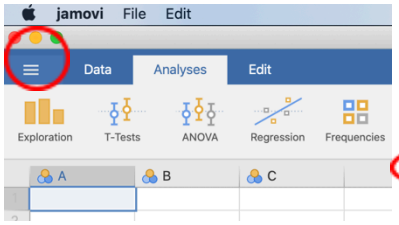
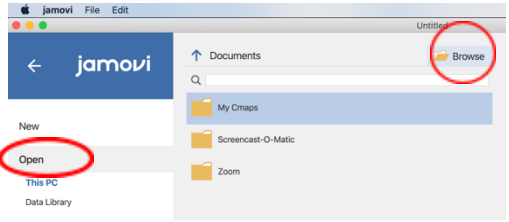
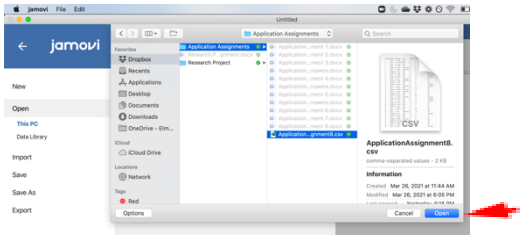
How to Use Jamovi for Data Analysis

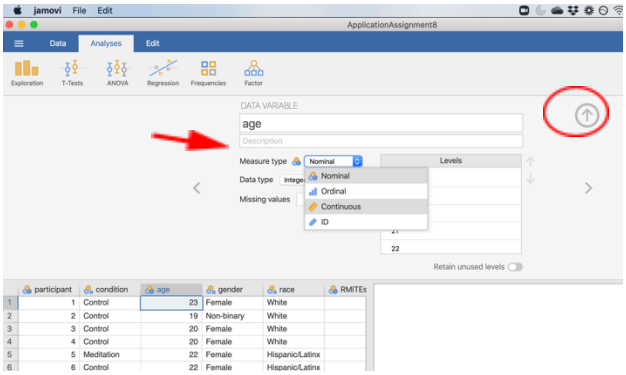
- **Download** Jamovi for free at https://www.jamovi.org/download.html
- **Opening Data.** Open the Jamovi application on your computer. Click on the three horizontal lines in the upper left corner, then click Open. Click on the Browse icon and navigate to the folder in which you saved the data file you want to view in Jamovi. Select the .csv or .xlsx spreadsheet containing your raw data and then click Open.



