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

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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

## 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 measuroment! 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

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

Number of Employees at Company

| Satisfaction | 1-25 | 26-100 | 101-999 | 1,000-3,000 | > 3000 | Total |
|---|---|---|---|---|---|---|
| te my job | 24.4% | 14.1% | 26.9% | 12.8% | 21.8% | 100% |
| not happy in my job | 31.6% | 21.3% | 19.2% | 6.3% | 21.5% | 100% |
| a paycheck | 27.6% | 20.4% | 22.6% | 7.7% | 21.8% | 100% |
| njoy going to work | 32.3% | 21.8% | 21.3% | 7.0% | 17.6% | 100% |
| ve my job | 47.8% | 17.2% | 17.0% | 5.0% | 13.0% | 100% |

t: Cols ▾ Rows ▾ Count All % Row % Col %

Number of Employees at Company

| Satisfaction | 1-25 | 26-100 | 101-999 | 1,000-3,000 | > 3000 |
|---|---|---|---|---|---|
| te my job | 0.8% | 0.8% | 1.5% | 2.2% | 1.5% |
| not happy in my job | 6.6% | 7.9% | 7.1% | 7.2% | 9.3% |
| a paycheck | 12.6% | 16.4% | 18.1% | 18.9% | 20.4% |
| njoy going to work | 43.3% | 51.6% | 50.3% | 50.8% | 48.4% |
| ve my job | 36.7% | 23.2% | 23.0% | 20.9% | 20.5% |
| tal | 100% | 100% | 100% | 100% | 100% |

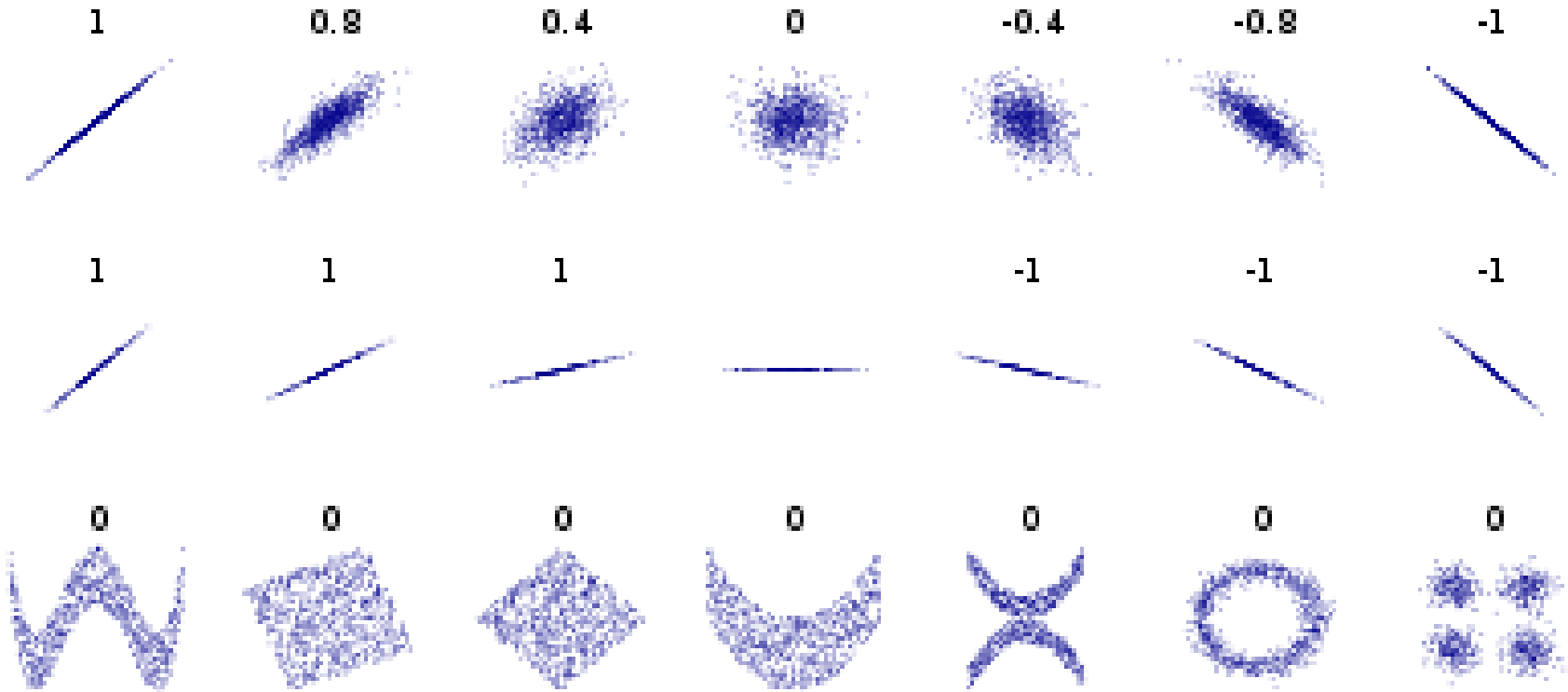
# percentage change v percentage point change

- 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!

