EDP 554

SPSS HANDOUT #2

t-tests

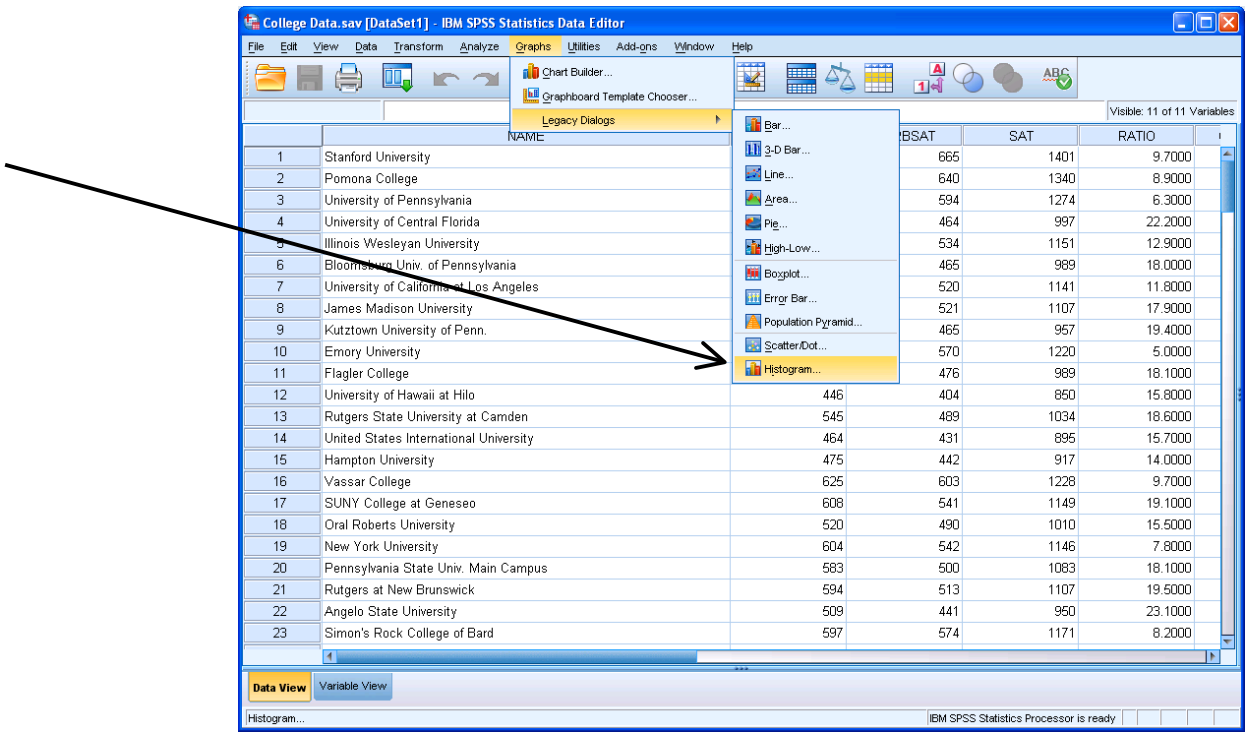
NOTE: This handout uses the **College Data** dataset. The data is from a mid-1990's US News & World Report Guide to America's Best Colleges.

Includes variables such as:

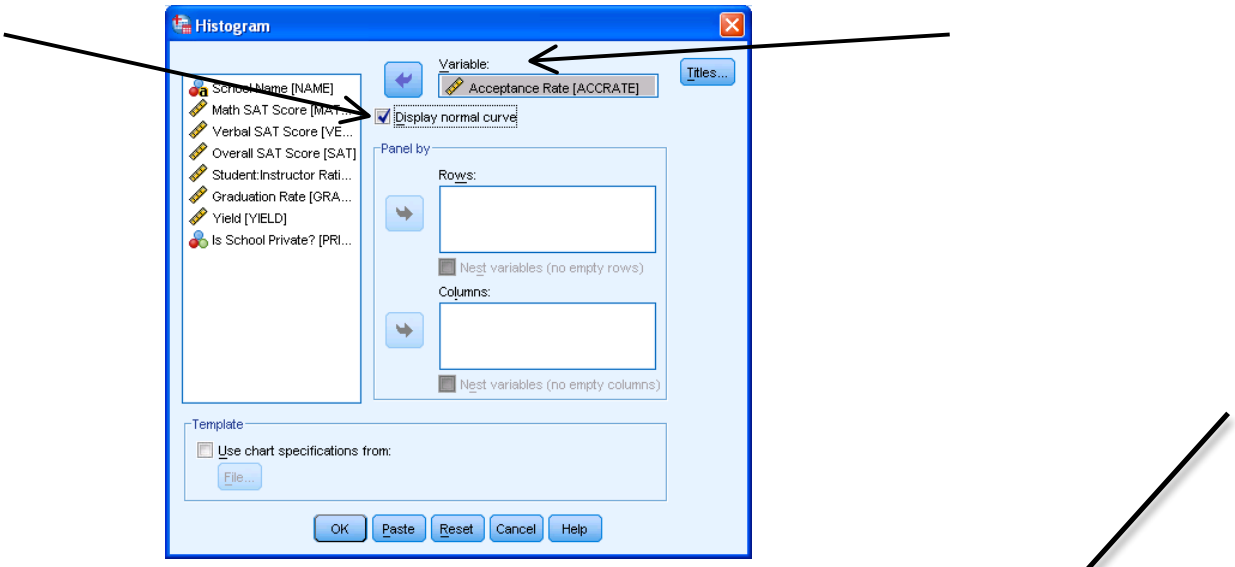
- SAT Score
- Student : Faculty Ratio
- Acceptance Rate
- Yield
- Private (1= private school and 0=public school)

Creating Histograms with Normal Curves

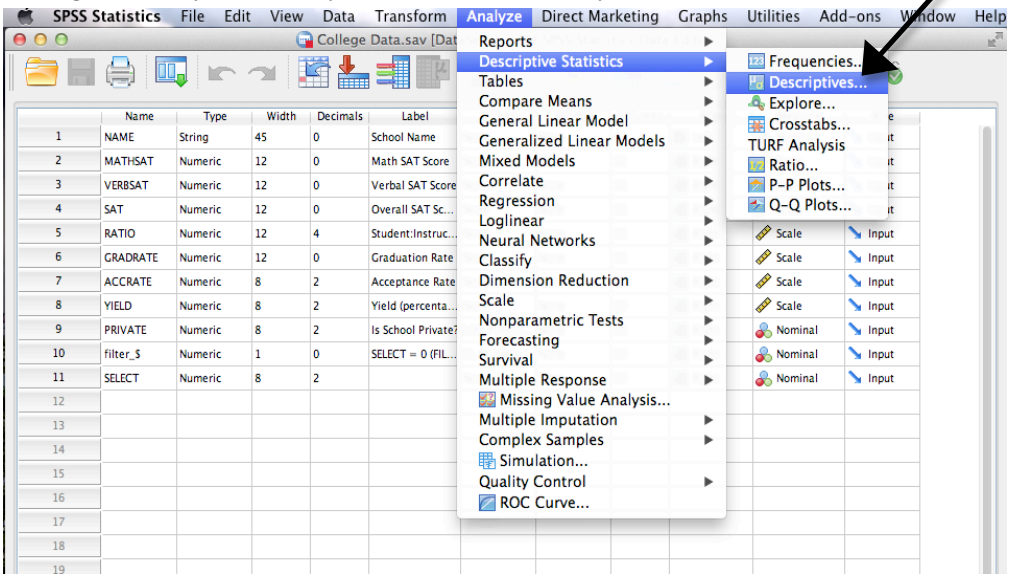
- This allows us to check the normality assumption for t-tests
- Go to Graphs->Legacy Dialogs -> Histogram.



