

## Practice: Using the $t$ Tests Task to Compare Groups

Elli Sagerman, a Masters of Education candidate in German Education at the University of North Carolina at Chapel Hill in 2000, collected data for a study. She looked at the effectiveness of a new type of foreign language teaching technique on grammar skills. She selected 30 students to receive tutoring. Fifteen received the new type of training during the tutorials and 15 received standard tutoring. Two students moved from the district before completing the study. Scores on a standardized German grammar test were recorded immediately before the 12-week tutorials and again 12 weeks later at the end of the trial. Sagerman wanted to see the effect of the new technique on grammar skills.

1. Using the  $t$  TEST task, analyze the **german** data set. Assess whether the treatment group improved more than the control group.
  - In the Navigation pane, select **Tasks and Utilities**.
  - Expand **Tasks**.
  - Expand **Statistics** and select the  **$t$  Tests** task.
  - On the DATA tab, do the following:
    - Select the **stat1.german** table.
    - Select **Two-sample test** under ROLES.
    - Assign **Change** as the Analysis variable and **Group** as the Groups variable.
  - On the OPTIONS tab, do the following:
    - Clear **Tests for normality**.
    - Under PLOTS, choose **Selected plots**. Select **Histogram and box plot**, **Normality plot**, and **Confidence interval plot**.
  - Run the task.

Here are the [results](#).

2. Do the two groups seem to be approximately normally distributed?

The plots show evidence that supports approximate normality in both groups.

3. Do the two groups have approximately equal variances?

Because the  $p$ -value for the Equality of Variances test is greater than the alpha level of 0.05, you would not reject the null hypothesis. This conclusion supports the assumption of equal variance (the null hypothesis being tested here).

4. Does the new teaching technique seem to result in significantly different scores compared with the standard technique?

The  $p$ -value for the Pooled (Equal Variance) test for the difference between the two means shows that the two groups are not statistically significantly different. Therefore, there is not strong enough evidence to say conclusively that the new teaching technique is different from the old. The Difference Interval plot displays these conclusions graphically.