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%

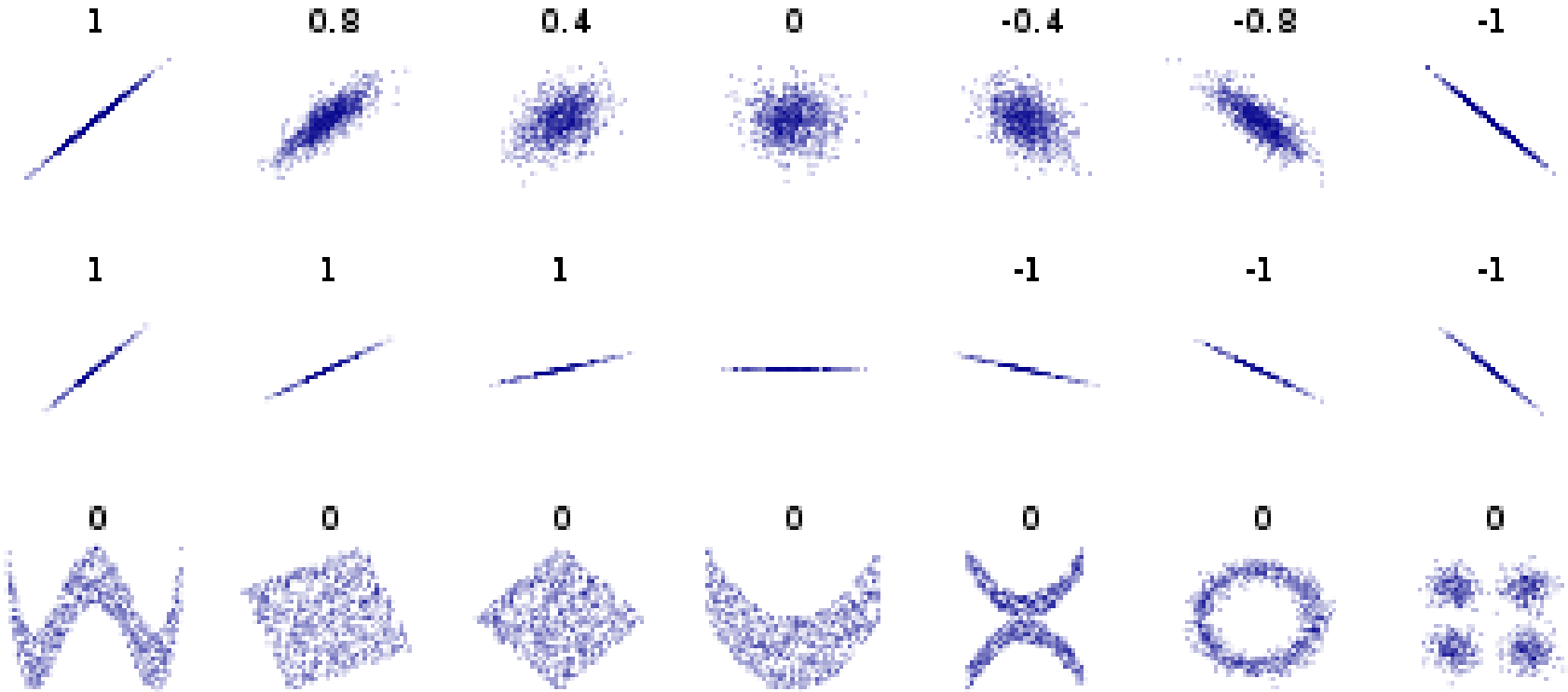
percentage change v percentage point change

- 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!

