

descriptive statistics 1-1: relationships:  
summarizing more than one variable:  
crosstabs and correlation, (Wheelan,  
2013, ch3,4)

Adam Okulicz-Kozaryn  
adam.okulicz.kozaryn@gmail.com

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## ps1; fa21

- great ideas, but do get actual data! just google it; and produce some stats
- and do read and cite literature (just put your research question into google scholar), and literature will also tell you about data
- <https://www.policymap.com/newmaps> may be useful
- for many of you i commented, do before-after
  - discuss quickly; and for elaboration in few weeks  
[res\\_des.pdf](#)
- check out redlining maps  
<https://dsl.richmond.edu/panorama/redlining>

## **ps1: great ideas, but start working on it asap!**

- just start writing!
- (can do free-writing, dump all the ideas on paper, worry later about organization)
- few discussed specific data and literature
- narrow down, be focused on sth specific,
- be specific, eg how would you measure 'fairness'
- measurment is the key! email listserv about finding data!
- use tools from class on your data asap! ps1-1.pdf
- great to kill 2 birds with one stone: internship, etc
- and study something you are passionate about!
- again, 2 keys to succes: start early, ask questions!!
- let's do one-on-one zooms :)

## howto describe data?

- depends on lev of measurement! cat v num **q&a**
- numbers
- graphs (always better unless very few ua, say  $<5$ )  
humans recognize patterns in graphs better and faster
- break it up into subsets/subsamples! dig deeper!
  - say see hist/tab for males and females separately
  - say corr or crosstab for low and hi val separately  
that's a quick way to see nonlinear relationship!  
eg may rise and fall, eg swb and place size in china
- **whiteboard**

## few categories / categorical

- use contingency tab / cross-tab (bc you cross-tab dat)
- use percents, not counts: usually clearer
- so what's the relationship: age and being a student?

What is your age?	Are you a student?			Total
	Yes - Full Time	Yes - Part Time	No	
15 and under	88%	12%	-	8
16 - 18	95%	-	5%	42
19 - 23	68%	12%	20%	205
24 - 29	16%	10%	74%	353
30 - 35	5%	9%	86%	192
36 - 45	4%	8%	88%	165
over 45	1%	7%	92%	129

- <http://www.custominsight.com/articles/crosstab-sample.asp>

# crosstabs: row percents v col percents

Sort: Cols ▾ Rows ▾ Count All % **Row %** Col %

Number of Employees at Company

Job Satisfaction	1-25	26-100	101-999	1,000-3,000	> 3000	Total
Hate my job	24.4%	14.1%	26.9%	12.8%	21.8%	100%
I'm not happy in my job	31.6%	21.3%	19.2%	6.3%	21.5%	100%
It's a paycheck	⌵ 27.6%	20.4%	22.6%	7.7%	⌶ 21.8%	100%
I enjoy going to work	⌵ 32.3%	⌶ 21.8%	21.3%	7.0%	17.6%	100%
Love my job	⌶ 47.8%	⌵ 17.2%	⌵ 17.0%	⌵ 5.0%	⌵ 13.0%	100%

Sort: Cols ▾ Rows ▾ Count All % **Col %**

Number of Employees at Company

Job Satisfaction	1-25	26-100	101-999	1,000-3,000	> 3000
Hate my job	0.8%	0.8%	1.5%	2.2%	1.5%
I'm not happy in my job	6.6%	7.9%	7.1%	7.2%	9.3%
It's a paycheck	⌵ 12.6%	16.4%	18.1%	18.9%	⌶ 20.4%
I enjoy going to work	⌵ 43.3%	⌶ 51.6%	50.3%	50.8%	48.4%
Love my job	⌶ 36.7%	⌵ 23.2%	⌵ 23.0%	⌵ 20.9%	⌵ 20.5%
Total	100%	100%	100%	100%	100%

## crosstabs covid example

- [https://www.cdc.gov/mmwr/volumes/70/wr/mm7037e1.htm#T1\\_down](https://www.cdc.gov/mmwr/volumes/70/wr/mm7037e1.htm#T1_down)

## percentage change v percentage point change

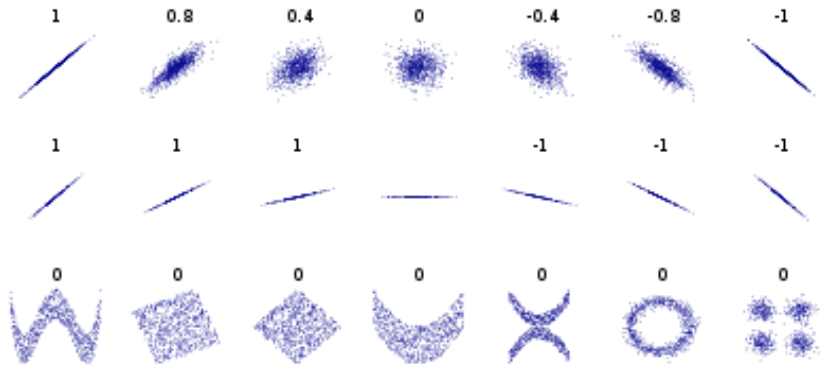
- say good school's dropout rate increases from 2% to 4%
  - percentage point increase is  $4 - 2 = 2$
  - percentage increase is  $(\frac{4-2}{2}) * 100 = 100$
  -
- say bad school's dropout rate increases from 50% to 75%
  - percentage point increase is  $75 - 50 = 25$
  - percentage increase is  $(\frac{75-50}{50}) * 100 = 50$
  -
- if you start from low base (eg 2), then small percentage point increase is huge percent increase!
  - and it matters! eg racism in Scandinavia