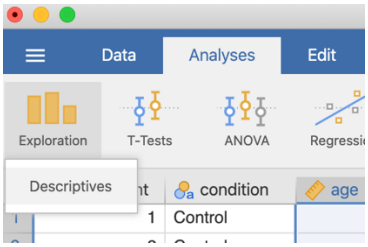


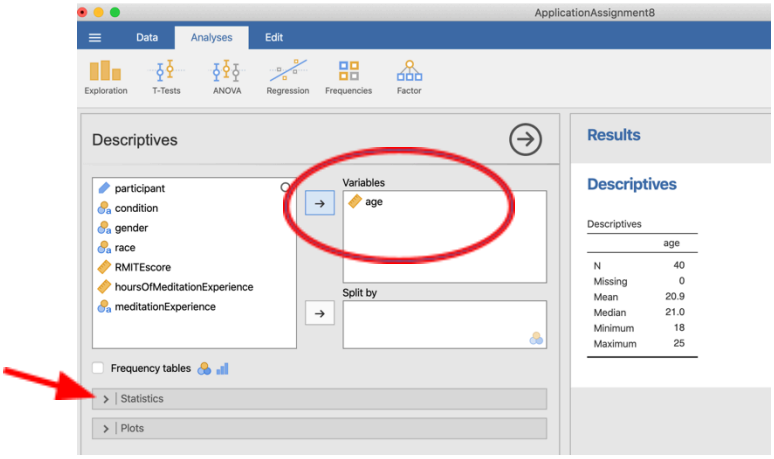


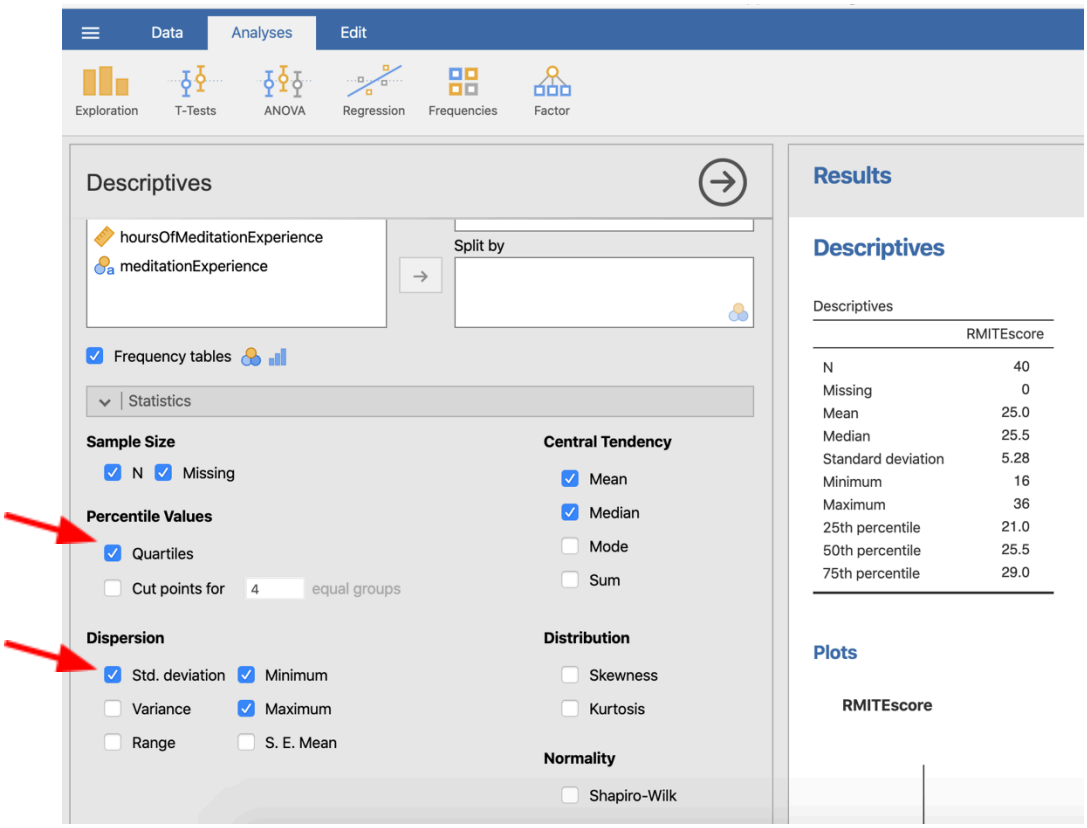
- **Scales of Measurement.** You should now see your data in Jamovi. Check to make sure each variable has the correct scale of measurement: nominal (categorical), ordinal, or continuous (interval or ratio). To do this, double click on the column header containing the name of the variable (e.g., age), and change the Measure type from the dropdown menu, if necessary. To hide this Data Variable view, click on the icon containing an up arrow in a circle in the upper right corner.



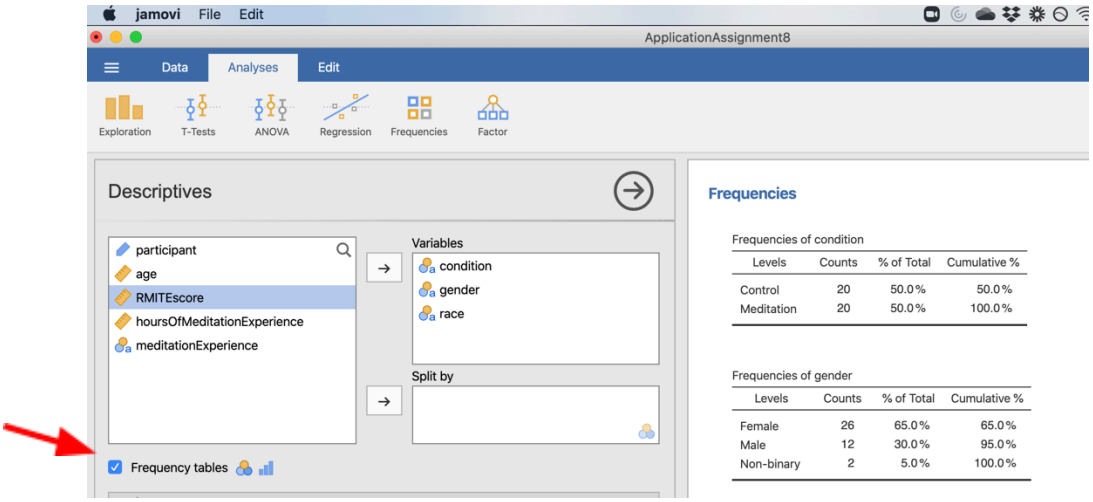
- **Central Tendency and Variability**. To compute descriptive statistics, go to the Analyses tab, then click on Exploration (the icon with the bar graph), then Descriptives. Select the variable you want to analyze and drag it (or click the arrow) to move it into the Variables box. The mean, median, min, and max should appear by default. To get the Standard Deviation, click on the Statistics tab, and under Dispersion, click "Std. deviation." It will then appear in the Results table on the right side of the screen. You can also get the interquartile range (IQR) by clicking on "Quartiles" under Percentile Values.