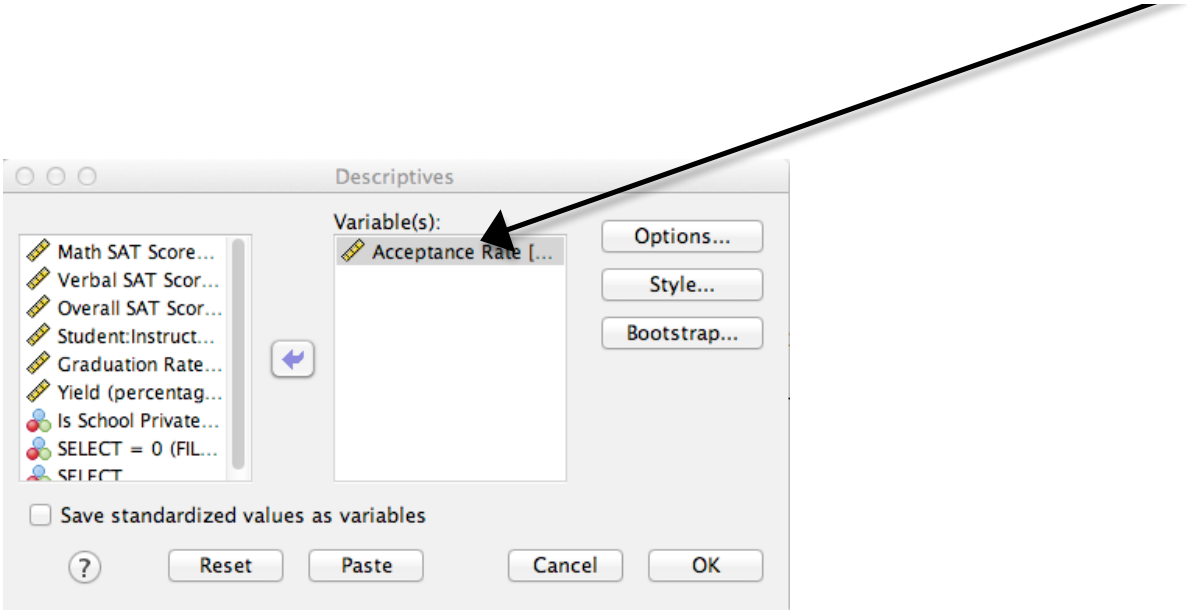
- Drag the continuous variable Acceptance Rate [ACCRATE] into the Variable field.
- Leave the Panel by section blank (i.e., do not put anything in Rows or Columns).



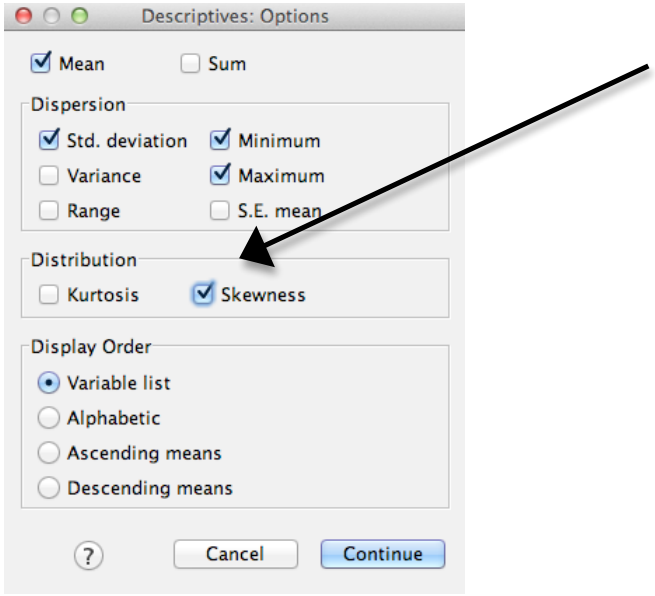
- Check the box for Display normal curve.
- Click OK.
- Then go to Analyze->Descriptive Statistics->Descriptives.



