

Wilcoxon Signed-Rank Test

Standalone verified Python analysis

Test: Wilcoxon Signed-Rank Test

Design: Magnitude-sensitive paired comparison of G3 versus G1.

Variables: G1, G3

Null hypothesis: The paired difference distribution is symmetric around zero.

Formula: $W = \min(\text{sum positive absolute-difference ranks}, \text{sum negative ranks})$; zeros are excluded.

Source rows: 649

Calculated metrics:

w_statistic: 25595.5

p_value: 5.5689174528880075e-24

nonzero_pairs: 464

zero_pairs: 185

rank_biserial: 0.5254820170559882

median_difference: 1.0

positive_rank_sum: 82284.5

negative_rank_sum: 25595.5

Independent reference values:

w_statistic: 25595.5

p_value: 5.5689174528880075e-24

nonzero_pairs: 464

zero_pairs: 185

rank_biserial: 0.5254820170559882

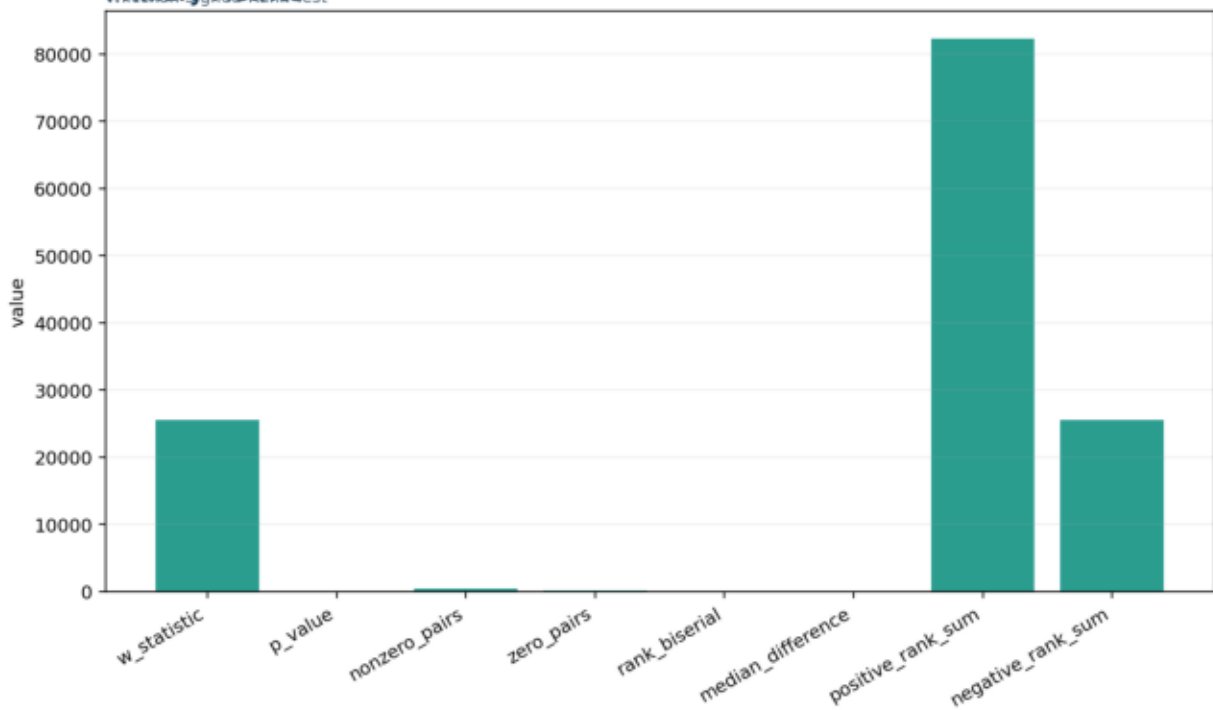
median_difference: 1.0

Interpretation:

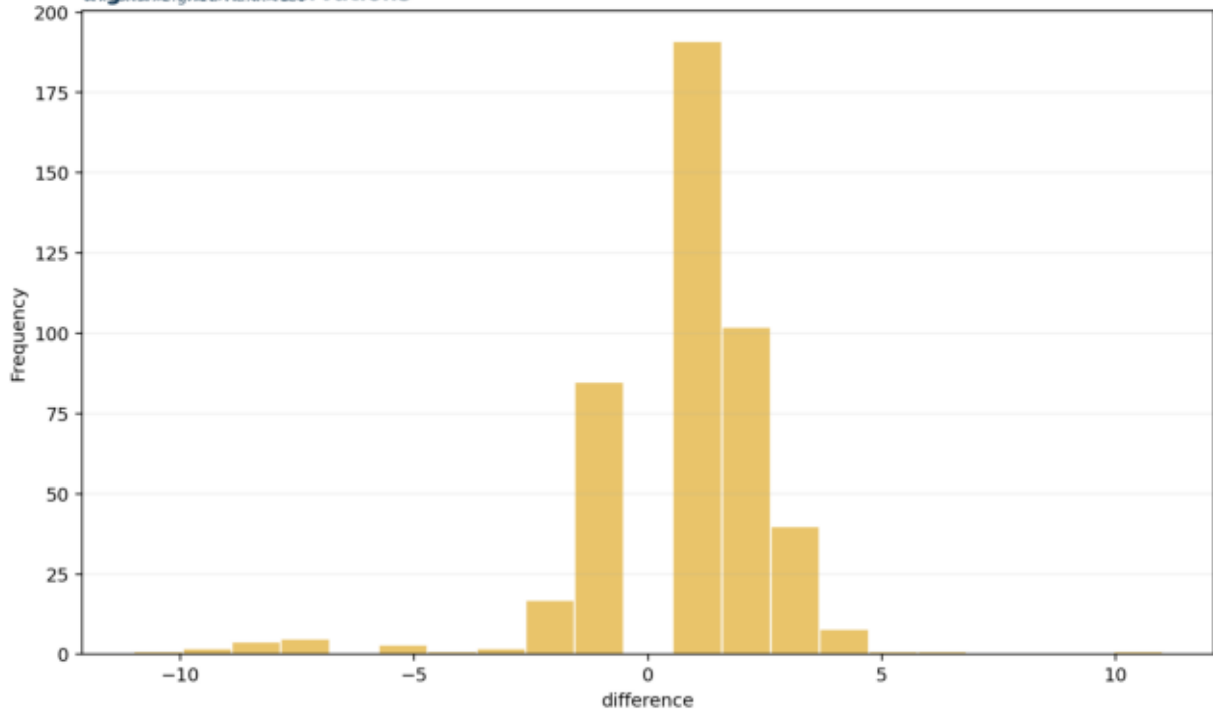
Zero differences are excluded; nonzero absolute differences are midranked and then signed.

$W=25595.500000$, $p=5.56892e-24$, rank-biserial=0.525482.

