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

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howto describe data?

- numbers
- graphs (always better unless very few data, 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
- googSheet or xournal

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 % | Row % | **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%

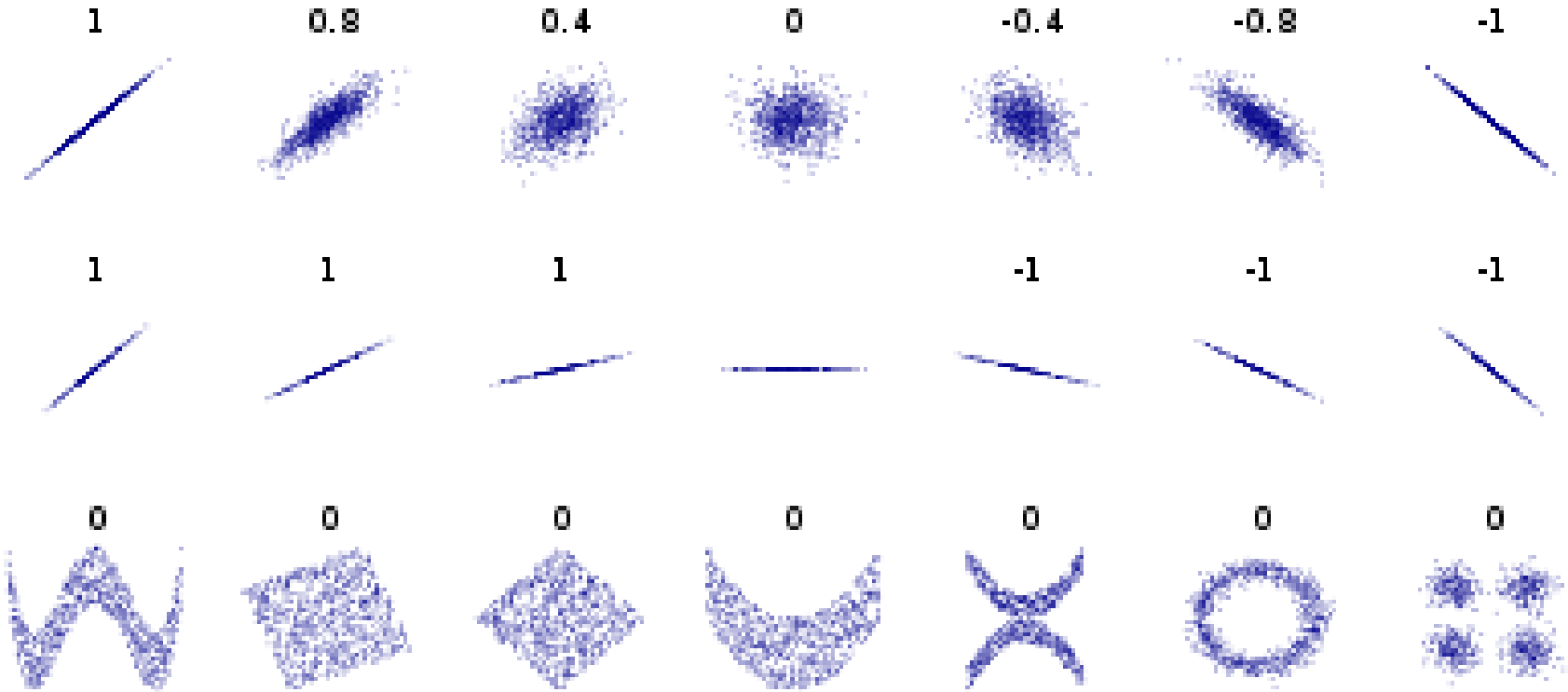
percentage change v percentage point change

- 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!