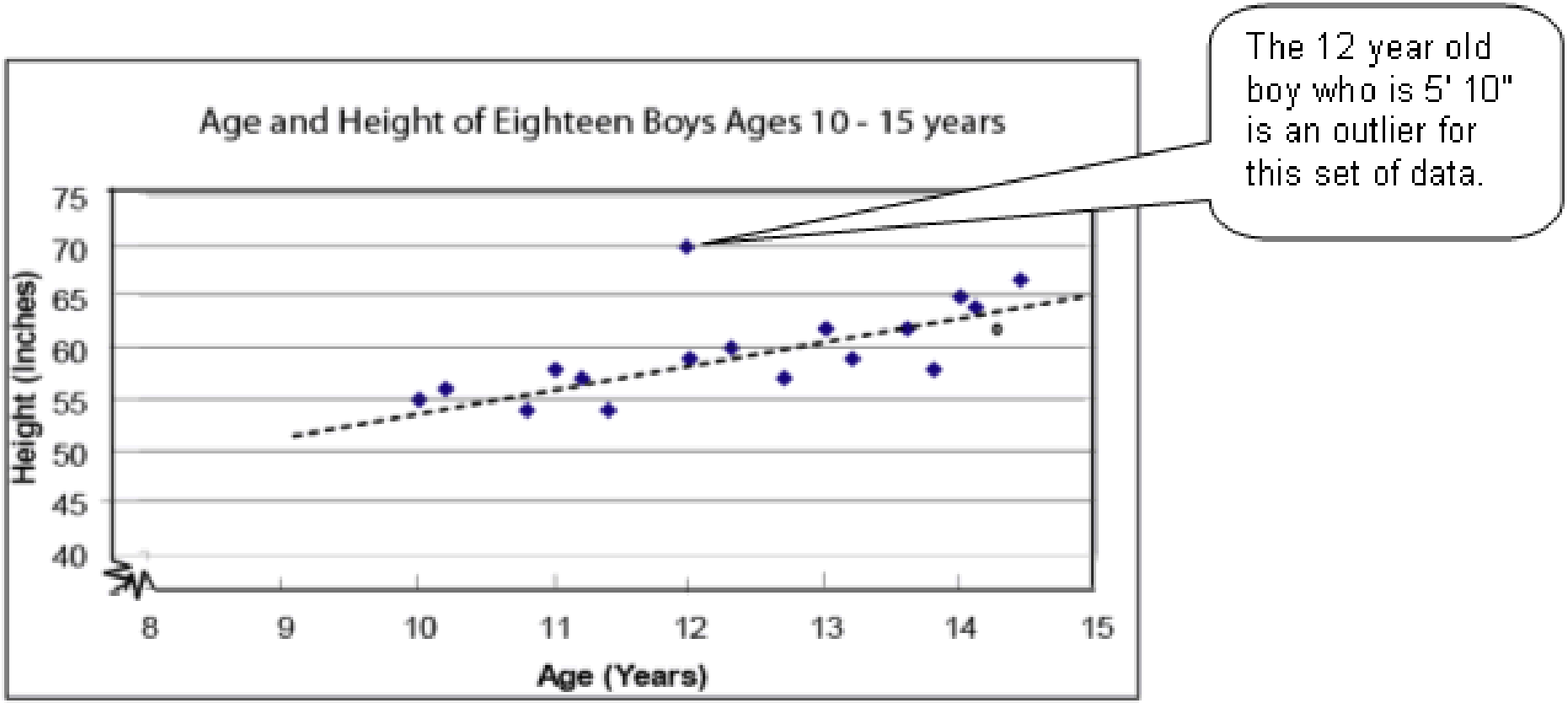
## many categories / continuous data: corr and scatterplots

