Third Assignment Group C

Group C members: Davide Piccinini, Chiara Terrile, Chiara Saporetti, Cristina Naso Rappis

Comments about the Third Assignment

We chose the people for the sample by extracting them randomly from the given data set (by generating 40 values using a random number generator) and dividing them in group A and group B.

For each of them we calculated the descriptive statistics for the Perceived time and for the HRI (excel sheets "Statistics Perceived Time A & B" and "Statistics HRI Group A & B") to check the normality of the distribution and the variance.

The "normality of the distribution" check

In order to double check the normality of the distribution we also performed the online Shapiro's test, obtaining the following results :

Group A Perceived time Shapiro's Test

Since p-value > α, we accept the H0. We can then infer that the data is normally distributed.

p-value is 0.836082, (83.60%)

Group B Perceived time Shapiro's Test

Since p-value > α, we accept the H0. Same as before.

p-value is 0.807186 (80.72%)

So we could apply the "t-test on two samples assuming different variances" to Perceived time data since it has a normal distribution.

Group A HRI Shapiro's Test

Since p-value < α, we reject the H0. We can infer that the data is not normally distributed.

In other words, the difference between the data sample and the normal distribution is big enough to be statistically significant.

p-value is 0.0111140, hence, the chance of rejecting a correct H0 is small: 0.01111 (1.11%)

Group B HRI Shapiro's Test

Since p-value > α, we accept the H0. It is assumed that the data is normally distributed.

p-value is 0.184472, (18.45%)

We couldn't apply the previous t-test since group A is not normally distributed, so we performed the Kruskal-Wallis Test on the online simulator. If we instead consider a "moderately restrictive" case (Kurtosis & Skewness below 1 in absolute value), the Kurtosis and Skewness values obtained from the descriptive statistics satisfy the requirement and thus we could in principle apply the t-test.

The results

Perceived time (excel sheet "Ttest diff. var. Perceived Time")

The p-value is 0.16 so we can't reject the null hypothesis because p > α which is 0.05. However, we can't be sure of the fact that we can always accept the hypothesis since the results are dependent on the chosen sample.

HRI (excel sheet "Ttest diff. var. HRI")

If we use the *t-test* we obtain the following result:

p-value is 0.008 so we can reject the null hypothesis because p < α .

By instead using a more restrictive approach for the normality of the distribution (and thus performing the *Kruskal-Wallis test*) we obtain that the p-value is 0.03046. The result is significant at p < .05.

Agrees to new test (excel sheet "Agrees to new test Percentages")

For this set of data we used a different approach, considering the percentages of agreement (TRUE answer) and of disagreement (FALSE answer). Counting the respective answers we obtain the first table shown in the Excel sheet: the percentage of agreement considering both groups together amounts to 37.5%.

We can then fill in the second table using this percentage value and use the formula shown in the slides to compute the test statistic ^{2}.

Performing the Chi-square test we obtained 0.96 as a result. Using the MatLab function "*chi2pdf(x, df)*" where x is the ^{2} value and df stands for degrees of freedom (in this case df = 1), we obtain the probability of observing that specific value: the result is 0.2519, which means that the difference between the two groups is statistically significant at probability level p < 0.25.