Optimal Data Analysis
Vol. 4 (December 29, 2015), 200-201

2155-0182/10/$3.00

UniODA *vs.* Wilcoxon Rank-Sum Test: Invariance over Monotonic Transformations

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A study compared ordinal scores between two groups (*N*s = 9 and 8) using the Wilcoxon rank-sum test ($p < 0.03$).[1] When the scores were compared using UniODA, $p < 0.02$, *ESS* = 66.7 (a relatively strong effect). While the Wilcoxon test is performed on ranks, UniODA is conducted using raw data. However, performing UniODA on the ranks yields identical results because UniODA is invariant over any monotonic transformation of the attribute.[2]

Data are reproduced in Table 1.

Table 1: Raw Data and Ranks for Two Groups

Group 1		Group 2	
Raw	Rank	Raw	Rank
11.5	3	15.2	7
12.6	5	8.6	1
19.4	13	9.3	2
21.3	14	14.4	6
32.5	17	15.6	8
18.6	12	11.8	4
17.0	10	16.3	9
23.4	15	17.8	11
29.6	16		

For raw data the UniODA model[2] was: if Raw $\leq$ 18.2 predict group = 2; otherwise predict group = 1. For rank data the UniODA model was: if Rank $\leq$ 11.5 predict group = 2. Because the results of UniODA analysis are invariant over any monotonic transformation of the attribute, the confusion table below applies to both UniODA analyses conducted presently.

Table 2: Confusion Table for UniODA Analysis of Raw and Rank Data

		Predicted Group	
		1	2
Actual	1	6	3
Group	2	0	8

Although such small-sample analyses are statistically underpowered, UniODA is adept at identifying statistically reliable models when underlying effects are very strong.[2]

References

[1]Walker HM, Lev J (1953). *Statistical inference*. New York, NY: Holt (pp. 434-435).

2155-0182/10/$3.00

[2]Yarnold PR, Soltysik RC (In Review). *Maximizing predictive accuracy*. Chicago, IL: ODA Books.

Author Notes

The study analyzed de-individuated data and was exempt from Institutional Review Board review. No conflict of interest was reported.

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