

Midterm results

Stat 543

5-12-15

①

6 | 3

7 |

8 | 8899

9 | 04456889

10 | 0

$$\bar{x} = 91.5$$

$$Q_2 = 92$$

+ 2 rats

②

Continuing last example:

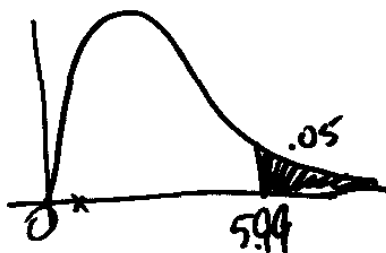
$\frac{(10-9.13)^2}{9.13}$	$\frac{(9-9.93)^2}{9.93}$	
.083	.087	.0005
.055	.054	.0003

Cell χ^2

$$\frac{(O-E)^2}{E}$$

$$\frac{(13-13.87)^2}{13.87}$$

Test stat = Sum of
everything in this
table
= .282



Fail to reject H_0 . We failed to find a dependence between gender and income.

(3)

Another χ^2 example

		Residence			
		room off-campus	parents	dorm	
<u>GPA</u>	Low	22	20	48	90
	Mid	36	40	54	130
	High	32	10	38	80
		90	70	140	300

H_0 : GPA and residence are independent

H_a : " " " " dependent

(4)

<u>GPA</u>	Low	27	21	42
	Mid	39	30.3	60.7
	High	24	18.7	37.3

$p\text{-val} = .044$, so reject H_0 .

(5)

Cell χ^2

	Low	.93	.05	.86
GPA	Mid	.23	3.11	.74
	Hi	2.67	4.05	.01

Test stat = 12.65

Post hoc: We observed 10 high GPA students living with parents, but expected 18.7
we observed 40 mid GPA students living with parents, but expected 30.3

We observed 32 high GPA students living off campus, but expected 24.

(6)

Rule of thumb: mention any cell whose cell $\chi^2 > 1$
or

Another rule: mention # cells corresponding to df.

Note: in SPSS, the std. resid. = $\sqrt{\text{Cell } \chi^2}$

(7)

Nonparametric tests

(Distribution-free)

- Used when sample sizes are small and normality assumptions fail
- Can replace the 1-sample t-test
2-sample t-test
ANOVA

Wilcoxon signed rank test (subst. for 1-sample t-test)

(8)

Before	After	Diff = A - B
12.3	12	-.3
12	12.3	.3
13	12	-1
13	13	0 ✓
12.5	12.5	0 ✓
11.3	10.3	-1
11.8	11.3	-.5
11	11.5	.5
11	11	0 ✓
11.3	11.5	.2
12	12.5	.5

Test to see if
aspirin changes
the clotting time

H_0 : median diff = 0

H_1 : median diff $\neq 0$

First, exclude any 0's.

(9)

Rank the remaining diffs, smallest to largest, ignoring the signs

	rank	corrected
.2	1	1
-.3	2	2.5
.3	3	2.5
-.5	4	5
.5	5	5
.5	6	5
-1	7	7.5
-1	8	7.5
	<u>36</u>	<u>36</u>

Compute T_+ = total of ranks for +

T_- = total of ranks for -

$$T_+ = 13.5$$

$$T_- = \frac{22.5}{36}$$

Rely on
software
to find
p-value

	gpa	residenc	freq
1	low	offroom	22
2	low	offpar	20
3	low	oncamp	48
4	mod	offroom	36
5	mod	offpar	40
6	mod	oncamp	54
7	high	offroom	32
8	high	offpar	10
9	high	oncamp	38

Crosstabs

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
GPA * RESIDENC	300	100.0%	0	.0%	300	100.0%

GPA * RESIDENC Crosstabulation

			RESIDENC			Total
			offpar	offroom	oncamp	
GPA	high	Count	10	32	38	80
		Expected Count	18.7	24.0	37.3	80.0
		Std. Residual	-2.0	1.6	.1	
	low	Count	20	22	48	90
		Expected Count	21.0	27.0	42.0	90.0
		Std. Residual	-.2	-1.0	.9	
	mod	Count	40	36	54	130
		Expected Count	30.3	39.0	60.7	130.0
		Std. Residual	1.8	-.5	-.9	
Total	Count	70	90	140	300	
	Expected Count	70.0	90.0	140.0	300.0	

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	12.577 ^a	4	.014
Likelihood Ratio	12.925	4	.012
N of Valid Cases	300		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.67.