Two-Sample Z Test for Proportions

Verified Python analysis transcript

Test: Two-Sample Z Test for Proportions

Design: Asymptotic comparison of male and female G3 pass proportions.

Variables: sex, G3 >= 10

Null hypothesis: The two population pass proportions are equal.

Primary formula: z = (p_1-p_2)/sqrt[p_pool(1-p_pool)(1/n_1+1/n_2)]

Valid source rows: 649

Verified results:

z_statistic: -1.9927454994231857

p_value: 0.04628932237899876

male_proportion: 0.8120300751879699

female_proportion: 0.8694516971279374

difference: -0.05742162193996747

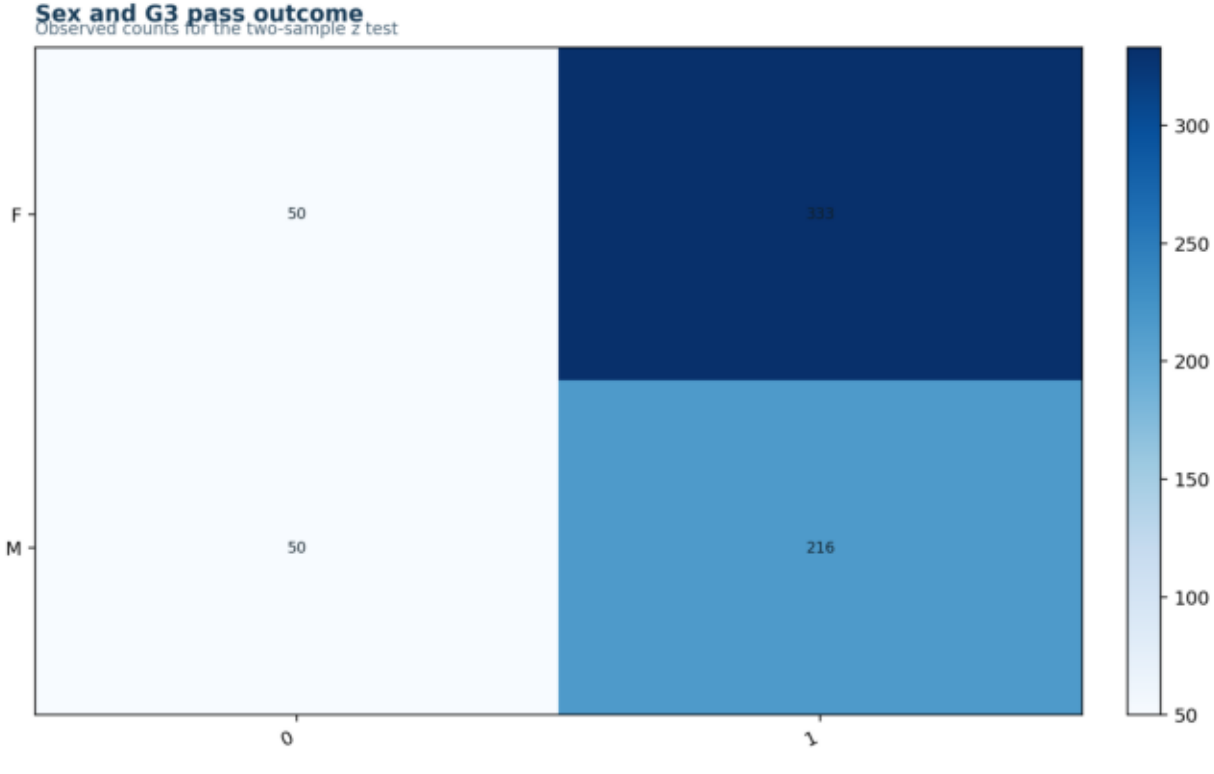
pooled_standard_error: 0.028815331389075306

