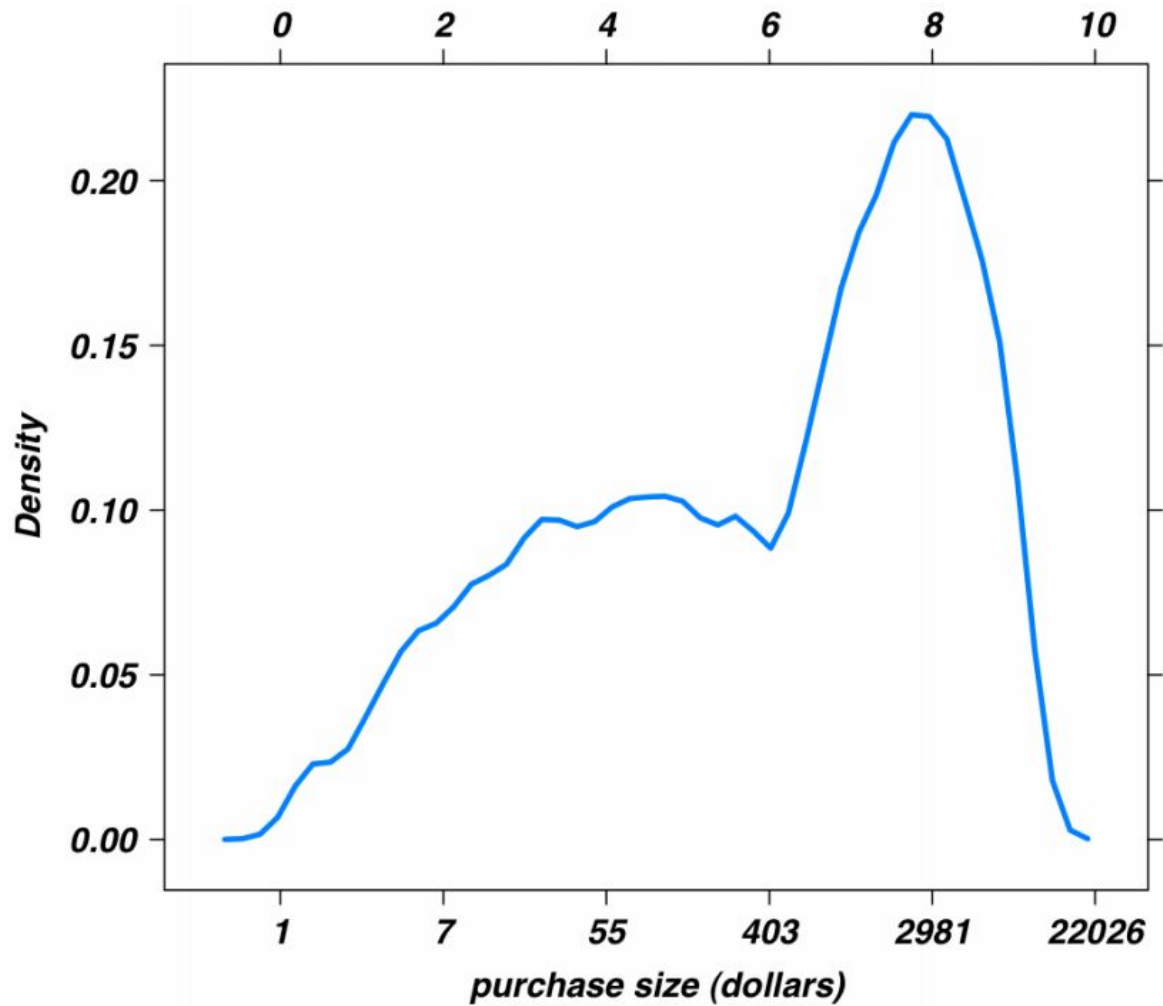
Scale Matters



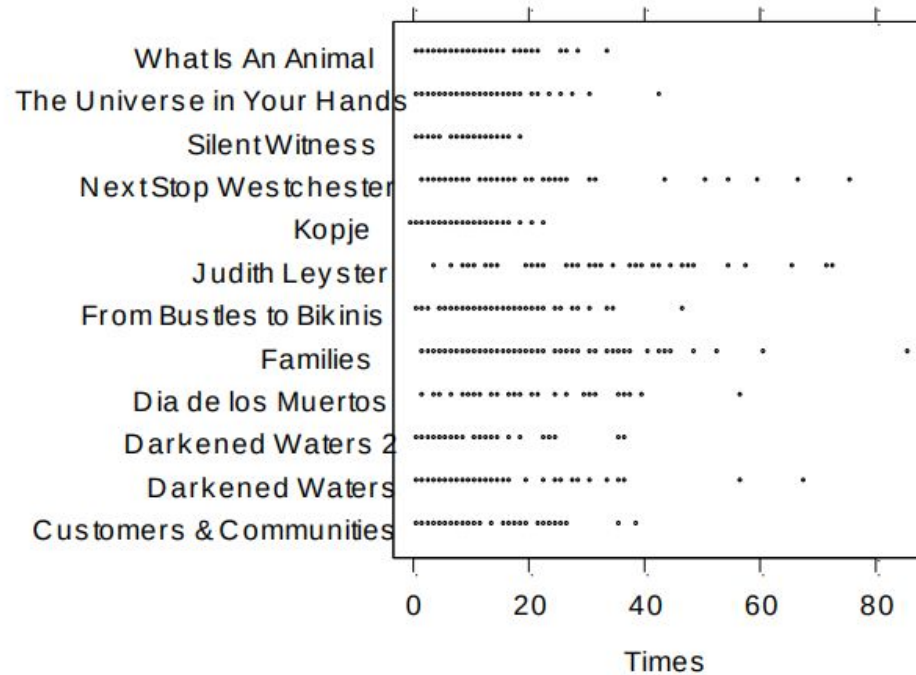


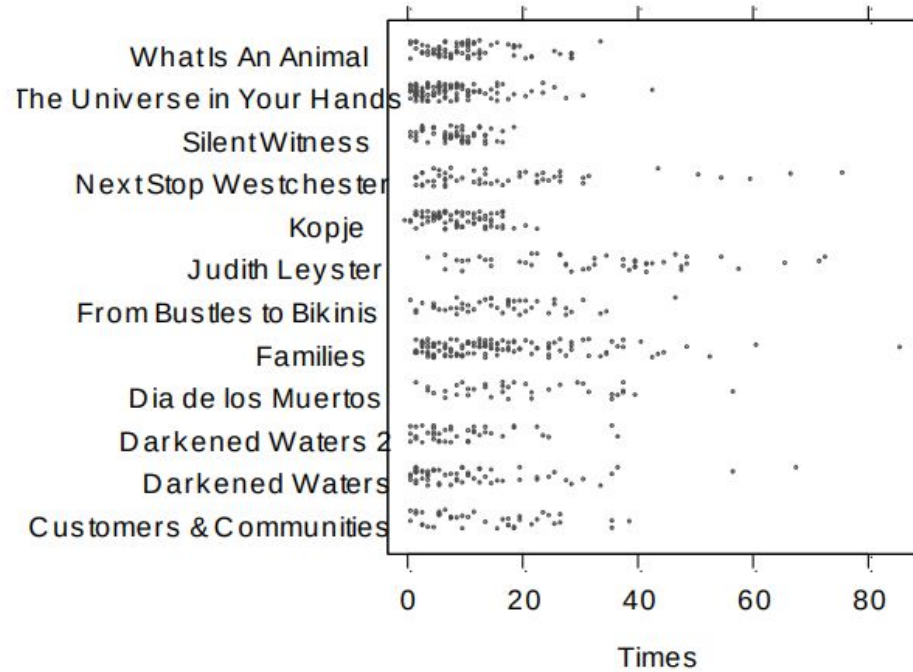