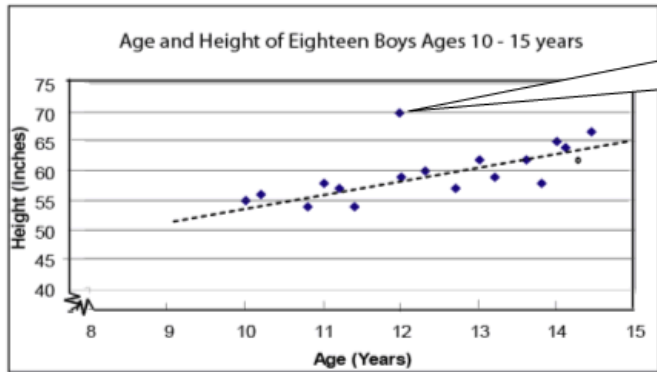
## many categories / continuous data: corr and scatterplots

- just plot data in scatterplot; identify outliers!
- **ex: outliers** cops/1k and crime (note dc and camden)
- correlation range: -1 to 1
- $< |.4|$  low
- $|.4 - .6|$  moderate
- $> |.7|$  strong
- again, keep in mind causation v correlation

## correlations for different scenarios



## scatterplot



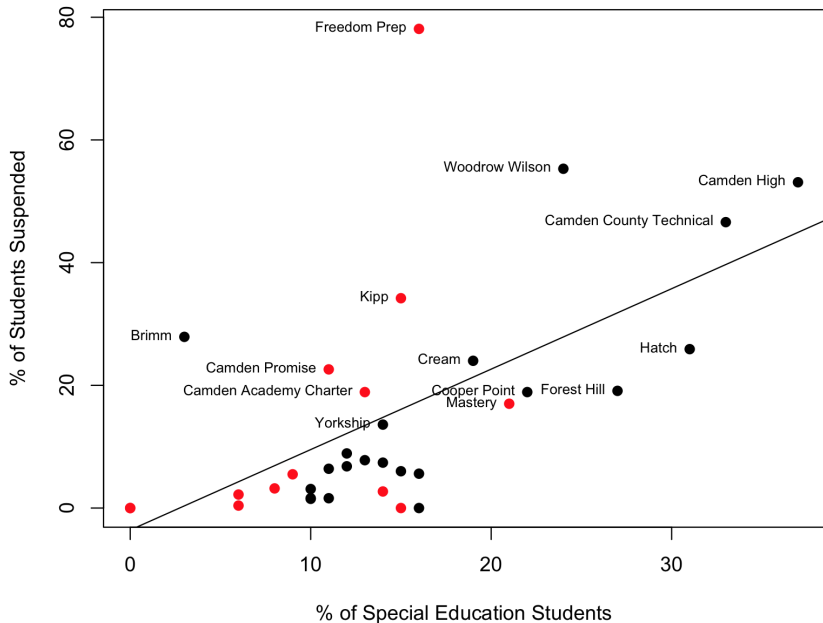
The 12 year old boy who is 5' 10" is an outlier for this set of data.

also see <http://www.socialresearchmethods.net/kb/statcorr.php>

next slide: <https://danley.camden.rutgers.edu/2017/04/13/who-suspends-the-highest-percentage-of-camden-students-freedom-prep/>

red: charter/renaissance; black: Camden schools

## Suspension Data



## do scatterplots

- it is useful to produce a scatterplot
  - you'd see outliers—
  - and whether the relationship is due to them
  - **blackboard**: relationships biased due to outliers
  - say marriage rate and divorce rate and that one state where really a lot of people get divorced (and married)

## calculate it!

- there are formulas in wheelan and trochim
  - but can just calc with software :)
  - lets see trochim's example of height and weight from syl
  - can do it excel or google sheets etc
  - but it's 21st century, so lets do it in Python :)

## Wheelan in ch11 mentions Whitehall studies

- high status causes better health!
- great book 'Status Syndrome' by m marmot
- eg nobel or oscar boosts one's health and longevity
- these successful folks live longer and in better health
- than exact same people (income, lifestyle, etc) but without status
- <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2566175/>
- Table 2A: correlations
- esp 'Decision latitude' (scroll down)
- conclusions?

# Nudge by Thaler

- use bus tools for pub pol and adm
- ...



## wrap-up

- end every class discussing what we covered and quick look at next week
- end with a review Q&A,
- give some examples (essp in pub pol and pub adm) for concepts covered
- students will discuss concepts from the class
- 
- quick look at next class

# bibliography I

WHEELAN, C. (2013): Naked statistics: stripping the dread from the data, WW Norton & Company.