Crafting with Data

Reality, Illusions, Truth & the Future

Instructor: Rob Faludi

Plan for Today

- Lady Tasting Tea: notes
- Designing Attraction: Judgement in Decision-making
- Review

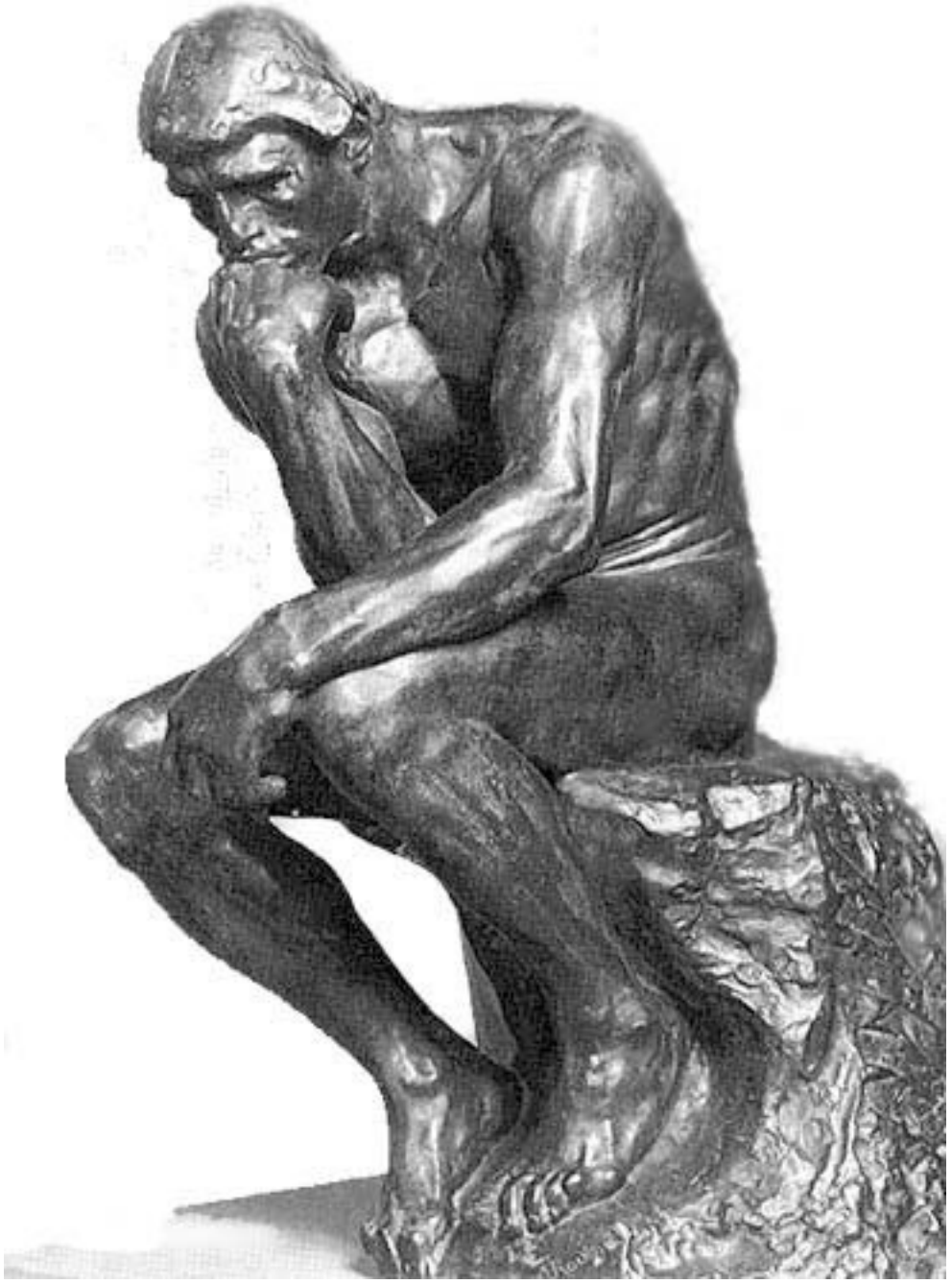
Designing Attraction

human decision-making

Rob Faludi

Thinking

is not for thinking



Thinking is for doing

– Susan T. Fiske

Designing Attraction

Designing Attraction

- If you want to attract people to your project...
- If you want to design a persuasive interaction...
- If you want to influence people's actions...

You must look into people's minds

...hardware isn't enough, you need to know the software

How don't people work?

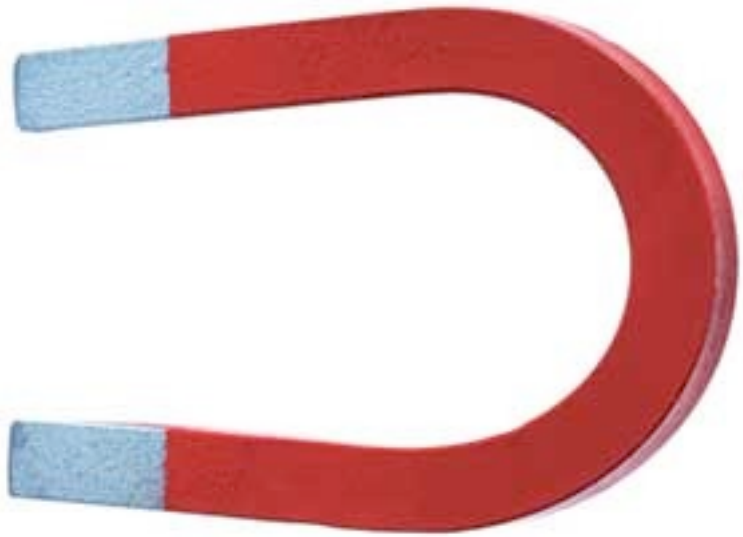
- people are not logical
- not even-handed, not objective
- not slow and thoughtful

People are a problem

Decision-making

- How to predict people
- How to influence people
- Ways to guide users to the goal

Attractions must be designed



The Human Brain

- A tangle of quickie rules, biased processes, evolutionary flotsam, attentional diversions
- The major influence shaping our planet
- Better understood now than ever before

Humans are predictable

- but we have some surprising behaviors

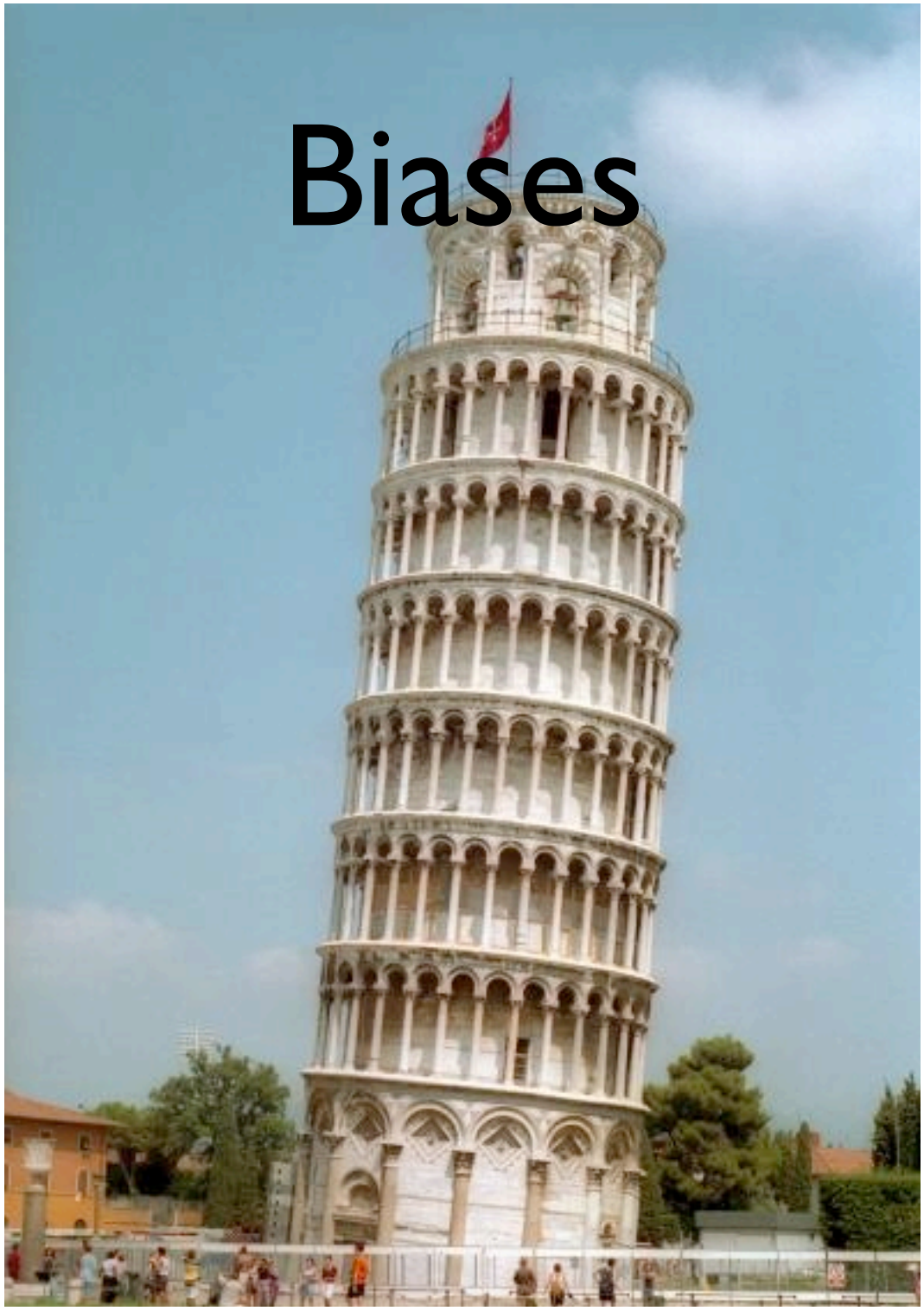
Click, whirr

Automation

- Fixed action patterns
- Doing what you did before
- Chains of events

Predictable processes

Biases



Biases

- leanings or predisposition
- favoring some outcomes over others
- sources of predictable errors

Heuristics

Heuristics

- A rule of thumb, simplification, or educated guess that reduces or limits the search for solutions in domains that are difficult and poorly understood. Unlike algorithms, heuristics do not guarantee optimal, or even feasible, solutions and are often used with no theoretical guarantee.

— Free Online Dictionary of Computing

Plenty of heuristics

- Anchoring and adjustment
- Availability heuristic
- Representativeness heuristic
- Affect heuristic
- Contagion heuristic
- Effort heuristic
- Familiarity heuristic
- Fluency heuristic
- Gaze heuristic
- Peak-end rule
- Recognition heuristic
- Scarcity heuristic
- Similarity heuristic

Scads of biases

- Bandwagon effect
- Base rate fallacy
- Bias blind spot
- Choice-supportive bias
- Confirmation bias
- Congruence bias
- Contrast effect
- Déformation professionnelle
- Distinction bias
- Endowment effect
- Extreme aversion
- Focusing effect
- Framing
- Hyperbolic discounting
- Illusion of control
- Impact bias
- Information bias
- Irrational escalatio
- Loss aversion
- Mere exposure effect
- Moral credential effect
- Need for closure
- Neglect of probability
- Omission bias
- Outcome bias
- Planning fallacy
- Post-purchase rationalization
- Pseudocertainty effect
- Reactance
- Selective perception
- Status quo bias
- Unit bias
- Von Restorff effect
- Zero-risk bias

- Ambiguity effect
- Anchoring
- Attentional bias
- Availability heuristic
- Availability cascade
- Clustering illusion
- Conjunction fallacy
- Gambler's fallacy
- Hawthorne effect
- Hindsight bias
- Illusory correlation
- Ludic fallacy
- Neglect of prior base rates effect
- Observer-expectancy effect
- Optimism bias
- Overconfidence effect
- Positive outcome bias
- Primacy effect
- Recency effect
- Regression toward the mean disregarded
- Reminiscence bump
- Rosy retrospection
- Selection bias
- Stereotyping
- Subadditivity effect
- Subjective validation
- Telescoping effect
- Texas sharpshooter fallacy

- Actor-observer bias
- Dunning-Kruger effect
- Egocentric bias
- Forer effect (aka Barnum Effect)
- False consensus effect
- Fundamental attribution error
- Halo effect
- Herd instinct
- Illusion of asymmetric insight
- Illusion of transparency
- Ingroup bias
- Just-world phenomenon
- Lake Wobegon effect
- Notational bias
- Outgroup homogeneity bias
- Projection bias
- Self-serving bias
- Self-fulfilling prophecy
- System justification
- Trait ascription bias

- Beneffectance
- Consistency bias
- Cryptomnesia
- Egocentric bias
- False memory
- Hindsight bias
- Suggestibility

Four Interesting Biases

- positive outcome bias
- confirmation bias
- illusion of control
- framing: presentation affects choice

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Some Effects and Fallacies

- Contrast effect — the enhancement or diminishment of a weight or other measurement when compared with recently observed contrasting object.
- Endowment effect — "the fact that people often demand much more to give up an object than they would be willing to pay to acquire it"
- Moral credential effect — the tendency of a track record of non-prejudice to increase subsequent prejudice.
- Planning fallacy — the tendency to underestimate task-completion times.
- Ludic fallacy — the analysis of chance related problems with the narrow frame of games. Ignoring the complexity of reality, and the non-gaussian distribution of many things.
- Texas sharpshooter fallacy — the fallacy of selecting or adjusting a hypothesis after the data is collected, making it impossible to test the hypothesis fairly.