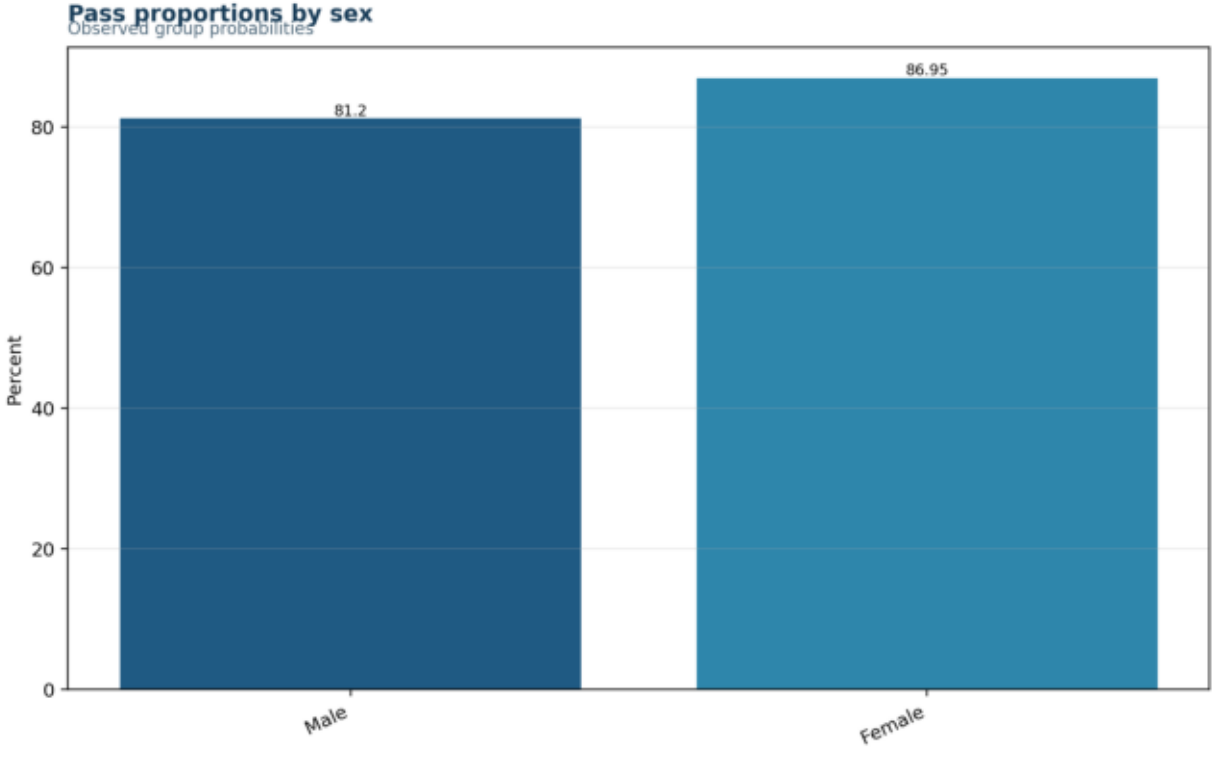
unpooled_standard_error: 0.02949886508675137

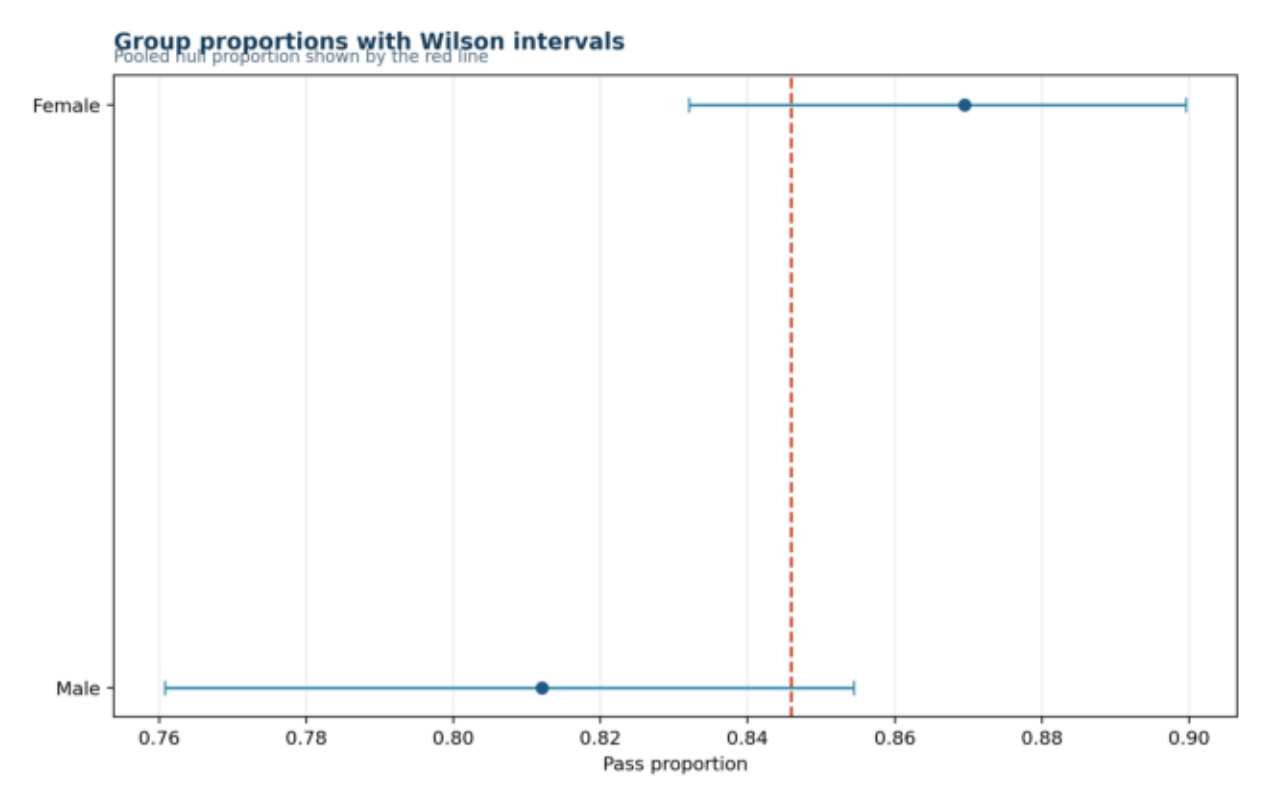
Interpretation:

