Chi-Square Test of Independence

Verified Python analysis transcript

Test: Chi-Square Test of Independence

Design: Two binary variables observed in one student sample.

Variables: internet, higher

Null hypothesis: Internet access and intention to pursue higher education are independent.

Primary formula: X^2 = sum_ij (O_ij-E_ij)^2/E_ij; E_ij = row_i*column_j/N

Valid source rows: 649

Verified results:

statistic: 3.2115218385514543

p_value: 0.0731214429965458

degrees_of_freedom: 1

cramers_v: 0.07034497690587595

minimum_expected_count: 16.053929121725734

cells_expected_below_5: 0

yates_chi_square: 2.6941222240584533

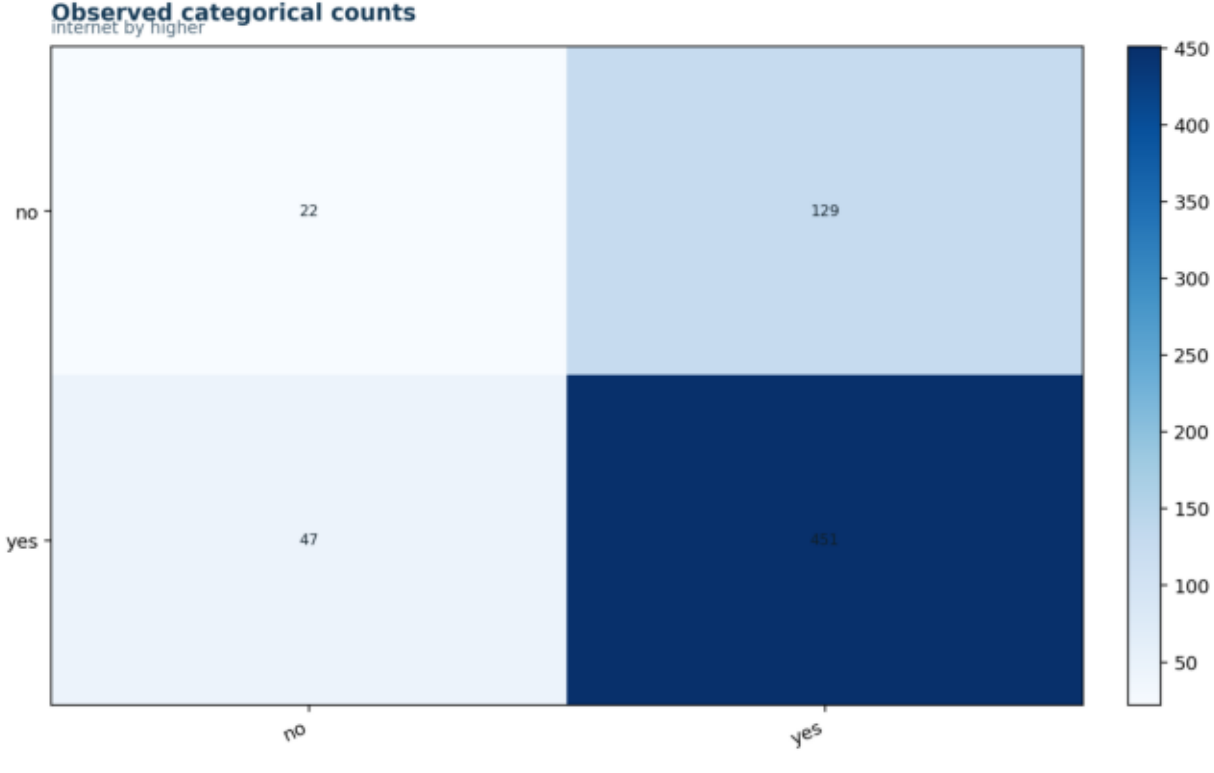
yates_p_value: 0.10071894310832907

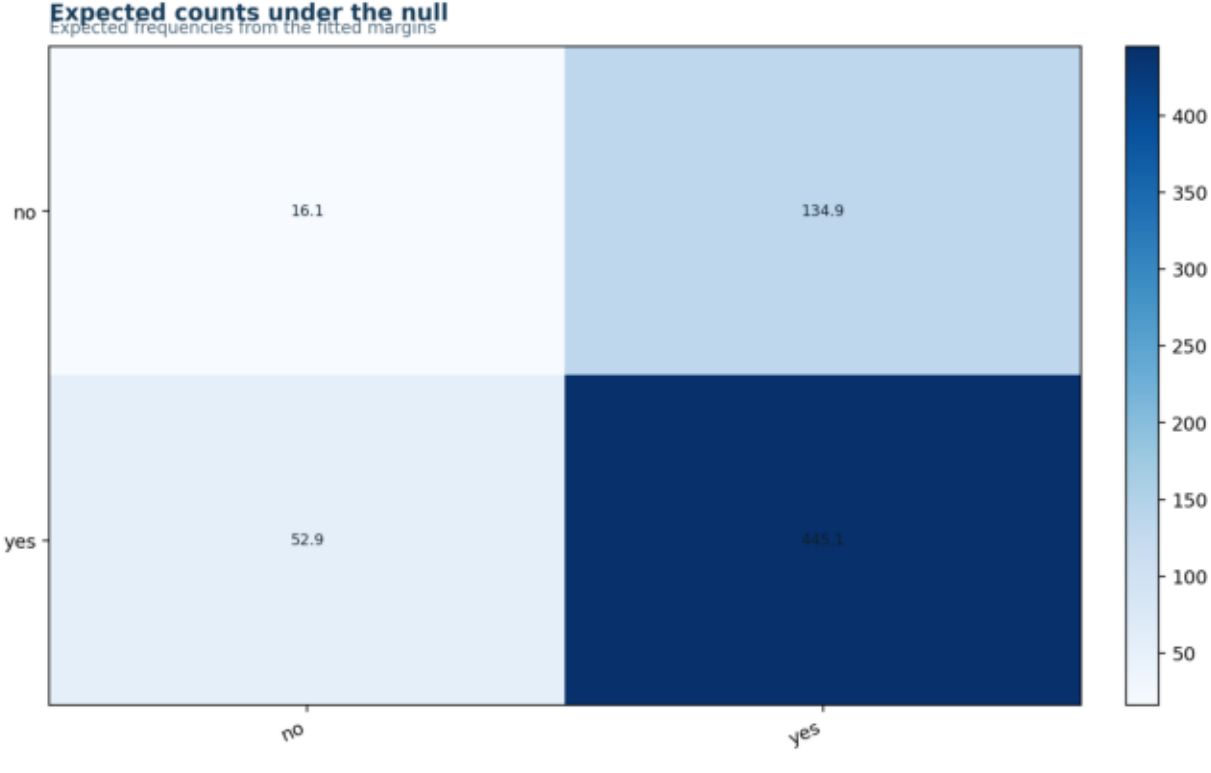
Interpretation:

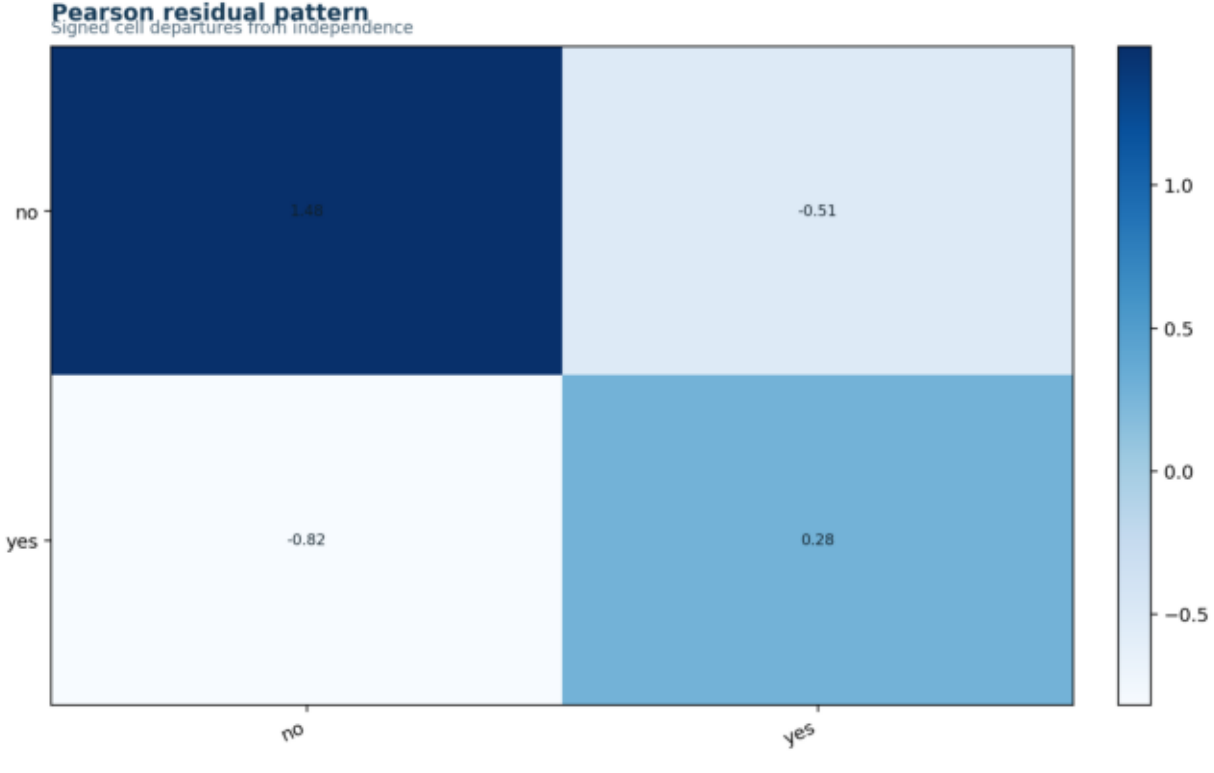
The primary statistic is 3.211522 with p = 0.0731214.

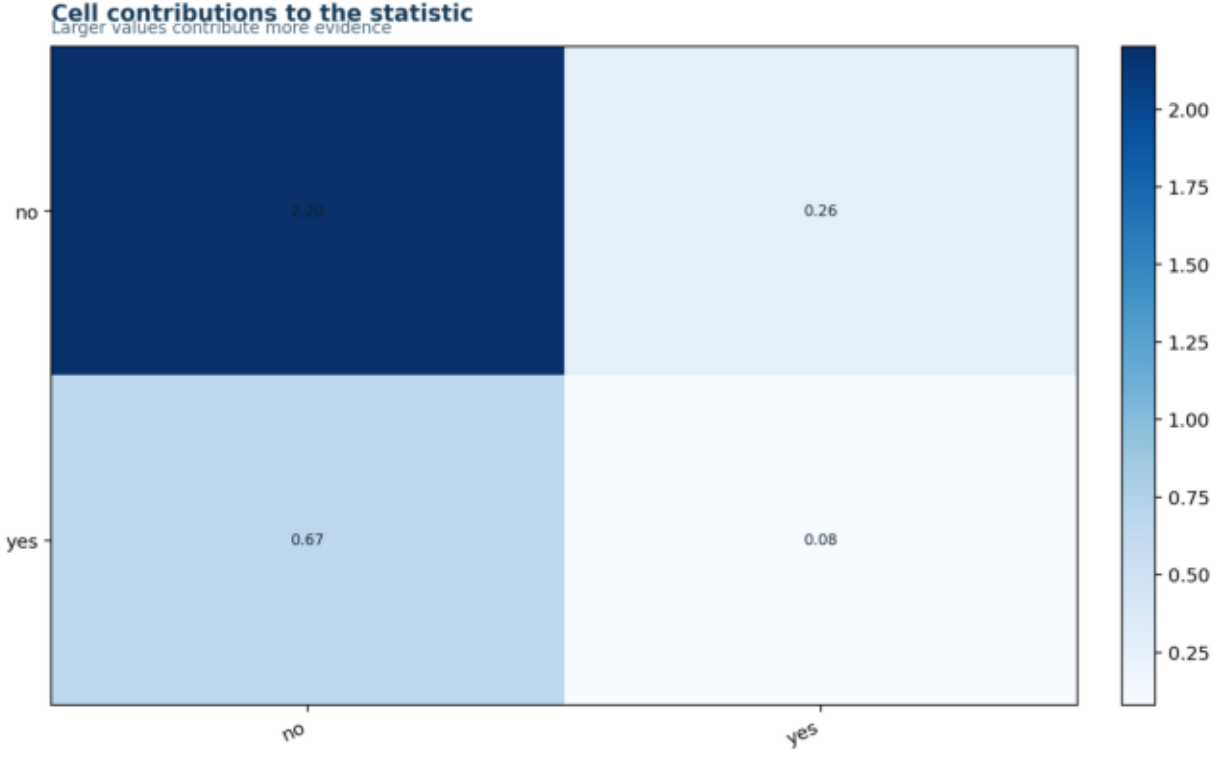
Cramer's V is 0.070345 and the minimum expected count is 16.054.

