

Chi-Square Test for Homogeneity

Verified Python analysis transcript

Test: Chi-Square Test for Homogeneity

Design: Reason distributions compared across two school populations.

Variables: school, reason

Null hypothesis: The school-choice reason distribution is homogeneous across schools.

Primary formula: $X^2 = \sum_{ij} (O_{ij} - E_{ij})^2 / E_{ij}$ under common category proportions.

Valid source rows: 649

Verified results:

statistic: 52.52394157003515

p_value: 2.315976089451305e-11

degrees_of_freedom: 3

cramers_v: 0.2844829916304641

minimum_expected_count: 25.07241910631741

cells_expected_below_5: 0

Interpretation:

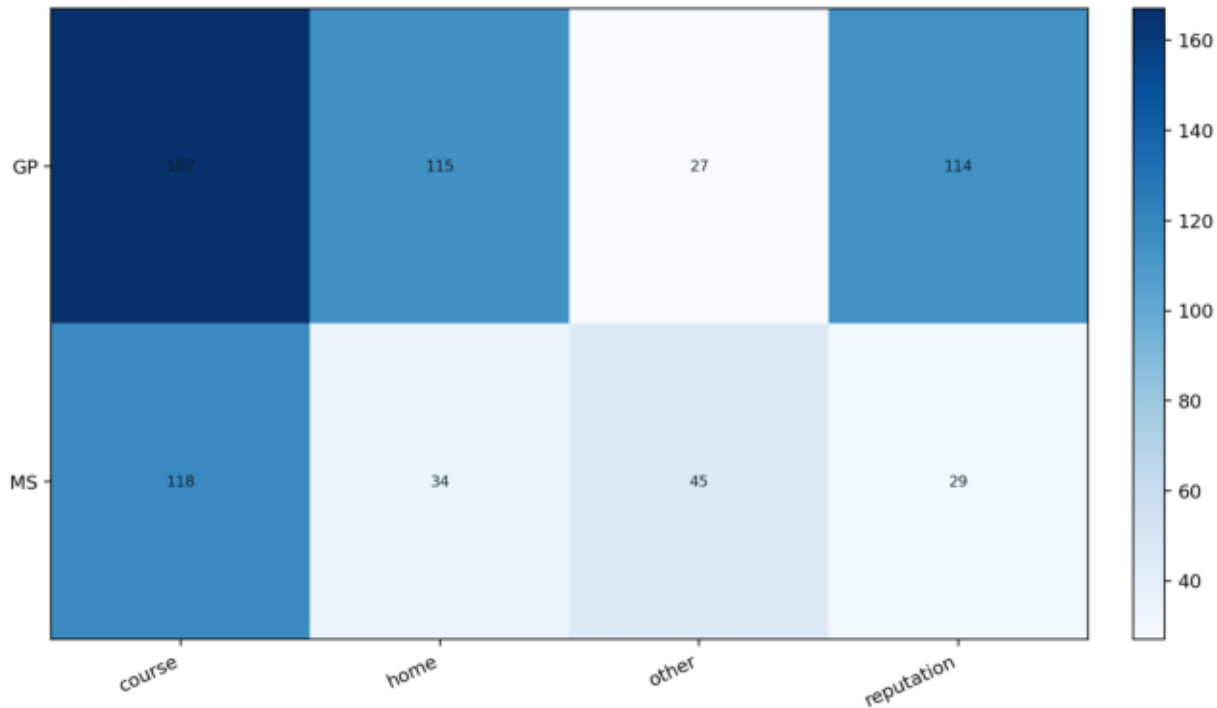
The primary statistic is 52.523942 with $p = 2.31598e-11$.

Cramer's V is 0.284483 and the minimum expected count is 25.072.

Interpret the residual and contribution tables before describing which cells account for the global result.