Cleveland 1968/1994





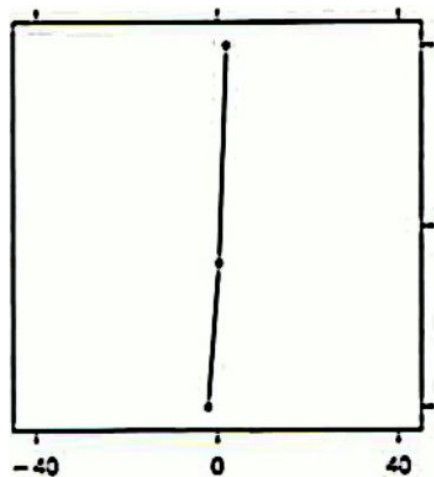
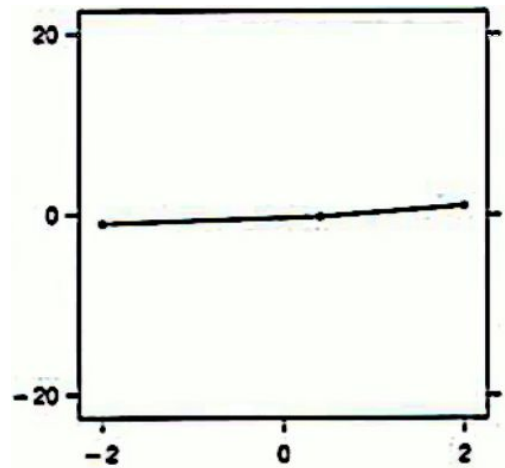
High Density Plots

