

NON - PARAMETRIC TEST

Introduction

- No rigid assumptions about the distribution of the populations - “Distribution-free tests”
- Answers the same sort of questions as the parametric test – for each Parametric tests (PT) there is an alternative Non-Parametric Test (NP) Test
- Applied to a wide variety of situations

When are non-parametric tests used?

- Assumptions of parametric test are violated
- **Non-normal** or skewed
- Unequal variance
- Data is on an **ordinal** scale
- Very few observations
- Dealing with ranks of scores rather than actual values of data

Parametric Test Procedures

- Involve population parameters
 - Example: population mean
- Require interval scale or ratio scale
 - Whole numbers or fractions
 - Example: height in inches (72, 60.5, 54.7)
- Have stringent assumptions
 - Example: normal distribution
- Examples: z -test, t -test, F -test, χ^2 -test

Nonparametric Test Procedures

- Do not involve population parameters
 - Example: probability distributions, independence
- Data measured on any scale
 - Ratio or interval
 - Ordinal
 - Example: good-better-best
 - Nominal
 - Example: male-female
- Example: Wilcoxon rank sum test

Advantages of Nonparametric Methods

- Nonnumeric data such as Taste of food: bad, good, great and excellent, Smoking habit: light, moderate and heavy etc.
- Involves simpler computations than the corresponding parametric methods and are therefore easier to understand.
- Since the inference is based on ranks, Nonparametric methods are quick for small samples and less subject to measurement error than parametric methods.

Disadvantages of NP Methods

- No parameters to describe and it becomes more difficult to make quantitative statements about the actual difference between populations
- Tend to waste information because it deals with ranks and discard the actual values
- Less powerful where parametric test is applicable.

Frequently Used Nonparametric Tests

- Sign Test
- Wilcoxon Rank Sum Test
- Wilcoxon Signed Rank Test
- Kruskal Wallis H -Test
- Spearman's Rank Correlation Coefficient

SELECTING A STATISTICAL TEST

Type of Data	Measurement from Normal Population	Rank, Score or Measurement from Non-normal
Describe one group	Mean, SD	Median, Interquartile Range
Compare two independent groups	Independent sample t-test (unpaired t test)	Mann-Whitney test
Compare two paired groups	Paired t test	Wilcoxon Signed rank test
Quantify relation between two variables	Pearson Correlation	Spearman Rank Correlation