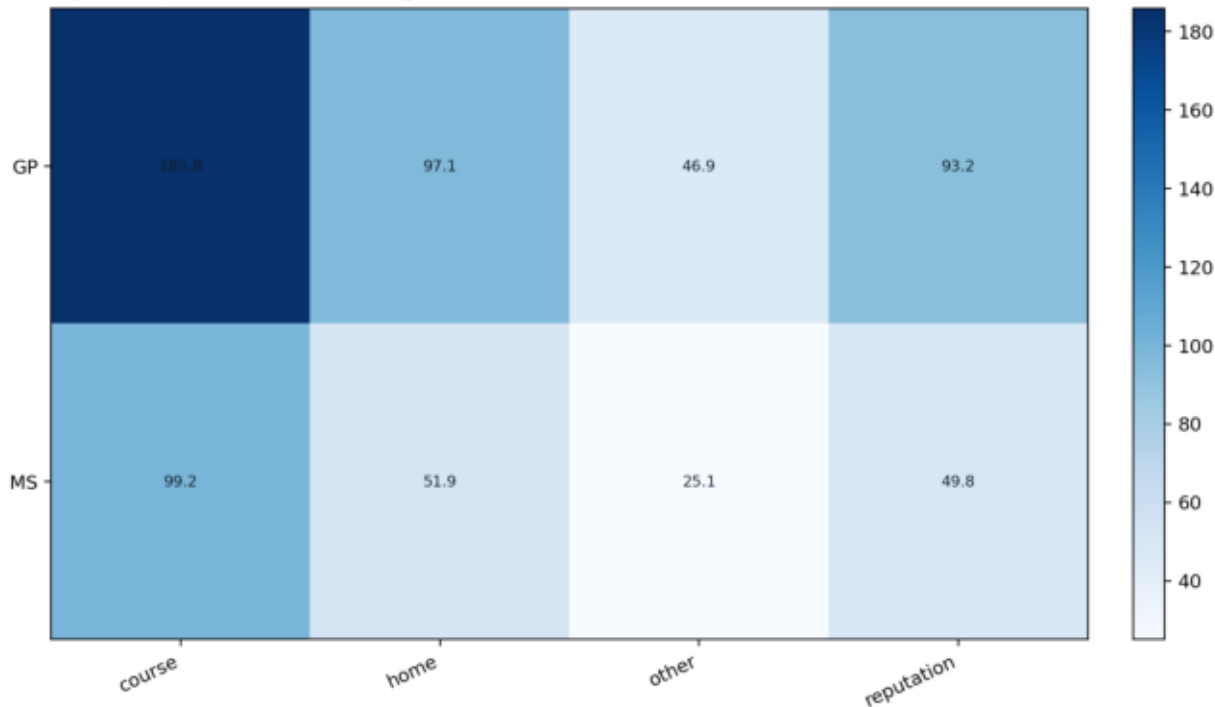
Observed categorical counts

school by reason



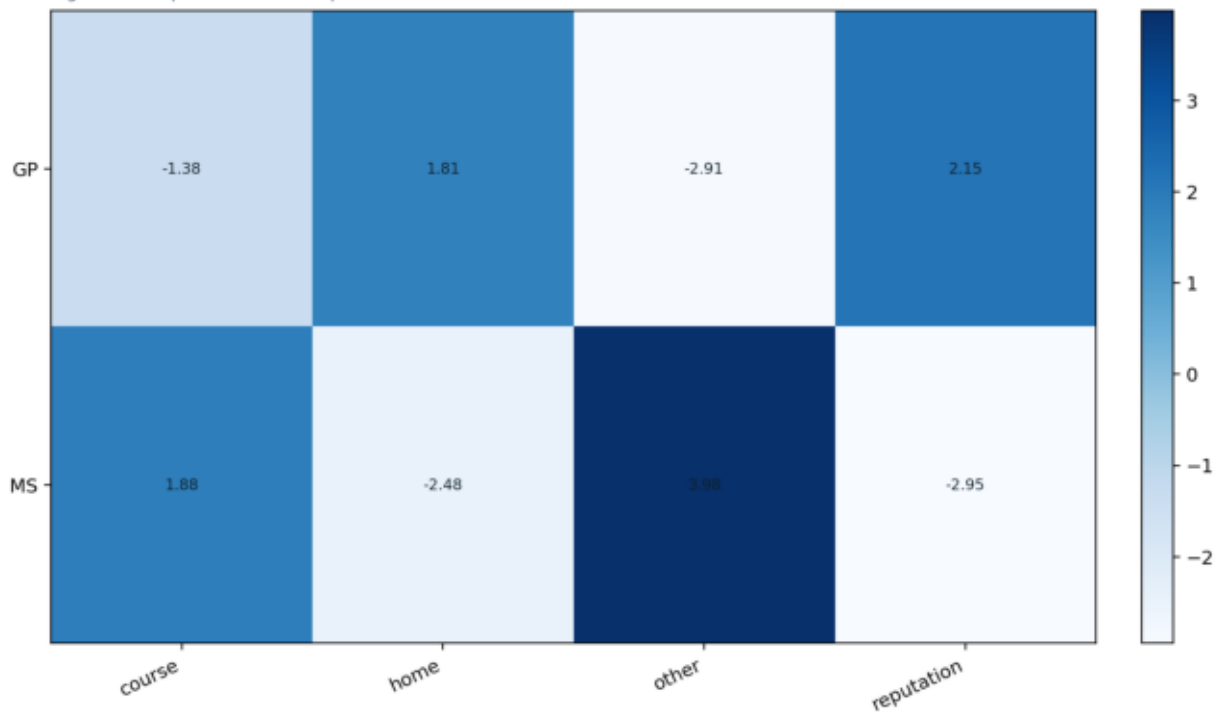
Expected counts under the null

Expected frequencies from the fitted margins



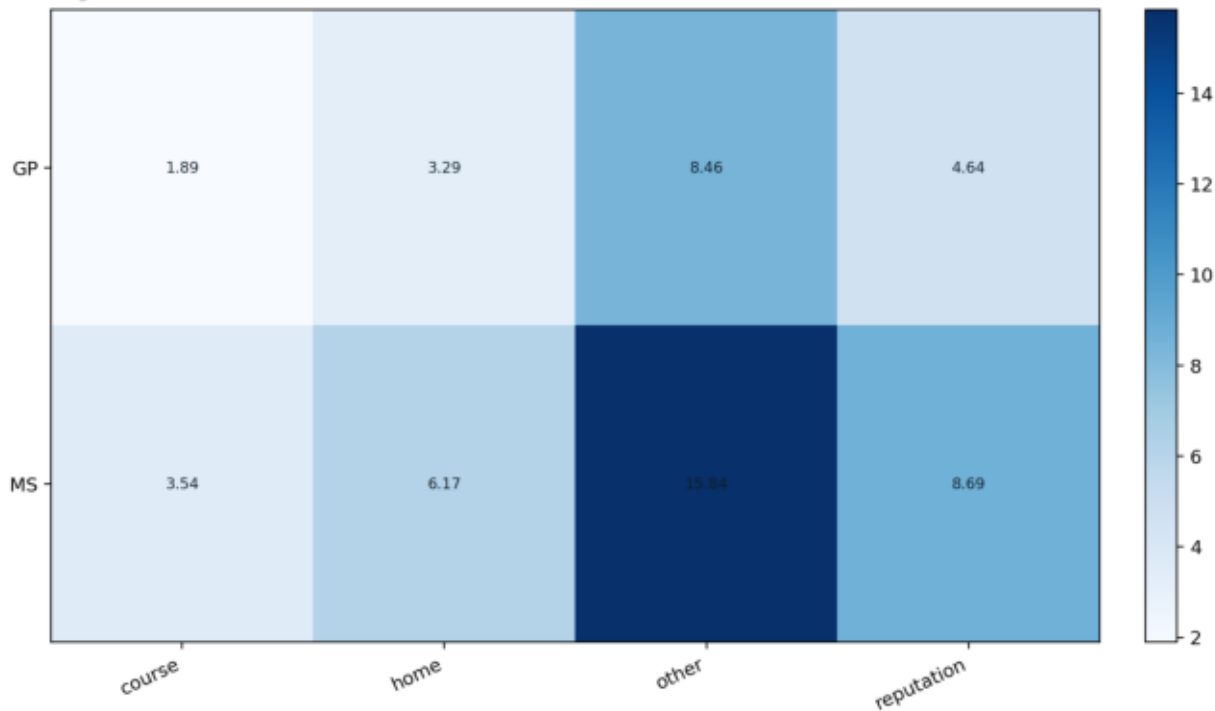
Pearson residual pattern

