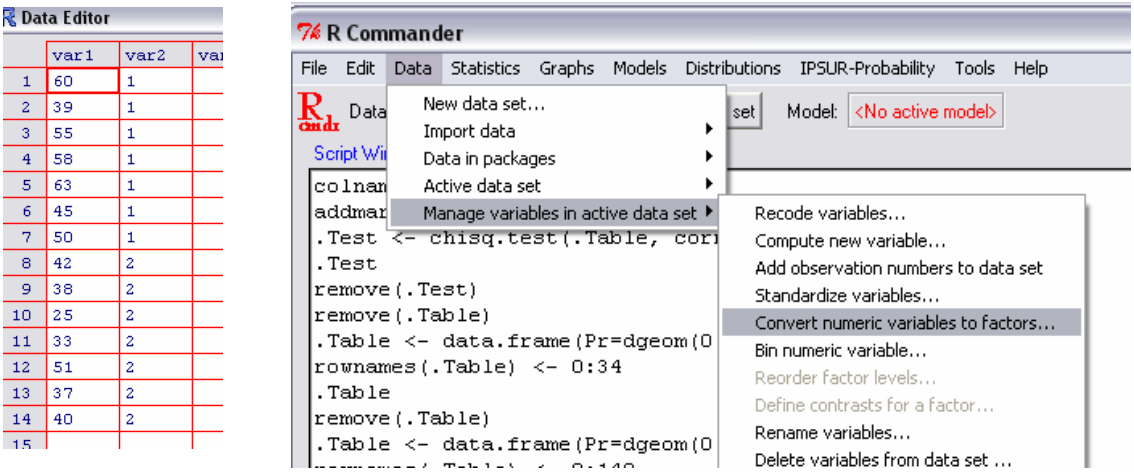
Test of Equality of Variances

When testing two independent samples (for differences in mean, one-sided tests, etc.), it is helpful to know that the samples have equal variances or not. In order to test this condition, a test of equality of variances must be done.

Example: At a 0.05 level of significance, test whether the average lifespan (in months) of aluminum bedpans is statistically significantly different from that of stainless steel bedpans by using the following data:

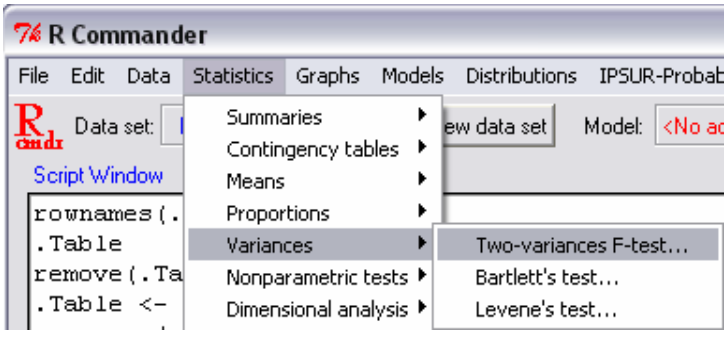
Lifespan (in months):
Aluminum: 60, 39, 55, 58, 63, 45, 50
Stainless Steel: 42, 38, 25, 33, 51, 37, 40

1) Create a new data set in R, and input all the lifespan values in the first column (var1), and separate the data into 2 groups by using the second column (var2) as a indicator or group variable (1 and 2):

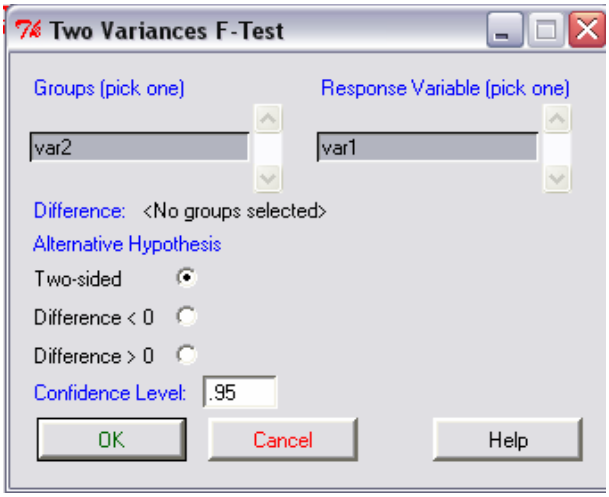


2) In IPSUR, select **Data / Manage variables in active data sheet / Convert numeric variables to factors…** (as shown in above right). Select the option to change "var2," and rename [1] as Aluminum and [2] as Stainless, to set var2 as a factor.

3) In IPSUR, select **Statistics / Variances / Two-variances F-test…** (shown below left).



For Groups, choose var2, and the Response Variable is var1. Choose a two-sided test because we want to know if the variances can be assumed equal or not, and 0.95 for Confidence Level is confidence interval is needed.



Interpret:

4) This gives the following in the output window of IPSUR:

```
        F test to compare two variances

data:  var1 by var2
F = 1.1637, num df = 6, denom df = 6, p-value = 0.8587
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
 0.1999552 6.7723953
sample estimates:
ratio of variances
          1.163690
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Since the p-value is 0.8587, and if the level of significance is 5%, and 0.8587 > 0.05, the null hypothesis of equal variances is not rejected due to sufficient evidence.

* In other words, this evidence cannot reject the null hypothesis that $\frac{\sigma_1^2}{\sigma_2^2} = 1$