

# How can I compute critical values for a test of simple effects in Stata?

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## RECOMMENDED CITATION

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To compute critical values for a test of simple effects in Stata, follow these steps:

1. Start by loading your data into Stata and selecting the variables you want to analyze.
2. Use the "anova" command to run a one-way ANOVA to determine if there are significant differences between the groups.
3. If the ANOVA is significant, use the "estimate" command to compute the effect size for each group.
4. Next, use the "pwcompare" command to run pairwise comparisons between the groups and obtain the p-values.
5. Once you have the p-values, use the "lincom" command to compute the simple effects by combining the effect sizes and p-values for each group.
6. Finally, use the "cutoff" command to determine the critical values for the simple effects test. These values represent the threshold for determining if the differences between the groups are significant.

By following these steps, you can efficiently compute critical values for a test of simple effects in Stata, allowing you to accurately assess the significance of differences between groups in your data.

## How can I compute critical values for test of simple effects? | Stata FAQ

**This FAQ presents an ado program (smecriticalvalue) that can be used to compute critical values for tests of simple interactions and simple main effects. You can find the smecriticalvalue program by typing search smecriticalvalue in the Stata command window (see**

**How can I use the search command to search for**

programs and get additional help? for more information about using search).

There are at least four different approaches in the literature for computing critical values for test of simple interactions and simple main effects. There is a method attributable to Dunn and one by Marascuilo and Levin. In addition there is the per family error rate and a very conservative method called the simultaneous test procedure that is closely related to the Scheffé method for multiple comparisons. There does not seem to be a clear favorite among these approaches in the literature.

Let's say that you have run a 3x4 factorial model with a significant interaction. The original 3x4 model has a total of 11 degrees of freedom for for the anova and 48 for the error term. You follow up the anova by doing four tests of simple main effects. Each of these tests has 2 degrees of freedom in the numerator and 48 in the denominator. Here is how you can compute the critical values using smecriticalvalue.

```
smecriticalvalue, number(4) df1(2) df2(48) dfmodel(11)
```

**number of tests: 4**

**numerator df: 2**

**denominator df: 48**

**original model df: 11**

**Critical value of F for alpha = .05 using ...**

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**Dunn's procedure = 4.7033201**

**Marascuilo & Levin = 5.1923643**

**per family error rate = 4.8075721**

**simultaneous test procedure = 8.4455227**

**If you are using the per family error rate then the critical value would be about 4.81.**

**If you had done the tests of simple main effects the other way around, that is, three tests with 3 degrees of freedom in the numerator and 48 in the denominator, the critical values would look like this:**

**smecriticalvalue, number(3) df1(3) df2(48) dfmodel(11)**

**number of tests: 3**

**numerator df: 3**

**denominator df: 48**

**original model df: 11**

**Critical value of F for alpha = .05 using ...**

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**Dunn's procedure = 3.9394001**

**Marascuilo & Levin = 4.3040955**

**per family error rate = 3.7605452**

**simultaneous test procedure = 5.6303484**

**This time the critical value for the per family error rate is 3.76.**

**Reference**

**Kirk, R.E. Experimental design: Procedures for the behavioral sciences, 3rd ed. (1995) Pacific Grove, CA: Brooks/Cole**