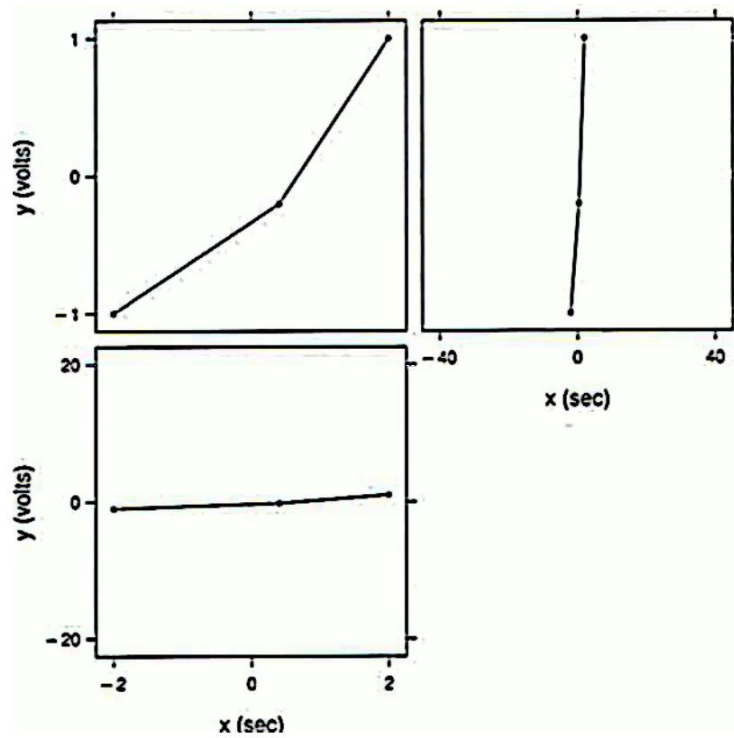


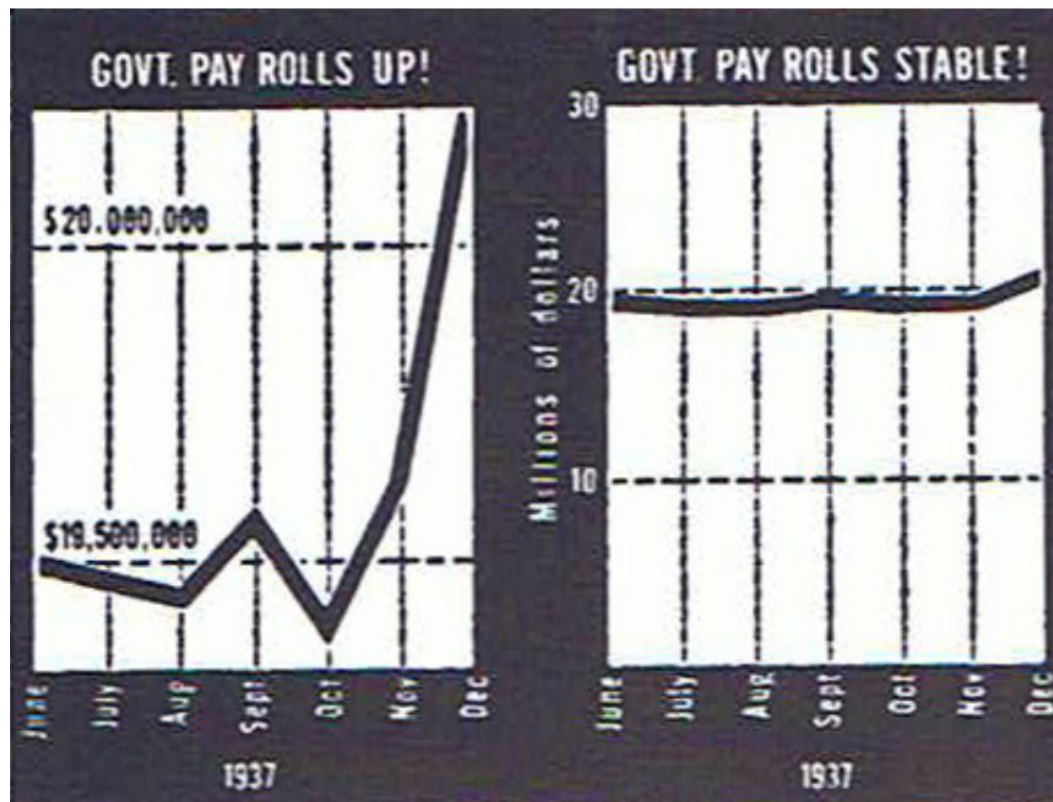


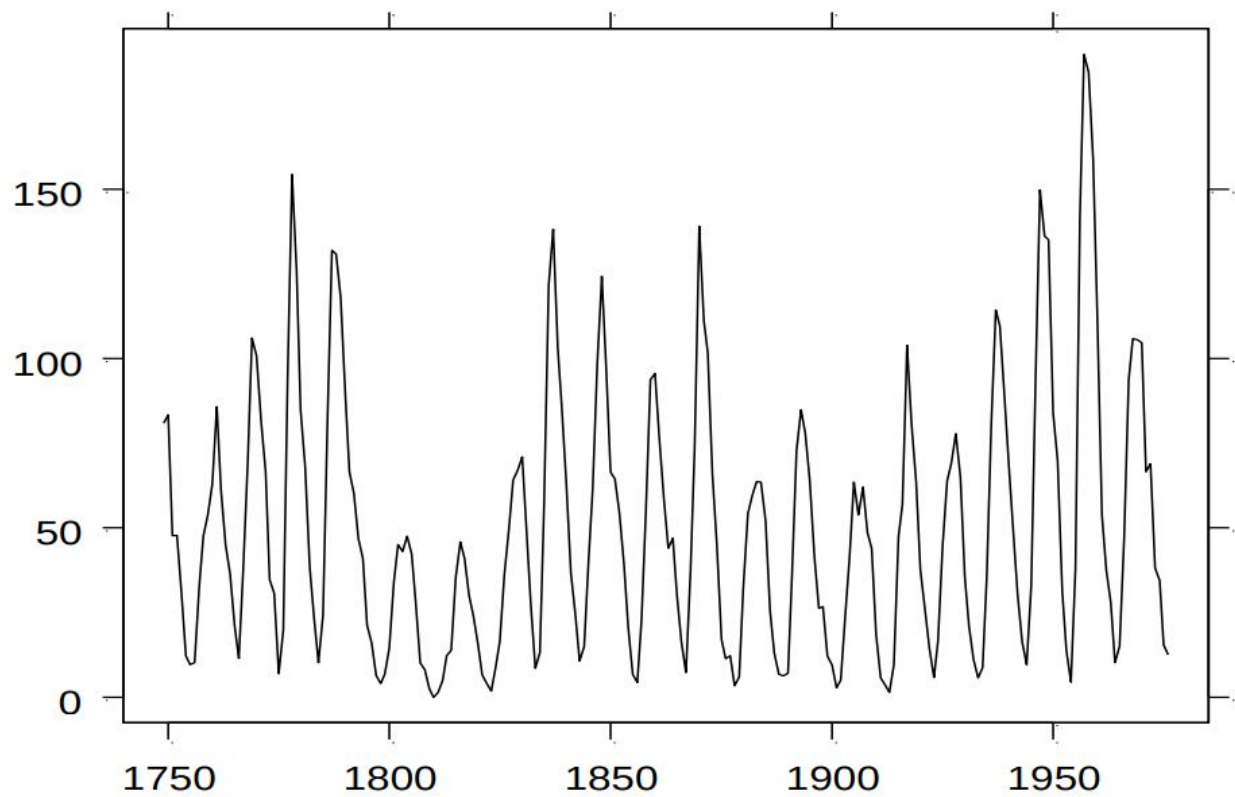
Binning

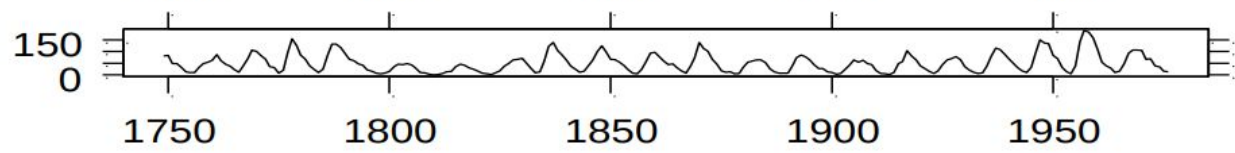