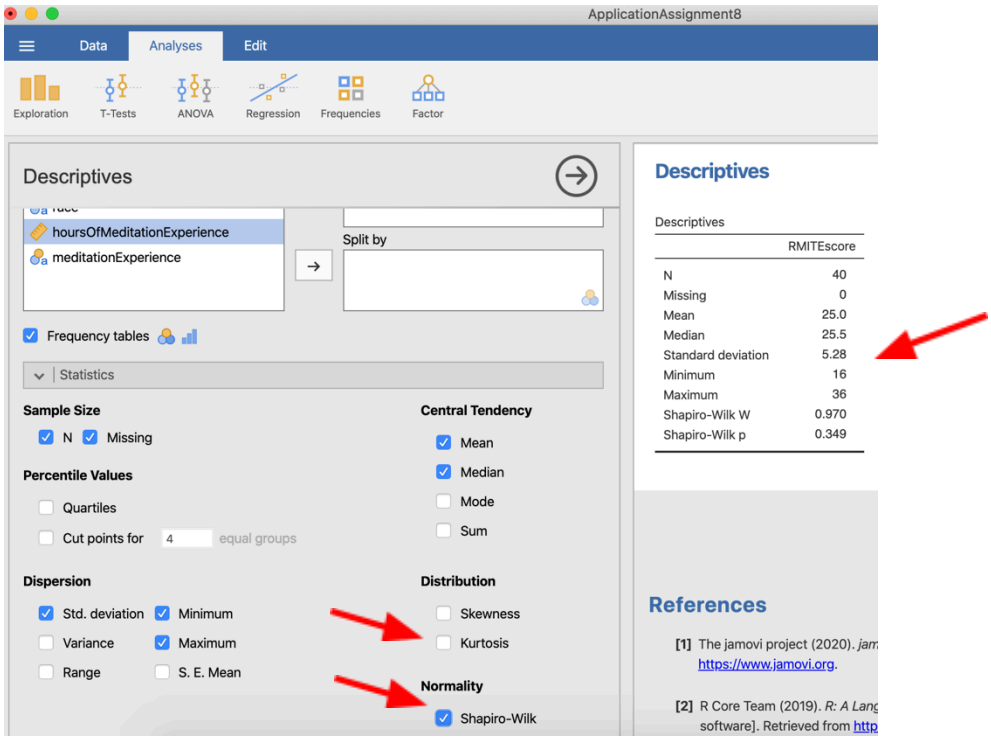


- **Frequencies.** To compute frequencies for a nominal variable, click on the "Frequency tables" option, once you've selected the Variable you want to view.

