

descriptive statistics 1-1: more than one variable; relationships

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outline

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 it may first rise and then fall
- ◇ googSheet or xournal

few categories / categorical

- ◇ use contingency table / cross-tabs (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://help.statwing.com/knowledge_base/topics/how-do-i-interpret-crosstabs

summarizing more than one variable: crosstabs and correlation. (Wheelan, 2013, ch3.4)
◇ <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%

summarizing more than one variable: crosstabs and correlation, (Wheelan, 2013, ch3,4)

percentage change v percentage point change

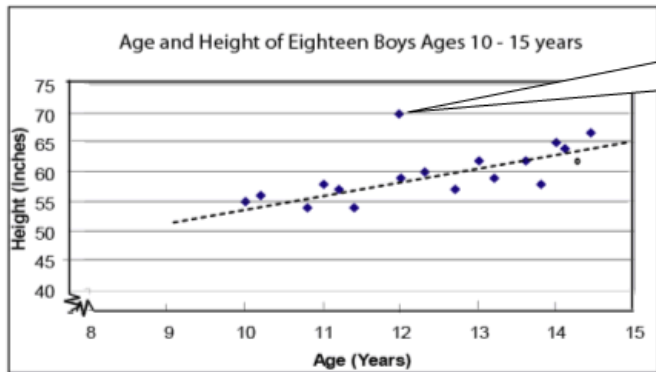
- ◇ say good school's dropout rate increases from 2% to 4%
 - percentage point increase is $4 - 2 = 2$
 - percentage increase is $(\frac{4-2}{2}) * 100 = 100$
- ◇
- ◇ say bad school's dropout rate increases from 50% to 75%
 - percentage point increase is $75 - 50 = 25$
 - percentage increase is $(\frac{75-50}{50}) * 100 = 50$
- ◇
 - 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!
 - blackboard: examples with outliers
 - correlation ranges between -1 and 1
 - $< |.4|$ low
 - $|.4 - .6|$ moderate
 - $> |.7|$ strong
- ◇ again, keep in mind causation v correlation

TODO: just insert here one of these corr coef graphs showing strength of relationship based on look

scatterplot



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

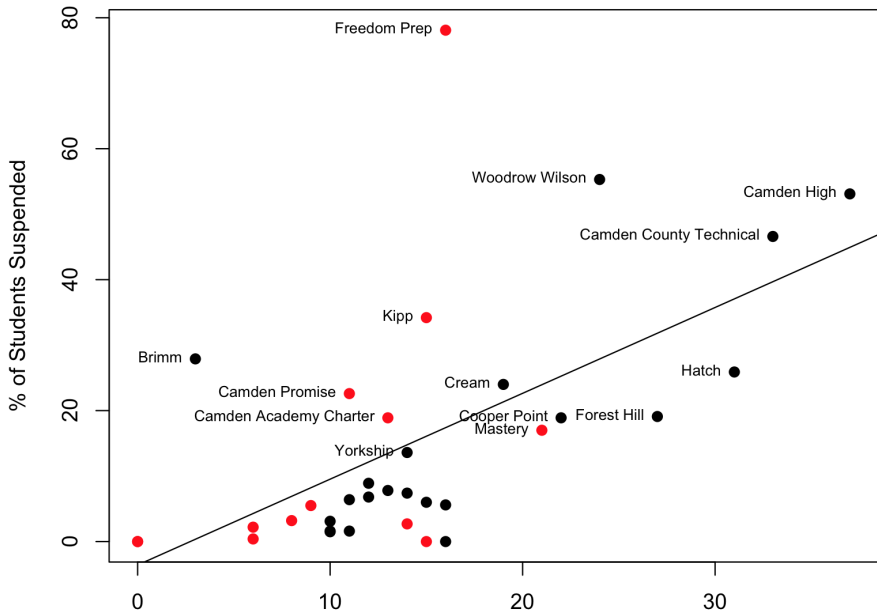
- also see <http://www.socialresearchmethods.net/kb/statcorr.php>



next slide: <https://danley.camden.rutgers.edu/2017/04/13/>

who-suspends-the-highest-percentage-of-camden-students-freedom-prep/
summarizing more than one variable: crosstabs and correlation, (Wheelan, 2013, ch3,4)

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 Nevada

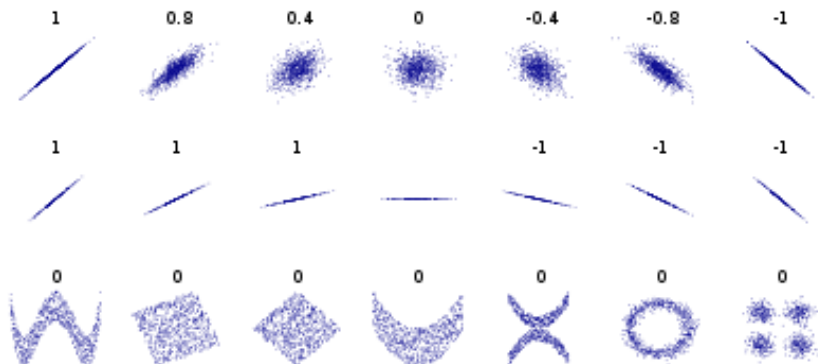
Wheelan in ch11 mentions Whitehall studies

- ◇ fascinating stuff!
- ◇ high status causes better health!
 - great book 'Status Syndrome' <http://a.co/jaUuwT7>
- ◇ say nobel prize 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

correlations for different scenarios



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.