Aspects and Banking





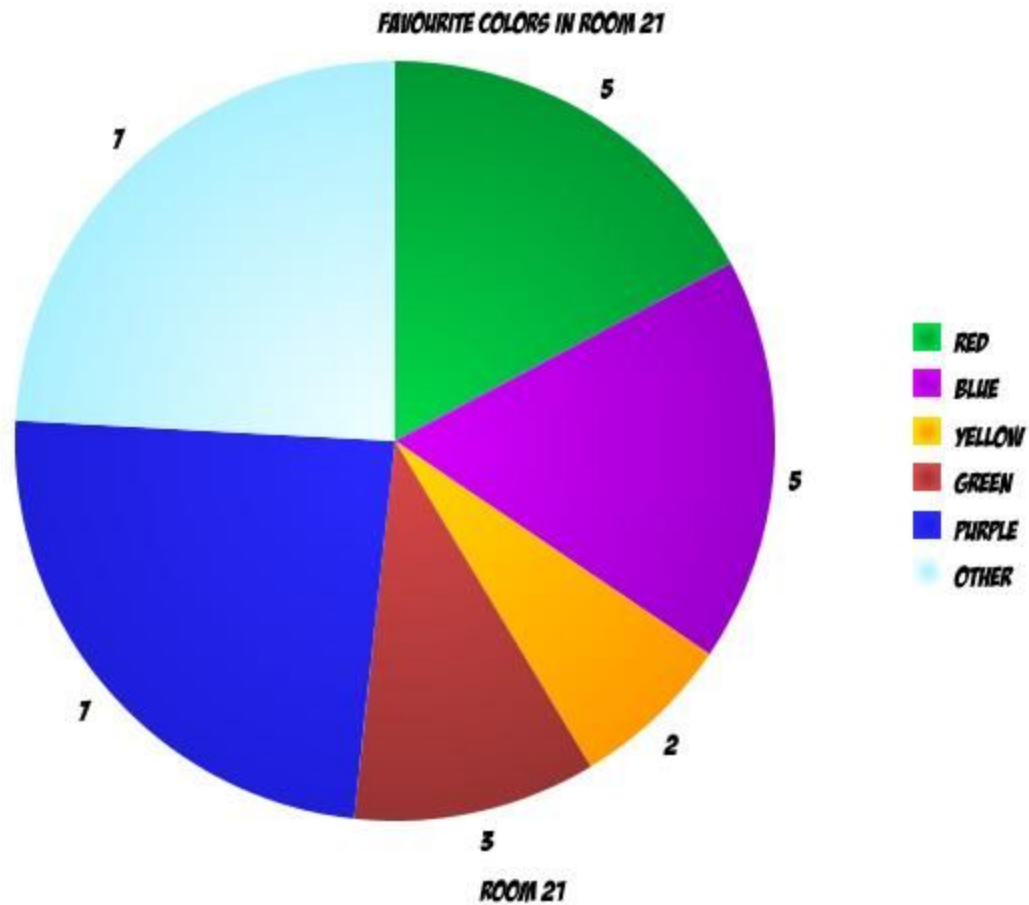




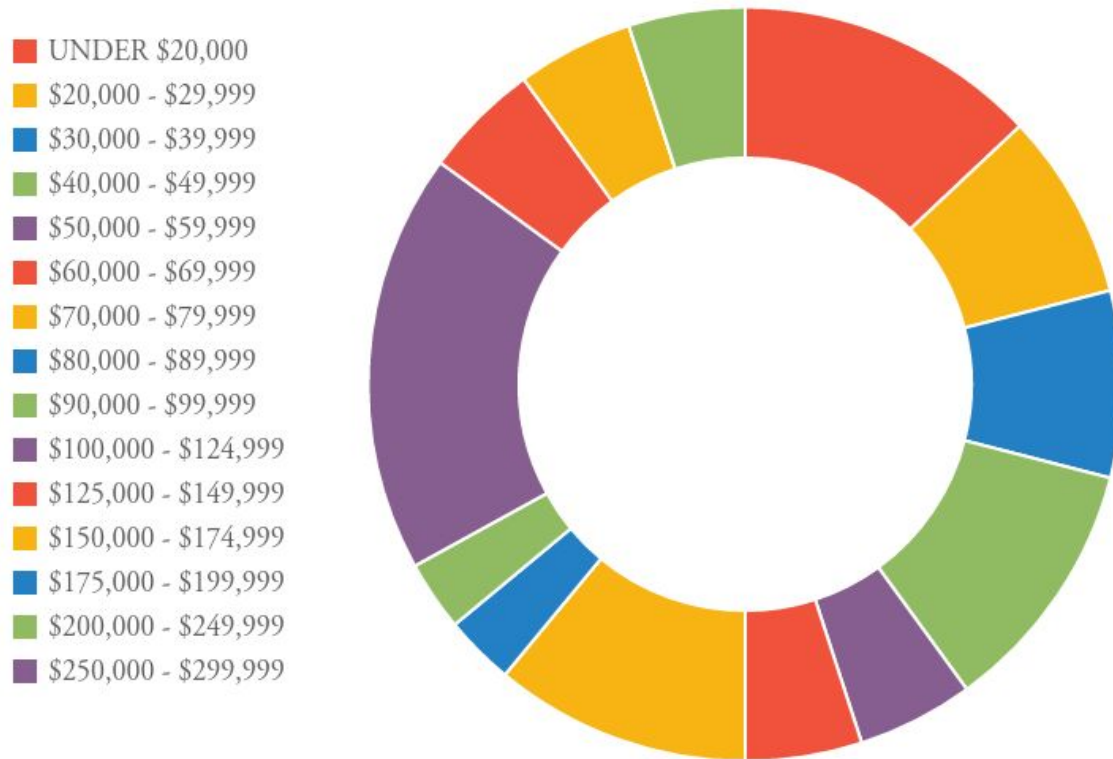


Bertin Efficiency
(sorry, no)