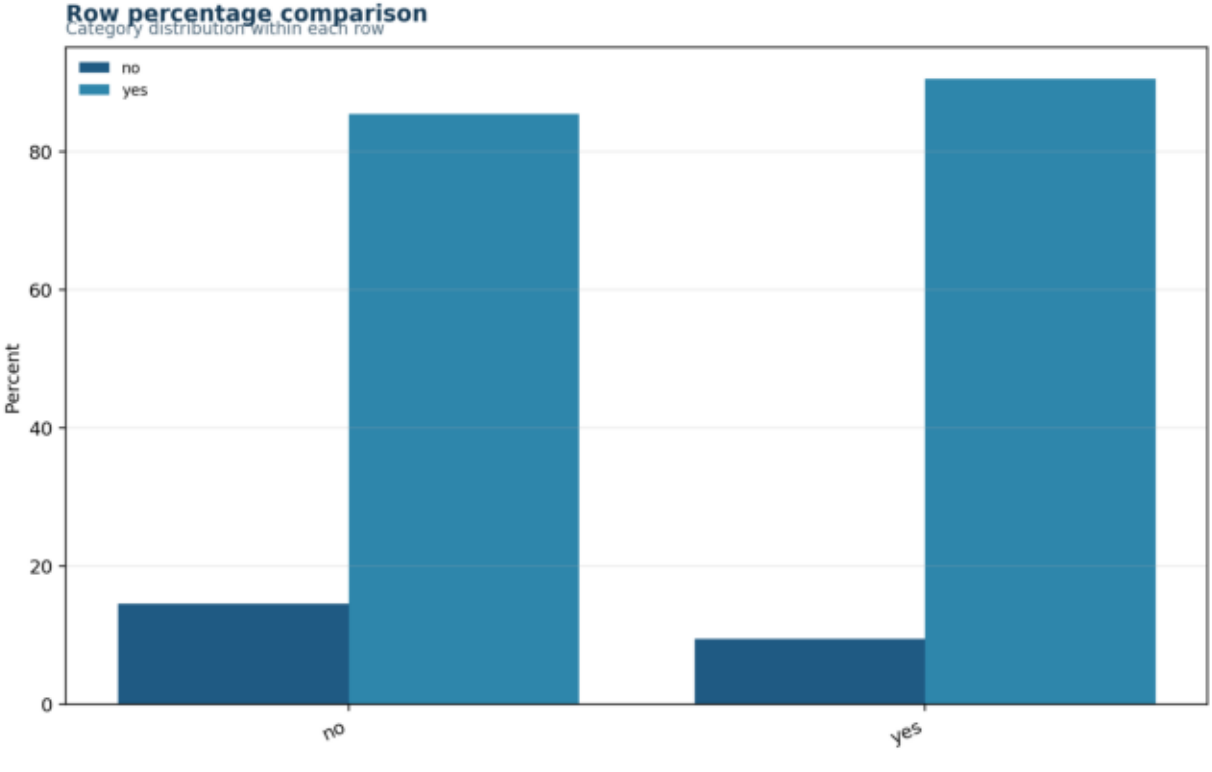
Interpret the residual and contribution tables before describing which cells account for the global result.

