



EduStat Software

Processing Mean Scores Results

This paper deals with the exploitation of the results obtained by students in a mathematics test. The "**MeanScoresEN.edu**" database will be used to carry out the proposed exercises. This database contains 34 variables and 450 records. Note that the records included in this database represent primary school pupils. We will produce statistical compilations related to the following EduStat software options:

- Tables of Mean Scores
- Synthetic Tables of Mean Scores
- Recalculate a score
- Compilation of the T-test
- Production of correlation coefficients
- Production of descriptive statistics

In addition to processing these statistical compilations, it is also possible to produce, using this database, frequency distributions as is the situation for most databases.

Several documents are available when using EduStat. If you would like further information on the process to be followed in order to carry out one or the other treatment presented in this document, it is possible to consult the following documents part of the documentation. To access it, choose the "Documentation" option from the "Help" menu. A window including five options appears. It is possible to open one of the three options allowing to have additional information by choosing the option of his choice: Slideshows, Videos (not available in English), Procedural documents. It is also possible to consult the "User's Guide" (not available in English). We advise you to read some of these documents before carrying out the activities presented in this document. Here are some references.

User Guide - Not available in English

Viewing Slide Shows

- Tables of Mean Scores: Option " Mean Scores"
- Synthetic Tables of Mean Scores: " Mean Scores"
- Recalculate a score: " Mean Scores"
- Production of correlation coefficients: " Mean Scores"

Viewing videos – Not available in English

Viewing procedural documents

- Tables of Mean Scores : “ Mean Scores”
- Synthetic Tables of Mean Scores: “ Mean Scores”
- Recalculate a score: “ Mean Scores”

The following six sections present information on options related to compilations of average results.

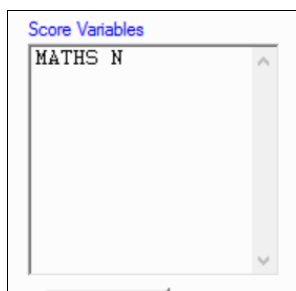
❖ *Tables of Mean Scores*

EduStat produces statistics that report the mean scores results obtained according to the values attached to contextual variables or opinions.

Here is how to produce table of mean scores. We will use the following variables: MATHS and AGE.

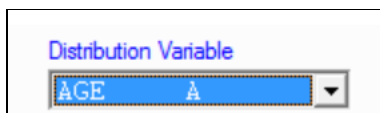
- Choice of the result variable (s)

From the list of "score variables", select the desired results; we will choose, for this exercise, the variable "MATHS" (note: it is possible to choose several variables of scores).



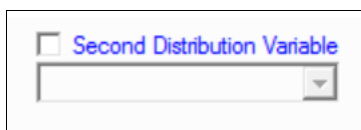
- Choice of the "distribution variable"

We will select the variable "AGE".



- If desired, choose a second distribution variable

For this exercise, we will not choose a second "distribution variable".



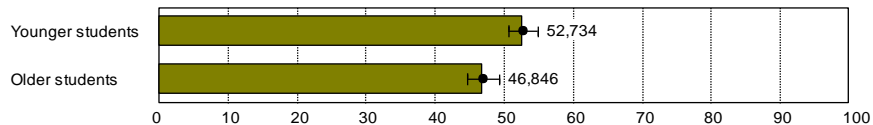
- Provide additional information (eg format of report to be produced).

Here is the report produced following the execution of the compilation.

Age of student

	Proportion		MATHS	
Younger students	59.152	(4.552)	52.734	(2.030)
Older students	40.848	(4.552)	46.846	(2.313)

Mathematics Results



❖ Synthetic Tables of Mean Scores

It is also possible to produce summary tables of mean scores. This option allows to select multiple distribution variables relative to one or more result variables. The approach is similar to the one used for the production of tables of scores.

- Choice of variable (s) of mean scores
- Choice of distribution variables

Here is the report. (Note that it is not possible to produce graphic illustrations.)

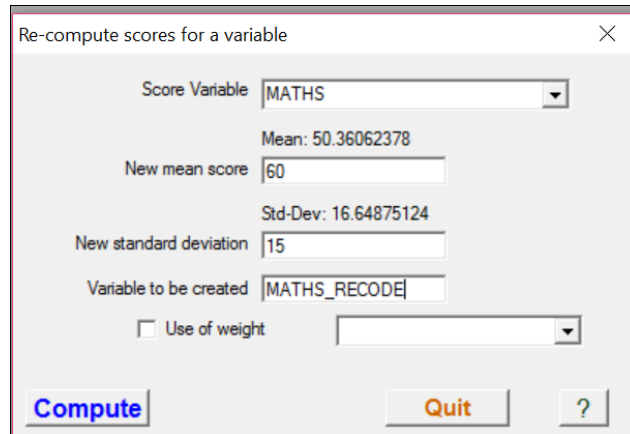
Question	Choice of answer	%		Mathematics	
SEX	Boy	57.8	(4.6)	51.2	(2.0)
	Girl	42.2	(4.6)	49.2	(2.4)
	Total	100.0	(0.0)	50.4	(1.5)
AGE	Younger students	59.2	(4.6)	52.7	(2.0)
	Older students	40.8	(4.6)	46.8	(2.3)
	Total	100.0	(0.0)	50.3	(1.5)
ZONE	Urban	41.6	(4.6)	52.2	(2.5)
	Rural	58.4	(4.6)	49.1	(2.0)
	Total	100.0	(0.0)	50.4	(1.5)
STATUS	Public	89.8	(2.8)	50.8	(1.6)
	Private	10.2	(2.8)	46.7	(6.0)
	Total	100.0	(0.0)	50.4	(1.5)

❖ Recalculate a score

If mean scores obtained by each student have been recorded in the database, it is possible to recalculate one mean score to make comparisons on a common scale reporting the results. This technique may be useful when analyzing results from different tests or from different samples.