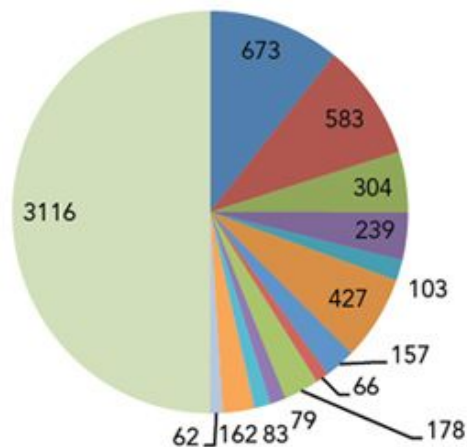
Rogues Gallery



INCOME DISTRIBUTION OF RESPONDENTS CHOOSING NEITHER HILLARY NOR TRUMP

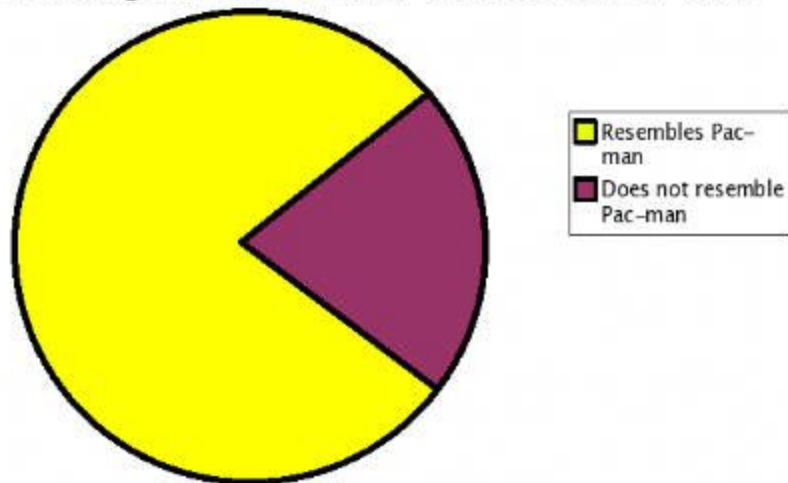


Distribution showing % of Respondents in each income category



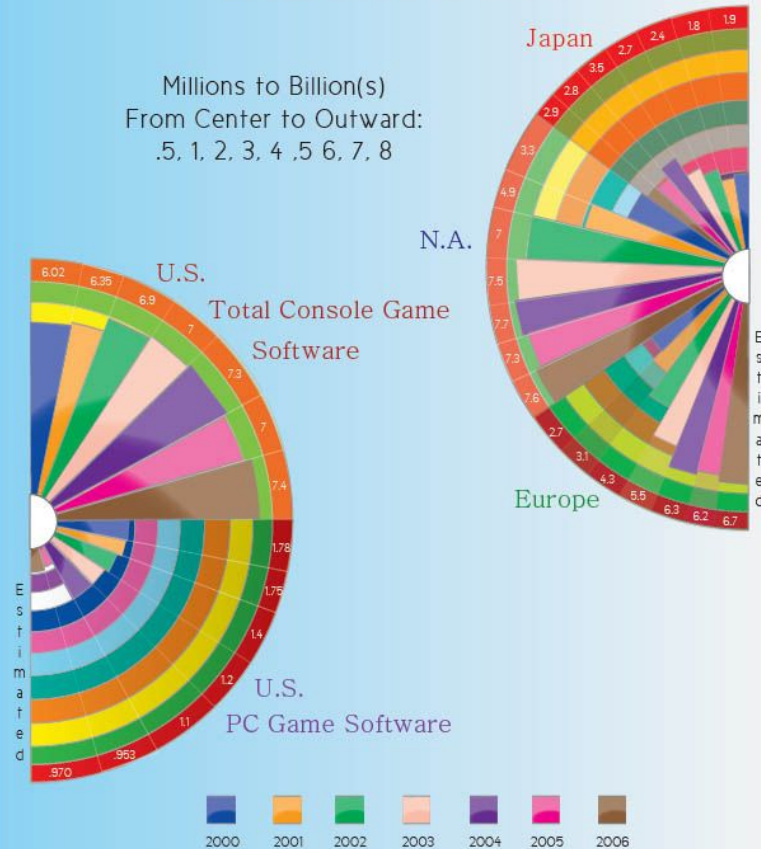
- Faith Based
- State Government
- For Profit Business
- Housing Collaboration
- Post Secondary Education
- Health Services
- Non Profit
- Local Government
- Federal Government
- Consortiums/Collaboration
- School Districts
- Financial Institutions
- Statewide Associations
- Total

Percentage of Chart Which Resembles Pac-man

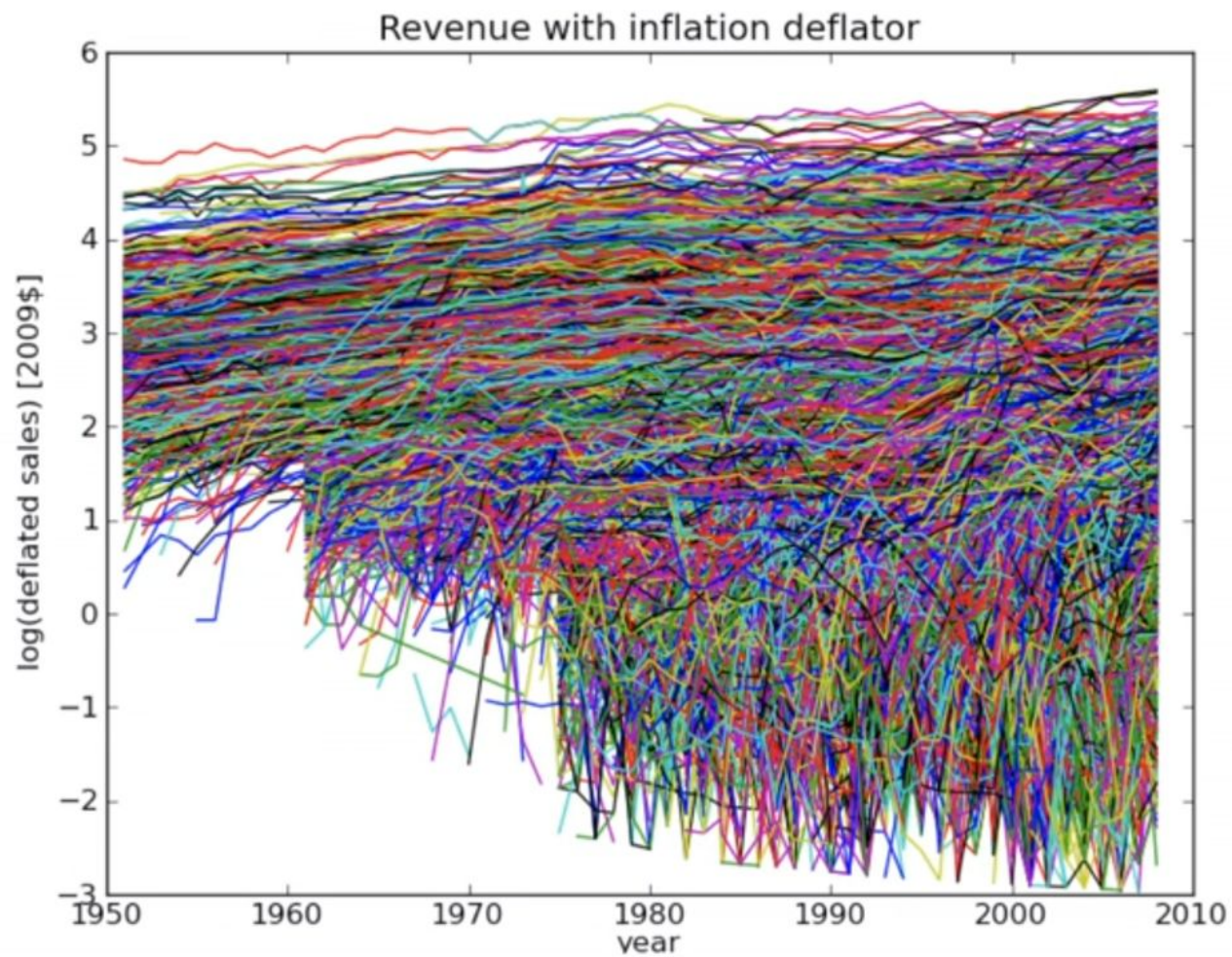


The Sale and Growth of Video Games From 2000 to 2006

Millions to Billion(s)
From Center to Outward:
.5, 1, 2, 3, 4, 5, 6, 7, 8



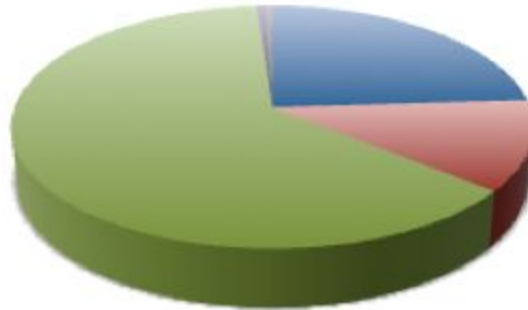
Only in retail sales. Online game subscriptions and digital distribution are NOT INCLUDED.