- Drag the continuous variable Acceptance Rate [ACCRATE] into the Variable field.



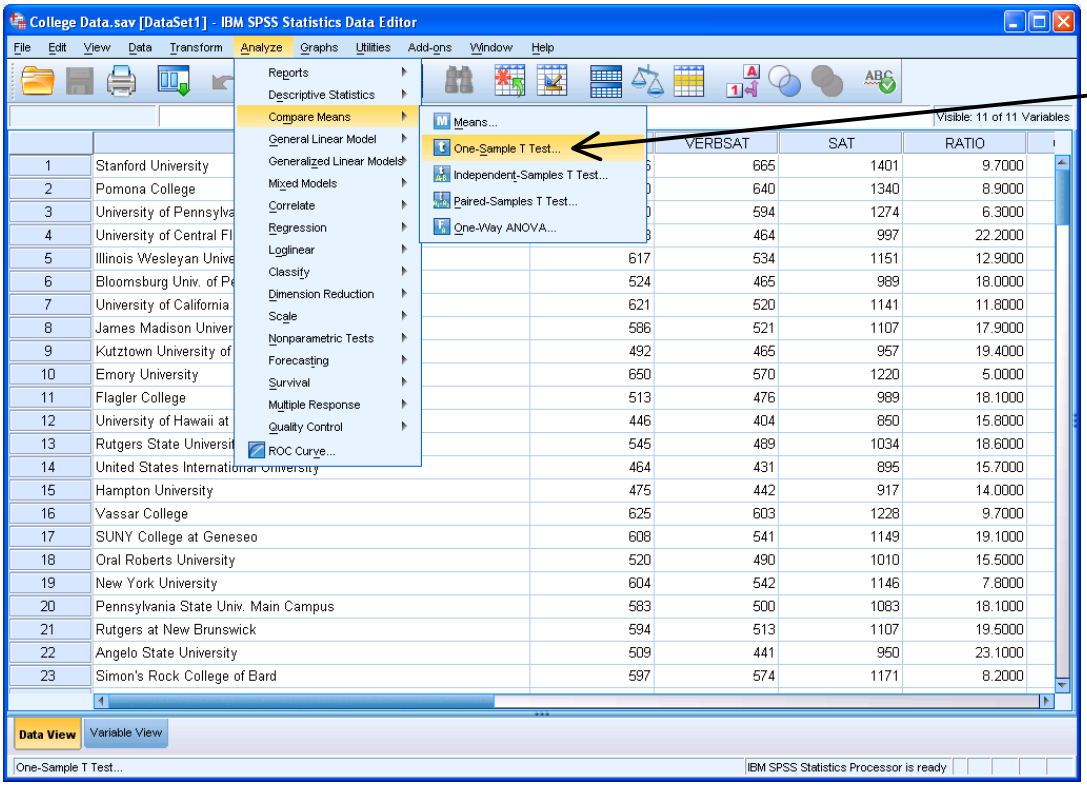
- Click the Options button on the right and make sure Skewness is selected in the Descriptives: Options menu.