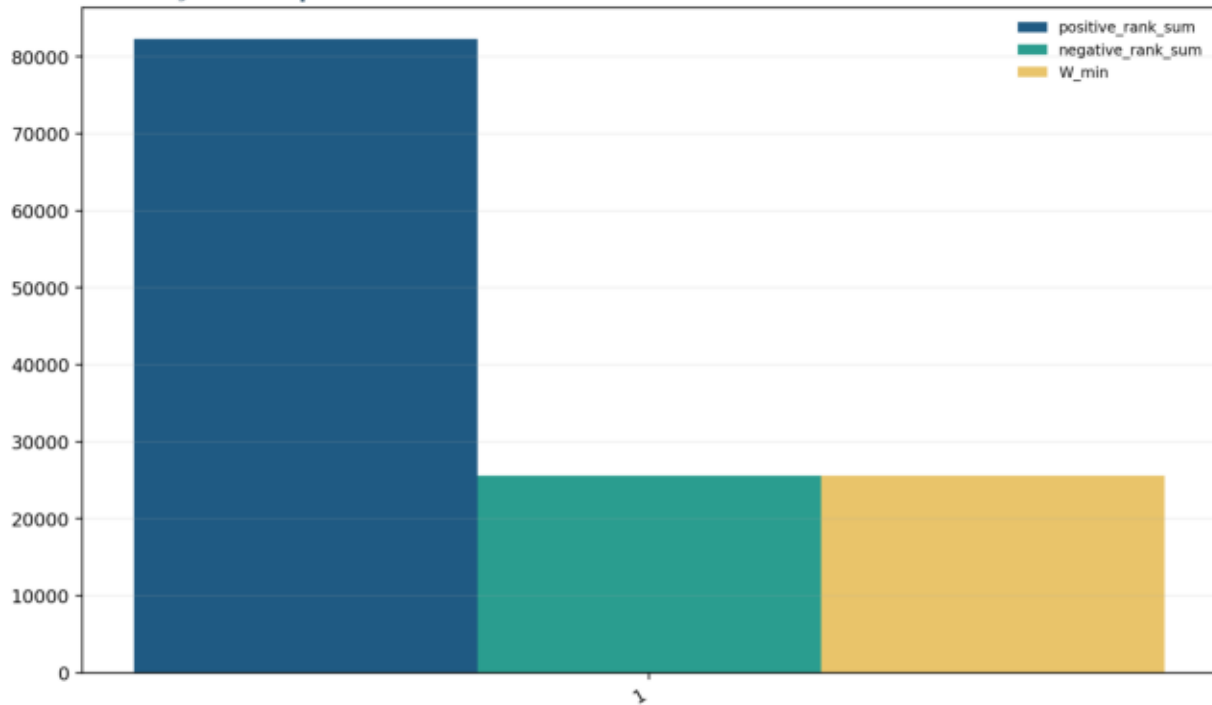
Primary Metrics



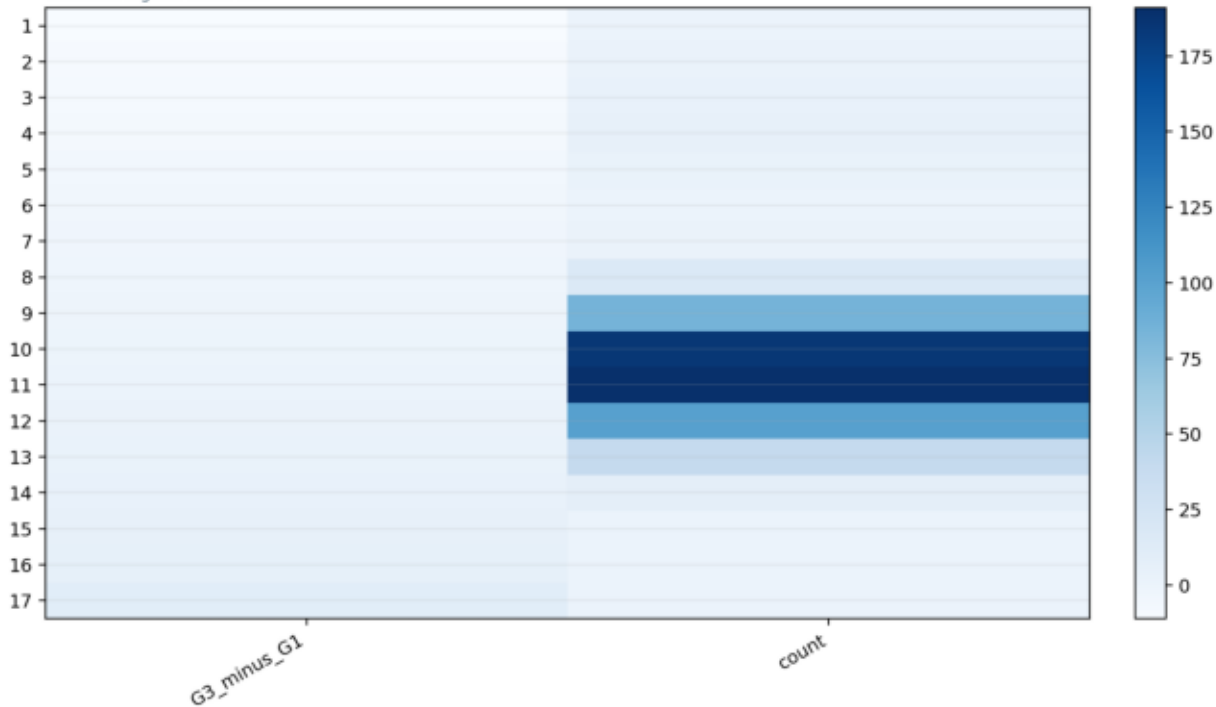
Signed Rank Observations



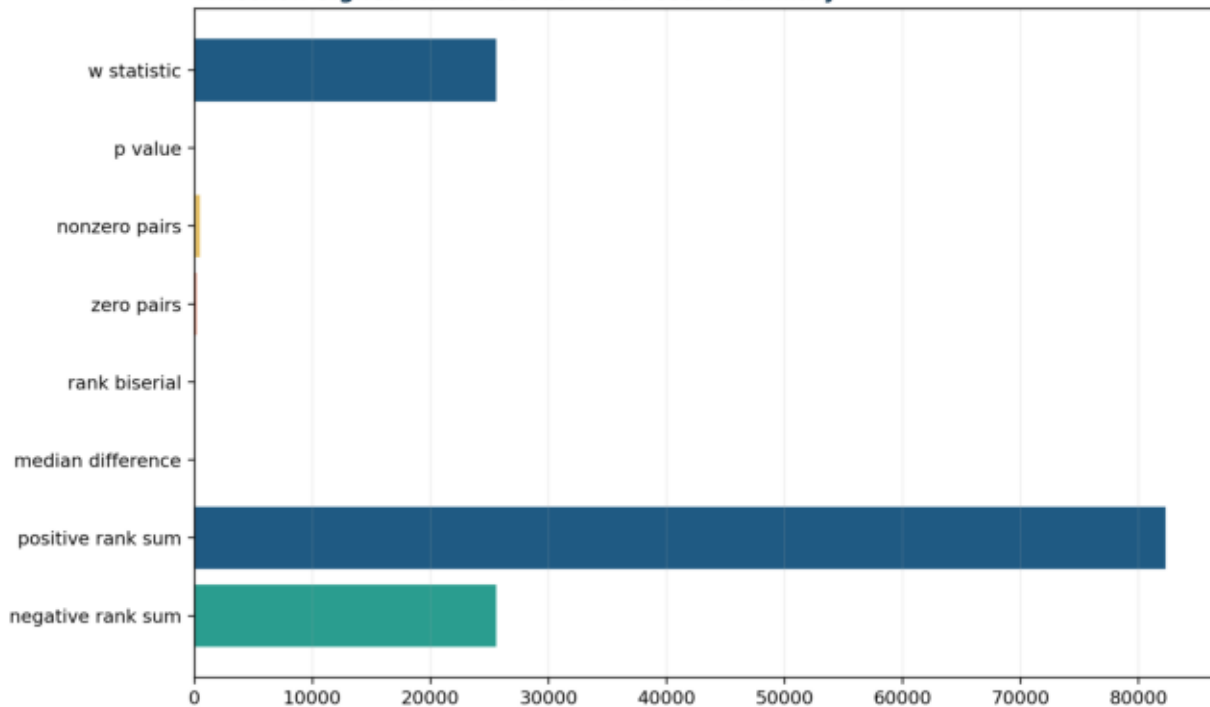
Rank Sum Decomposition



Difference Counts



Wilcoxon Signed-Rank Test verified result summary



Primary Metrics

metric	value
w_statistic	25595.5
p_value	5.56892e-24
nonzero_pairs	464
zero_pairs	185
rank_biserial	0.525482
median_difference	1
positive_rank_sum	82284.5
negative_rank_sum	25595.5

Signed Rank Observations

difference	absolute_difference	absolute_rank	signed_rank
11	11	463.5	463.5
2	2	336	336
2	2	336	336
1	1	138.5	138.5
3	3	416.5	416.5
2	2	336	336
1	1	138.5	138.5
3	3	416.5	416.5
1	1	138.5	138.5
1	1	138.5	138.5
1	1	138.5	138.5
-1	1	138.5	-138.5
2	2	336	336
1	1	138.5	138.5
2	2	336	336
2	2	336	336
1	1	138.5	138.5
1	1	138.5	138.5
1	1	138.5	138.5
2	2	336	336
-1	1	138.5	-138.5
1	1	138.5	138.5
-2	2	336	-336
-1	1	138.5	-138.5
1	1	138.5	138.5

Rank Sum Decomposition

positive_rank_sum	negative_rank_sum	W_min
82284.5	25595.5	25595.5

Difference Counts

G3_minus_G1	count
-11	1
-9	2
-8	4
-7	5
-5	3
-4	1
-3	2
-2	17
-1	85
0	185
1	191
2	102
3	40
4	8
5	1
6	1
11	1