Percent of Mass

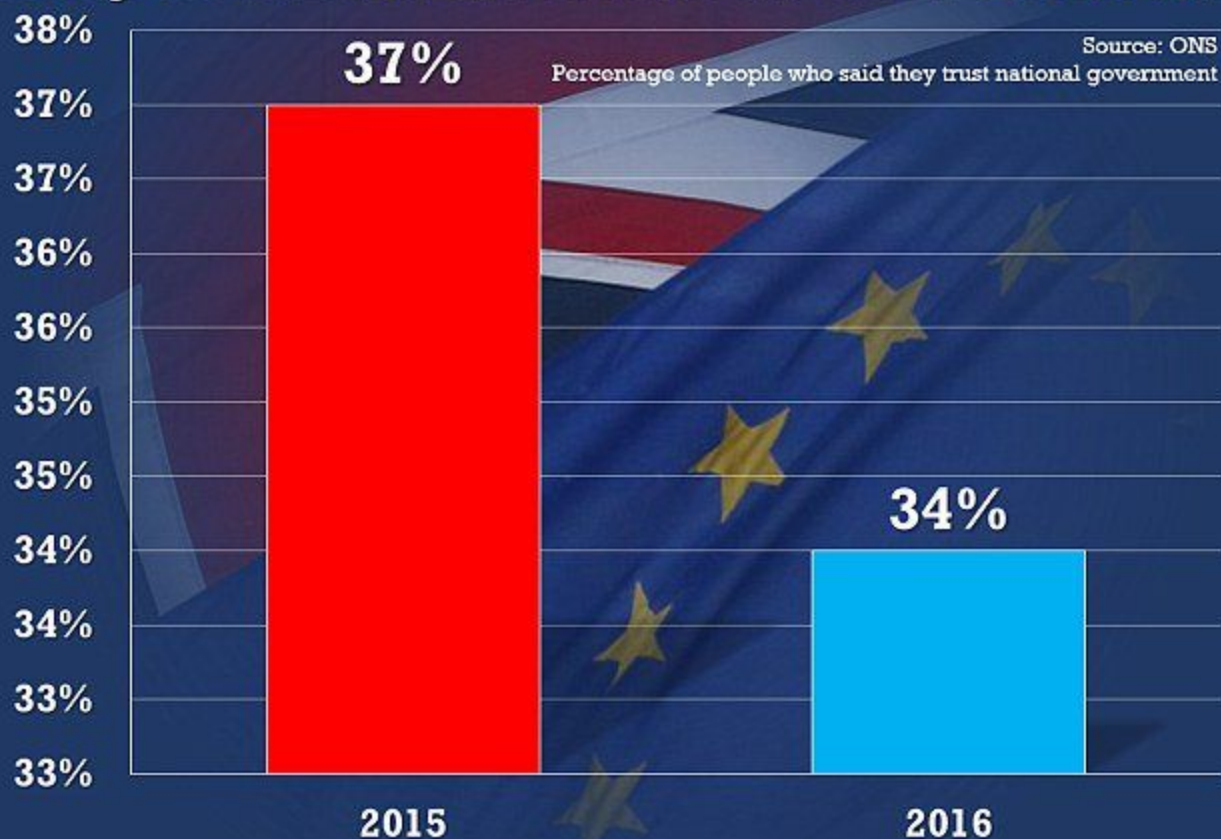


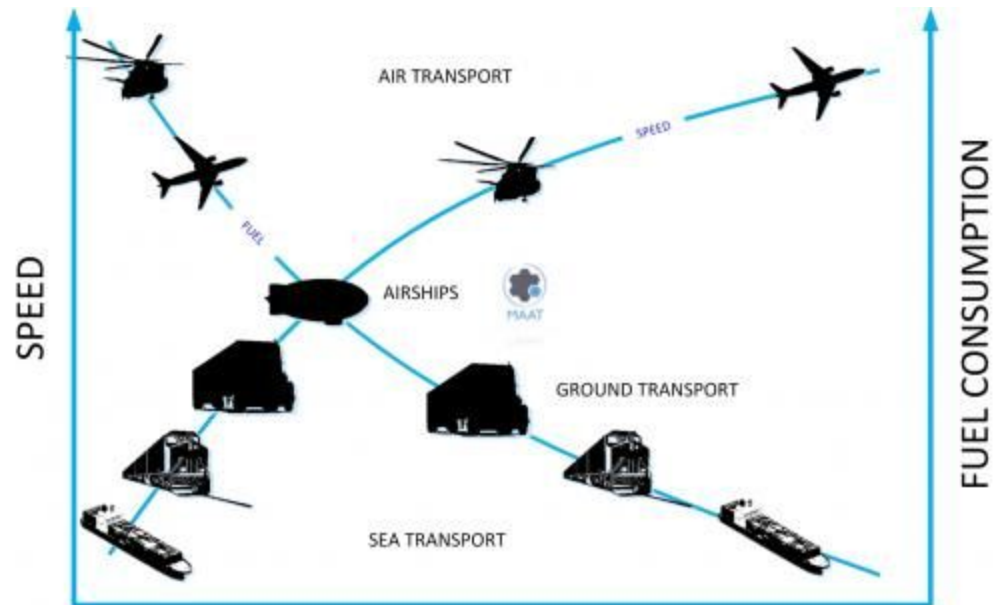
Atomic percent



- Oxygen
- Carbon
- Hydrogen
- Nitrogen
- Calcium
- Phosphorus
- Potassium
- Sulfur
- Sodium
- Chlorine
- Magnesium
- Iron*
- Fluorine
- Zinc
- Silicon
- Rubidium
- Strontium
- Bromine
- Lead
- Copper
- Aluminium
- Cadmium
- Cerium
- Barium
- Tin
- Iodine
- Titanium
- Boron
- Selenium
- Nickel
- Chromium
- Manganese
- Arsenic
- Lithium
- Mercury
- Caesium
- Molybdenum
- Germanium
- Cobalt
- Antimony
- Silver
- Niobium
- Zirconium
- Lanthanum
- Tellurium
- Gallium
- Yttrium
- Bismuth
- Thallium
- Indium
- Gold
- Scandium
- Tantalum
- Vanadium
- Thorium
- Uranium
- Samarium
- Tungsten
- Beryllium
- Radium