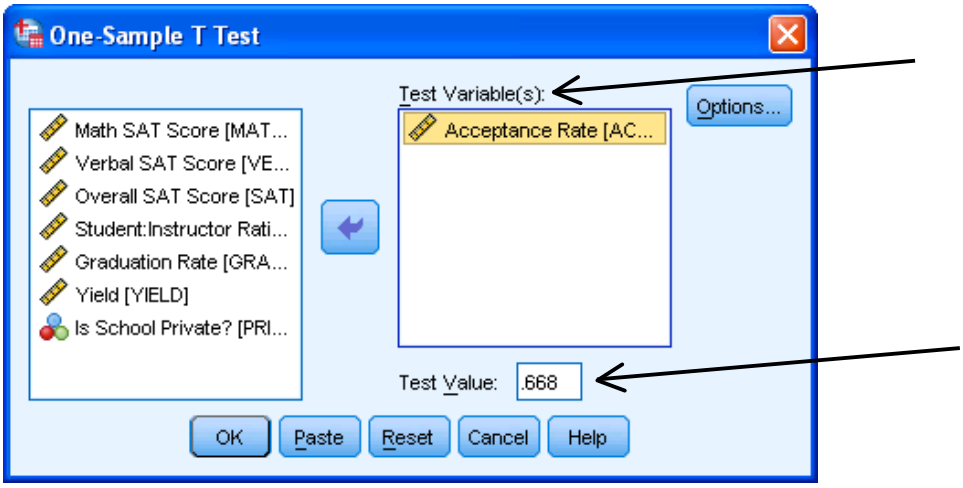
- Click Continue. Click OK.
- Look at your Skewness statistic in relation to the standard error – if it is more than **2.58** standard errors away from the null hypothesized value of ZERO skew (i.e., the p-value for the Z-score of the Skewness statistic is less than or equal to .01), then the normality assumption is violated. **However, if your sample size (N) is 30 or greater, violation of the normality assumption does not pose a major problem.** If one or both of the distributions is extremely skewed, a nonparametric test such as the Mann-Whitney U is more appropriate.

Running a One-Sample t-Test

- Go to Analyze -> Compare Means -> One-Sample T Test.



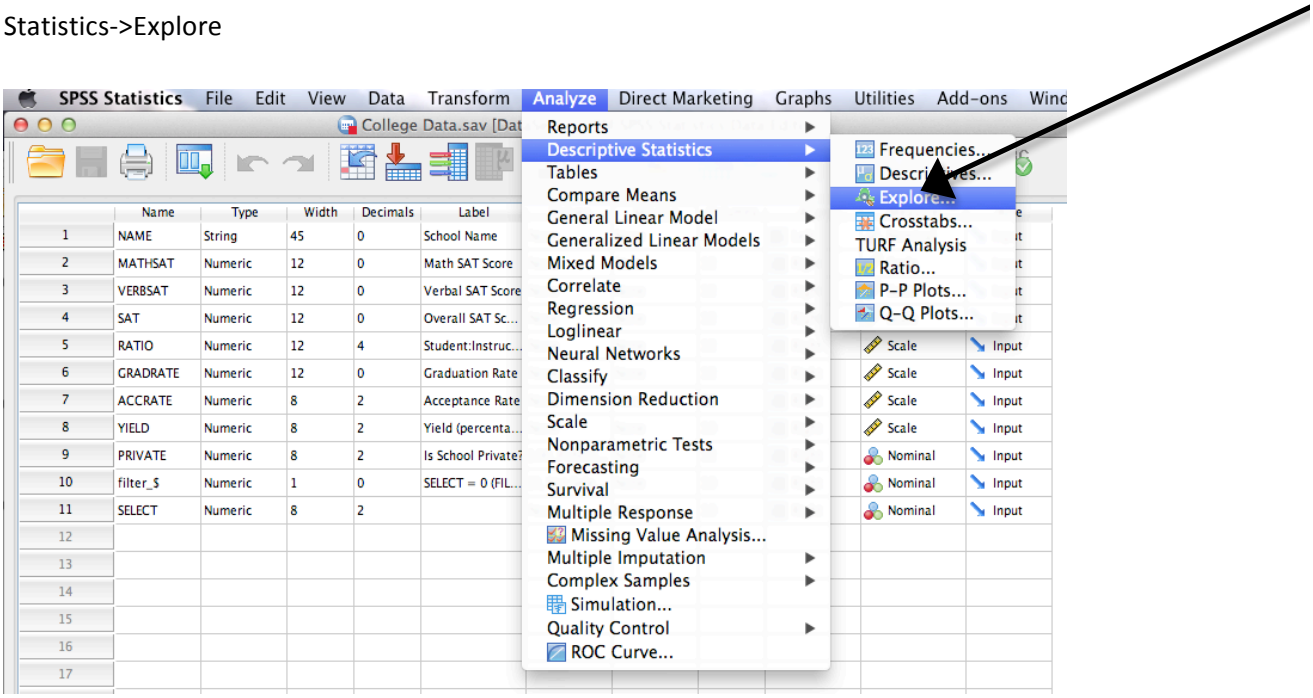
- Drag the continuous variable Acceptance Rate [ACCRATE] into the Test Variable(s) field.
- Type .668 (the average acceptance rate of U.S. colleges in 2007) in the Test Value field.



