**Assumptions for ANOVA/Regression Analysis:**

**Testing of the Assumptions**

1. The population from which samples are drawn should be normally distributed.  
2. Independence of cases: the sample cases should be independent of each other.  
3. Homogeneity of variance: Homogeneity means that the variance among the groups should be approximately equal.

The assumption of homogeneity of variance can be tested using tests such as Levene’s test or the Brown-Forsythe Test.

Normality of the distribution of the scores can be tested using histograms, the values of skewness and kurtosis, or using tests such as Shapiro-Wilk or Kolmogorov-Smirnov.

|  |
| --- |
| **Shapiro-Wilk’s method** is widely recommended for normality test and it provides better power than K-S. It is based on the correlation between the data and the corresponding normal scores.  The R function **shapiro.test**() can be used to perform the Shapiro-Wilk test of normality for one variable (univariate):  shapiro.test(my\_data$len)  Shapiro-Wilk normality test  data: my\_data$len  W = 0.96743, p-value = 0.1091  From the output, the p-value > 0.05 implying that the distribution of the data are not significantly  different from normal distribution. In other words, we can assume the normality.    Ho: Data is normal  H1: Data is not normal |

The assumption of independence can be determined from the design of the study.

It is important to note that ANOVA is not robust to violations to the assumption of independence.  This is to say, that even if you violate the assumptions of homogeneity or normality, you can conduct the test and basically trust the findings.  However, the results of the ANOVA are invalid if the independence assumption is violated.

In general, with violations of homogeneity the analysis is considered robust if you have equal sized groups.

With violations of normality, continuing with the ANOVA is generally ok if you have a large [sample size](http://www.statisticssolutions.com/academic-solutions/academic-research-consulting/sample-size-determination/).