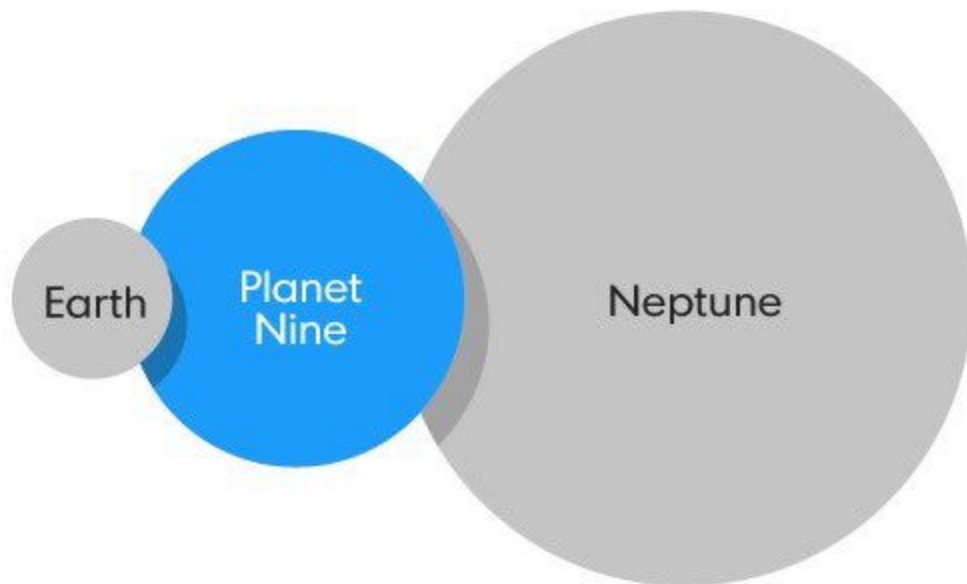
PROJECT FEAR HIT TRUST IN GOVERNMENT





SIZING UP PLANET NINE

Scientists estimate the planet measures somewhere between the size of Earth and that of the planet Neptune.



SOURCE: Caltech
Frank Pompa, USA TODAY



NBC2 VIEWER VOTE

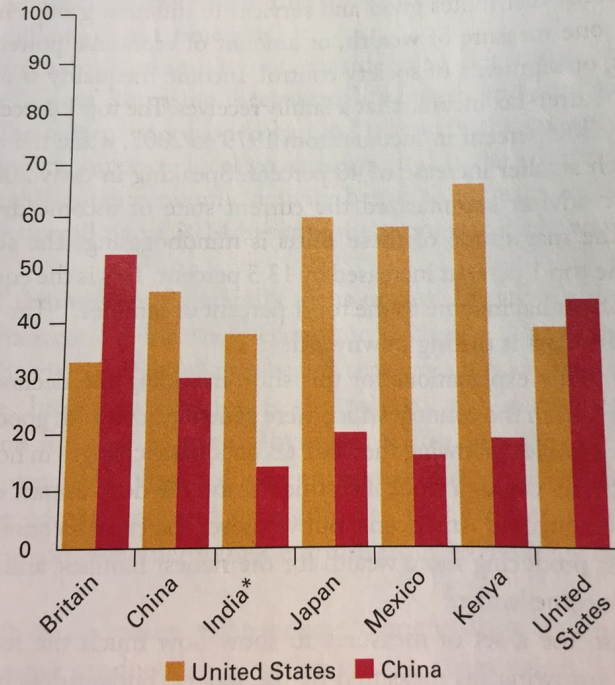
NBC-2.COM

HOW CONCERNED ARE YOU ABOUT THE ZIKA VIRUS?



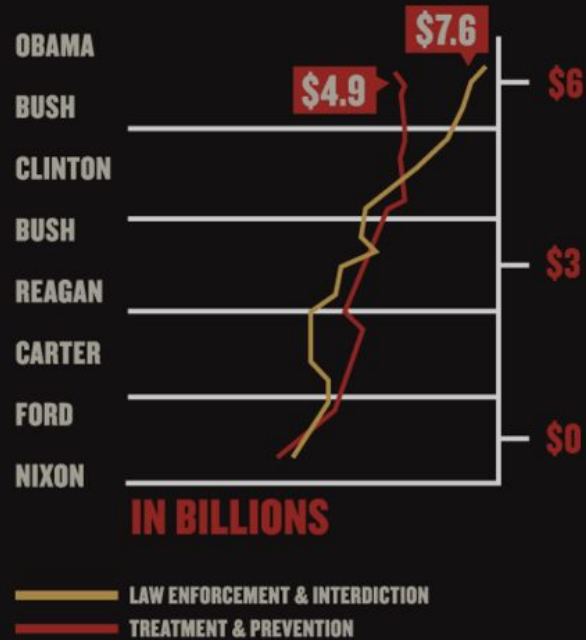
88° 4:04

Who has the world's strongest economy?