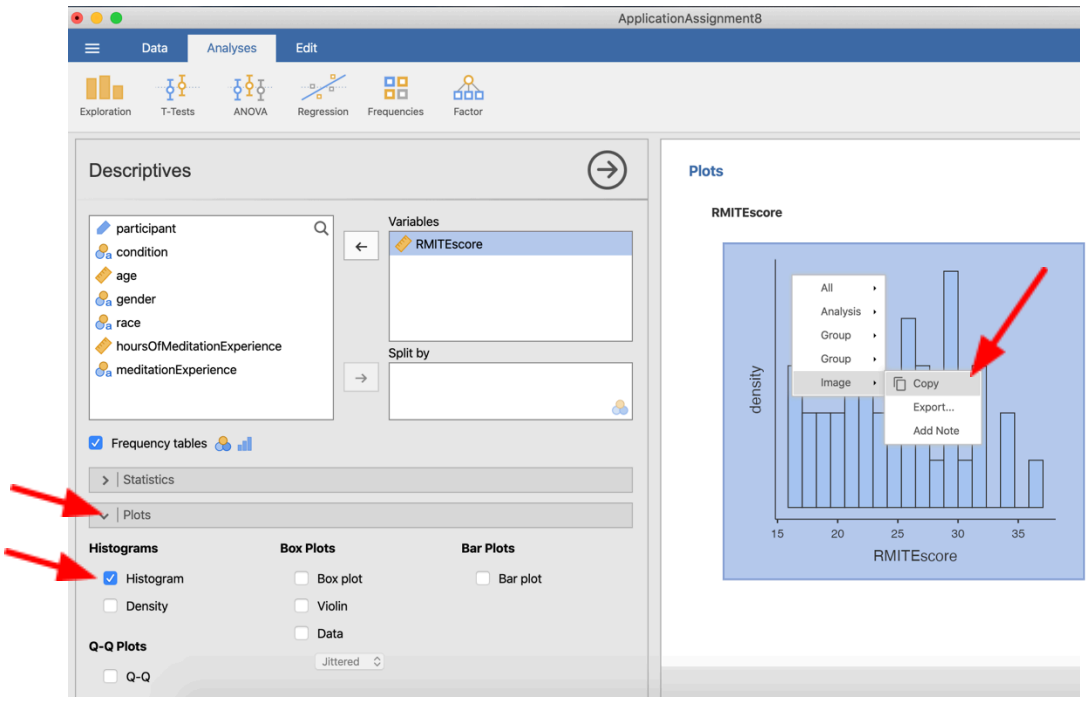


- **Normality Test.** Select your Dependent Variable. Under Statistics > Normality select "Shapiro-Wilk." You will now see the W and P values for this statistical test. Remember, the null hypothesis for a normality test is that there is no difference between your data and a dataset with a true normal distribution. If you get a p value less than .05, it means you should reject the null hypothesis (i.e., your data is significantly different from a normal distribution. If your p value is greater than .05, it means we fail to reject the null hypothesis (i.e., your data is normally distributed). We want our data to be normally distributed (that's an underlying assumption for most common statistical tests), so you want a p value GREATER than .05 (unlike correlation tests, t-tests and ANOVA, in which you want a p value less than .05—for those the null hypothesis is that

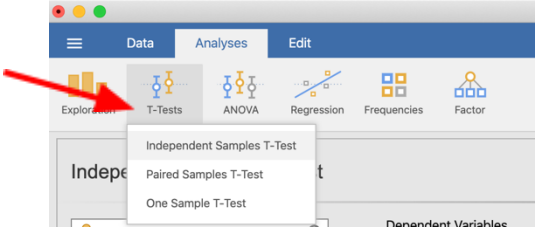
there is no relationship between the two variables, but you want to reject that null hypothesis to see a significant relationship).



- **Histograms.** Select your dependent variable. Under the Plots > Histograms, select “Histogram.” Right click on the graph to Copy and then paste into a word document. You can also Export the graph as a PNG image to save it onto your computer.