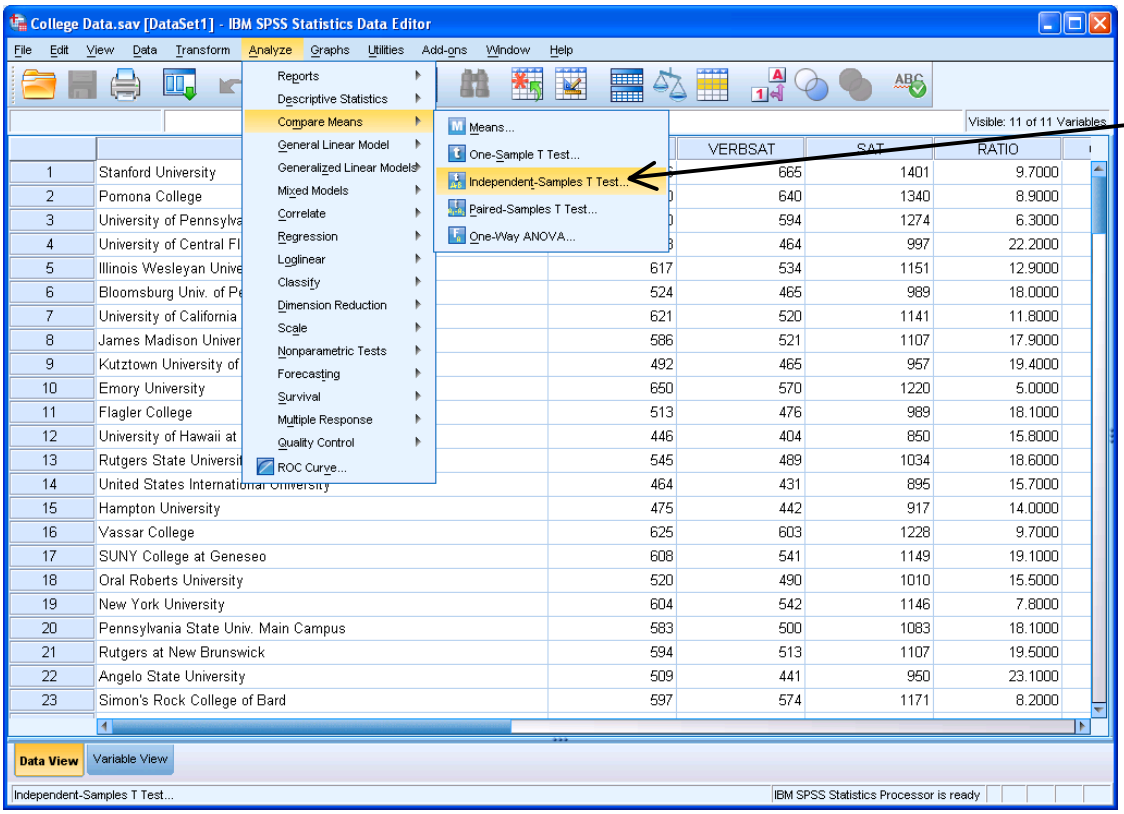
- Click OK.