Texas Sharpshooter

Texas Sharpshooter

- A logical fallacy created by devising meaning after the fact. Name comes from a story about a Texan who shoots at the side of a barn.
- Post-hoc analysis

Three Important Heuristics

- anchoring and adjustment
- availability heuristic
- social proof heuristic

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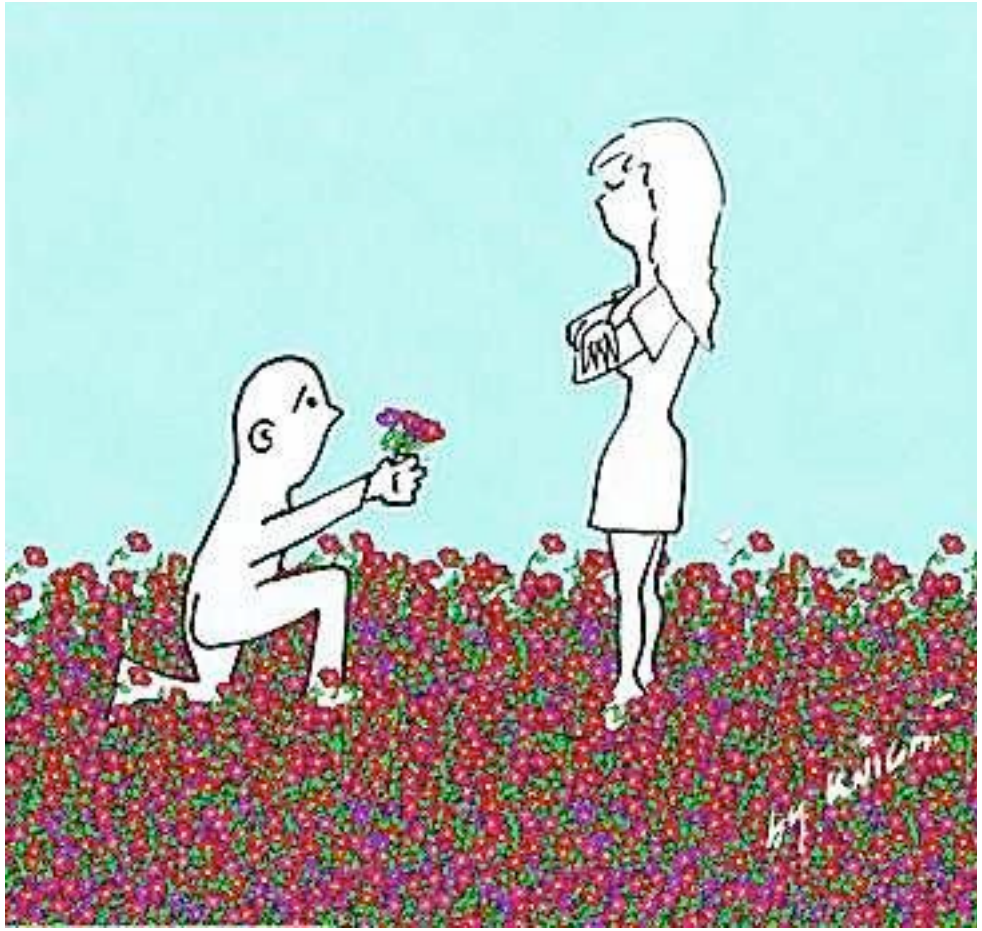
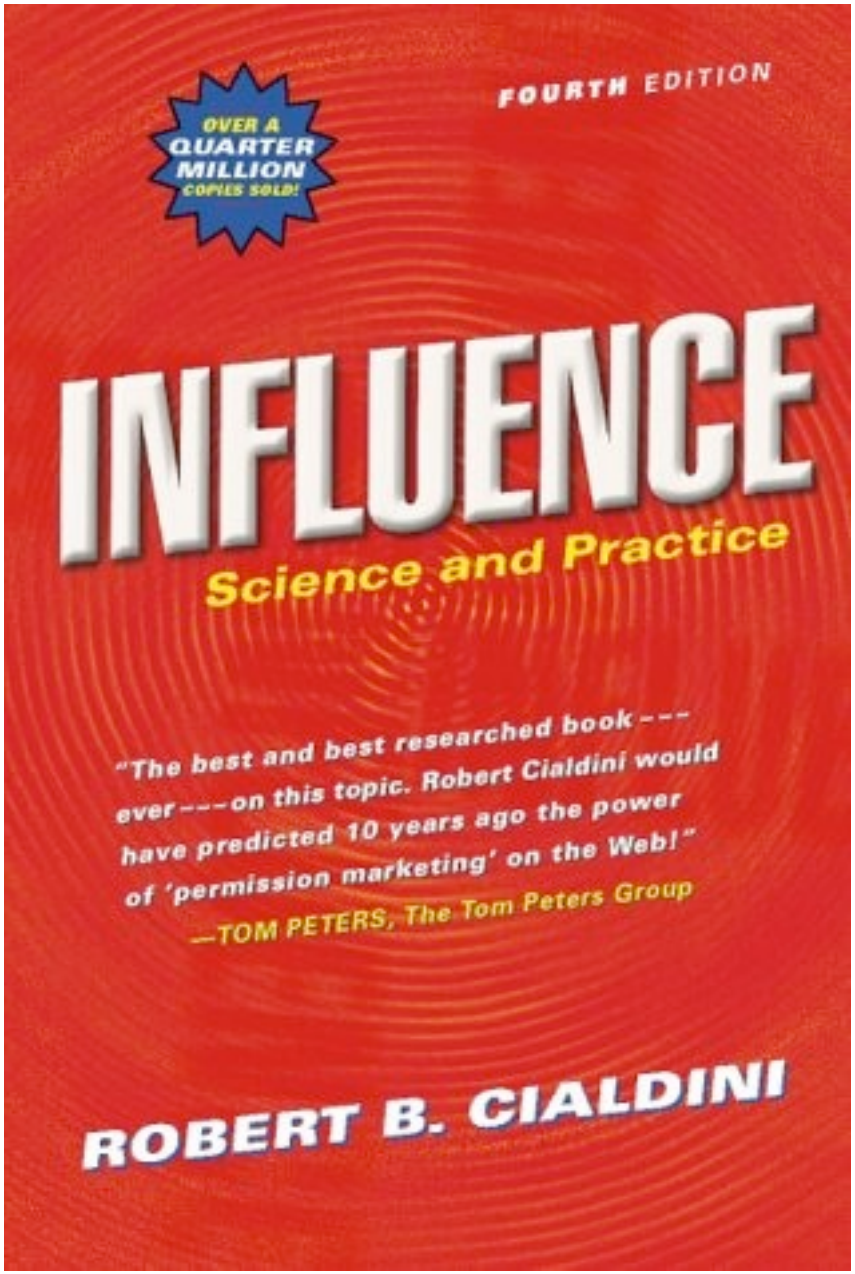
Heuristics Are Sensible

- Rules of thumb work because they are often correct
- Heuristics are fast
- Exhaustive analysis isn't usually possible

How to attract



...and persuade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INFLUENCE
Science and Practice
"The best and best researched book---ever---on this topic. Robert Cialdini would have predicted 10 years ago the power of 'permission marketing' on the Web!"
—TOM PETERS, The Tom Peters Group
ROBERT B. CIALDINI

Influence

- Robert Cialdini and the *weapons* of persuasion

Influential Tools

- Reciprocity
- Commitment and consistency
- Social proof
- Liking
- Authority
- Scarcity

Reciprocity

- we try to repay, in kind, what another person does for us
  -Alvin Gouldner (1960)
- web of indebtedness
- watch out for uninvited debts
- mailing labels, in-person solicitations, engineered concessions

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Commitment & Consistency

- we like things better after we choose them
- foot-in-the-door: small to large (Freedman, Fraser 1966)
- justification of effort: boot camp, up all night

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Social Proof

Stanley Milgram

Social Proof

- if everyone else jumped off a cliff...
- Milgram conformity
- effective in ambiguous situations with social peers
- can be tragically powerful

Liking

Liking

- more likely to comply with someone we like
- ...and we like people who are
  - attractive
  - similar
  - familiar

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Authority

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- Milgram
- value of authority symbols
- illusion of authority (not a doctor but play one on TV)
- heuristic value

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Scarcity

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- increases perceived value
- baseball cards, wine, mates
- time limits

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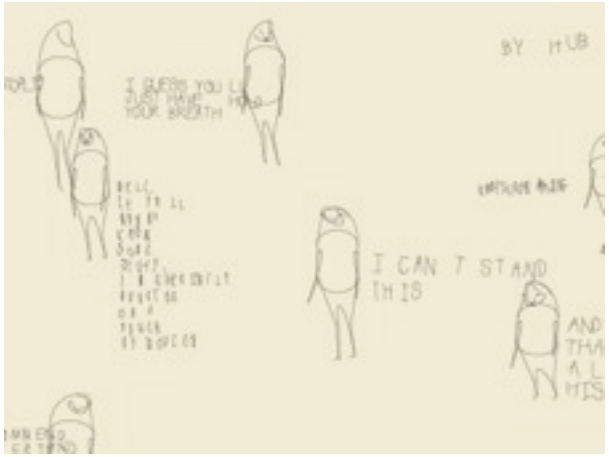
- baseball cards, wine, mates
- time limits

Influential tactics relevant to:

- advertising
- social networks
- art
- media
- projects
- dating
- religion

dodgeball.com



Gmail by Google BETA

JabberJockeys
underwear for talkative couples

Ethics and Exemption

- Is it okay to use these tools?

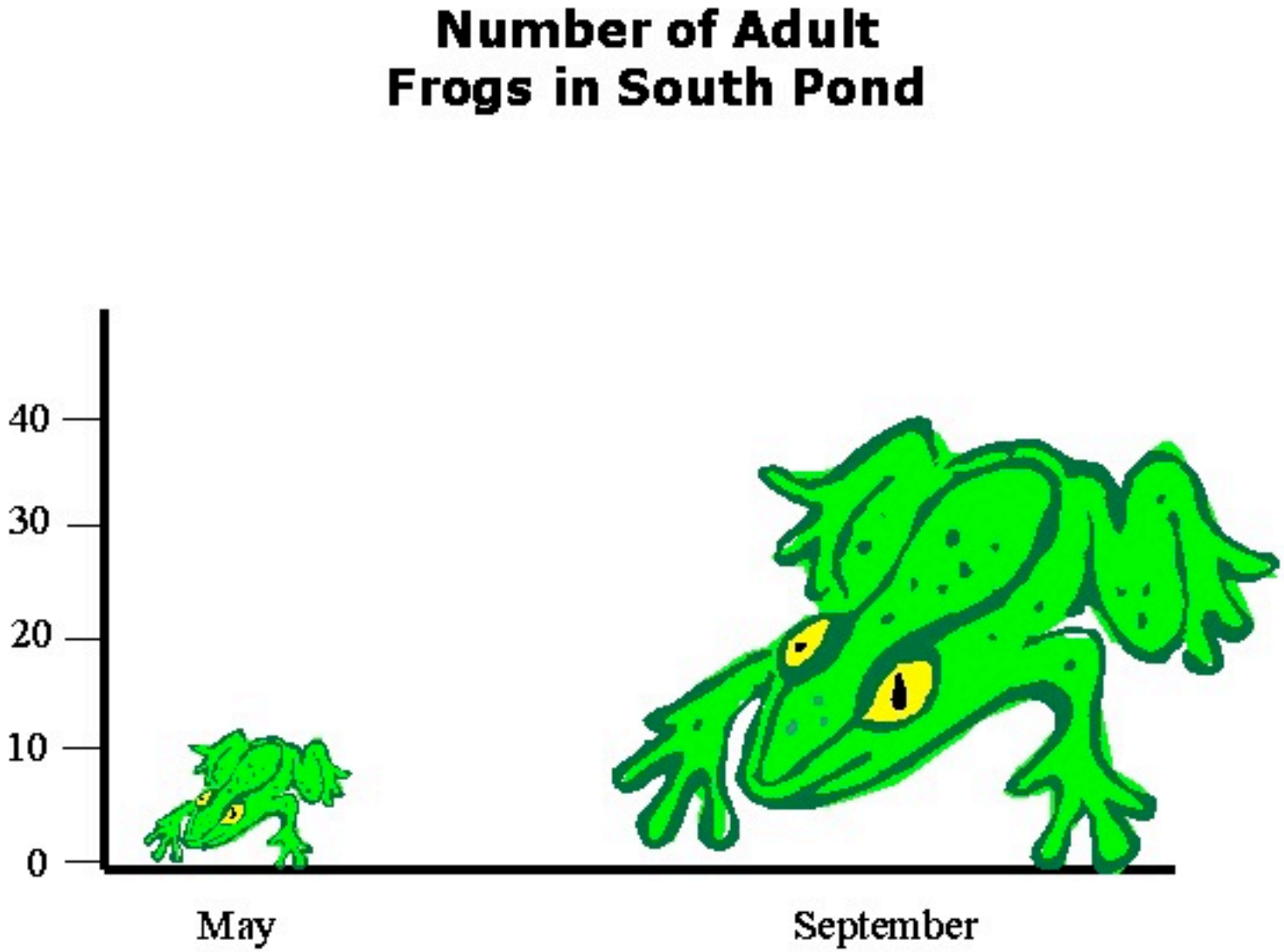
- Does understanding them exempt us from their influence?

