

10.5: Addressing Violations to Assumptions

As noted earlier in this chapter, there are several assumptions to the one-way ANOVA. When they are met, we can proceed using the standard procedures described throughout this chapter. However, when assumptions of tests are not met it means either the test cannot be used or that a modified or alternative formula must be used. Most of the assumptions have to do with the types of variables and measures used and those cannot be violated. You must always have two or more independent groups measured on the same, quantitative variable. However, it is possible to proceed with the one-way ANOVA if the other assumptions are not all met. Those assumptions include approximate normality for the dependent variable, no problematic outliers, homogeneity of sample sizes, and homogeneity of variances.

Thankfully, the one-way ANOVA is fairly robust to violations, especially when the sample sizes are large and even. Nevertheless, it is good practice to check the homogeneity of variances. As was true of the independent samples t -test, homogeneity of variances can be checked for a one-way ANOVA using the Levene's test. This is often done with the aid of SPSS software. When variances are not homogeneous, a Welch's ANOVA with a Games-Howell post-hoc test should be considered instead of a standard one-way ANOVA with a Tukey's post-hoc test.

When conducting a one-way ANOVA in SPSS, users can choose to include a Levene's test. With this in mind, let's turn to how to conduct a one-way ANOVA using SPSS, paying attention to when and how to check the assumption of homogeneity of variances.

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