Running a Two-Sample t-Test

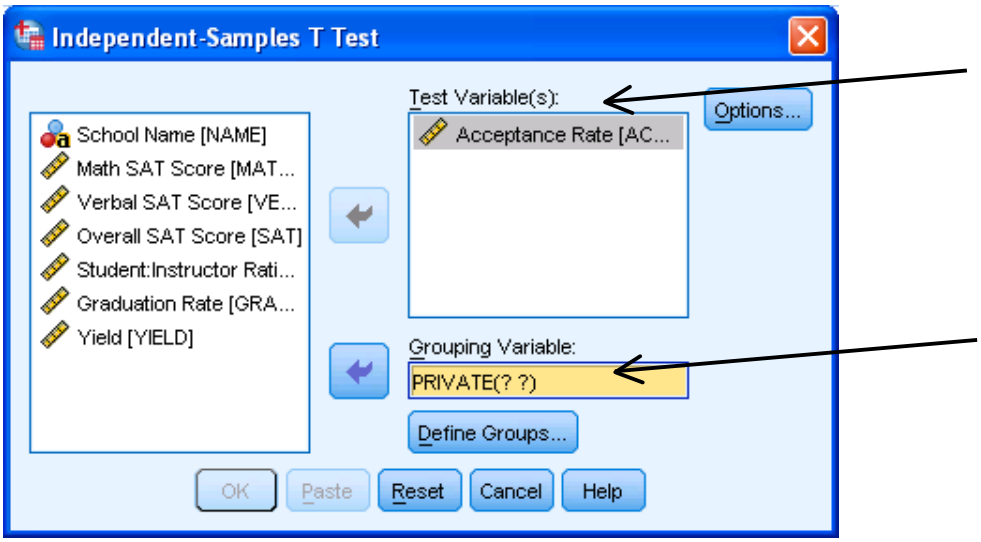
- You can check the normality assumption in the same fashion you did for the one-sample t-test, now examining the normality of each of your two samples. Remember, the t-test is robust to the normality assumption, especially for sample sizes greater than N=30.
- Two-sample t-tests also assume HOMOGENEITY OF VARIANCE,
- To explore the variance of multiple examples, go to Analyze->Descriptive Statistics->Explore



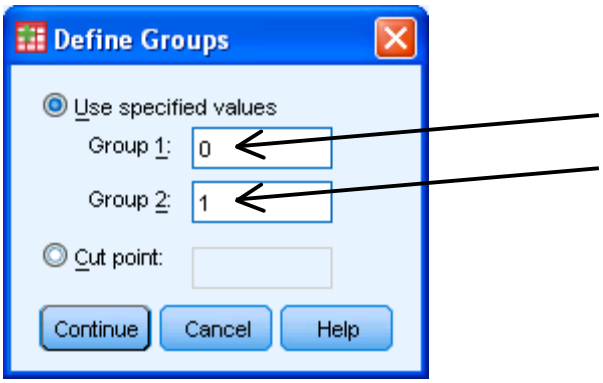
- In the explore menu, drag the continuous variable Acceptance Rate [ACCRATE] into the Dependent List field and drag Is this School Private [PRIVATE] into the Factor list. Click OK. This will allow you to explore a breakdown of ACCRATE for both public [PRIVATE=0] and private [PRIVATE=1] schools.
- **Insofar as the sample sizes are roughly equal, two-sample t-tests are also robust to the homogeneity of variance assumption. However, if the sample sizes are quite different, the t-test is more sensitive to the homogeneity of variance assumption. In such a case where both variances and sample sizes significantly differ, you may want to check the Levine's Test (see below).**
- To run the two-samples t-test, go to Analyze -> Compare Means -> Independent-Samples t-Test.



- Drag the continuous variable Acceptance Rate [ACCRATE] into the Test Variable(s) field.
- Drag the variable PRIVATE into the Grouping Variable field.



- Click Define Groups.
- Type 0 for Group 1 and 1 for Group 2.



- Click Continue.
- Click OK.
- The output includes Levene's Test. If the Sig. value (i.e., the p-value) for the Levene's test is greater than .05, you CANNOT REJECT the null hypothesis that the variances of the two groups are equal, and hence go with EQUAL VARIANCES ASSUMED.