Choosing Between a Nonparametric Test and a Parametric Test

Minitab Blog Editor 19 February, 2015

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It's safe to say that most people who use statistics are more familiar with parametric analyses than nonparametric analyses. Nonparametric tests are also called distribution-free tests because they don't assume that your data follow a specific distribution.

You may have heard that you should use nonparametric tests when your data don't meet the assumptions of the parametric test, especially the assumption about normally distributed data. That sounds like a nice and straightforward way to choose, but there are additional considerations.

In this post, I'll help you determine when you should use a:

- Parametric analysis to test group means.
- Nonparametric analysis to test group medians.

In particular, I'll focus on an important reason to use nonparametric tests that I don't think gets mentioned often enough!

Hypothesis Tests of the Mean and Median

Nonparametric tests are like a parallel universe to parametric tests. The table shows related pairs of hypothesis tests that Minitab statistical software offers.

Parametric tests (means)	Nonparametric tests (medians)
1-sample t test	1-sample Sign, 1-sample Wilcoxon
2-sample t test	Mann-Whitney test
One-Way ANOVA	Kruskal-Wallis, Mood's median test
Factorial DOE with one factor and one blocking variable	Friedman test

Reasons to Use Parametric Tests

Reason 1: Parametric tests can perform well with skewed and nonnormal distributions

This may be a surprise but parametric tests can perform well with continuous data that are nonnormal if you satisfy the sample size guidelines in the table below. These guidelines are based on simulation studies conducted by statisticians here at Minitab. To learn more about these studies, read our Technical Papers.

Parametric analyses	Sample size guidelines for nonnormal data
1-sample t test	Greater than 20
2-sample t test	Each group should be greater than 15
One-Way ANOVA	If you have 2-9 groups, each group should be greater than 15. If you have 10-12 groups, each group should be greater than 20.

Reason 2: Parametric tests can perform well when the spread of each group is different

While nonparametric tests don't assume that your data follow a normal distribution, they do have other assumptions that can be hard to meet. For nonparametric tests that compare groups, a common assumption is that the data for all

Nonparametric Hypothesis Testing Paper

AN Whitehead

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