11.2a

2-way tables : dimensions rows x columns (don't include "totals")

Show the relationship between 2 variables

χ^2 test for Homogeneity

to see if distributions are the same for all populations

one categorical variable with several treatments or populations

Step 1: H_0: there is NO DIFFERENCE in the the distributions of a categorical variable for several populations or treatments

H_a: there IS A DIFFERENCE in...

Step 2 Method: χ^2 test for homogeneity

Conditions: ① Random

② Expected counts ≥ 5

Expected counts $= \frac{(\text{row total})(\text{col total})}{\text{table total}}$

③ Independent — samples taken independently and 10% rule should be met.

Step 3 give χ^2, df, p-val

$\chi^2 = \sum \frac{(obs-exp)^2}{exp}$ (sum of all cells except totals.)

df = (# of rows − 1)(# of columns − 1)

Step 4 same as always.

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on calc:

1. enter observed counts in a matrix
   2nd → matrix x^{-1} → edit → 1:A
   - dimensions (rows x colums)
   - values
2. stat → tests → C: χ^2-test
3. to see expected values:
   2nd → matrix x^{-1} → 2:B

Step 1

ex: H_0: there is no difference in the distr. of superpower preference for U.K. & U.S. kids

H_a: there is a difference in the distr. of superpower preference for U.K & U.S. kids

$\alpha = 0.05$

Step 2: Use a χ^2 test for Homogeneity

Conditions: ① Random - random samples of 200 UK kids and 215 U.S. kids were chosen.

② Expected Counts ≥ 5 ✓

	UK	U.S.
Fly	$\frac{99 \cdot 200}{415} = 47.71$	51.28
Freeze Time	46.2	49.7
Invisible	32.3	34.7
Super St.	20.7	22.28
Telepathy	53.01	56.9

③ Independent - 2 samples wer taken independently, and more than 2000 kids in the U.K. and 2150 kids in the U.S.