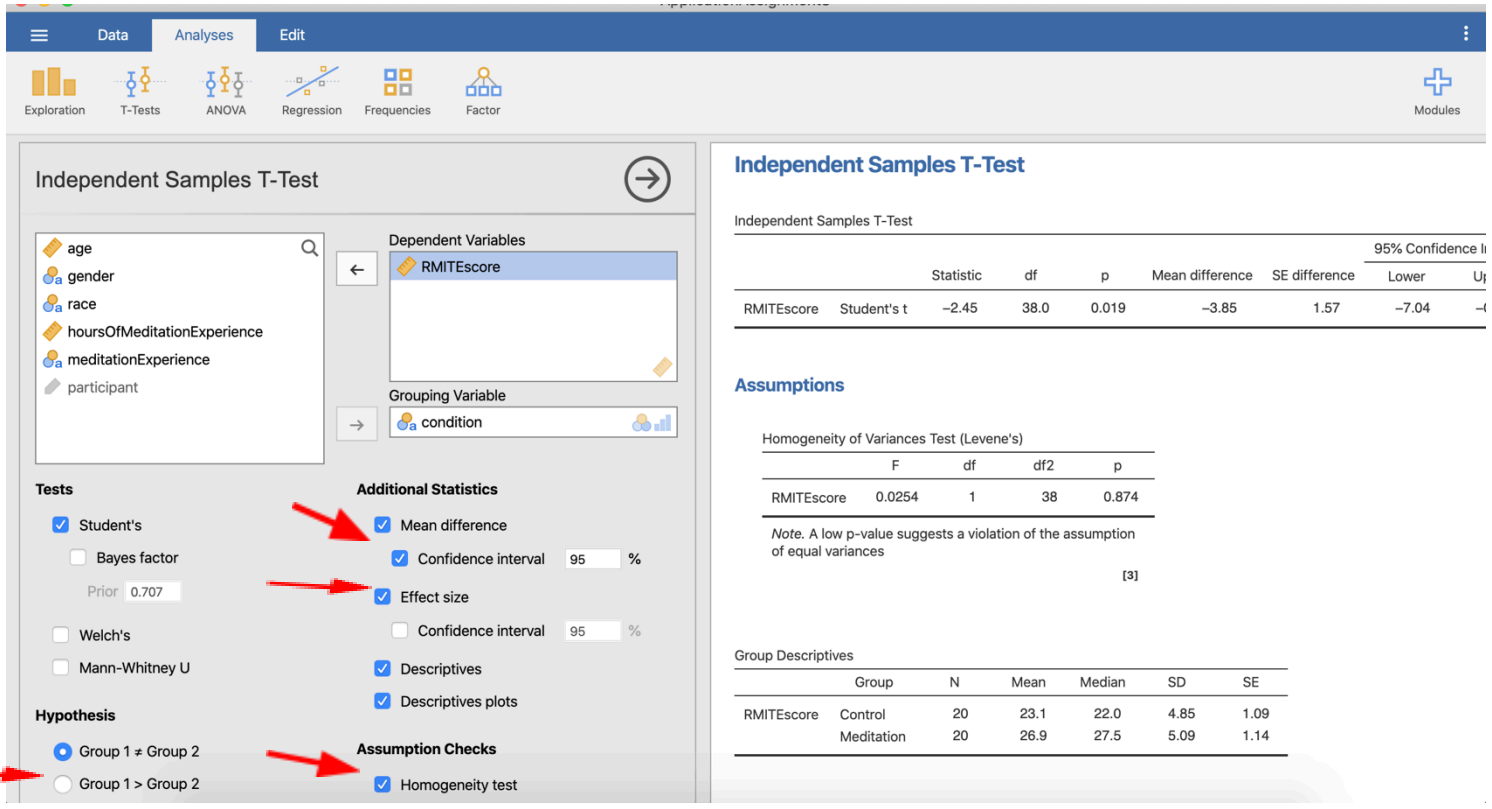


- **T-tests.** Under the Analyses tab, click on the T-Tests icon and select Independent samples t-test (or Paired samples t-test if your experiment has a within-groups design).

