

Selecting a Statistic

RECAP:

- Dependent Variable
- Independent Variable
- Continuous Variable
- Ordinal Variable
- Nominal Variable

STEP 1: IDENTIFY THE DEPENDENT VARIABLE OF INTEREST

STEP 2: IDENTIFY THE INDEPENDENT VARIABLE(S) OF INTEREST

STEP 3: **YOU NEED TO UNDERSTAND YOUR VARIABLES TO DECIDE WHICH TEST IS APPROPRIATE**

| | | | |
|--------------------|--------------------------|-----------------------|--|
| DEPENDENT VARIABLE | NO INDEPENDENT VARIABLE | UNIVARIABLE ANALYSIS | <ol style="list-style-type: none">1. Continuous dependent variable2. Ordinal dependent variable3. Nominal dependent variable |
| | ONE INDEPENDENT VARIABLE | BIVARIATE ANALYSIS | <ol style="list-style-type: none">1. Continuous dependent variable2. Ordinal dependent variable3. Nominal dependent variable |
| | >1 INDEPENDENT VARIABLE | MULTIVARIATE ANALYSIS | <ol style="list-style-type: none">1. Continuous dependent variable2. Ordinal dependent variable3. Nominal dependent variable |

We will look at each of the scenarios listed above

| Dependent Variable | Independent Variable | UNIVARIABLE Analysis | Test | Assumptions |
|--|----------------------|---|----------------------------------|--|
| Continuous Dependent Variable | None | comparing <u>means</u> | Students t-test | <ol style="list-style-type: none"> 1. Population from which sample is drawn is normally distributed 2. Sample (s) are randomly selected from the population 3. Samples have approximately equal variance (homogeneity of variance) 4. Parametric data- based on an interval or ratio based scale |
| Continuous Dependent Variable | None | comparing <u>one pre-and one post measure in same subject</u> | Paired t-test | Same as above |
| Ordinal Dependent Variable | None | comparing <u>medians</u> | Wilcoxon Signed Rank Test | <ol style="list-style-type: none"> 1. Distribution free or non parametric data 2. Samples are randomly selected or representative of a general population |
| Nominal dependent variable <u>affected by time</u> | None | <u>Rate</u> | Normal approximation to Poisson | |
| Nominal dependent variable NOT affected by <u>time- Outcome common</u> | None | <u>Proportion</u> | Normal approximation to binomial | |
| Nominal dependent variable NOT affected by <u>time- Outcome Uncommon</u> | None | <u>Proportion</u> | Normal approximation to Poisson | |

| Dependent Variable | Independent Variable | BIVARIABLE Analysis | Test |
|---|---|--|--|
| Continuous Dependent Variable | Continuous Independent variable from naturalistic or purposive sampling | Slope and Intercept | Regression Analysis, F-Test |
| Continuous Dependent Variable | Continuous Independent Variable from naturalistic sample | Pearson's correlation coefficient | Correlation analysis, Students t-test |
| Continuous Dependent Variable | Nominal Independent Variable from naturalistic sample or purposive sample | Difference between means | Students t-test |
| Ordinal Dependent Variable | Ordinal Independent Variable from naturalistic sample | Spearman's Correlation Coefficient | Spearman's Correlation test |
| Ordinal Dependent Variable | Nominal Independent Variable from a naturalistic or purposive sample | Difference between medians | Mann Whitney Test |
| Nominal dependent Variable NOT AFFECTED by time | Nominal Independent Variable- paired design | Odds Ratio, Relative Risk, difference in proportions | McNemars test |
| Nominal dependent Variable NOT AFFECTED by time | Nominal Independent Variable- unpaired design | Odds Ratio, Relative Risk, difference in proportions | Chi-square test, normal approximation, Mantel Haenzel Test, Fishers Exact Test |
| Nominal dependent Variable AFFECTED by time | Nominal Independent Variable- unpaired design | Rate difference or ratio | Normal approximation |
| Nominal dependent Variable NOT AFFECTED by time | Continuous Independent Variable | Slope and intercept | Chi-square test for trend |

| Dependent Variable | Independent Variable | MULTIVARIABLE Analysis | Test |
|---|---|--|---|
| Continuous Dependent Variable | Nominal Independent variables representing one characteristic | Means | One-Way Analysis of Variance (ANOVA), F test, Student Newman Keuls Test |
| Continuous Dependent Variable | Nominal Independent variables representing > 1 characteristic | Means | Factorial Analysis of Variance (ANOVA), F test, Student Newman Keuls Test |
| Continuous Dependent Variable | Continuous Independent Variables from naturalistic sample or purposive sample | Regression coefficients | Multiple regression analysis, F test, partial F test |
| Continuous Dependent Variable | Continuous Independent Variables from naturalistic sample | Coefficient of determination | Multiple correlation analysis, F test |
| Continuous Dependent Variable | Nominal or continuous Independent Variables from a naturalistic or purposive sample | Regression coefficients | Analysis of Covariance (ANCOVA), F test, Partial F test |
| Ordinal Dependent Variable | Ordinal Independent Variables | Kendalls coefficient of concordance | Chi-square test |
| Ordinal Dependent Variable | Nominal Independent Variables | Mean of Ranks | Kruksal Wallis Test or Dunn's test |
| Nominal dependent Variable AFFECTED by time | Continuous and Nominal Independent Variables | Incidence Ratio | Cox Proportional Hazards Regression, Chi-square test |
| Nominal dependent Variable NOT AFFECTED by time | Continuous and Nominal Independent Variables | Odds Ratio | Logistic Regression, chi square test |
| Nominal dependent Variable AFFECTED by time | Nominal independent Variables | Cumulative probabilities | Kaplan Meier Life table analysis, Mantel Haenzel Test or logrank test |
| Nominal dependent Variable NOT AFFECTED by time | Nominal independent Variables | Odds ratio, relative risk or difference in proportions | Stratified analysis, Mantel Haenzel test |