Here is the approach to use.

- Choose the result variable; we will retain the variable "MATHS". Information on the value of the mean scores and the value of the standard deviation are displayed.
- Enter the desired values for the mean score and the standard deviation.



Re-compute scores for a variable

Score Variable: MATHS

Mean: 50.36062378

New mean score: 60

Std-Dev: 16.64875124

New standard deviation: 15

Variable to be created: MATHS_RECDEI

Use of weight

Buttons: Compute, Quit, ?

- Identify the name of the variable that will contain the new values. This variable will then be part of the database and can be used to perform certain statistical options.

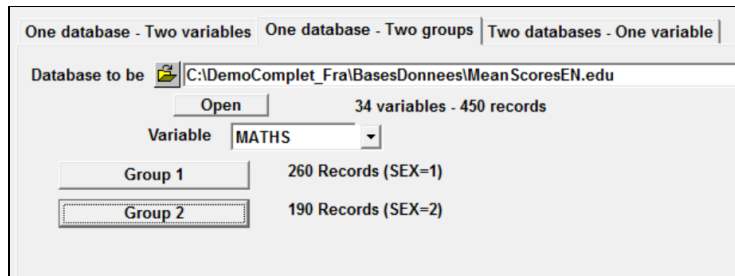
❖ T Test

The Student test or T test is a set of parametric hypothesis tests where the calculated statistic follows a Student's law when the null hypothesis is true. A Student test can be used in particular to test statistically the hypothesis of equality of two variables according to a normal law and of unknown variance.

EduStat calculates the value of a T-test in relation to the following three situations:

1. *Use of one base and two variables* - Two numerical variables part of the same database can be compared with the observed statistics.
2. *Use of one database and a variable* - Only one variable is used here; we will compare the statistics observed with two groups of records.
3. *Use of two databases and two variables* - A variable is selected in each database; we will compare the statistics of these two variables from different databases.

We will retain the second situation described above. The variable "MATHS" will be used in relation to the gender.



Here's the report:

Variable: MATHS (Mathematics Results)

Group 1: 260 Records (SEX=1)

Group 2: 190 Records (SEX=2)

Groups	Results	Std-Dev
Group 1	51.231	16.410
Group 2	49.169	16.984
T Test	1.291	

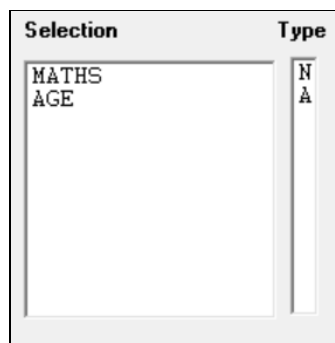
Given the value of the T-test (1.291), it would appear that the difference between the two mean scores is not statistically different.

❖ *Correlation coefficients*

It is possible to produce correlation coefficients between a set of variables. Three modalities are available.

1. *Simple Correlation* - Computation of correlations is made between the selected set of variables.
2. *One variable with several* - It is possible to have the correlation between a given variable and another series in another one to have coefficients that account for the links that may exist between the first variable and the values contained in each of the other selected in the list.
3. *Two variables with distribution* - We may wish to establish the correlation between two variables while distributing according to another variable.

We chose the first method offered by EduStat. The two variables compared are: "MATHS" and "AGE" (note: it would have been possible to select more than two variables).



Here is the report

Correlation	MATHS	AGE
MATHS	1.000 (N=450)	-0.174 (N=448)
AGE		1.000 (N=448)

The obtained coefficient (0.174) indicates that the link between these two variables is rather weak.

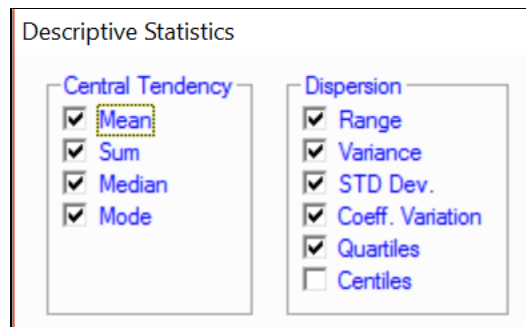
❖ *Descriptive Statistics*

This option allows to obtain a set of statistics from numerical variables; here is the list:

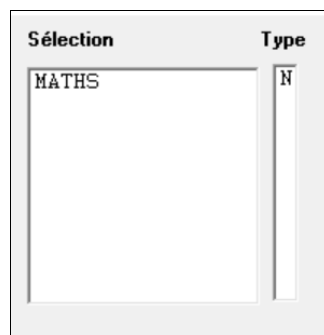
- *Central Tendency* - It is possible to choose the following statistics for the central trend measure: mean scores, sum, median and mode.
- *Dispersion* – According to dispersion statistics, EduStat can produce: range, variance, standard deviation, coefficient of variation, quartiles and percentile ranks.
- Production of *mean scores*.

Here's how:

- Selection of statistics indicating measures of central tendency and dispersion



- Select one or more numeric variables



Report

For each selected variable, there is production of statistics included in the tables on central trends and dispersion options. If there is a request for production of frequency distribution, a table will be available. (Note: we have produced a report that includes all available statistical coefficients for central trends and dispersion measures).

MATHS - Mathematics

Observations	450
Missing	0
Mean	50.361
Sum	22662.281
Median	50.877
Mode	59.649
Range -Min	4.386
Range -Max	91.228
Variance	277.181
Std Dev	16.649
Var. Coeff.	33.059
Quartile 25	40.351
Quartile 50	50.877
Quartile 75	61.404