

Bowker's Test of Symmetry

Test name: Bowker's Test of Symmetry

Dataset: D:/DATA ANALYSIS/I Chi Square and Categorical Data Tests/Bowkers Test of Symmetry/dataset.csv

Rows in original dataset: 649

Columns in original dataset: 33

Complete paired observations used: 649

Before source: G1

After source: G3

Category preparation: Fixed grade bands: Low 0–9, Medium 10–13, High 14+

Common categories: Low, Medium, High

Bowker chi-square: 62.161111

Degrees of freedom: 2

P-value: 3.1760419e-14

Alpha: 0.05

Decision: Reject the null hypothesis of symmetry; the paired category changes are directionally asymmetric.

Simple diagonal agreement rate: 0.7519

Off-diagonal discordant count: 161

Directional asymmetry index: 0.6149

Null hypothesis: for every pair of categories i and j , $n(i,j)$ equals $n(j,i)$.

Assumption: observations are paired and the same category set is used at both measurements.

Reporting guide: report the square table, Bowker chi-square, df, p-value, category-pair contributions, and substantive direction of change.

Charts generated: 7

Bowker test summary

		test	n_complete_pairs	number_of_categories	bowker_chi_square	degrees_of_freedom	p_value
Bowker's Test of Symmetry			649	3	62.16111	2	3.176042e-14
alpha	decision	diagonal_agreement_count	off_diagonal_discordant_count		simple_agreement_rate		
0.05	Reject symmetry		488		161		0.751926
directional_asymmetry_index							
		0.6149068					

Pairwise asymmetry contributions

category_i	category_j	i_to_j	j_to_i	discordant_pair_total	directional_difference_i_to_j_minus_j_to_i
Low	Medium	69	12	81	57
Low	High	0	0	0	0
Medium	High	61	19	80	42
bowker_contribution		pairwise_exact_mcnemar_p			
		40.11111	7.033001e-11		
		0.00000	NA		
		22.05000	2.731870e-06		

Before and after marginal distributions

category	before_count	after_count	before_percent	after_percent	after_minus_before_count
Low	157	100	24.19106	15.40832	-57
Medium	340	355	52.38829	54.69954	15
High	152	194	23.42065	29.89214	42