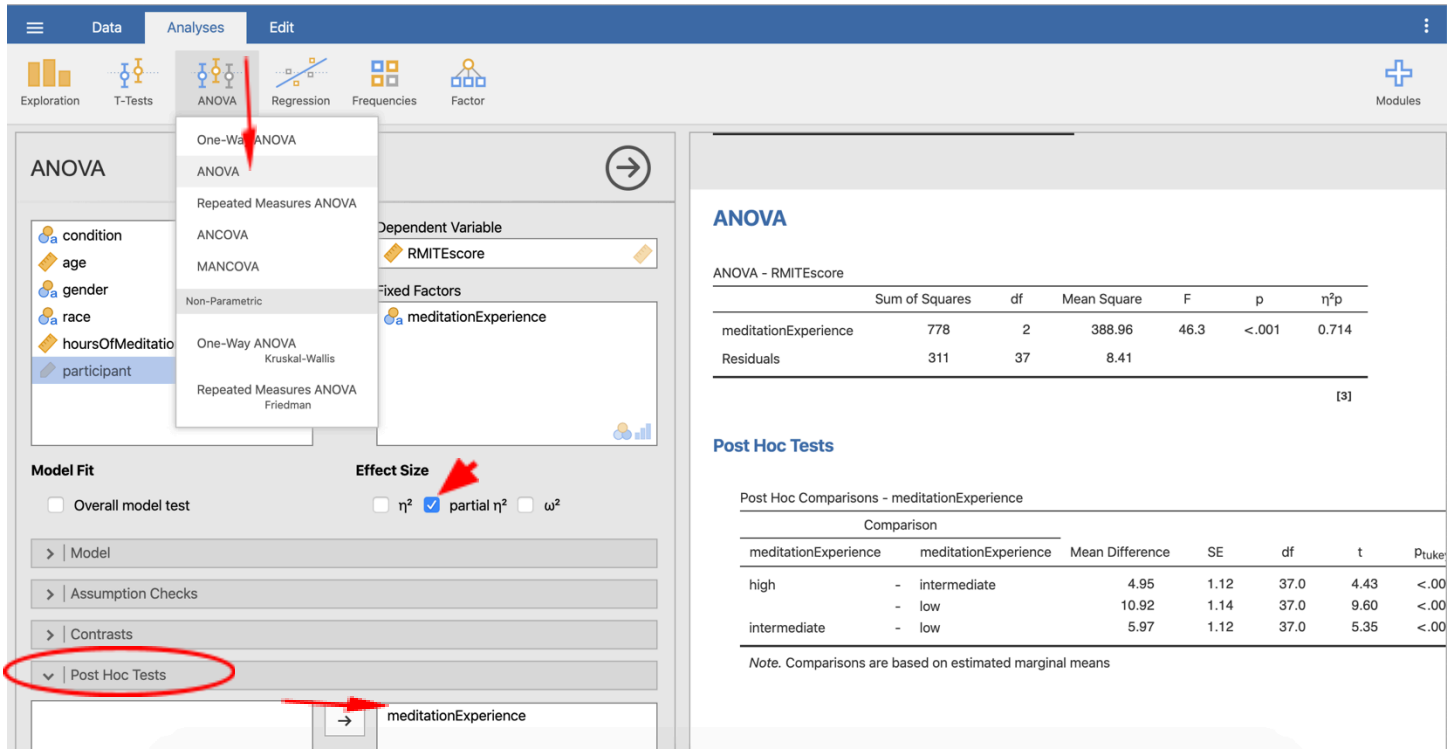


Move your dependent variable into the Dependent Variables box and your independent variable into the Grouping Variable box. Remember you use a t-test to determine whether there is a significant difference in scores on your dependent variable between TWO groups (i.e., whether your independent variable had a significant effect on your dependent variable). The null hypothesis for this test is that there is no difference in mean scores between the two groups. When you reject the null hypothesis (with a p value less than .05), that means you have enough evidence to conclude that the difference between groups you found in your sample is unlikely (less than a 5% probability) to have occurred due to chance alone (i.e., you found a difference because the independent variable does really influence the dependent variable). If you have a directional hypothesis (one group mean will be greater than the other group, as opposed to not being sure which will be larger), then select Group 1 > Group 2 under Hypothesis.

