Siegel-Tukey Scale Test

Standalone verified Python analysis

Test: Siegel-Tukey Scale Test

Design: Median-adjusted two-sample scale comparison of final grades between female and male students.

Variables: median-centered G3, sex

Null hypothesis: The two groups have equal dispersion.

Formula: Alternating extreme ranks are assigned 1,2,3,...; the group score sum is standardized by its permutation variance.

Source rows: 649

Calculated metrics:

female_score_sum: 121481.97107087617

expected_score_sum: 124475.0

variance: 5271279.28271198

z_statistic: -1.3036256626852152

p_value: 0.19236124639723062

Independent reference values:

female_score_sum: 121481.97107087617

expected_score_sum: 124475.0

variance: 5271279.28271198

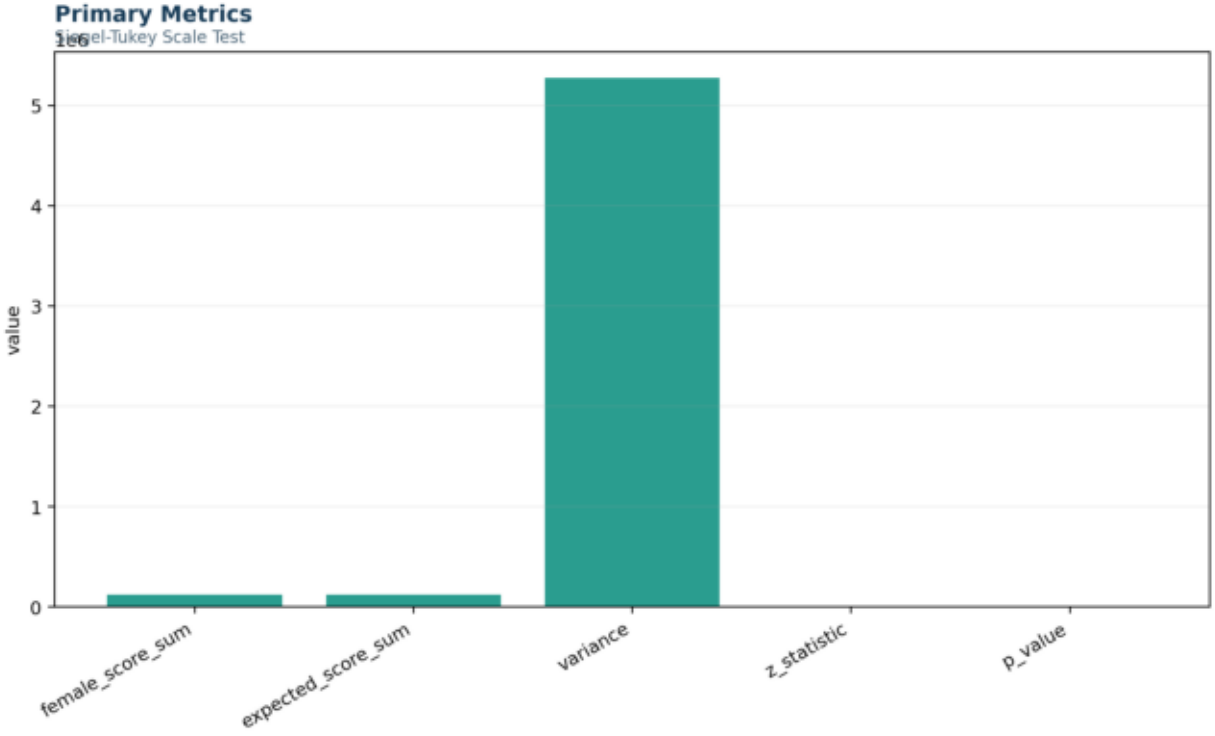
z_statistic: -1.3036256626852152

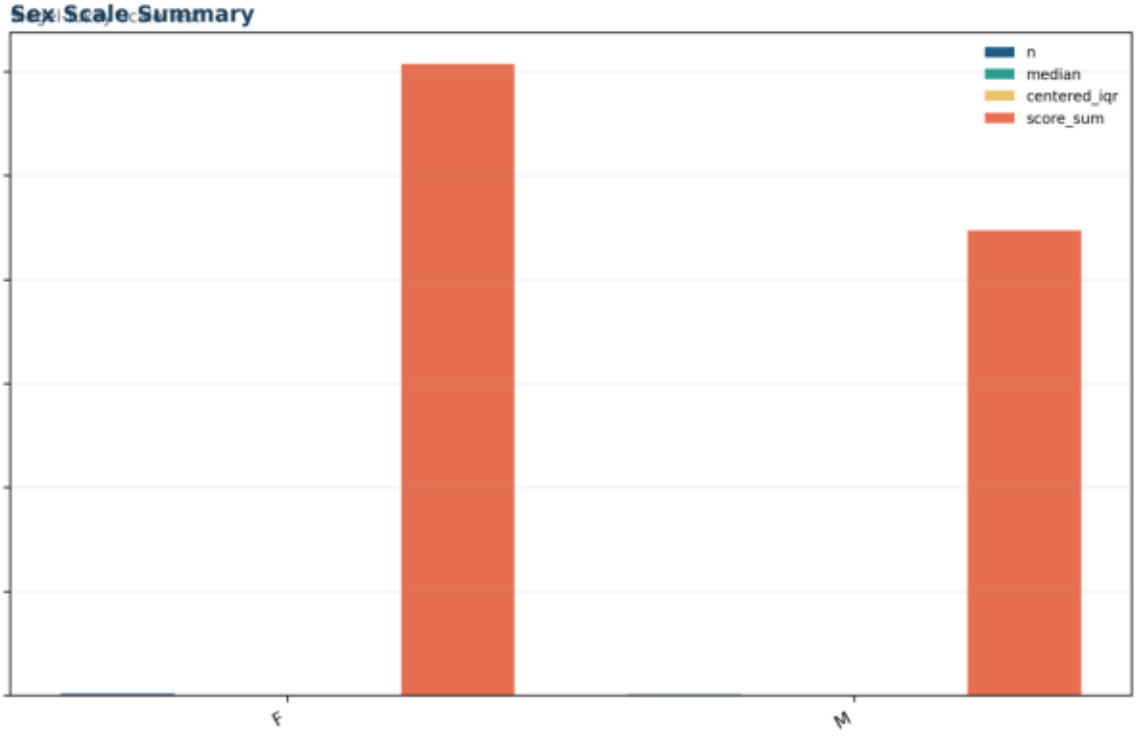
p_value: 0.19236124639723062

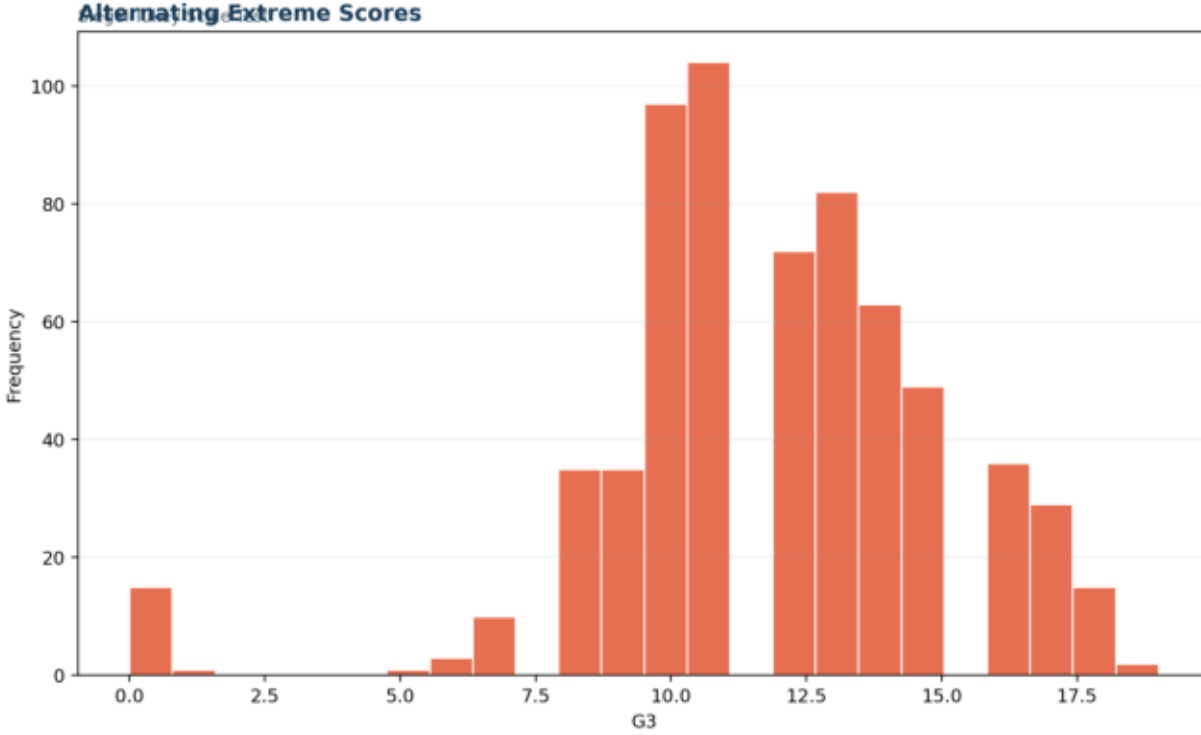
Interpretation:

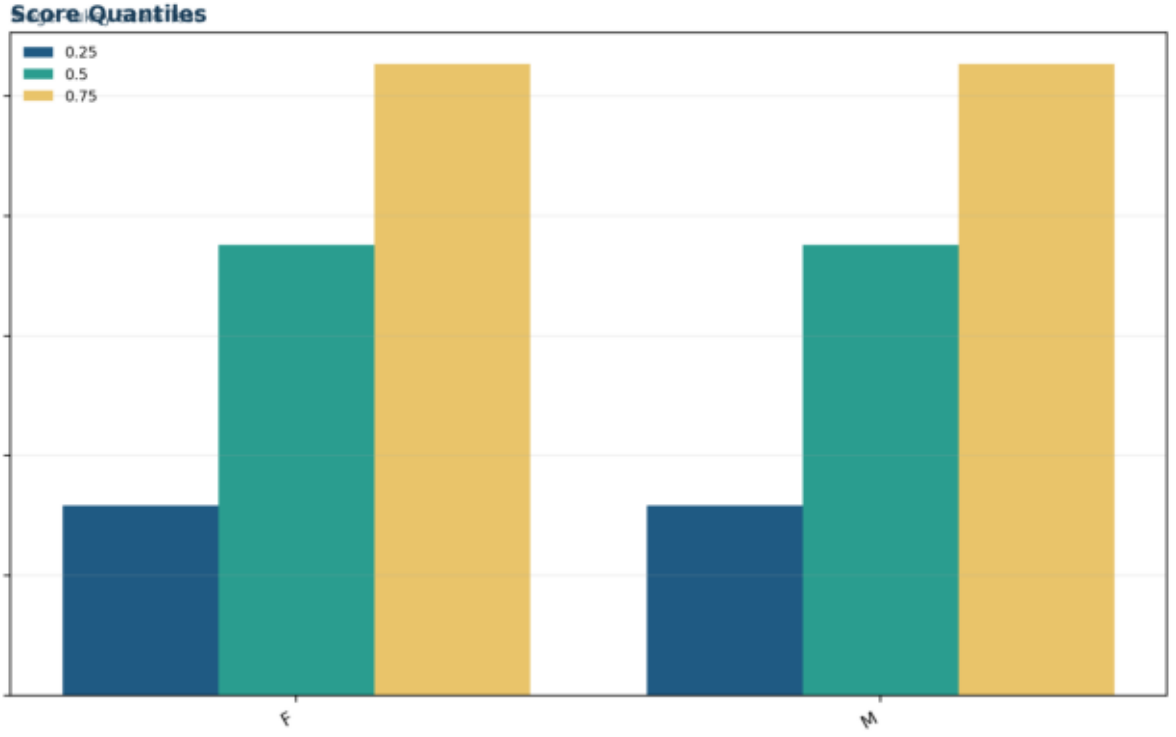
Group medians are removed before alternating extreme ranks are assigned, focusing inference on scale.

