

# Nonparametric Statistical Tests

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## What is a nonparametric test? (See Table 3.1)

<b>Parametric Tests</b>	<b>Nonparametric Tests</b>
Assume a distribution, generally the normal.	No distribution assumed.
Requires interval or ratio data.	Uses almost any type of data.
Hard to use with very small samples.	Good for small samples.
Good detection of differences, if assumptions are met.	Not as good at detecting differences, but less likely to be misleading.

# Mann-Whitney U Statistic

- Nonparametric equivalent of t test
- Uses ranks of two data sets, not values themselves
- Example: Tree Condition
  1. Most leaves have areas of light color
  2. Most leaves have large patches of light color
  3. Many leaves have patches of light color
  4. Several leaves have light speckling
  5. Leaves mainly dark green but some have light speckling
  6. Leaves dark green all over

## Calculating the U statistic

$$U_1 = n_1 n_2 + \frac{n_1(n_1+1)}{2} - \sum R_1$$

and

$$U_1 = n_1 n_2 + \frac{n_2(n_2+1)}{2} - \sum R_2$$

where:

$n_1$  and  $n_2$  are the number of data points in each sample, and  $\sum R_1$  and  $\sum R_2$  are the sum of the ranks in each sample.

## Let's try it: Tree-Condition Data

Clean	Polluted
4	2
5	2
4	2
4	1
5	6
6	4
6	4
6	5
6	4
3	3