Designing Attraction

Class Review

Ethics and understanding

- how to lie with statistics



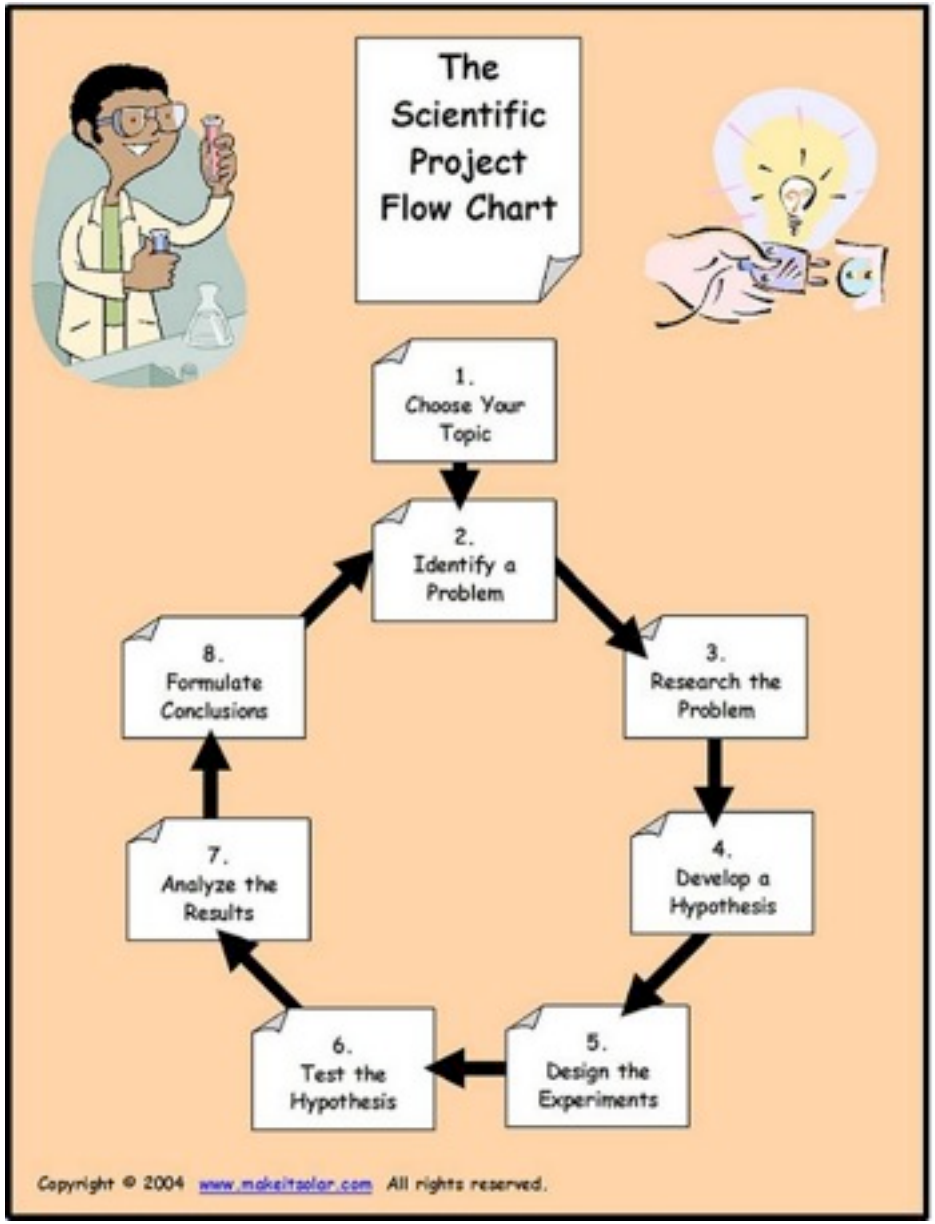
HOW TO LIE WITH STATISTICS

Darrell Huff

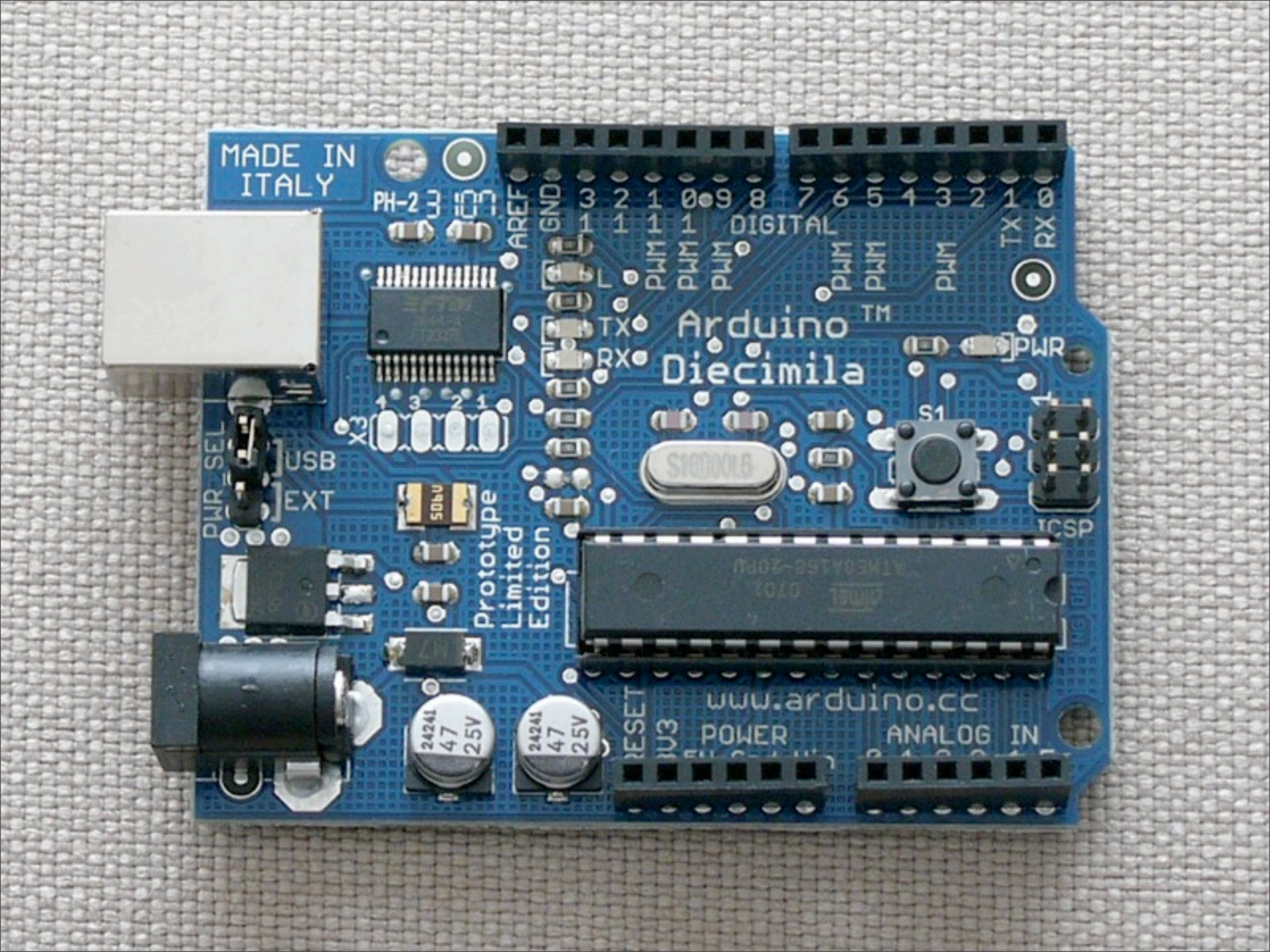
Illustrated by Irving Geis

Over Half a Million Copies Sold—
An Honest-to-Goodness Bestseller

Thinking Scientifically



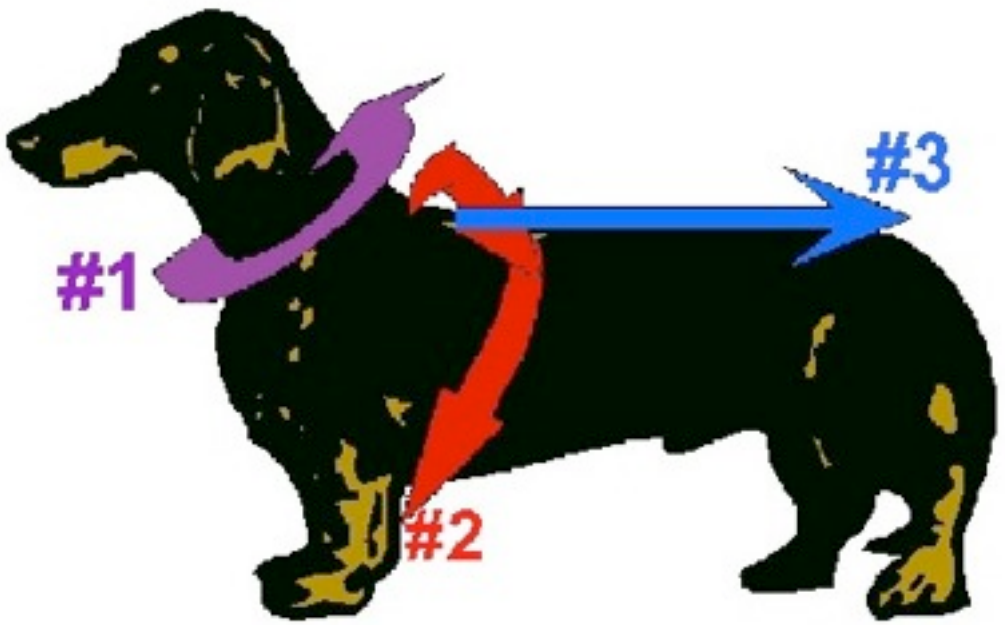
Thinking Scientifically


MADE IN ITALY
PH-2
AREF
GND
DIGITAL
PWM
TX
RX
L
Arduino
TM
Diecimila
PWR
S1
ICSP
PWR_SEL
USB
EXT
Prototype
Limited
Edition
www.arduino.cc
POWER
ANALOG IN
RESET
3V3

The Modern Science of Measuring

- a world of parameters. Scientific method, gathering data, ethics and IRB, informed consent

The Modern Science of Measuring



The Modern Science of Measuring

Diagram A: Place thumb or finger beneath tape measure when taking bust measurement.

