

The Mann–Whitney U-test & Kolmogorov–Smirnov two-sample test

1. The data in Table 1 were obtained from a reading-level test for 1st-grade children. Compare the performance gains of the two different methods for teaching reading.

TABLE 1.

Method	Gain score	Method	Gain score
One on one	16	Small group	11
One on one	13	Small group	2
One on one	16	Small group	10
One on one	16	Small group	4
One on one	13	Small group	9
One on one	9	Small group	8
One on one	12	Small group	5
One on one	12	Small group	6
One on one	20	Small group	4
One on one	17	Small group	16

Use two-tailed Mann–Whitney U and Kolmogorov–Smirnov two-sample tests to determine which method was better for teaching reading. Set $\alpha = 0.05$. Report your findings.

2. A research study was conducted to see if an active involvement in a hobby had a positive effect on the health of a person who retires after age 65. The data in Table 2 describe the health (number of doctor visits in 1 year) for participants who are involved in a hobby almost daily and those who are not.

TABLE 2

No hobby group	Hobby group
12	9
15	5
8	10
11	3
9	4
17	2

Use one-tailed Mann–Whitney U and Kolmogorov–Smirnov two-sample tests to determine whether the hobby tends to reduce the need for doctor visits. Set $\alpha = 0.05$. Report your findings.

3. Table 3 shows assessment scores of two different classes who are being taught computer skills using two different methods.

TABLE 3

Method 1	Method 2
53	91
41	18
17	14
45	21
44	23
12	99
49	16
50	10

Use two-tailed Mann–Whitney U and Kolmogorov–Smirnov two-sample tests to determine which method was better for teaching computer skills. Set $\alpha = 0.05$. Report your findings.

4. Two methods were used to provide instruction in science for 7th grade. Method 1 included a laboratory each week and method 2 had only classroom work with lecture and worksheets. Table 4 shows end-of-course test performance for the two methods. Construct a 95% median confidence interval based on the difference between two independent samples to compare the two methods.

TABLE 4.

Method 1	Method 2
15	8
23	15
9	10
12	13
18	17
22	5
17	18
20	7