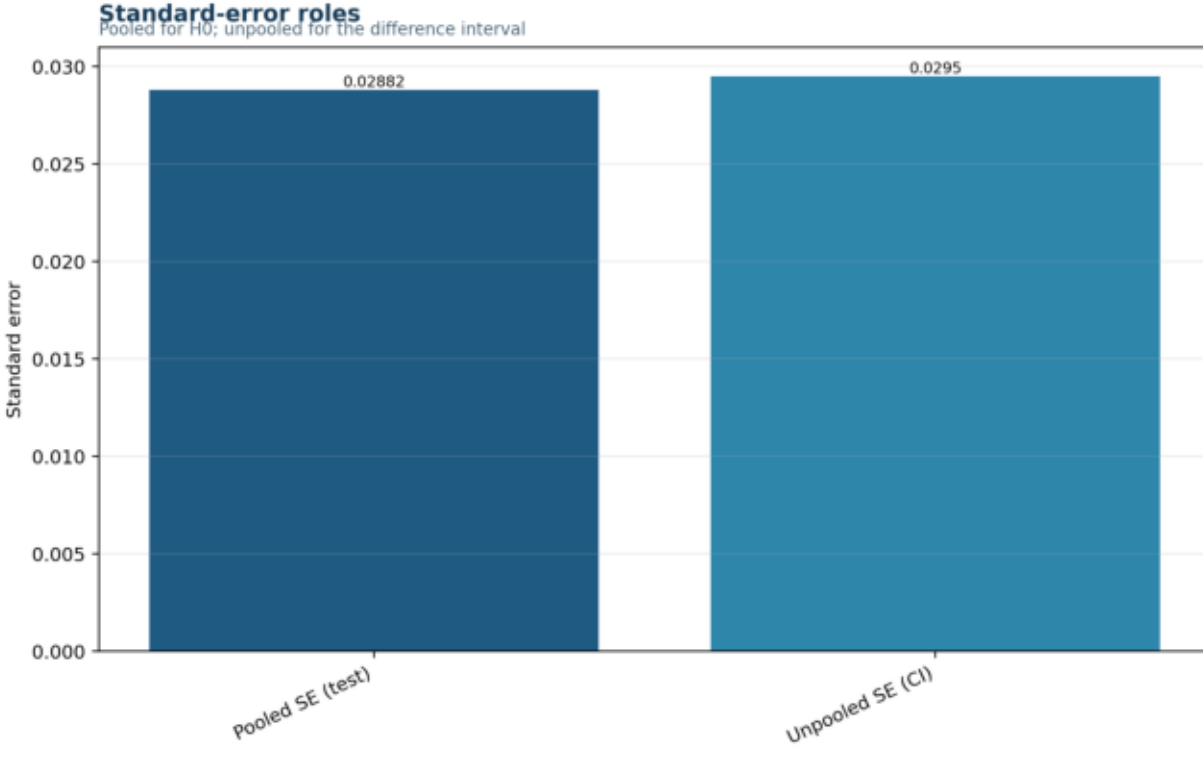
z = -1.992745, p = 0.0462893; male-female proportion difference = -0.057422.