The Modern Science of Measuring

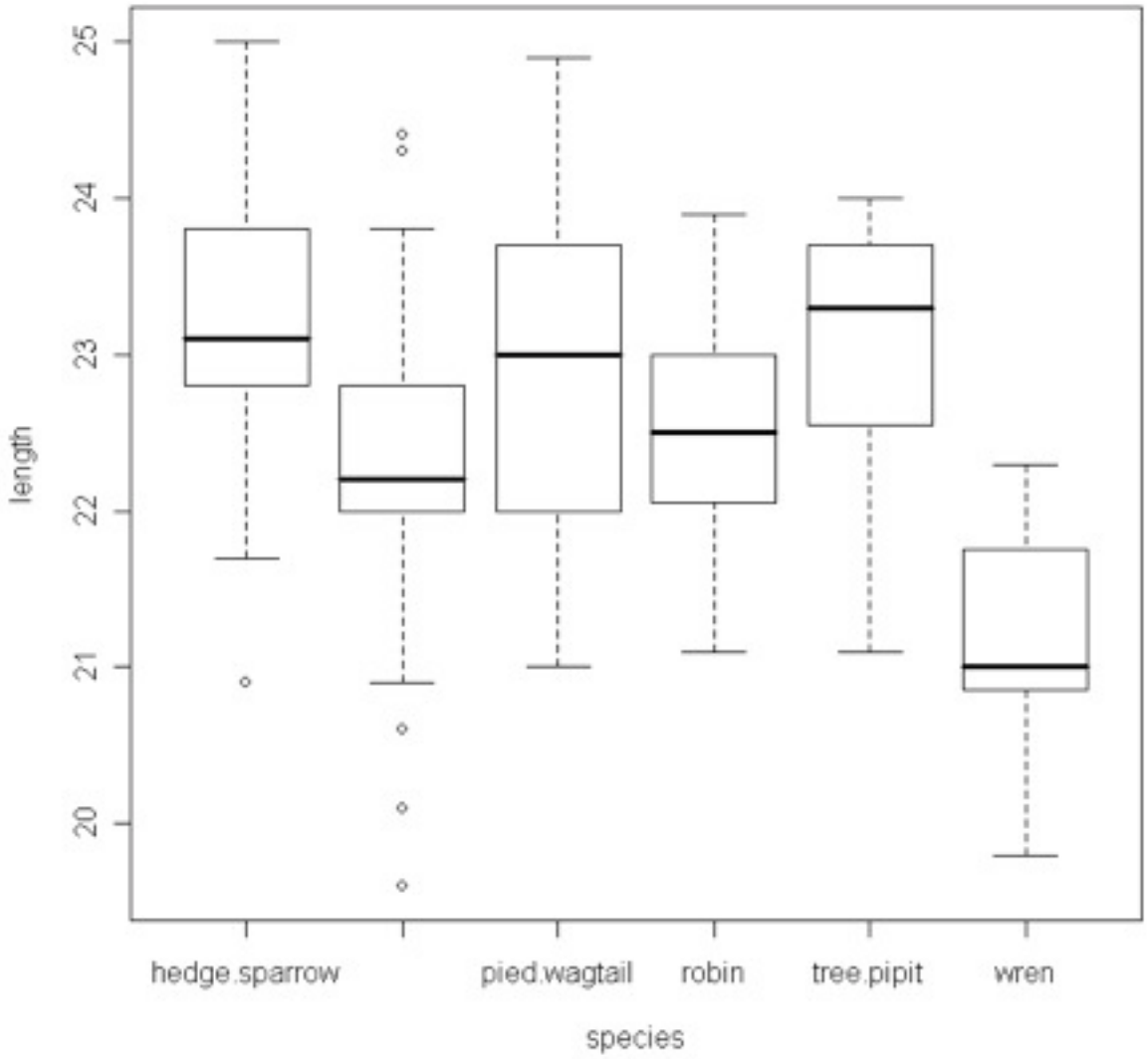

SCHOOL BUS
SCHOOL BUS
SCHOOL BUS
SCHOOL BUS
EMERGENCY

Looking at Data

- exploratory data analysis and descriptive statistics

	A	B	C	D	E	F	G	H	I	J	K	L
1	Site	Longitude	Latitude	Elevation	Annual Me	Mean Diur	Isothermali	Temperatu	Max Temp	Min Tempe	Temperatu	Mean T
2	O0002258	149.3833	-19.9167	0	23.8	4.5	0.39	0.9	29.4	17.8	11.6	2
3	O0000469	144.2483	-17.4283	10	25.8	14	0.61	0.98	36.2	13.1	23.1	2
4	O0000181	144.85	-15.5167	600	21	8.3	0.53	0.91	28.7	13	15.7	2
5	O0000409	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
6	O0001066	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
7	O0001064	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
8	O0000387	153.9	-14.6	165	24.8	-3.3	-41.25	0.33	25.7	25.7	0.1	2
9	O0000405	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
10	O0001065	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
11	O0001092	153.9	-14.6	150	24.9	-3.2	-38.27	0.33	25.8	25.7	0.1	2
12	O0000368	152.9667	-14.5	1200	19	-4.1	-4.28	0.4	20.8	19.8	1	2
13	O0000382	153.9	-14.6	165	24.8	-3.3	-41.25	0.33	25.7	25.7	0.1	2
14	O0000392	152.95	-14.45	1800	15.7	-4.9	-4.05	0.44	17.8	16.6	1.2	1
15	O0001048	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
16	O0001081	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
17	O0000369	152.9667	-14.5	1200	19	-4.1	-4.28	0.4	20.8	19.8	1	2
18	O0000399	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
19	O0001054	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
20	O0001055	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
21	O0000400	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
22	O0001056	152.9833	-14.5667	260	24.2	-2.8	-3.97	0.35	25.5	24.9	0.7	2
23	O0000371	152.9667	-14.5	1200	19	-4.1	-4.28	0.4	20.8	19.8	1	2

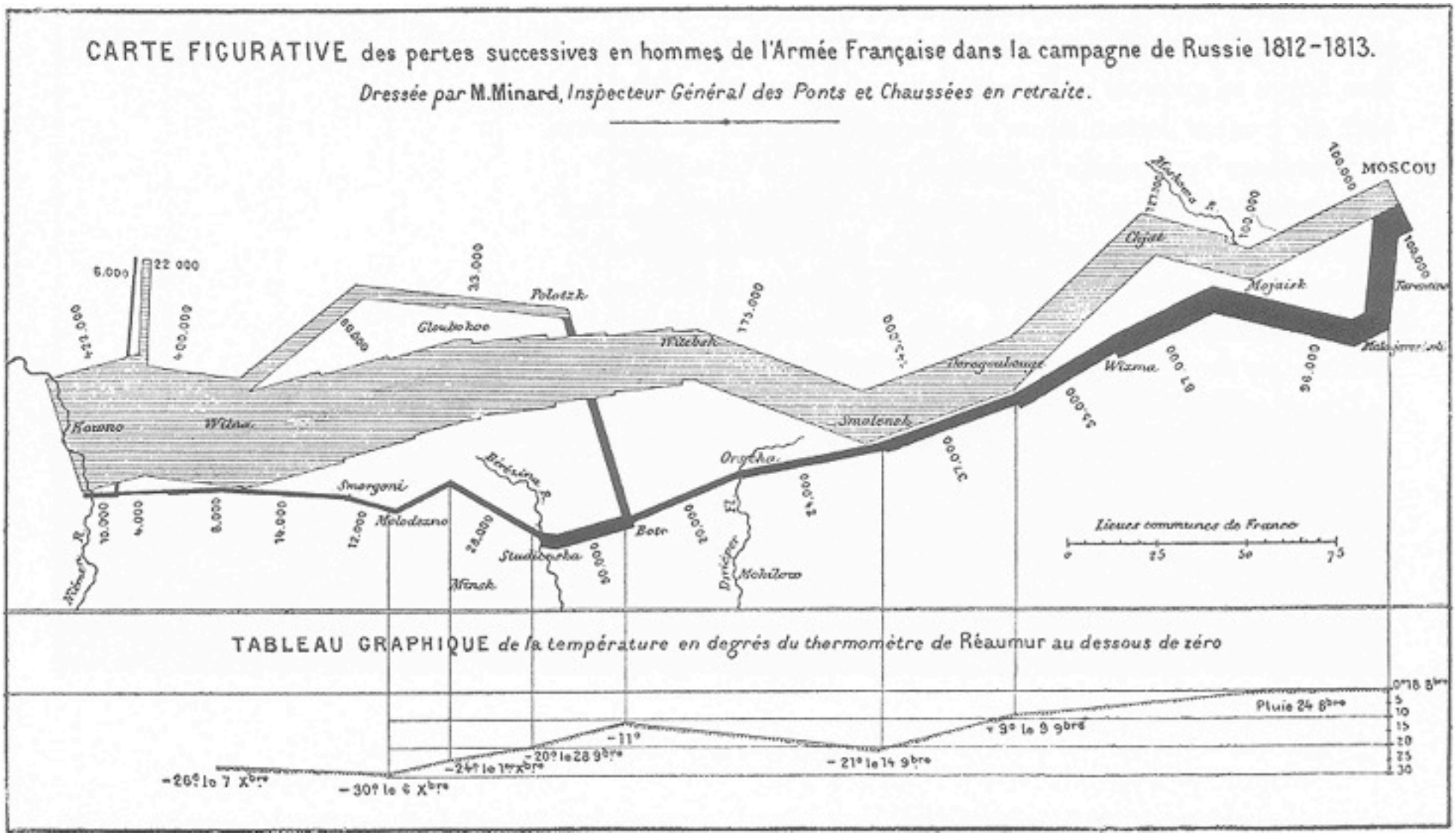
Looking at Data



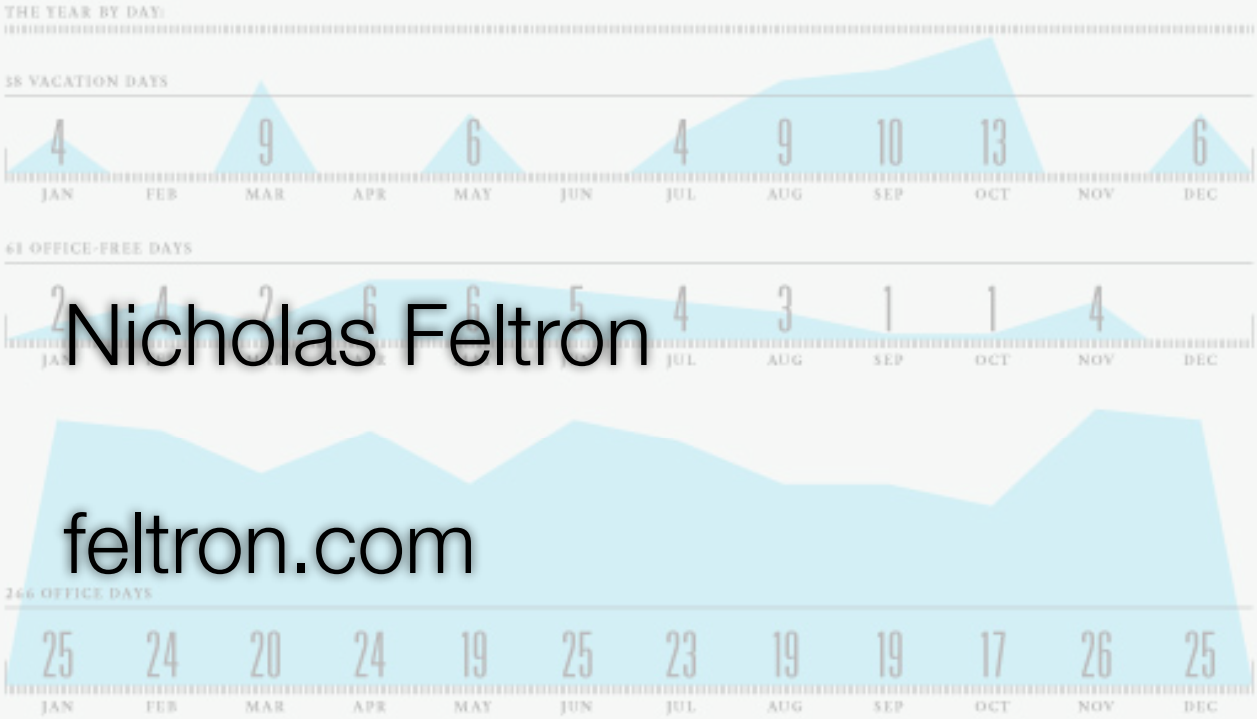

```
Stem-and-leaf of Weight    N  = 92
Leaf Unit = 1.0

  1     9 5
  2    10 2
  4    10 88
  7    11 002
 13    11 556688
 19    12 000123
 24    12 55555
 31    13 0000013
 37    13 555688
 42    14 00002
 (6)   14 555558
 44    15 00000000003
 33    15 55555555557
 22    16 00004
 17    16 5
 16    17 0000
 12    17 55
 10    18 000
  7    18 5
  6    19 0000
  2    19 5
  1    20
  1    20
  1    21
  1    21 5
```

