

Practice Exercise 9: Independent Samples T Test

1. When is it appropriate to use a t-test for independent means?
2. What is meant by the term “independent groups”?
3. Does the t-test for independent means require that certain assumptions are met?
4. What is meant by the term “degrees of freedom”?
5. Use the Independent Samples T Test option in SPSS to answer the questions based on the following scenario. (Assume a nondirectional (two-tailed) research hypothesis and a level of significance of .05)

A physician is interested in determining if a new medication leads to fewer side effects than the best-selling brand. To conduct the study, 18 patients are randomly assigned to receive the new medication while 17 patients are assigned to receive the best-selling brand. The number of side effects is reported below:

New medication: 11 7 10 8 10 7 10 8 7 6 9 9 12 8 10 9 7 12

Best-Selling: 15 8 7 10 9 10 13 12 12 6 12 12 15 13 9 10 11

- a. Write an appropriate null hypothesis for this analysis.
- b. What are the mean and standard deviation for the group that received the new medication?
- c. What are the mean and standard deviation for the group that received the best-selling brand?
- d. What is the observed or computed value of t (refer to the equal variances assumed row of the output)?
- e. How would you explain the procedure for determining the degrees of freedom for

an Independent Samples t-test?

- f. What is the value of the degrees of freedom that are reported in the output?
- g. Does this correspond to the value obtained using the formula for the degrees of freedom?
- h. What is the reported level of significance (equal variances assumed)?
- i. Based on the reported level of significance, would you reject the null hypothesis?
- j. Write a statement as it might appear in an article that reports the results of the Independent Samples T test.

Practice Exercise 10: Independent Samples T Test

Use the Independent Samples T Test option in SPSS to answer the questions based on the following scenario. (Assume a nondirectional research hypothesis and a critical level of significance of .05)

A researcher is interested in determining if receiving tennis lessons affects the number of matches won during a 50 match season. In order to conduct the study, one group is randomly assigned to receive formal tennis lessons while the second group does not receive lessons. The number of matches won for each subject is listed below.

Lessons: 38 48 32 26 38 26 34 24 26 22 32 35 40 26 39

No Lessons: 29 30 19 22 30 29 28 34 23 21 29 17 24 36 43

1. Write an appropriate null hypothesis for this analysis.
2. What are the mean and standard deviation for the group that received lessons?
3. What are the mean and standard deviation for the group that did not receive lessons?
4. What is the observed or computed value of t ?
5. What is the value of the degrees of freedom that are reported in the output?
6. What is the level of significance reported in the output?
7. Based on the reported level of significance, would you reject the null hypothesis?
8. Write a statement as it might appear in an article that reports the results of the Independent Samples T test.
9. The SPSS output reported a two-tail level of significance. If you had specified a directional hypothesis, which implies a one-tail test, you must divide the reported two-tailed level of significance by 2 (e.g., two-tailed level of significance of .14 corresponds to a one-tail level of significance of .07 [$.14/2 = .07$]). Now, assume that the researcher had stated a directional hypothesis, based on the results of the analysis would you reject the null hypothesis?
10. Can the decision to state a directional versus nondirectional hypothesis affect the decision concerning the statistical significance?