Selecting Appropriate Statistical Test

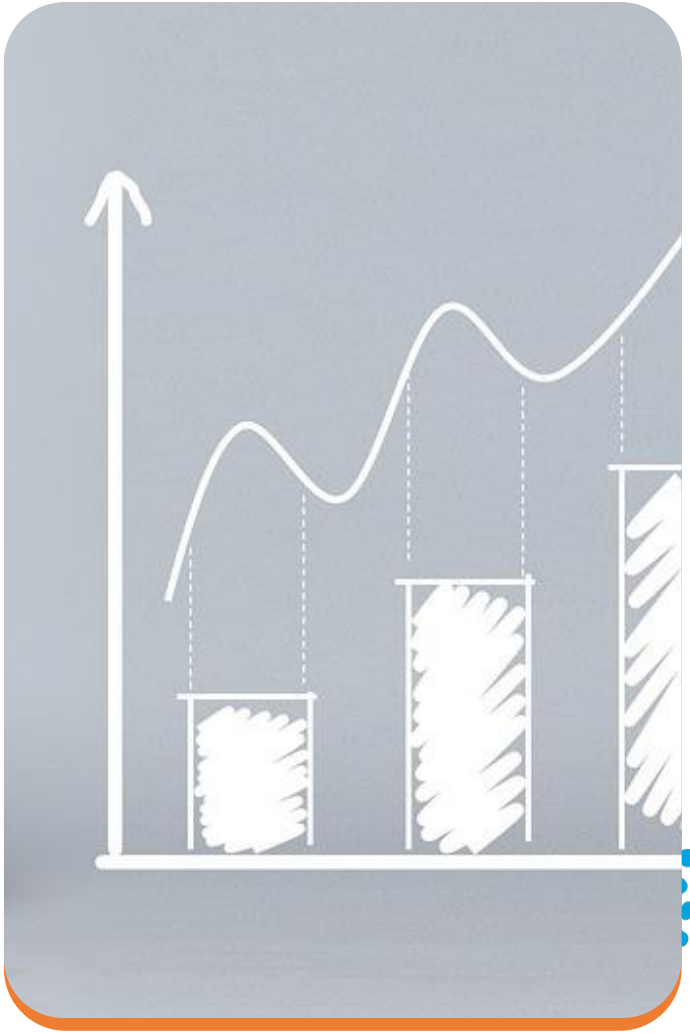
This lesson provides guidance on how to select the correct statistical test based on given conditions and assumptions.

Types of Statistical Tests

- One sample t test
- Independent sample t test
- Paired sample t test
- Analysis of variance (ANOVA)
- Chi Square test for independence
- Pearson correlation test
- Regression analysis

Scenario	Hypothesis	Test
Find **difference** between mean and predefined value	H0: No difference Ha: Difference	One sample t-test
Find **difference** in the mean value between **two independent groups**	H0: No difference Ha: Difference	Independent sample t-test
Find **difference** in the mean value between **two periods (e.g., before and after)**	H0: No difference Ha: Difference	Paired sample t-test
Find **difference** in the mean value among **more than two independent groups**	H0: No difference Ha: Difference	Analysis of Variance (ANOVA)

Scenario	Hypothesis	Test
Find **association between two categorical variables**	H0: No association Ha: Association	Chi-square test for independence
Find **relationship between two numeric variables**	H0: No relationship Ha: Relationship	Pearson correlation test
Find **influence or effect of independent variables on dependent variable**	H0: No influence Ha: Influence	Regression Analysis



Assumption Testing in Statistics

- Assumption testing is crucial for the validity and accuracy of statistical analysis
- It ensures the assumptions required by the statistical method are met
- Assumption testing helps in choosing the correct test and improving accuracy

Common Assumptions in Statistical Analysis

- **Normality:** Data should be normally distributed. Use histogram or perform Shapiro-Wilk test. In Shapiro-Wilk test, if p-value < 0.05 = not-normal. if p-value > 0.05 = normal.
- **Linearity:** Linear relationship between variables. Measure linearity by plotting two numeric data in a scatter plot and check for upper-lower or lower-upper linear trend within the scatters.
- **Homoscedasticity:** Variances of groups should be equal. Perform Levene's or Bartlett's test. If p-value < 0.05 = violated. if p-value > 0.05 = accepted.

Statistical Tests	Assumption Tests
One sample, Independent and Paired Sample t-test	Normality
Analysis of Variance (ANOVA)	Normality and Homoscedasticity
Pearson correlation test	Normality and Linearity
Linear regression analysis	Normality and Linearity

Steps for Choosing the Correct Statistical Test

- Understand the scenario
- Define null and alternative hypothesis
- Choose the test based on purpose
- Perform relevant assumption testing. Adjust normality if required by performing log or box-cox transformation.
- Proceed with the chosen statistical test

Thank you for your time and attention 🙂