Looking at Data



Two Thousand and Seven



Nicholas Feltron

feltron.com

LOWEST TEMPERATURE (°F):
8°
FEBRUARY 5, NYC

HIGHEST TEMPERATURE (°F):
92°
JULY 16 & AUGUST 2, NYC

POSTCARDS RECEIVED:
13

WEIGHT GAINED:
2.6
POUNDS

BURGLARS CONFRONTED:
ONE

LONGEST DAY OF THE YEAR:
MARCH TENTH

TEETH LOST BY CAT:
1

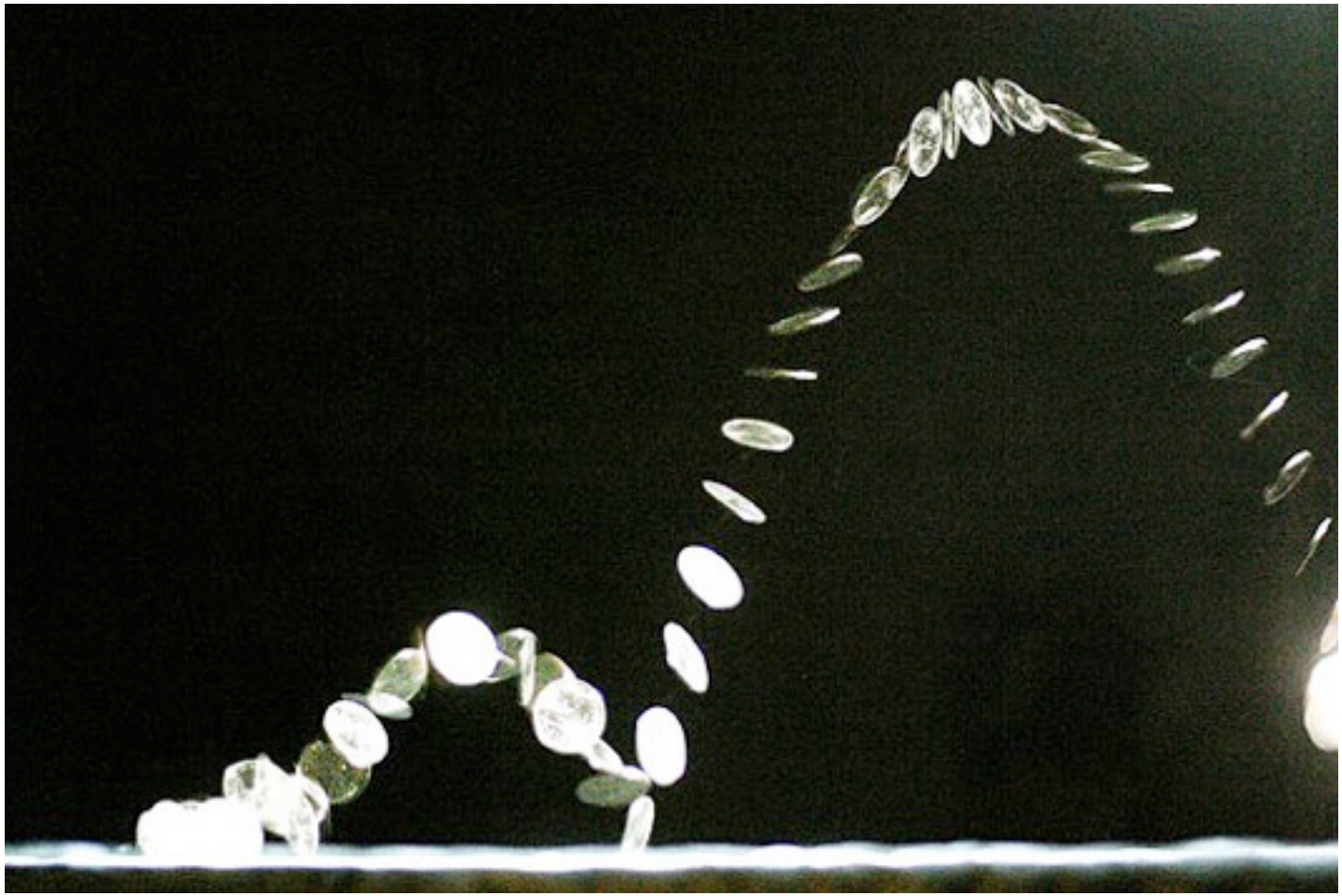
MUSEUM VISITS:
EIGHT

An Averag

CHANCE OF OLIVE'S LUNCH:
44%

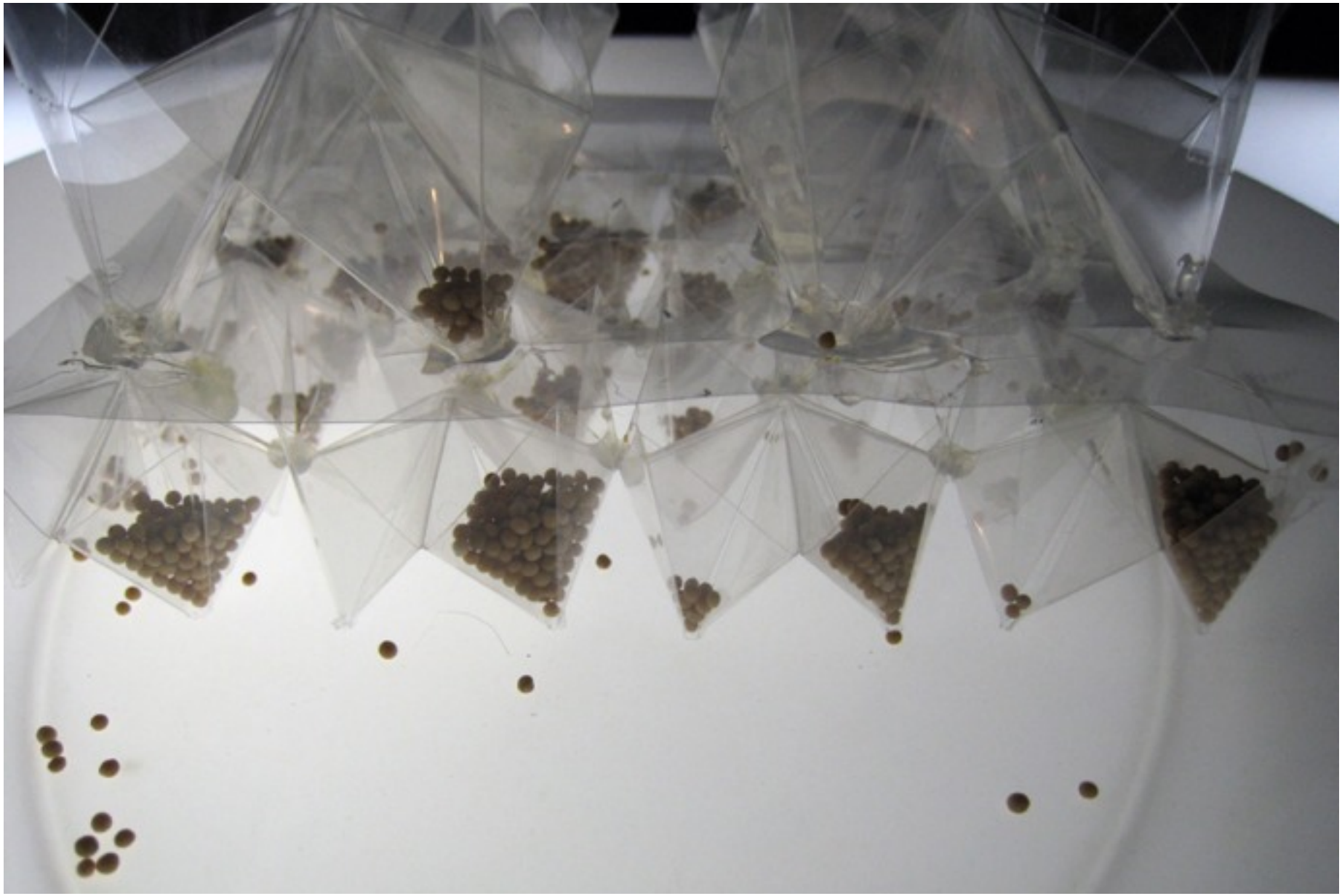
CHANCE OF DINNER AT HOME:
39%

Knowing Uncertainty

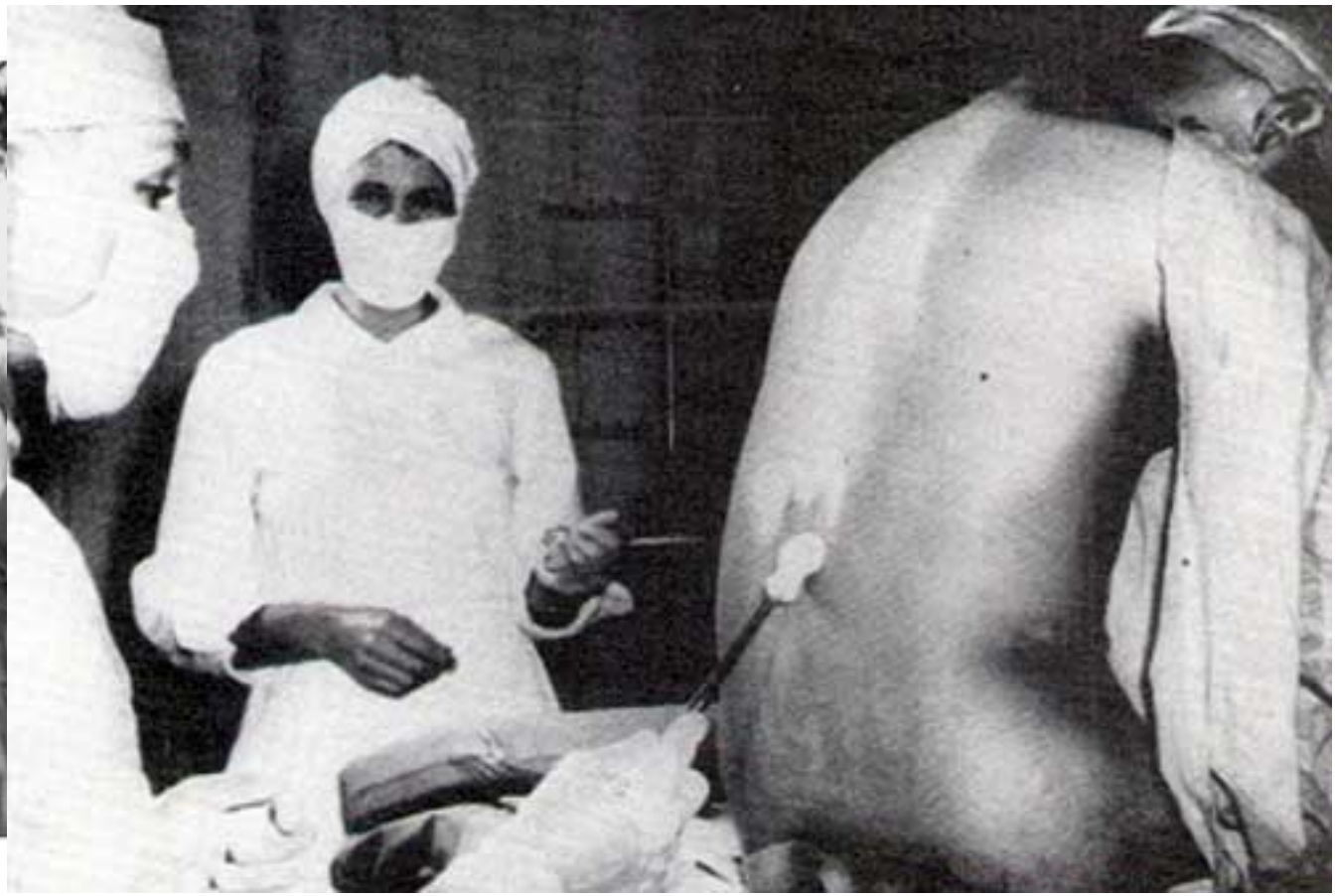


Knowing Uncertainty

Quincunx



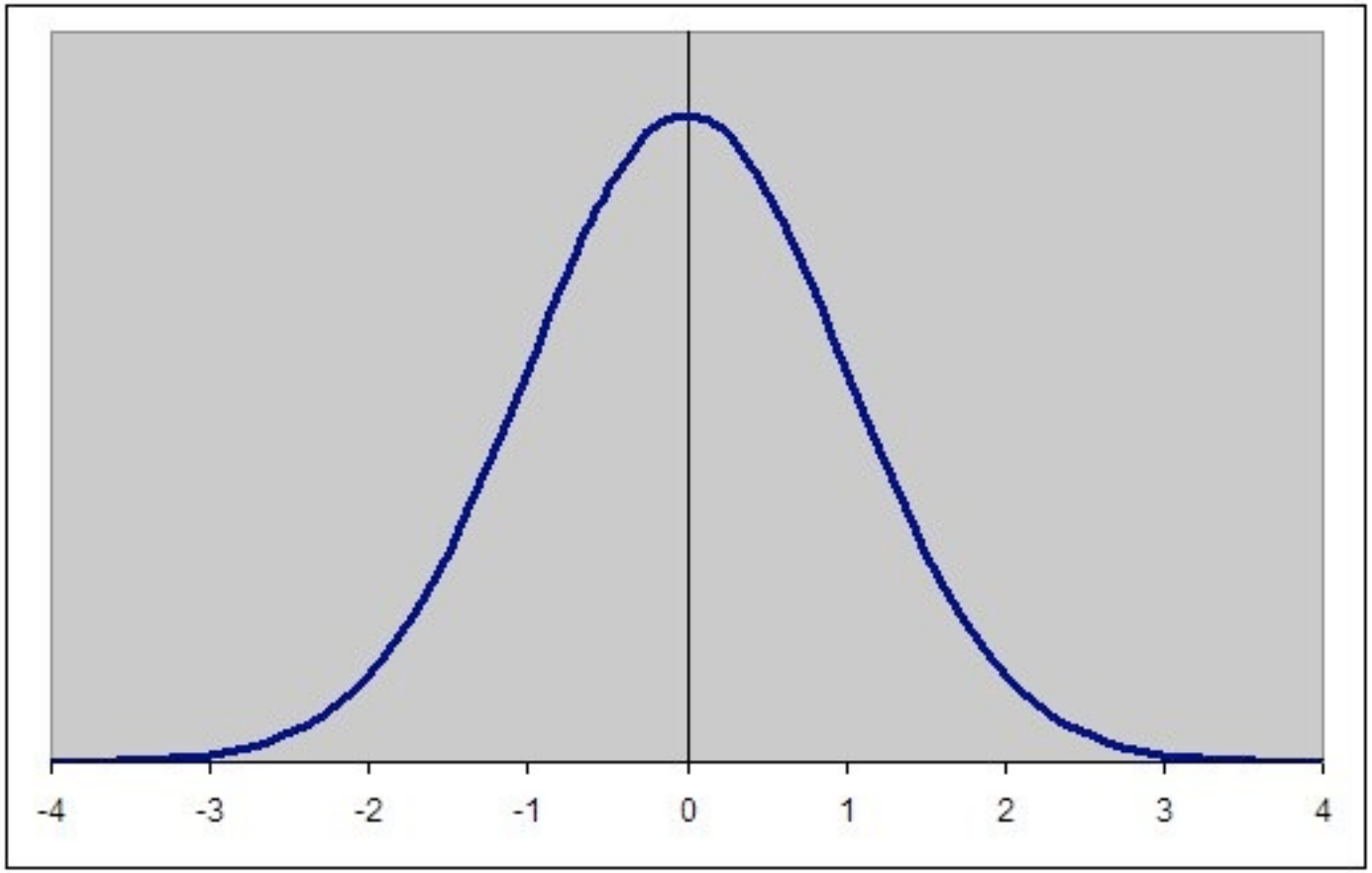
American Human Experimentation



"Tuskegee Study of Untreated Syphilis in the Negro Male"