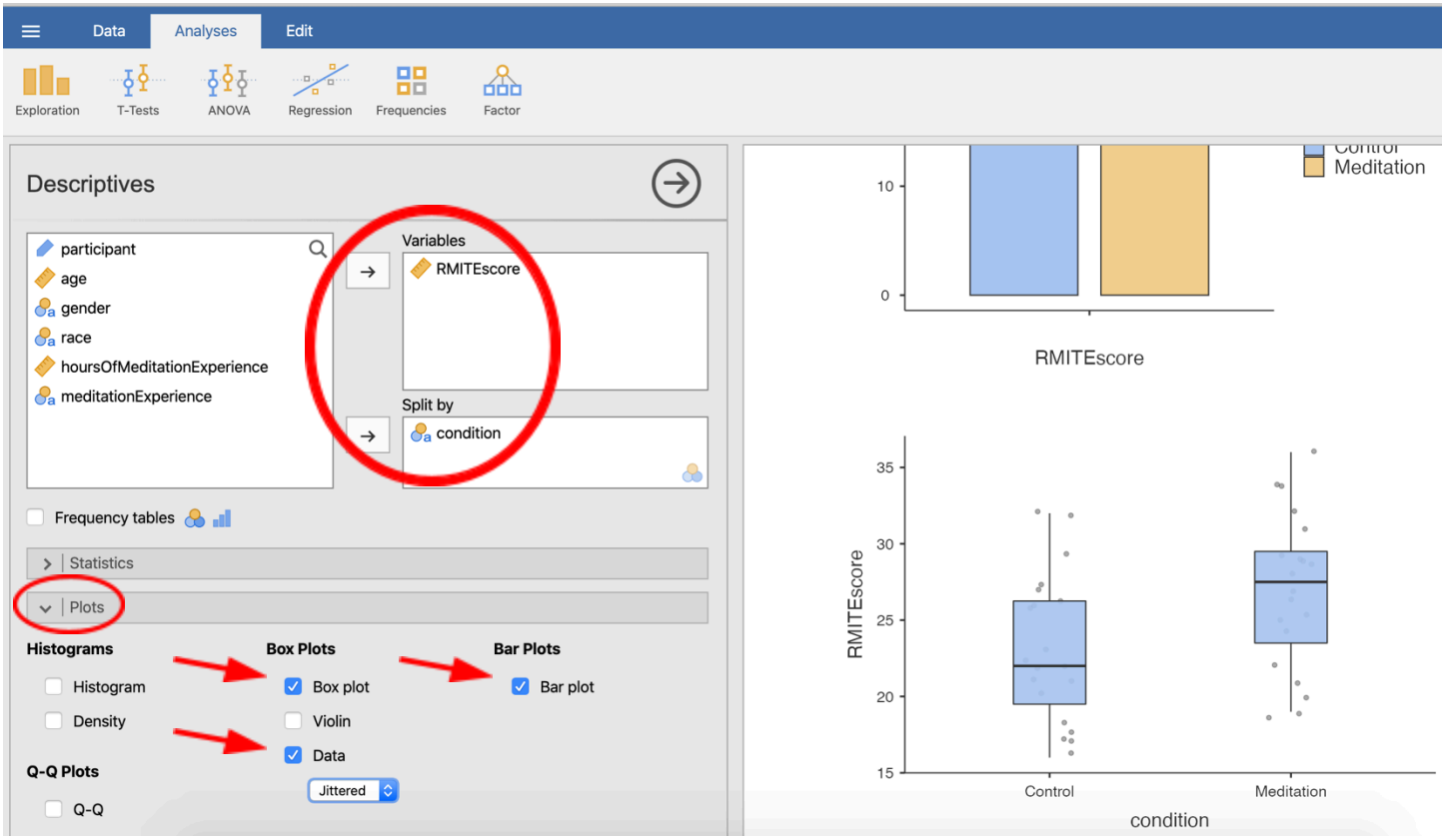
- To get the 95% confidence interval, select "Mean difference" and "Confidence interval" under Additional Statistics.
- To get Cohen's d, select "Effect size."
- You can also get frequency, mean, median, standard deviation, and standard error of the mean grouped by your independent variable by clicking on "Descriptives" and a simple graph of central tendency and confidence interval spread by clicking "Descriptives plots."
- Note that to use a t-test, you need to make sure you meet the homogeneity of variances assumption, meaning that the variability of scores for each level of your independent variable is roughly the same (i.e., one group doesn't have everyone scoring around the mean, while the other group has scores all over the place). To check for this assumption, select "Homogeneity test" under Assumption Checks. The null hypothesis for this test is that the variance of the two groups is the same, so if you reject the null hypothesis (by having a p value less than .05), that means your groups do not have equal variances (which you don't want). Thus, you want to find a p value GREATER than .05 for the Levene's test for homogeneity of variance (like the Shapiro-Wilk normality test).



