

χ^2 - OE - Homework

	SD	SO	N	SA	SA	Total
M	10 (13.5)	15 (18)	15 (18)	25 (22.5)	25 (18)	90
F	20 (16.5)	25 (22)	25 (22)	25 (27.5)	15 (22)	110
Total	30	40	40	50	40	200

H_0 : Gender and response are independent.
 (no assoc.)
 H_a : " " " " are NOT independent
 (is an assoc.)

cond:

lowest exp. value (see chart) is 13.5, so all are ≥ 5 .
 Problem says "random sample of 200 students"

$$\chi^2 = \frac{(10-13.5)^2}{13.5} + \frac{(15-18)^2}{18} + \dots + \frac{(15-22)^2}{22} = 8.92$$

$$df = (5-1)(2-1) = 4$$

$$p\text{-value} = .063$$

The p-value of .063 is not sign. at $\alpha = .05$, so I fail to reject H_0 . I do not believe there is suff. evid. to indicate that response is dependent on gender.

2)

(exp)	U	D	S	T
N	20 (18)	50 (48)	50 (54)	120
E	10 (17)	30 (32)	40 (36)	80
T	30	80	90	200

Example:

Exp. value novice/uphill: $\frac{120(30)}{200} = 18$

Cond:

- All exp. values ≥ 5
- See table - smallest is 12
- 200 hikers were selected at random from all hikers applying for permits.

H_0 : There is no assoc. between level of hiking exp. and direction hiker would head if lost. (independent)

H_a : there is an assoc. between these 2 var. (NOT ind.)

$$\chi^2 = \frac{(20-18)^2}{18} + \frac{(50-48)^2}{48} + \dots + \frac{(40-36)^2}{36}$$

$$\chi^2 = 1.5046$$

$$df = (3-1)(2-1) = 2$$

$$p\text{-value} = .47$$

the p-value of .47 is not sign. at any reasonable level. Fail to reject H_0 . The data does not provide convincing evid. that there is an assoc. between level of hiking exp. and direction headed when lost.

5)

	M	F	T
S	384 (371.2)	416 (428.8)	800
NS	80 (92.8)	120 (107.2)	200
T	464	536	1000

(exp)

$$m/s = \frac{800 \cdot 464}{1000} = 371.2$$

Cond:

- All exp. values ≥ 5
- See table - smallest is 92.8
- 1000 adults were selected at random from the county residents.

H_0 : There is no assoc. between gender and whether or not they were satisfied w/ services offered by the hospital

H_a : there is an assoc. between these 2 var. (NOT ind.)

$$\chi^2 = \frac{(384-371.2)^2}{371.2} + \frac{(416-428.8)^2}{428.8} + \dots + \frac{(120-107.2)^2}{107.2}$$

With a p-value of .042 there is sign. evid. at the .05 level. Reject H_0 . There is evid. of an assoc. between gender and whether or not they were satisfied w/ hosp. services.

$$\chi^2 = 4.117$$

$$d.f. = (2-1)(2-1) = 1$$

$$p\text{-value} = .042$$

b) Yes, $\frac{800}{1000}$ is a reasonable est. of all county res. satisfied

full credit \rightarrow because the 1000 was an SRS of all county res.

(If 2 ind. SRS of M and F \rightarrow answer would be no, because there is a sign. diff. in opinion and sample sizes weren't \Rightarrow weighting it a certain way)

Partial credit \rightarrow no because