Hands-on Statistics

- central tendency and variance

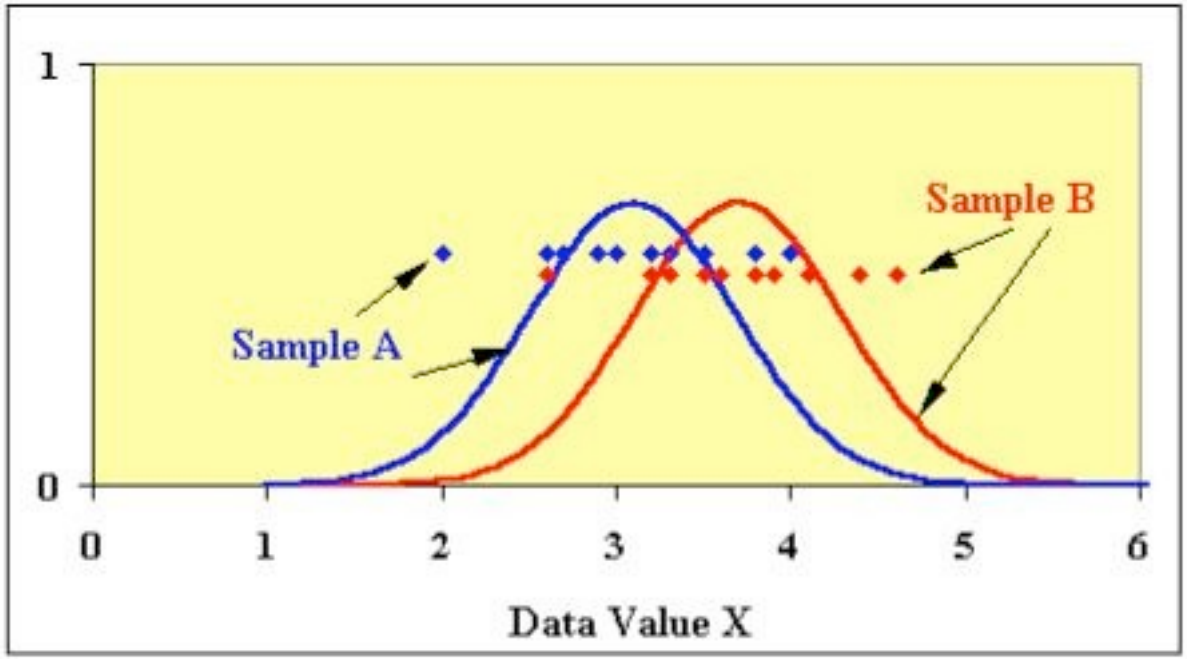


Variation and Measures of Spread

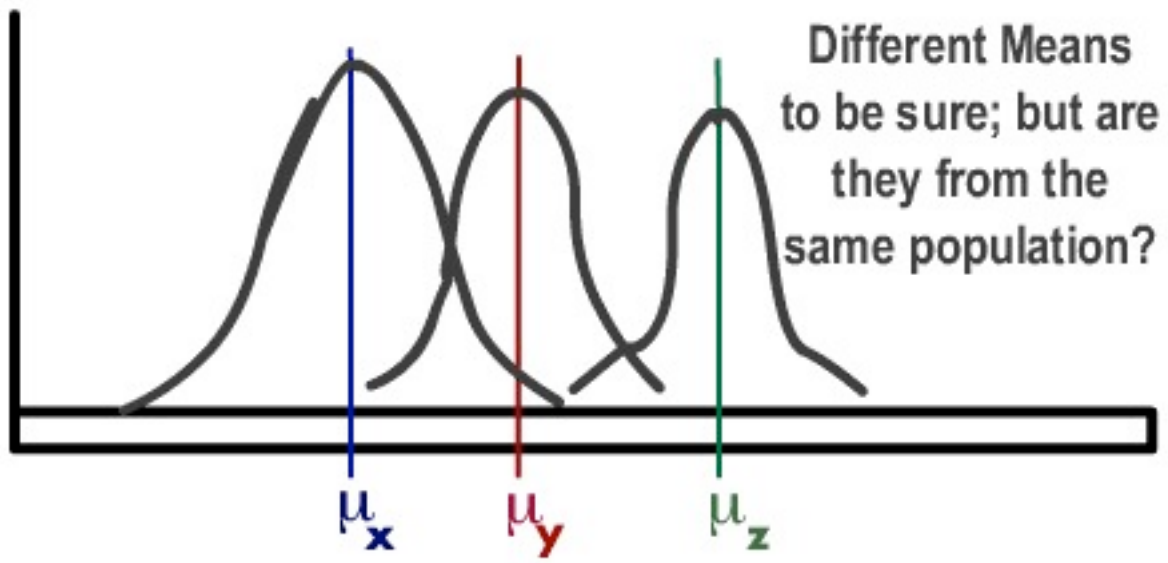
Testing for Truth

- confirmatory stats and your favorite spreadsheet

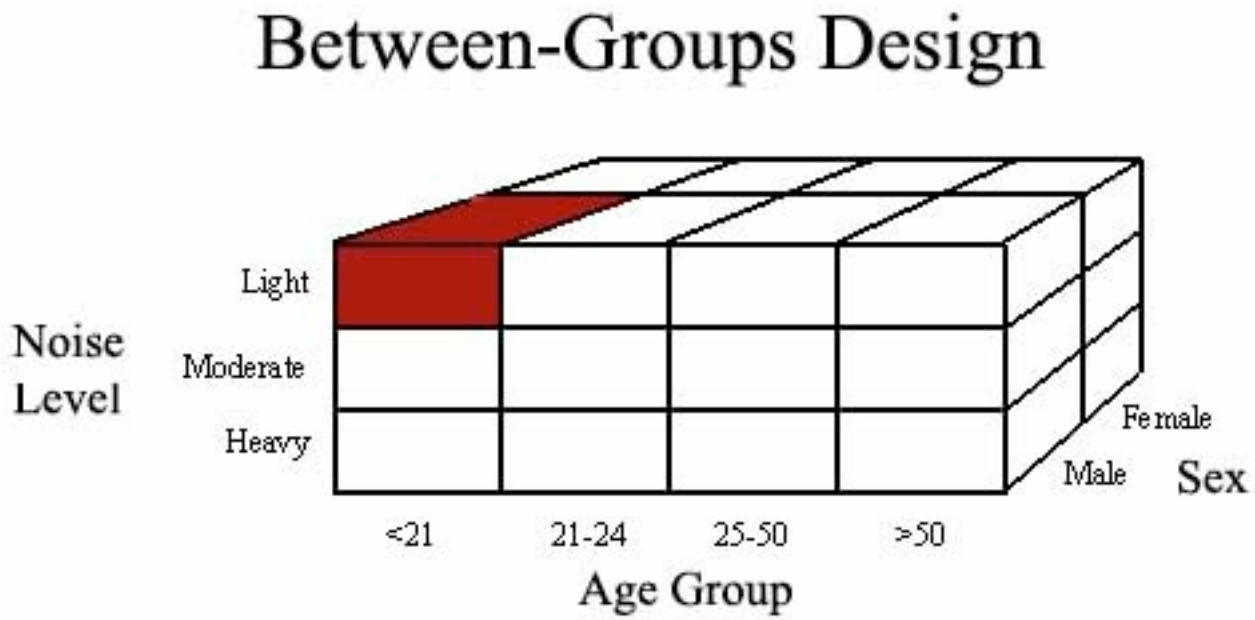
Testing for Truth



Testing for Truth

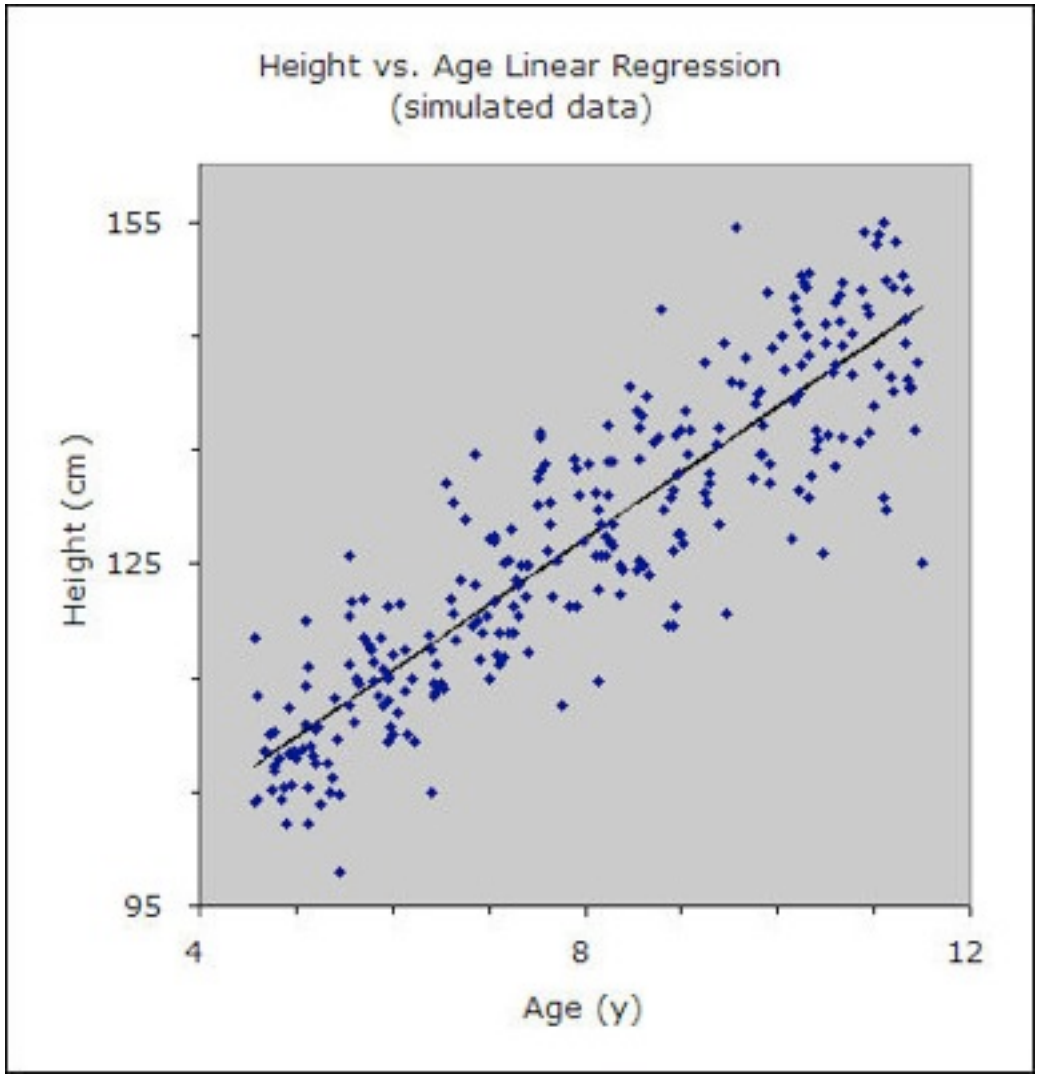


Testing for Truth



Seeing the Future

- predictive statistics



Testing for Truth

One-in-a-million

Getting it Right

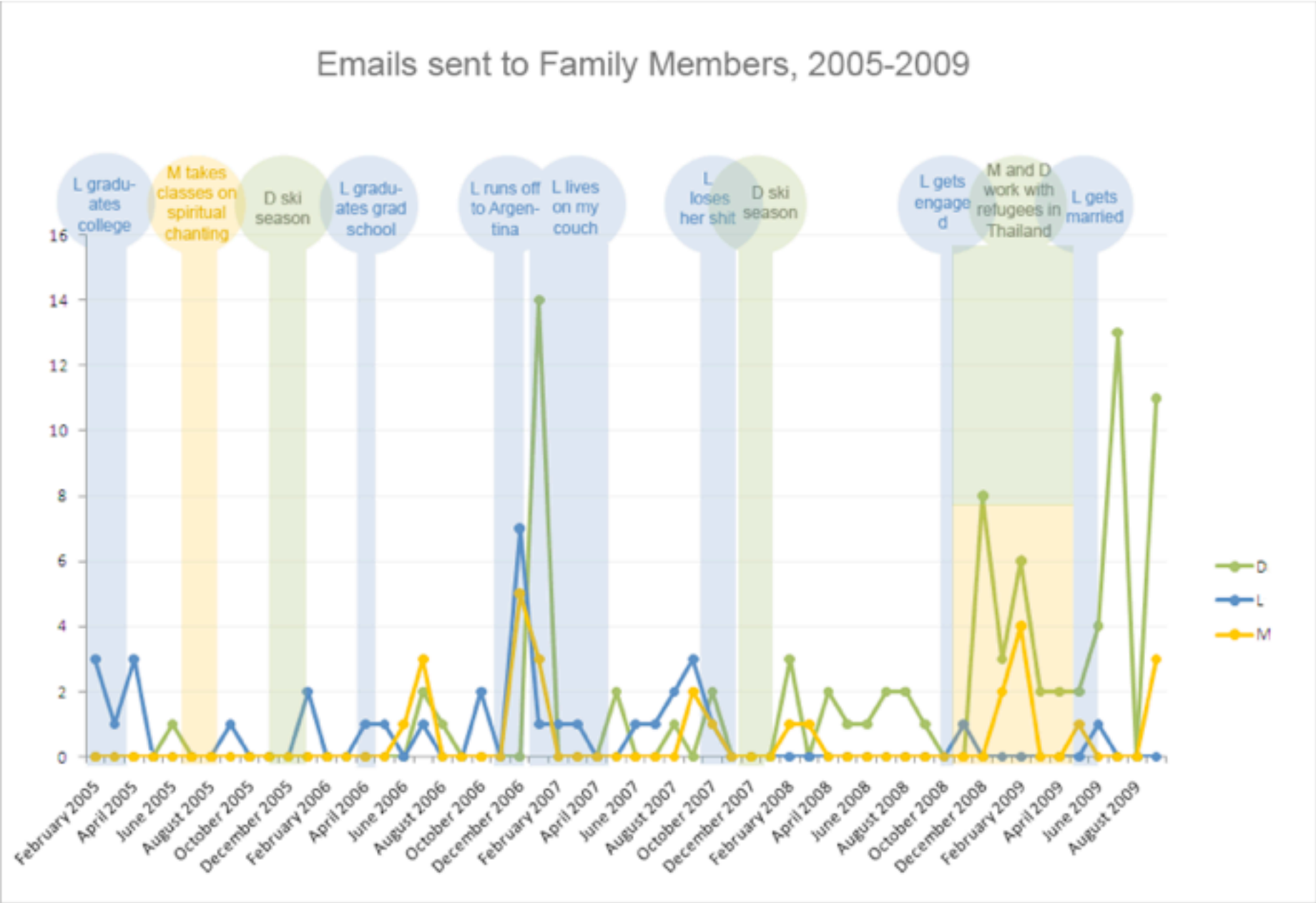
- sample size, effect size and power

Getting it Right

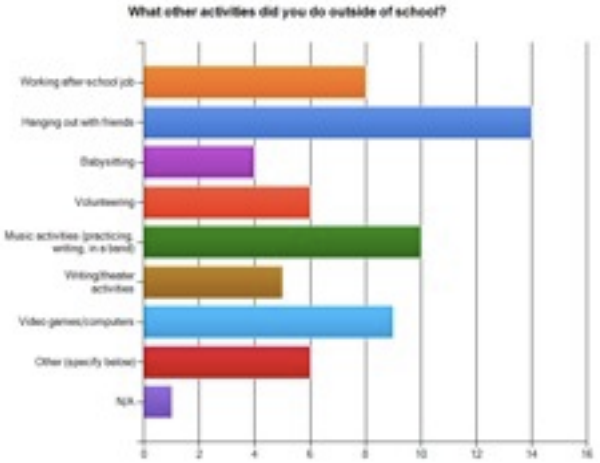
Chi-square

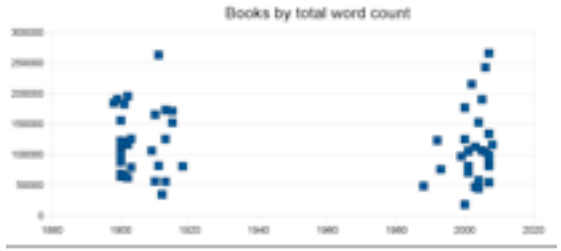
Africa and Anchoring

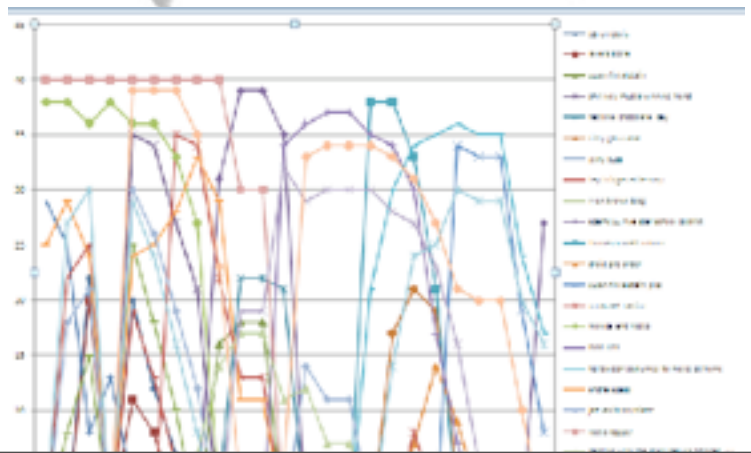
Self Portraits