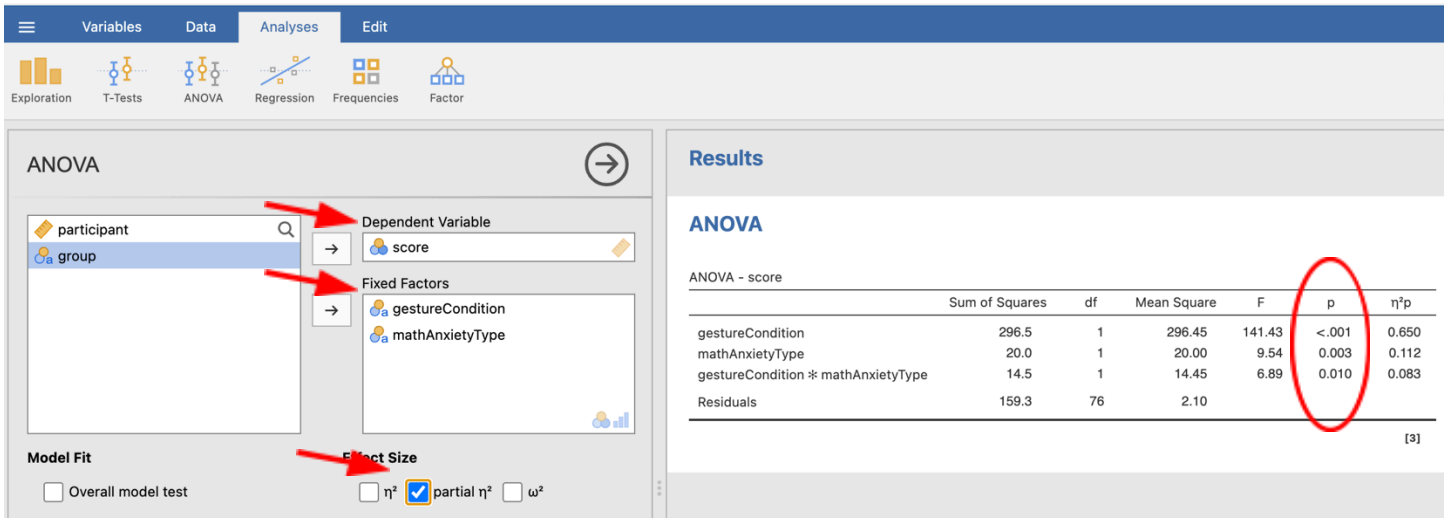
- **ANOVA.** In the Analyses tab, click on the ANOVA icon and select ANOVA (or Repeated Measures ANOVA if you have a within-groups design). Move your dependent variable into the Dependent Variable box and the independent variable in the Fixed Factors box. The null hypothesis for an ANOVA is that there is no difference between any of the groups (i.e., no effect of the independent variable on the dependent variable in the population). If the p value is less than .05 you can reject the null hypothesis, and conclude that there is a significant difference between at least two of the groups.
    - To figure out which groups differ from each other, conduct a Tukey's Post Hoc Test. Under Post Hoc Tests, move the independent variable into the box on the right. Make sure "Tukey" is selected under Correction. Select "Cohen's d" under Effect Size. The output will show you a separate t-test for each pairwise comparison. If the p value for a given row is less than .05 it means those two groups significantly differ.



    - **Box Plots.** Go to the Exploration > Descriptives tab. Move the dependent variable into the Variables box and the independent variable into the Split by box. Expand the Plots section and select "Bar plot" under Bar Plots. To get a box and whisker plot, select "Box plot" under the Box Plots section, and select "Data" (Jittered) to display the individual data points.



- **Factorial ANOVAs.** To conduct an ANOVA with more than one independent variable, follow the same steps as for a one-way ANOVA (click on the ANOVA tab > ANOVA). Then drag all of your independent variables into the "Fixed Factors" box and your dependent variable into the "Dependent Variable" box. Jamovi will automatically calculate the main effect of each of your independent variables and the interaction. A p-value less than .05 for each row in your output table represents a significant main effect (for the rows labels with a single independent variable) or a significant interaction (for the last row labeled with the names of both variables). Click on the "partial η^{2}" symbol under "Effect Size" to see the size of each main effect and interaction.



- To make a boxplot, go the Exploration > Descriptives tab. Move the dependent variable into the Variables box and the independent variables into the Split by box. Expand the Plots section and select "box plot" under the Box Plots section and select "Data" (Jittered) to display the individual data points.

- **Correlations and Scatterplots.** Under the Analyses tab click on the Regression icon and select Correlation Matrix. Move the continuous variables (at least two) you want to analyze into the window on the right. Make sure "Pearson" is selected under Correlation Coefficients. The null hypothesis is that there is no relationship between the two variables in the population, so if you get a p value less than .05 you can reject the null hypothesis and conclude that the two variables being related in your sample was not just due to chance. The degrees of freedom is the number of participants (N) – 2. Under Additional Options, select "Confidence intervals" for 95% confidence intervals and "Flag significant correlations" to get asterisks appear next to Pearson's r values that are statistically significant ($p < .05$). To make a scatterplot, select "Correlation matrix" under Plot.