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Unequal Variances Tests

You use a two-sample t test to compare two independent means. However, instead of comparing the centering of two distributions, you might want to compare the spread or dispersion of these distributions.

To do this, you would perform a hypothesis test for unequal variances. In an unequal variances test, your null hypothesis is that the variances for the two groups are equal. Your alternative hypothesis is simply that they are not equal.

Consider the data in the file Breaking Strength 2.jmp in the course data folder. You measure the breaking strength of two materials and are concerned that the variability in the breaking strength of the two materials is not the same. You measure the breaking strength for 10 randomly selected parts made from each material. You want to test the null hypothesis that the variance for the two materials is the same against the alternative that the variances are different.

There are several types of unequal variances tests. When you compare two variances in JMP, five different tests are conducted. We omit the technical details and focus on the interpretation of the tests. Each of the reported p-values is below a significance level of 0.05. Therefore, you can reject the null hypothesis and conclude that the variances for the two materials are not the same. What if you are also interested in comparing the means for the two materials?

Because you've found the variances to be unequal, you would use the unequal variances two-sample t test in this situation. For details about how these tests are constructed, search for "unequal variances" in the JMP Help files.

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