INTRODUCTION TO T-TESTS

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INTRODUCTION

- Welcome to the presentation on T-tests.
- T-tests are statistical tests used to compare means of two groups and determine if they are significantly different.
- In this presentation, we will cover the basics of T-tests, their types, assumptions, and interpretation of results.

TYPES OF T-TESTS

- **Independent Samples T-Test:** Used to compare means between two independent groups.
- **Paired Samples T-Test:** Used to compare means within the same group at different time points or conditions.
- **One-Sample T-Test:** Used to compare the mean of a single group to a known population mean.

ASSUMPTIONS OF T-TESTS

- **Independence:** Observations in each group are independent of each other.
- **Normality:** The data in each group are normally distributed.
- **Homogeneity of Variance:** Variances in both groups being compared are equal.

INDEPENDENT SAMPLES T-TEST

- Used to compare means of two independent groups.
- **Hypotheses:** Null hypothesis (H0) assumes no significant difference between group means, alternative hypothesis (H1) assumes a significant difference.
- **Assumptions:** Independence, normality, and equal variances.
- **Test statistic:** T-value calculated based on sample means, sample variances, and sample sizes.
- **P-value interpretation:** If p-value < alpha (chosen significance level), we reject H0 and conclude a significant difference exists.

PAIRED SAMPLES T-TEST

- Used to compare means within the same group at different time points or conditions.
- **Hypotheses:** H0 assumes no significant difference between paired observations, H1 assumes a significant difference.
- **Assumptions:** Independence, normality, and equal variances of the differences between pairs.
- **Test statistic:** T-value calculated based on the mean of the differences, standard deviation of the differences, and sample size.
- **P-value interpretation:** If p-value < alpha, we reject H0 and conclude a significant difference exists.

ONE-SAMPLE T-TEST

- Used to compare the mean of a single group to a known population mean.
- **Hypotheses:** H0 assumes no significant difference between the sample mean and population mean, H1 assumes a significant difference.
- **Assumptions:** Independence and normality.
- **Test statistic:** T-value calculated based on the sample mean, sample standard deviation, and sample size.
- **P-value interpretation:** If p-value < alpha, we reject H0 and conclude a significant difference exists.

INTERPRETING RESULTS

- When the p-value is less than the chosen significance level (alpha), we reject the null hypothesis.
- The difference is considered statistically significant.
- Conversely, when the p-value is greater than alpha, we fail to reject the null hypothesis.
- The difference is not considered statistically significant.

CONCLUSION

- T-tests are valuable statistical tools to compare means of two groups.
- They help us determine if observed differences are statistically significant.
- Remember to check assumptions and choose the appropriate type of T-test based on your research design.

THANK YOU