- 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

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  - also see `http://www.socialresearchmethods.net/kb/statcorr.php`
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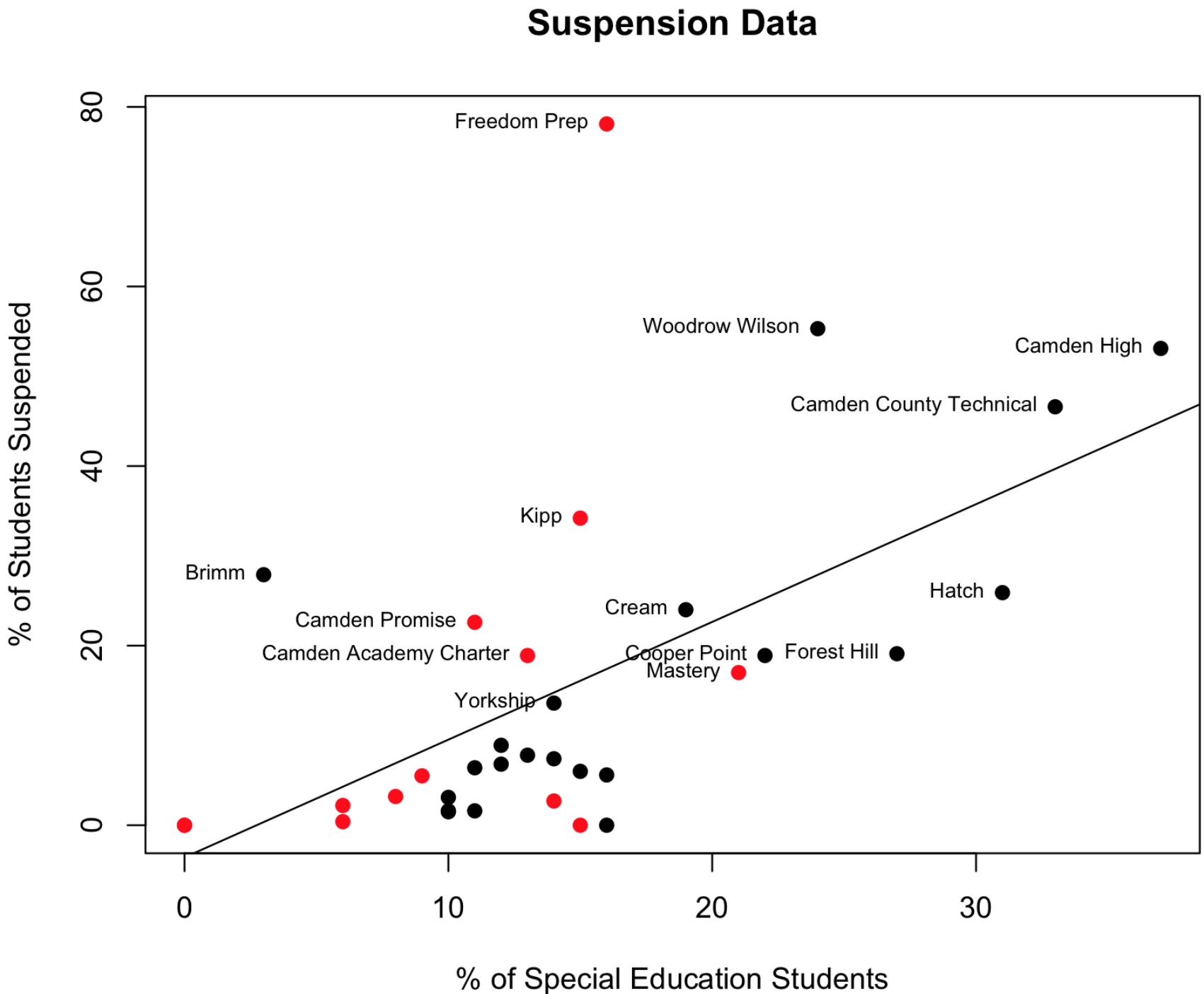
- next slide: `https://danley.camden.rutgers.edu/2017/04/13/who-suspends-the-highest-percentage-of-camden-students-freedom-prep/`
  - red: charter/renaissance; black: Camden schools


Suspension Data
% of Students Suspended
% of Special Education Students
0
20
40
60
80
0
10
20
30
Freedom Prep
Woodrow Wilson
Camden High
Camden County Technical
Kipp
Brimm
Hatch
Cream
Camden Promise
Camden Academy Charter
Cooper Point
Forest Hill
Mastery
Yorkship

## 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 :)
- can do it excel or google sheets etc
- but it's 21st century, so lets do it in Python :)
- see des.py

# Wheelan in ch11 mentions Whitehall studies

- high status causes better health!
  - great book 'Status Syndrome' http://a.co/jaUuwT7
- 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?

## 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.