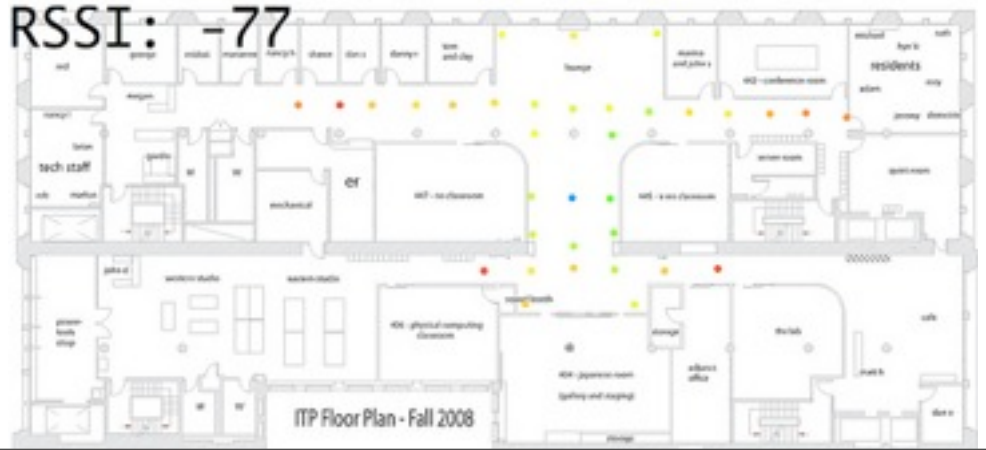


Discovery Seeker







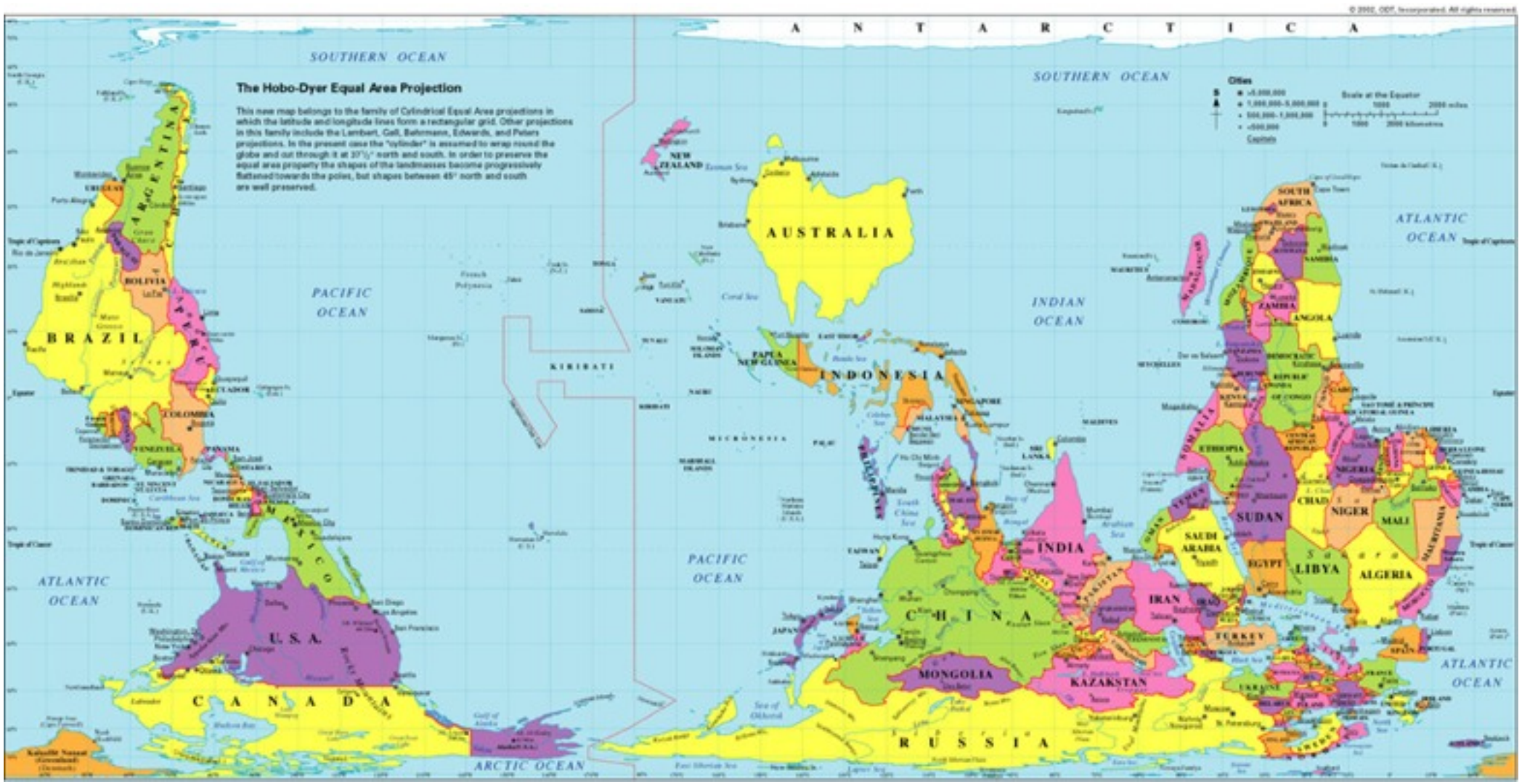


Graphical Persuasion

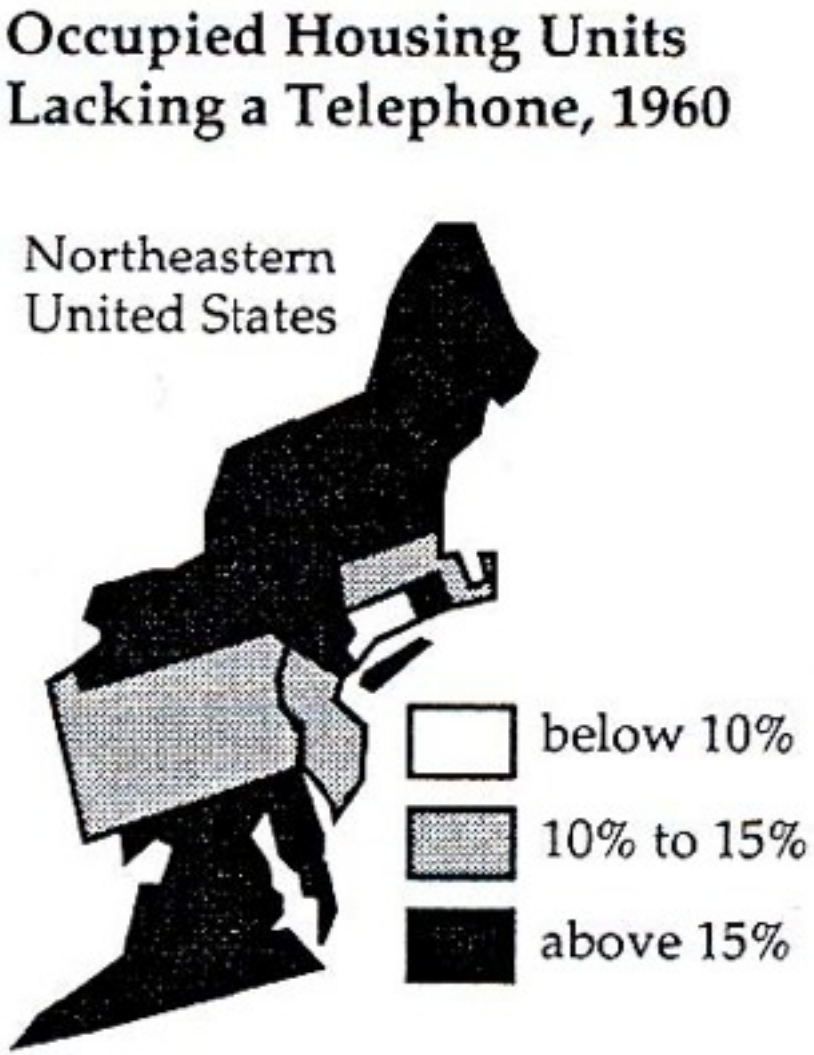
- how to lie with maps

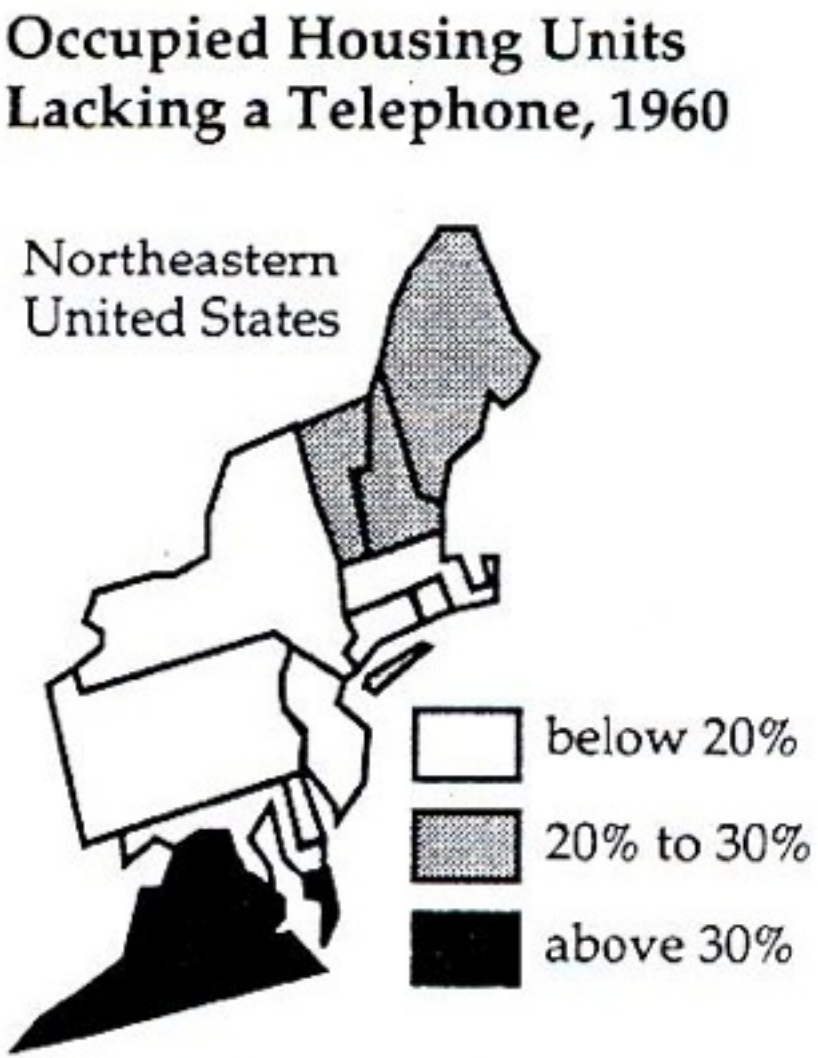
Graphical Persuasion

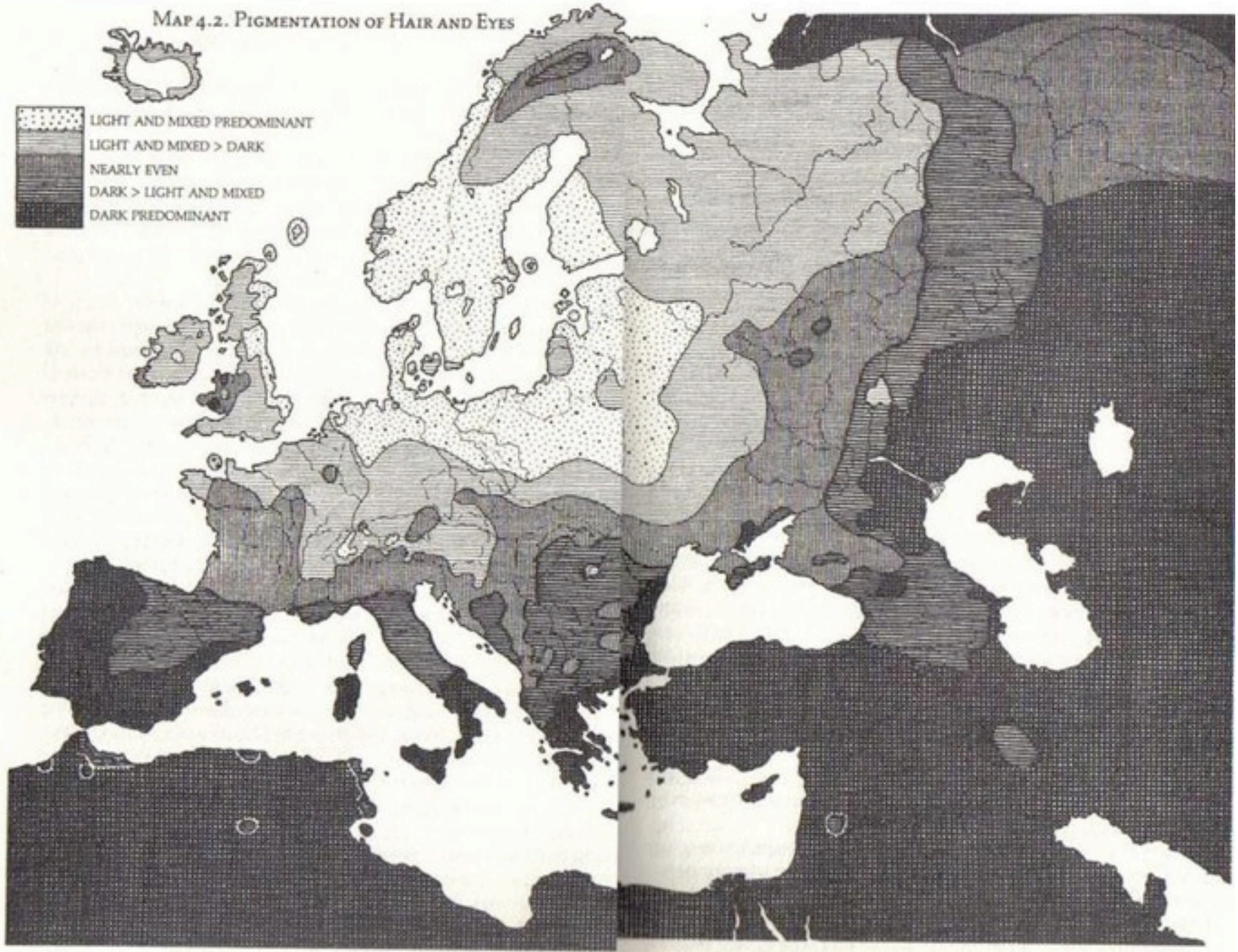
- how to lie with maps



Graphical Persuasion





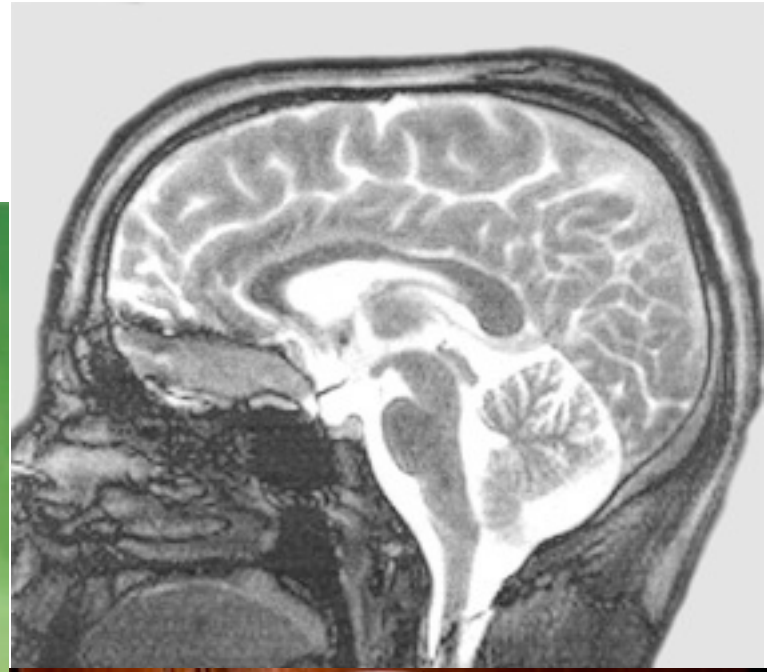


SOURCE: Drawn by Elmer Rising, ca. 1939.

THIS map combines data on the pigmentation of hair and eyes in modern Europe. Light hues cluster around the North Sea and the Baltic in the lands most recently deglaciated. Hair is darkest to the west in Wales, Ireland, the Faroes, Iceland, and parts of western Norway. There, browns and reds are frequent, and the local blonds are mostly golden, while farther east in Baltic and Slavic lands the combination of brown eyes and ashen hair is common. Although not shown here, in the west exposed skin may be red and raw; in the east it is smoother and shinier and tans more easily.

Judgment

- designing attraction



Questions

- What's worse than too few samples?
- What are subjects properly called?
- Correlation is not _____.
- When you see regression, think _____.
- Where does the normal curve come from?
- How do you talk back to a statistic?
- What statistic can you use to test if a jury is fair?

Assignments

- Critical thinking
- Iterative design
- Ethical rigor, ethics aren’t obvious
- Look at your data
- Show all your data
- Find the data’s story