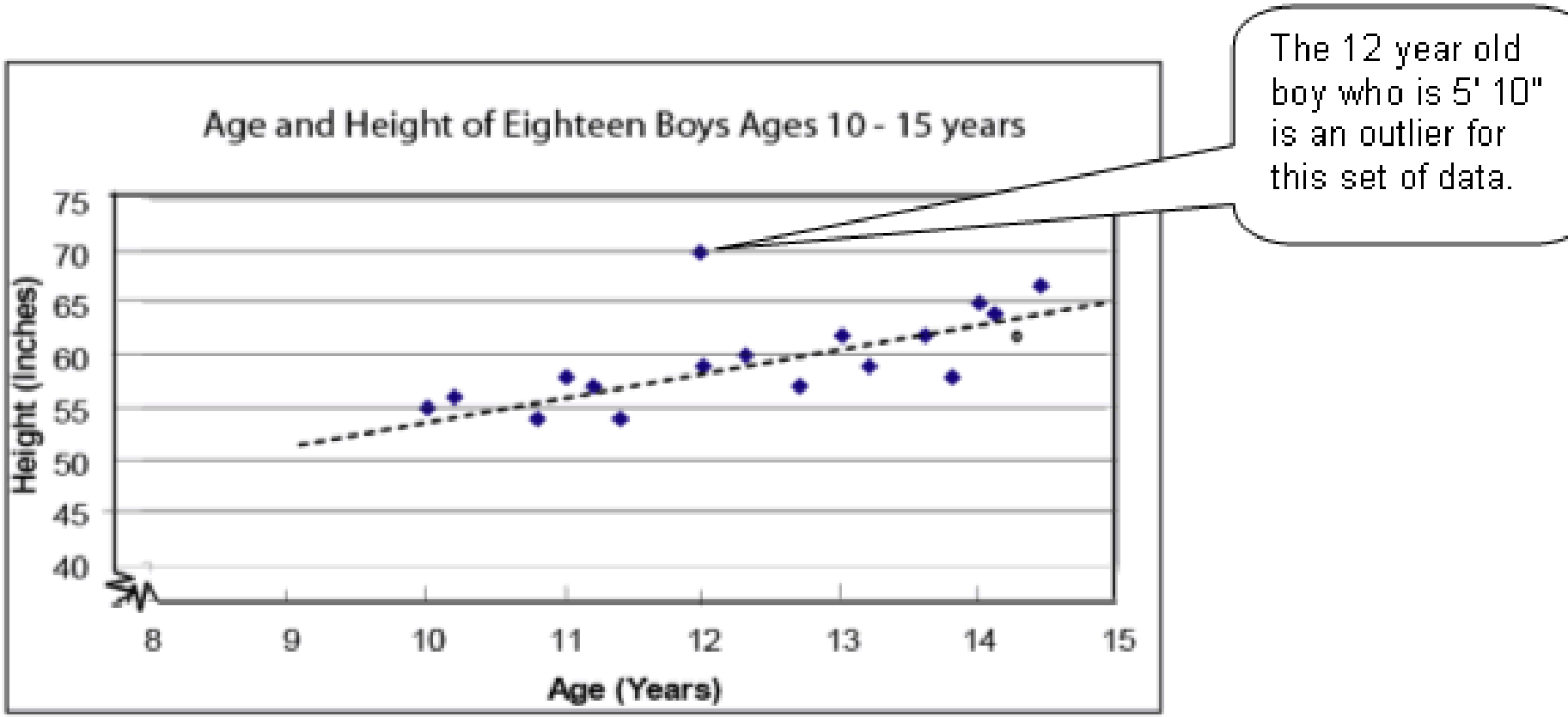
many categories / continuous data

- use correlation and scatterplots
  - just plot them in scatterplot; identify outliers!
  - xournal: ex with 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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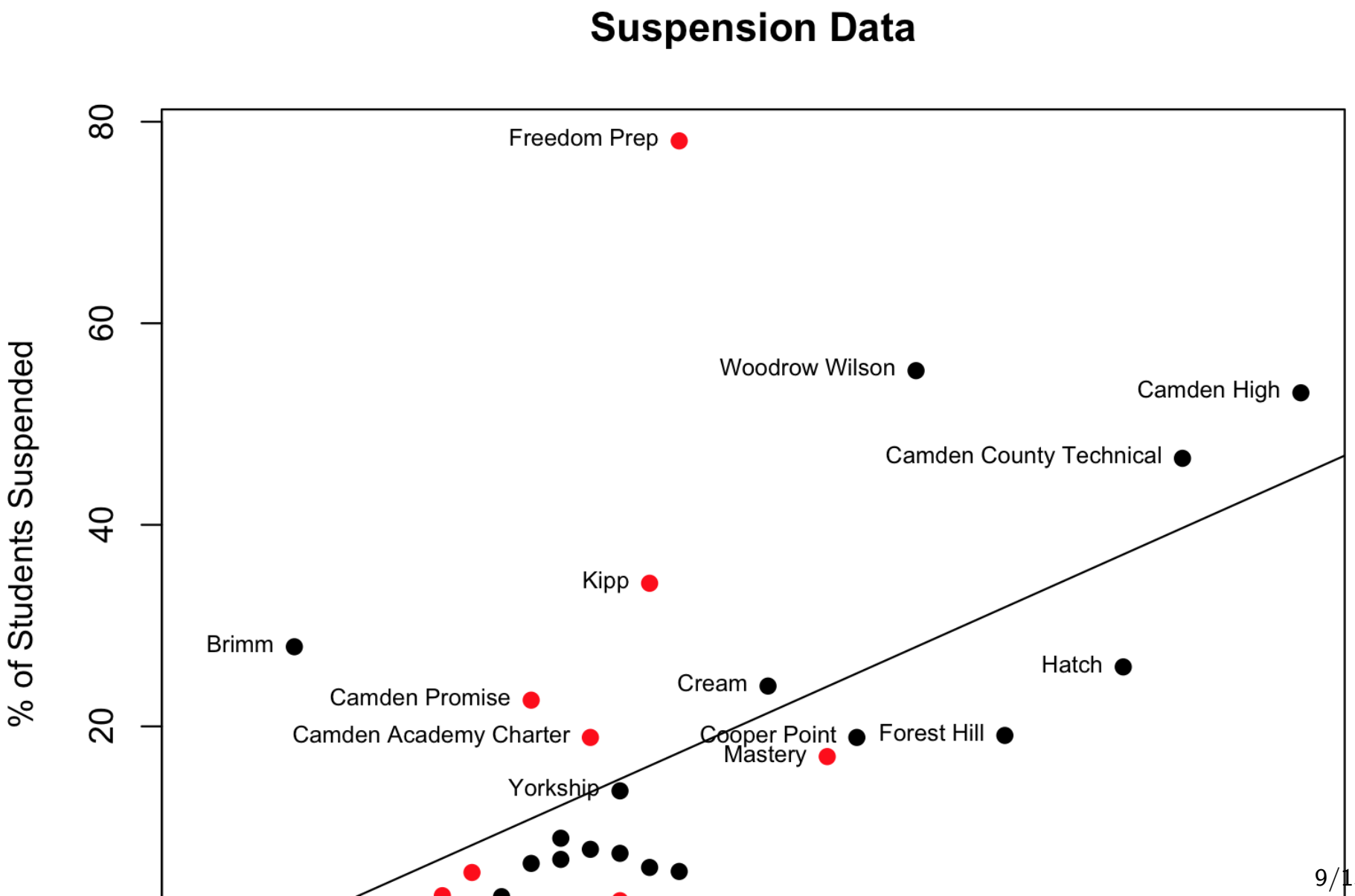
- next slide: `https://danley.camden.rutgers.edu/2017/04/13/who-suspends-the-highest-percentage-of-camden-students-freedom-prep/`
  - red: charter/renaissance; black: Camden schools


Suspension Data
% of Students Suspended
80
60
40
20
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 Nevada

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

closer look at status syndrome

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2566175/
- see Table 2A for correlations
  - especially 'Decision latitude'
  - conclusions? extra credit

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.