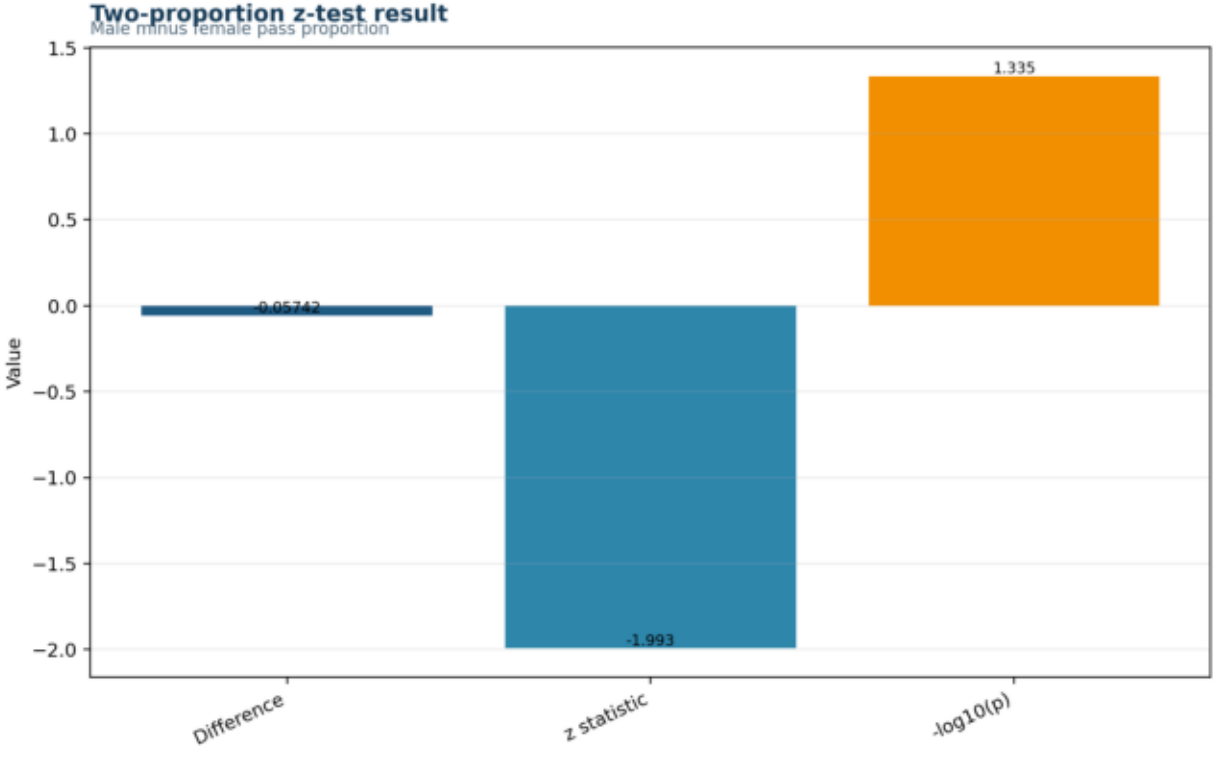
The null test uses the pooled standard error; confidence intervals use unpooled group uncertainty.


Sex and G3 pass outcome
Observed counts for the two-sample z test
F
M
50
333
50
216
0
1
300
250
200
150
100
50


Pass proportions by sex
Observed group probabilities
Percent
0
20
40
60
80
81.2
86.95
Male
Female


Group proportions with Wilson intervals
Pooled null proportion shown by the red line
Female
Male
0.76
0.78
0.80
0.82
0.84
0.86
0.88
0.90
Pass proportion


Standard-error roles
Pooled for H0; unpooled for the difference interval
Standard error
0.030
0.025
0.020
0.015
0.010
0.005
0.000
0.02882
0.0295
Pooled SE (test)
Unpooled SE (CI)


Two-proportion z-test result
Male minus female pass proportion
Value
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
−2.0
-0.05742
-1.993
1.335
Difference
z statistic
-log10(p)

Observed 2X2

0	1
50	333
50	216

Group Proportions

successes	n	proportion	ci_low	ci_high
216	266	0.81203	0.760762	0.854414
333	383	0.869452	0.83201	0.899556