

## THE KRUSKAL–WALLIS H-TEST

1. A researcher conducted a study with  $n = 15$  participants to investigate strength gains from exercise. The participants were divided into three groups and given one of three treatments. Participants' strength gains were measured and ranked. The rankings are presented in Table 1.

**TABLE 1**

| Treatments |    |     |
|------------|----|-----|
| I          | II | III |
| 7          | 13 | 12  |
| 2          | 1  | 5   |
| 4          | 7  | 16  |
| 11         | 8  | 9   |
| 15         | 3  | 14  |

Use a Kruskal–Wallis  $H$ -test with  $\alpha = 0.05$  to determine if one or more of the groups are significantly different. If a significant difference exists, use a two-tailed Mann–Whitney  $U$ -tests or two-sample Kolmogorov–Smirnov tests to identify which groups are significantly different. Use the Bonferroni procedure to limit the Type I error rate. Report your findings.

2 A researcher investigated how physical attraction influences the perception among others of a person's effectiveness with difficult tasks. The photographs of 24 people were shown to a focus group. The group was asked to classify the photos into three groups: very attractive, average, and very unattractive. Then, the group ranked the photographs according to their impression of how capable they were of solving difficult problems. Table 2 shows the classification and rankings of the people in the photos (1 = *most effective*, 24 = *least effective*).

Use a Kruskal–Wallis  $H$ -test with  $\alpha = 0.05$  to determine if one or more of the groups are significantly different. If a significant difference exists, use two-tailed Mann–Whitney  $U$ -tests to identify which groups are significantly different. Use the Bonferroni procedure to limit the type I error rate. Report your findings.

**TABLE 2**

| Very attractive | Average | Very unattractive |
|-----------------|---------|-------------------|
| 1               | 3       | 11                |
| 2               | 4       | 15                |
| 5               | 8       | 16                |
| 6               | 9       | 18                |
| 7               | 13      | 20                |
| 10              | 14      | 21                |
| 12              | 19      | 23                |
| 17              | 22      | 24                |