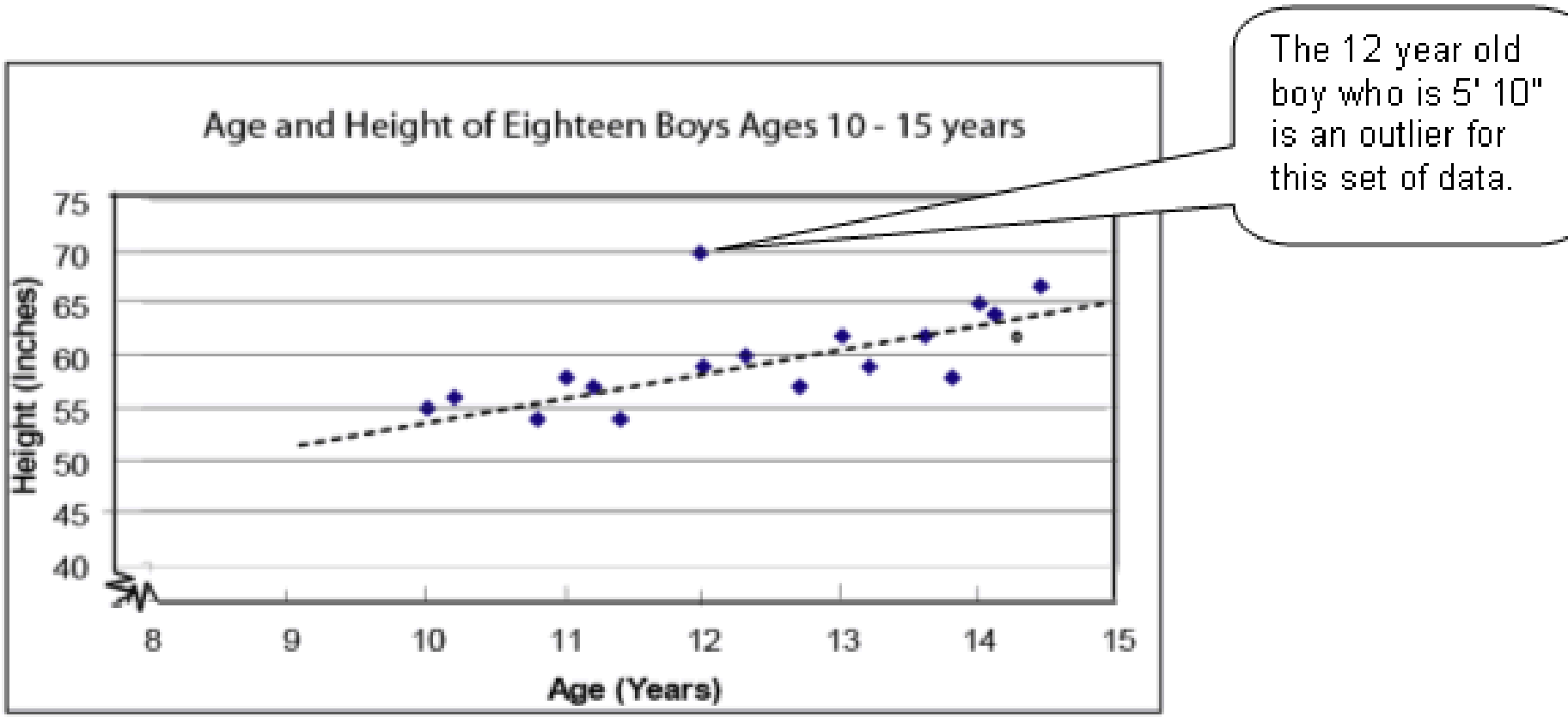
many categories / continuous data: corr and scatterplots