Signed cell departures from independence



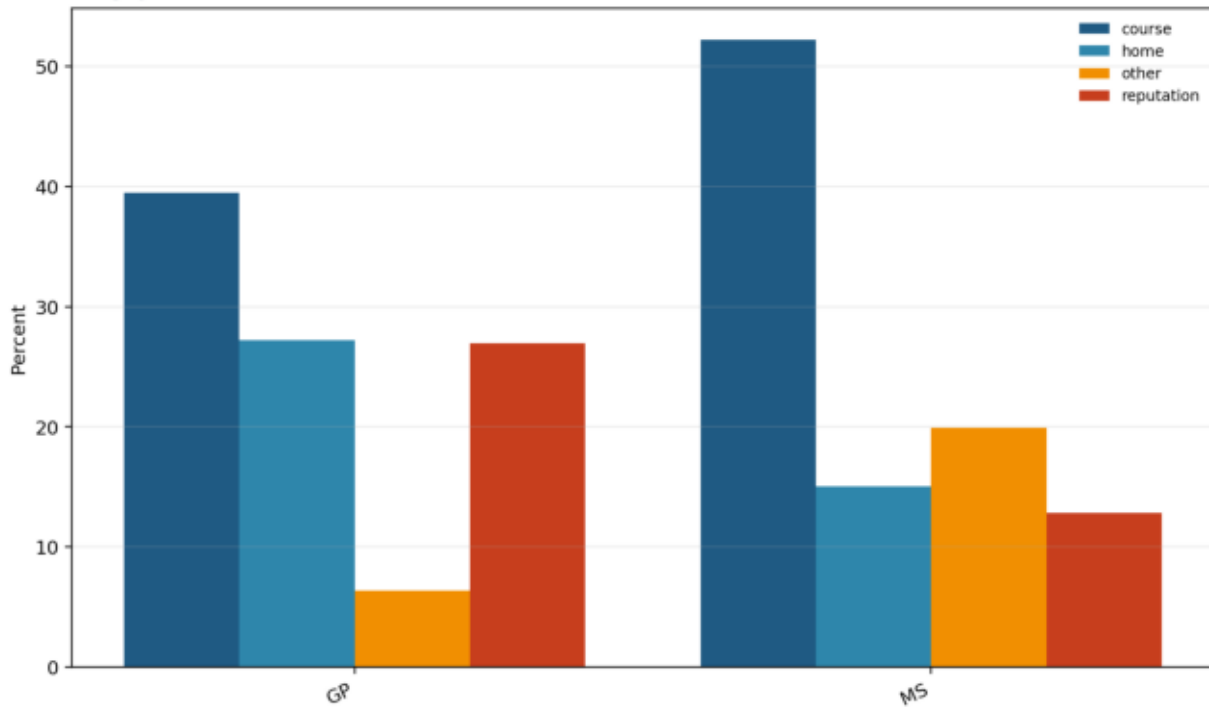
Cell contributions to the statistic

Larger values contribute more evidence



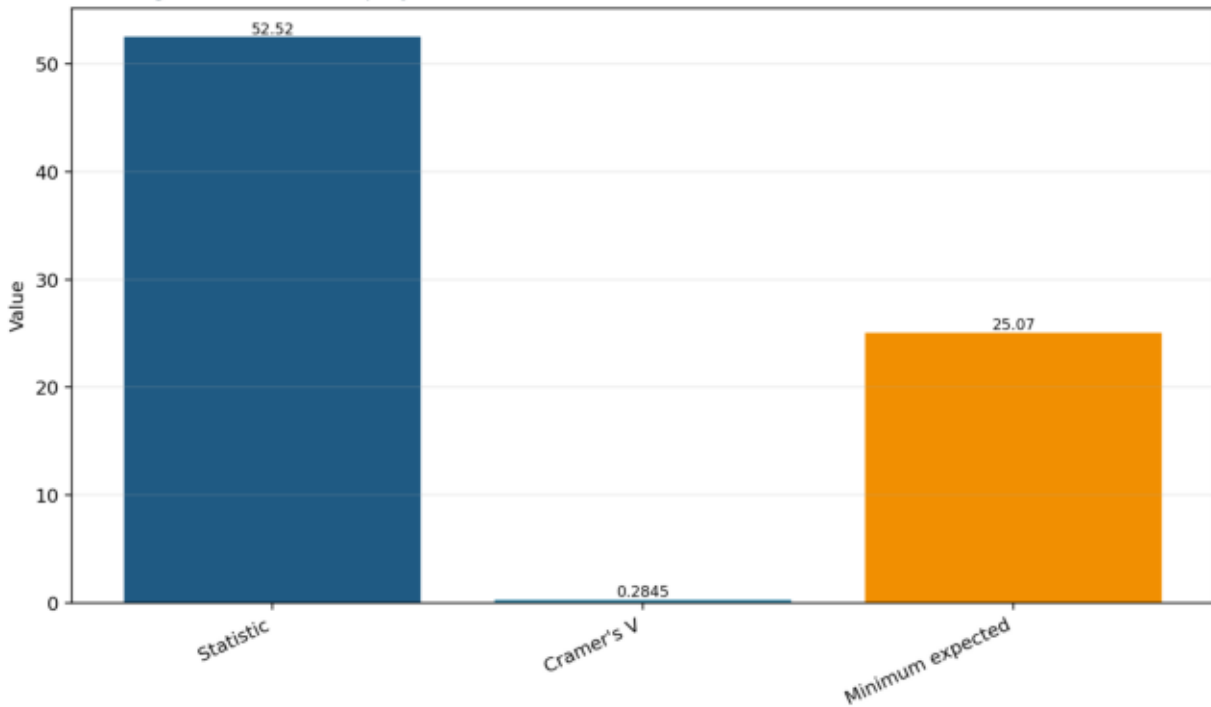
Row percentage comparison

Category distribution within each row



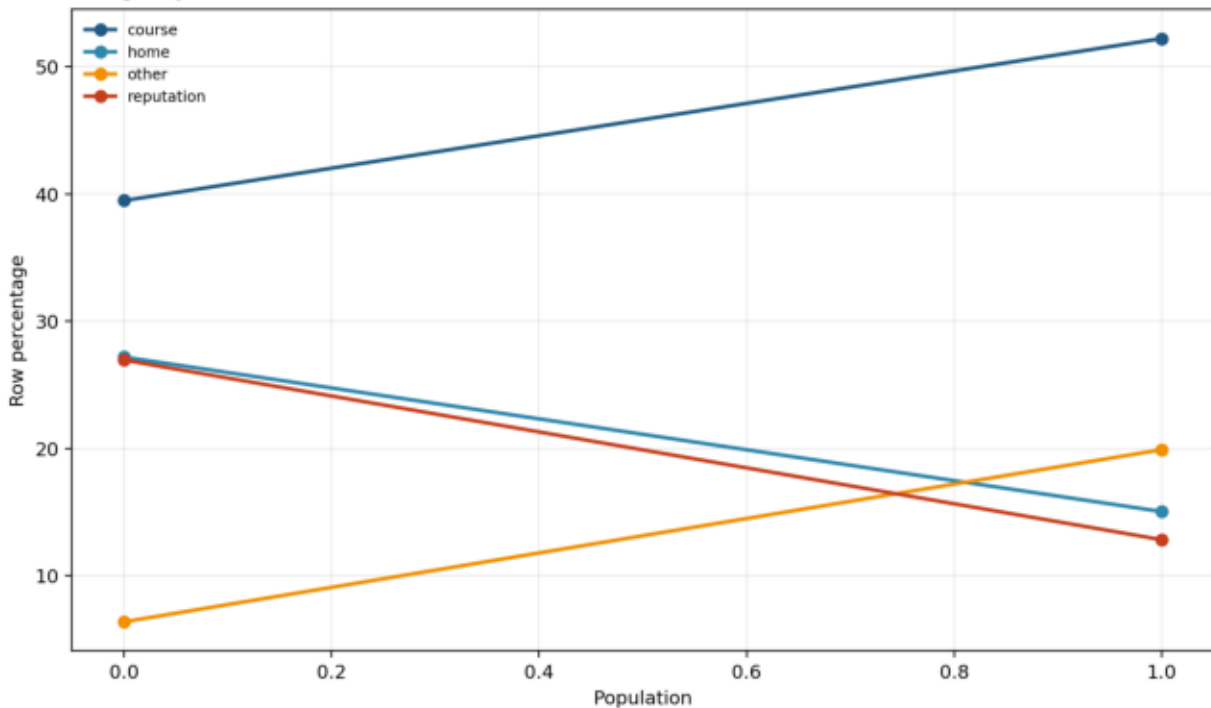
Model diagnostics

test strength, effect size, and adequacy



Population category profiles

Homogeneity asks whether these distributions match



Observed Counts

course	home	other	reputation
167	115	27	114
118	34	45	29

Expected Counts

course	home	other	reputation
185.755	97.114	46.9276	93.2034
99.245	51.886	25.0724	49.7966

Pearson Residuals

course	home	other	reputation
-1.37609	1.81498	-2.90898	2.15415
1.88262	-2.48306	3.97976	-2.94708

Cell Contributions

course	home	other	reputation
1.89362	3.29415	8.46216	4.64038
3.54426	6.1656	15.8385	8.68531