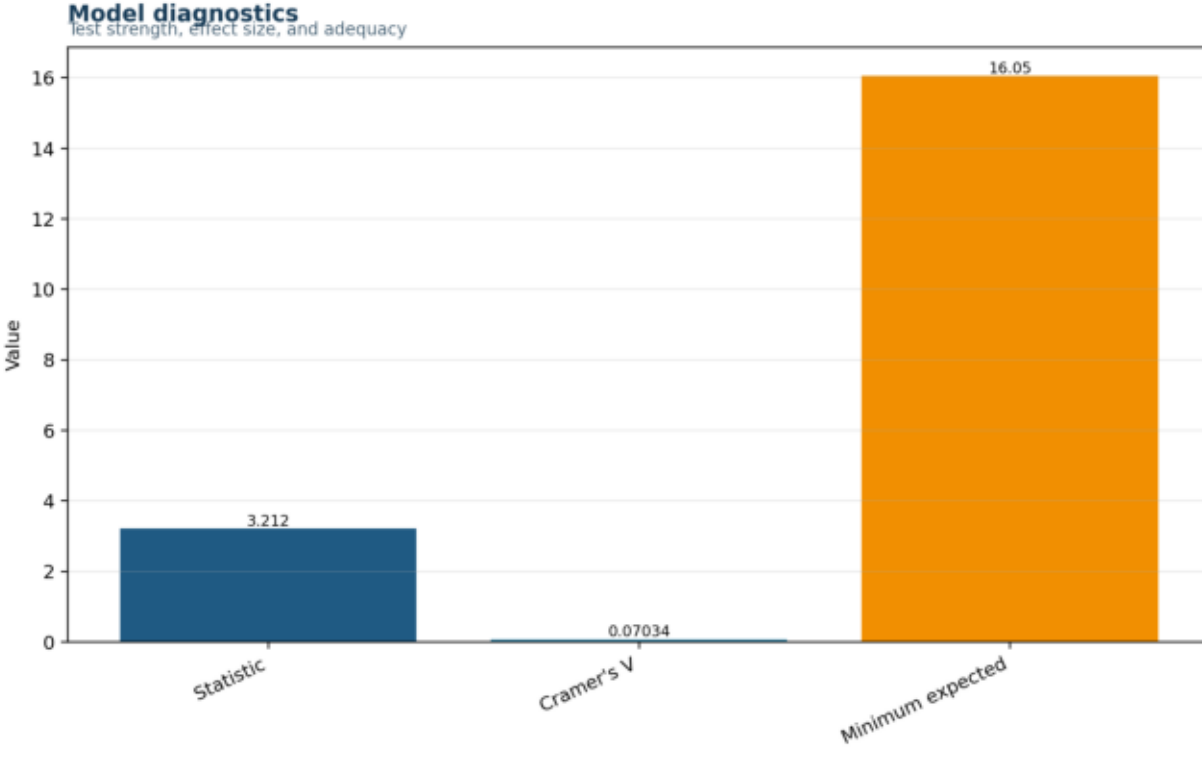

Observed categorical counts
internet by higher
no
yes
22
129
47
451
no
yes
450
400
350
300
250
200
150
100
50


Expected counts under the null
Expected frequencies from the fitted margins
no
yes
16.1
134.9
52.9
445.1
no
yes
400
350
300
250
200
150
100
50


Pearson residual pattern
Signed cell departures from independence
no
yes
1.48
-0.51
-0.82
0.28
no
yes
1.0
0.5
0.0
−0.5


Cell contributions to the statistic
Larger values contribute more evidence
no
yes
2.20
0.26
0.67
0.08
no
yes
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25


Row percentage comparison
Category distribution within each row
no
yes
Percent
0
20
40
60
80
no
yes


Model diagnostics
Test strength, effect size, and adequacy
Value
16
14
12
10
8
6
4
2
0
3.212
0.07034
16.05
Statistic
Cramer's V
Minimum expected


Continuity-correction sensitivity
Two binary variables in one sample
p-value
0.04
0.02
0.00
−0.02
−0.04
Pearson
Yates corrected

Observed Counts

no	yes
22	129
47	451

Expected Counts

no	yes
16.0539	134.946
52.9461	445.054

Pearson Residuals

no	yes
1.48402	-0.511859
-0.817172	0.281854

Cell Contributions

no	yes
2.20231	0.261999
0.667769	0.0794415