- 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

- 

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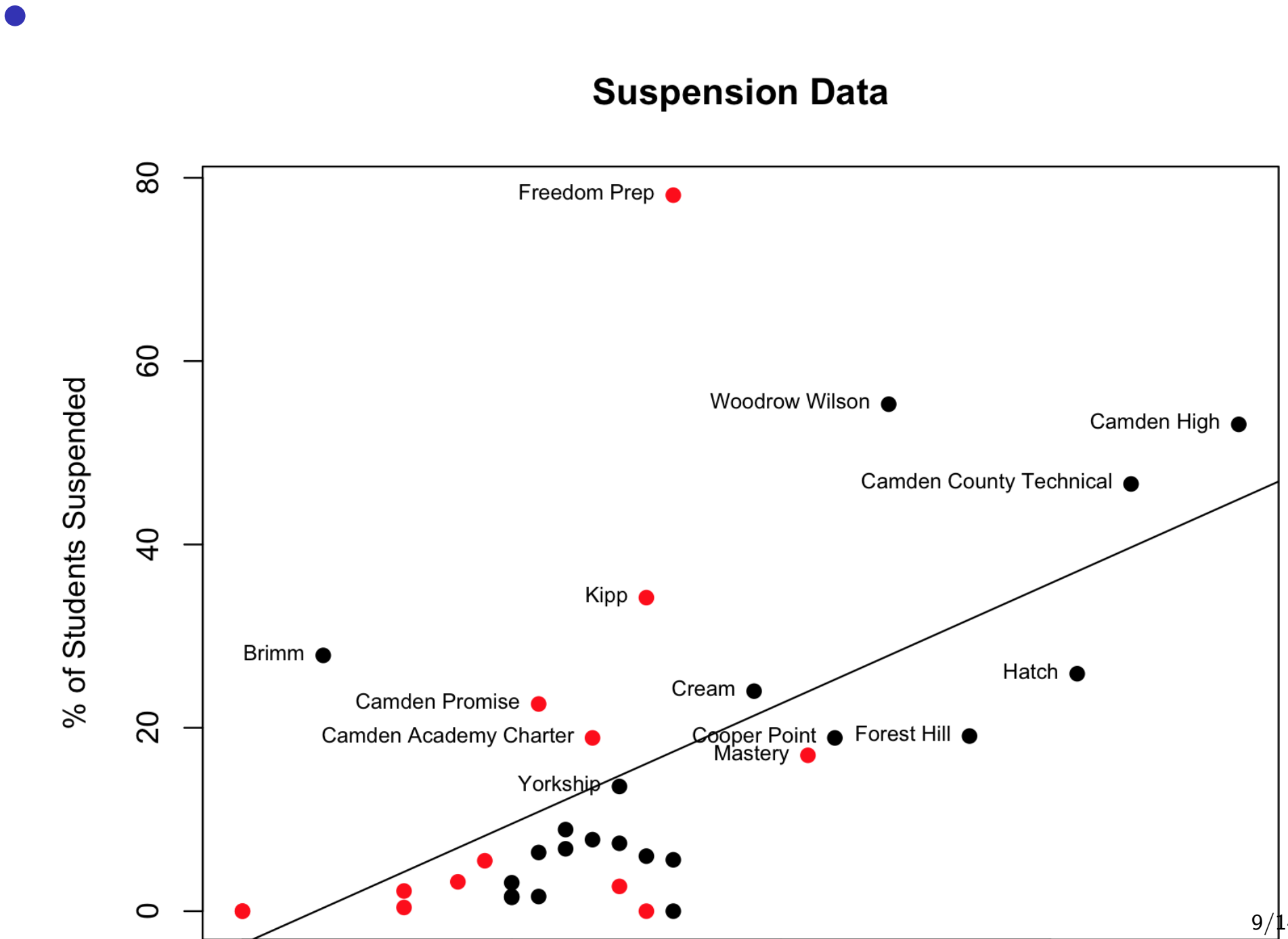
- next slide: `https://danley.camden.rutgers.edu/2017/04/13/who-suspends-the-highest-percentage-of-camden-students-freedom-prep/`
  - red: charter/renaissance; black: Camden schools


Suspension Data
% of Students Suspended
0
20
40
60
80
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
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- quick look at next class

bibliography I

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