

9.1 Inference for two way tables

Example (9.3)

Party

Vacc.
required

	Dem	Rep	total
No	230	258	488
Yes	729	479	1208
	959	737	1696

← 2x2 table
in general.
rxc table.

H_0 : no correlation between variables. (independent!)
in this case: expected cell count = $\frac{\text{row total} \times \text{column total}}{n}$.

compute: chi-squared statistic $\chi^2 = \sum_{\text{cells}} \frac{(\text{observed count} - \text{expected count})^2}{\text{expected count}}$

If H_0 is true, this has distribution as χ^2 -dist with $(r-1)(c-1)$ degrees of freedom.

 (want: all cells ≥ 5).

↑ always use 1-sided upper tail.

Example expected values:

	Dem	Rep	
No	276	212	488
Yes	683	525	1208
	959	737	1696

χ^2	
	7.66 9.98
	3.10 4.03

total: 24.77

In R: `chisq.test(H0)`

`d = matrix(c(276, 212, 683, 525), nrow=2, ncol=2)`.

p-value 9×10^{-7}
very significant!