

Panel 1

Want to analyse 2 vars. simultaneously!

Q: Does smoking cause cancer?

Do men make more money than women?

Do Mr. Amer. vote more Democrat than Republican

One variable is independent, other is dependent  
(earlier in time)

smoking vs cancer  
(indep)

gender vs income  
(indep)

race vs. opinion  
(indep)

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Panel 2

Trick: Make contingency table (cross tabs)  
column var.

row var.


age (indep)

	< 50	50	
For	92	97	179
Against	158	75	233
	240	162	402

Ex: Residents of town  
vote on zoning law  
and their age was recorded

$$\text{row \%} = \frac{\text{cell}}{\text{row total}}$$

$$\text{col \%} = \frac{\text{cell}}{\text{col total}}$$

$$\text{tot \%} = \frac{\text{cell}}{\text{total}}$$

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Panel 3

age (indep)

	≤ 50	> 50	
For	92	87	179
Against	158	75	233
	250	162	412

Q1: Out of all young people, how many are for  
col%: 77%

Q2: How many supporters of low are young?  
44%

row% →

	≤ 50	> 50	
For	57%	49%	100%
Against	67%	72%	100%

col% →

	≤ 50	> 50	
For	44%	54%	x
Against	56%	46%	x
	100%	100%	

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Panel 4

Q: Out of all people with (exactly) HS degree, how many are male? 47.76% row%

StatCrunch: Stats/Tables/Contingency/with data

a) 45.70%  
b) 48.87%

How many males have (exactly) HS degree  
48.87% col%

	Female	Male	Total
0 - Less than HS	163 (54.88%) (14.91%)	134 (45.12%) (14.42%)	297 (100.00%) (14.69%)
1 - High School	449 (54.71%) (50.23%)	454 (45.28%) (48.87%)	1003 (100.00%) (49.6%)
2 - Junior College	93 (53.78%) (8.509%)	88 (46.24%) (8.611%)	173 (100.00%) (8.556%)
3 - Bachelor	182 (51.27%) (16.65%)	173 (48.73%) (18.62%)	355 (100.00%) (17.56%)
4 - Graduate	106 (54.84%) (9.698%)	88 (45.36%) (9.473%)	194 (100.00%) (9.594%)
Total	1093 (54.06%) (100.00%)	929 (45.94%) (100.00%)	2022 (100.00%) (100.00%)

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Panel 5

Rows: HIGHEST DEGREE  
Columns: SEX

Cell format			
Count			
(Row percent)			
(Column percent)			
	Female	Male	Total
0 - Less than HS	163 (54.88%) (14.91%)	134 (45.12%) (14.42%)	297 (100.00%) (14.69%)
1 - High School	549 (54.74%) (50.23%)	454 (45.26%) (48.87%)	1003 (100.00%) (49.6%)
2 - Junior College	93 (53.76%) (8.509%)	80 (46.24%) (8.611%)	173 (100.00%) (8.556%)
3 - Bachelor	182 (51.27%) (18.65%)	173 (48.73%) (18.62%)	355 (100.00%) (17.58%)
4 - Graduate	106 (54.64%) (9.698%)	88 (45.36%) (9.473%)	194 (100.00%) (9.594%)
Total	1093 (54.06%) (100.00%)	929 (45.94%) (100.00%)	2022 (100.00%) (100.00%)

How many males have at least HS degree?  
 $45.12\% + 45.26\% + 46.24\% + 48.73\% + 45.36\% = 85.6\%$

Quiz on Wed!

Panel 6

Big Question: Is there a relationship between two variables.

ToDo: Contingency Table,  
 → ind. var. ⇒ cols  
 → dep. var. ⇒ rows  
 compute Row%

circle highest value in each row

	low	med.	high
low	○		○
high	○	○	○

a) positive relation  
 b) neg. relation

Panel 7

Does Money make you happy?

↑  
incls

↑  
deps.

Rows: SATISFACTION WITH FINANCIAL SITUATION  
Columns: GENERAL HAPPINESS

Cell format				
Count (Row percent)				
	1 - very happy	2 - pretty happy	3 - not too happy	Total
1 - satisfied	267 (46.76%)	273 (47.81%)	31 (5.429%)	571 (100.00%)
2 - more or less	236 (28.99%)	476 (58.48%)	102 (12.53%)	814 (100.00%)
3 - not at all satisfied	93 (14.93%)	348 (55.86%)	182 (29.21%)	623 (100.00%)
Total	596 (29.88%)	1097 (54.63%)	315 (15.69%)	2008 (100.00%)

no relation!

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Panel 8

This does not work super well, especially not for ordinal vars.

Contingency mechanism  $\Rightarrow$  Expected values

	male	female	
smoke	40 100 · 30	60 100 · 30	30
not smoke	40 100 · 10	60 100 · 70	70
	40	60	100

If there was no relation between two variables  $\Rightarrow$  expected values!  

$$\frac{(\text{row total})(\text{col total})}{\text{total}}$$

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