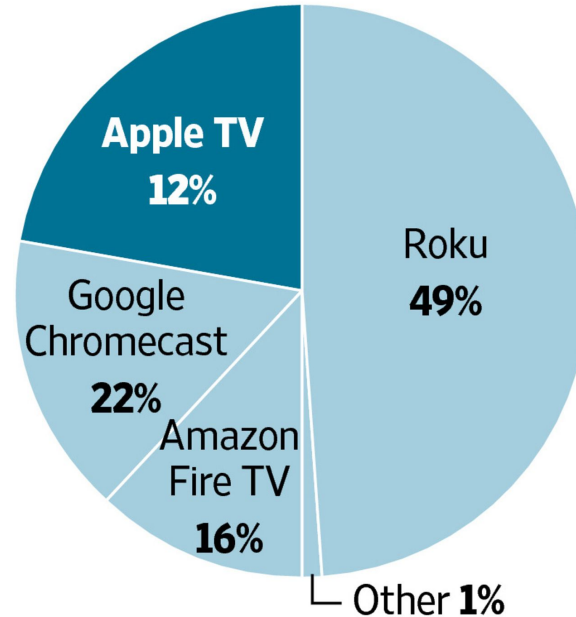
*Percentages are from 2011

FEDERAL DRUG CONTROL BUDGET



Streaming-TV Rivals

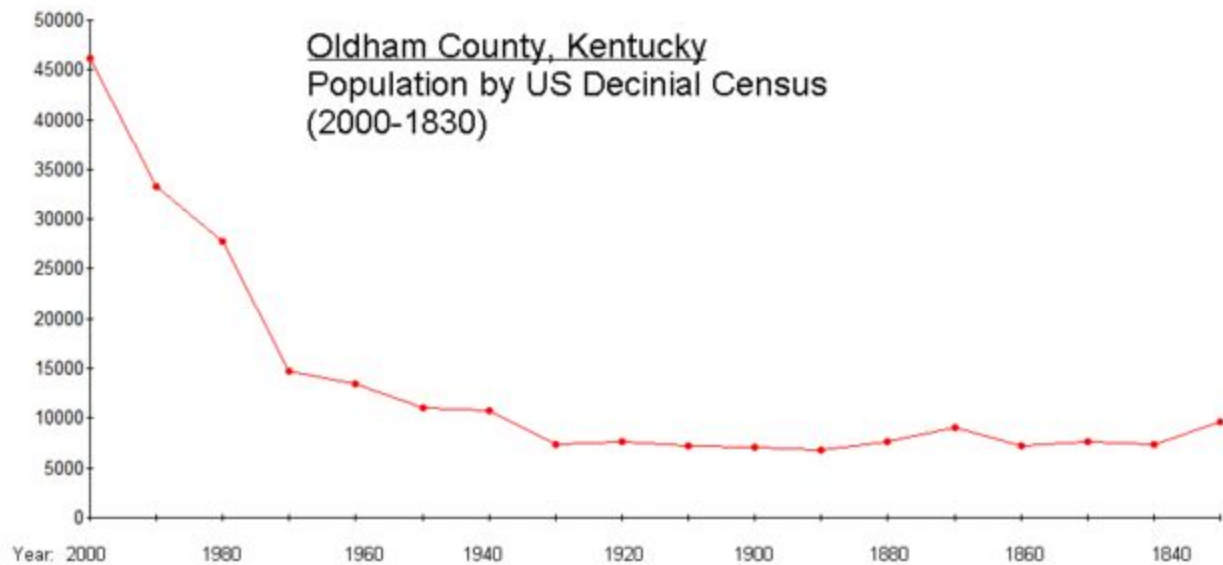
Market share for over-the-top streaming devices

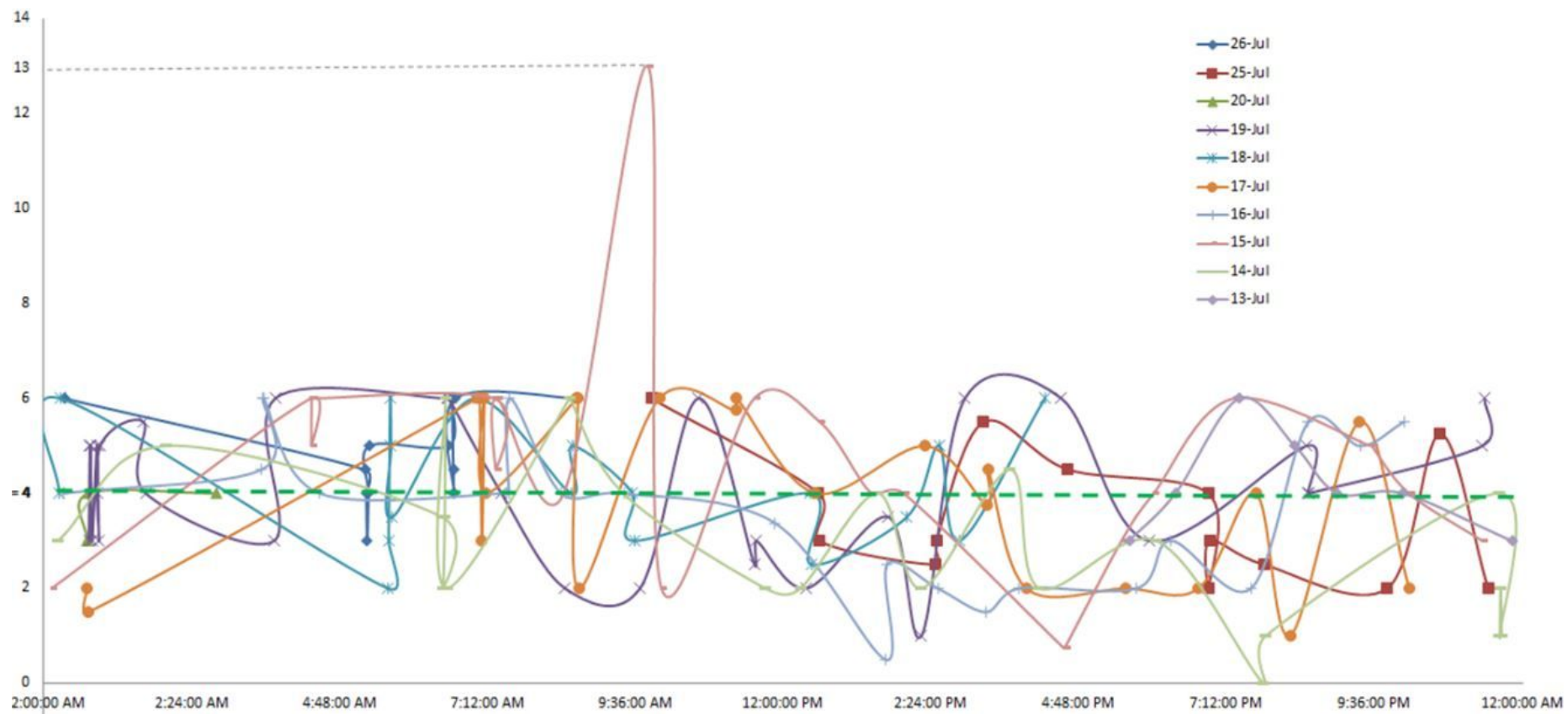


Note: As of March 2016

Source: comScore

THE WALL STREET JOURNAL.





@caskey