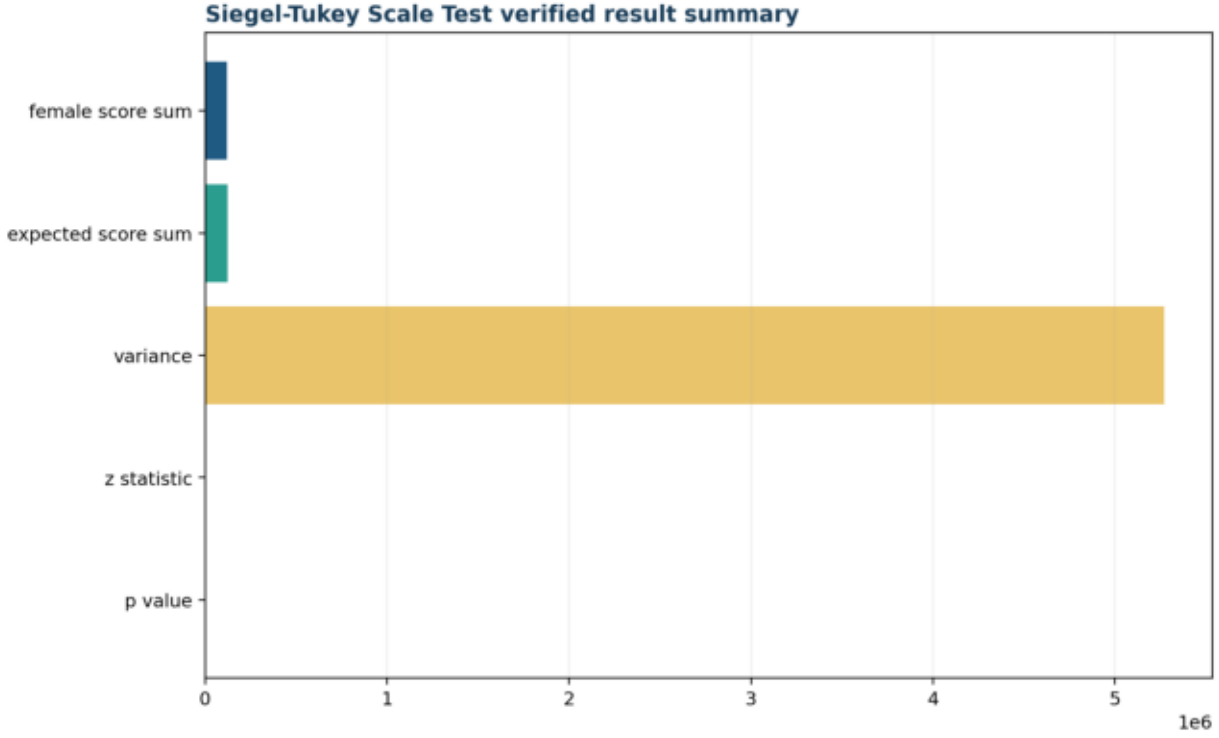
The two-sided scale-test p-value is 0.192361.


Primary Metrics
Siegel-Tukey Scale Test
1e6
5
4
3
2
1
0
value
female_score_sum
expected_score_sum
variance
z_statistic
p_value


Sex Scale Summary
n
median
centered_iqr
score_sum
120000
100000
80000
60000
40000
20000
0
F
M


Alternating Extreme Scores
Frequency
G3
0
20
40
60
80
100
0.0
2.5
5.0
7.5
10.0
12.5
15.0
17.5


Score Quantiles
0.25
0.5
0.75
500
400
300
200
100
0
F
M


Siegel-Tukey Scale Test verified result summary
female score sum
expected score sum
variance
z statistic
p value
0
1
2
3
4
5
1e6

Primary Metrics

metric	value
female_score_sum	121482
expected_score_sum	124475
variance	5.27128e+06
z_statistic	-1.30363
p_value	0.192361

Sex Scale Summary

sex	n	median	centered_iqr	score_sum
F	383	12	4	121482
M	266	11	3	89443

Alternating Extreme Scores

sex	G3	centered_G3	siegel_tukey_score
F	11	-1	403.495
F	11	-1	403.495
F	12	0	587.564
F	14	2	375.493
F	13	1	526.5
M	13	2	375.493
M	13	2	375.493
F	13	1	526.5
M	17	6	31.5263
M	13	2	375.493
F	14	2	375.493
F	13	1	526.5
M	12	1	526.5
M	13	2	375.493
M	15	4	158.5
F	17	5	84.5
F	14	2	375.493
F	14	2	375.493
M	7	-4	77.5217
M	12	1	526.5
M	14	3	252.5
M	12	1	526.5
M	14	3	252.5
M	10	-1	403.495
F	10	-2	233.507
F	12	0	587.564

Score Quantiles

sex	0.25	0.5	0.75
F	158.5	375.493	526.5
M	158.5	375.493	526.5