LSA_Stats Functions

(Eugenio Gonzalez and Duygu Savasci, 2013)

These are a set of Excel functions that have been created to facilitate the post-processing of results generated using the IDB Analyzer. However, their functionality extends beyond output from the IDB Analyzer.

In order to access these functions, you will need to install the Excel AddIn called "LSA_Stats.xla" by following instructions specific to the version of Excel and operating system of your computer.

Once installed, you can access these functions in two ways:

1. Go to the FORMULAS tab, select "Insert Function", and under "Or Select Category:…" select "User Defined". You will see the user defined formulas available in your computer. Select the function you want to use, and enter the arguments. Once finished click "Ok" and the calculated value will appear on in the selected cell.
2. Click on the cell and type the name of the formula following an "=" sign. Proceed then to enter the arguments for the formula and pres RETURN or ENTER when finished. The calculated value will appear on in the selected cell.

You will know that you have successfully installed the AddIn if you can access the functions using step 1 above.

Available Functions

There are several functions available to you. These are described below using the format **FunctionName(Argument(s))**. In general, the following conventions apply to describing the arguments to these functions:

a. The argument **"… As Range"** indicates a range of cells in the spreadsheet that the function will use to make the calculations or comparisons. When a function requires 2 arguments "…As Range", you will need to specify two ranges of cells, and there should be a one-to-one correspondences between these two ranges cells. For example, when using the function "WgtAverage(Values As Range, Weights As Range)", you will need to indicate the cells where the values are, followed by the cells where the corresponding weights for those values are. If you specify A1:A10 and B1:B10, it will use A1 with B1, A2 with B2, etc.

b. The argument **"…As String"** is usually used to indicate a text or string value that will be used for a comparison. For example, in the function "CritAverage(Crit As String, CritRange As Range, Values As Range)", you will need to specify a string that will be looked up in the range, and if met the values will be averaged. A string argument must be enclosed in quotes, unless it refers to a cell. String arguments are case sensitive.

WgtAverage(Values As Range, Weights As Range)

'Computes the weighted average of the values in the range

Example: WgtAverage(A1:A10, B1:B10)

This will compute the average of the values contained in cells A1:A10, using the weights contained in cells B1:B10. The calculation is equivalent to "=SUMPRODUCT(A1:A10,B1:B10) / SUM(B1:B10)" .

CritAverage(Crit As String, CritRange As Range, Values As Range)

'Computes the average of the values in the range that meet a criteria

Example: CritAverage("BOY", A1:A10, B1:B10)

This function computes the average of the values in cells B1:B10, provided the value in the corresponding cell A1:A10 contains the string "BOY". This is equivalent to the function AVERAGE(B1:B10) when the value in A1:A10 is equal to "BOY". The string value is case sensitive.

CritWgtAverage(Crit As String, CritRange As Range, Values As Range, Weights As Range)

'Computes the weighted average of the values in the range that meet a criteria

Example: CritAverage("BOY", A1:A10, B1:B10, C1:C10)

This function computes the weighted average of the values in cells B1:B10, using the weights in cells C1:C10, provided the value in the corresponding cells A1:A10 contains the string "BOY". This is equivalent to SUMPRODUCT(B1:BA10,C1:C10)/SUM(C1:C10) when the value in A1:A10 is equal to "BOY". The string value is case sensitive.

IntSE(CountrySE As Range) or
CompositeSE(UnitSE As Range)

' Computes the SE for an international/composite average where each country/unit contributes the same

Example: IntSE(A1:A10) or CompositeSE(A1:A10)

This function treats the elements in the range A1:A10 as standard errors of elements that make up a composite statistic computed as the simple average of the elements. It returns the square root of the sum of the squared elements divided by the number of elements squared, or the equivalent of SQRT(SUMSQ(A1:A10)/COUNT(A1:A10)^2)

CritIntSE(Crit As String, CritRange As Range, CountrySE As Range) or
CritCompositeSE(Crit As String, CritRange As Range, UnitSE As Range)

' Computes the SE for an international/composite average based on a selection criteria, where each country/unit contributes the same

Example: CritIntSE("BOY", A1:A10, B1:B10) or CritCompositeSE("BOY", A1:A10, B1:B10)

This function treats the elements in the range B1:B10 as standard errors of elements that make up a composite computed as the simple average of the elements. It returns the square root of the sum of the squared elements divided by the number of elements squared, or the equivalent of SQRT(SUMSQ(B1:B10)/COUNT(B1:B10)^2), but only for the cases when the element in corresponding cells A1:A10 contains the string "BOY".

WgtIntSE(CountrySE As Range, Weights As Range) or
WgtCompositeSE(UnitSE As Range, Weights As Range)

' Computes the SE for an international/composite average where each country/unit contributes proportional to a weight

Example: WgtIntSE(A1:A10, B1:B10) or WgtCompositeSE(A1:A10, B1:B10)

This function treats the elements in the range A1:A10 as standard errors of elements that make up a composite computed as the weighted average of the elements. It returns the square root of the weighted

sum of the squared elements in cells A1:A10, using the weights in cells B1:B10, divided by the squared sum of the weights contained in cells B1:B10. It is the equivalent of "=SQRT(SUMPRODUCT(A1:A10, A1:A10, B1:B10, B1:B10)/SUM(B1:B10)^2)".

CritWgtIntSE(Crit As String, CritRange As Range, CountrySE As Range, Weights As Range) or
CritWgtCompositeSE(Crit As String, CritRange As Range, UnitSE As Range, Weights As Range)

' Computes the SE for an international/composite average based on a selection criteria where each country/unit contributes proportional to a weight

Example: CritWgtIntSE("BOY", A1:A10, B1:B10, C1:C10) or CritWgtCompositeSE("BOY", A1:A10, B1:B10, C1:C10)

This function treats the elements in the range B1:B10 as standard errors of elements that make up a composite computed as the weighted average of the elements, using the weights in cells C1:C10. It returns the square root of the weighted sum of the squared elements in cells B1:B10, using the weights in cells C1:C10, divided by the squared sum of the weights contained in cells C1:C10. It is the equivalent of "=SQRT(SUMPRODUCT(B1:B10, B1:B10, C1:C10, C1:C10)/SUM(C1:C10)^2)", but only for the cases when the element in corresponding cells A1:A10 contains the string "BOY".

PartWholeDiffSE(PartSE, WholeSE, NParts)

' Computes the SE for a part whole difference when all parts contribute the same

Example: PartWholeDiffSE(A1, B1, C1)

This function calculates the standard error of the difference between a part and the whole, assuming the whole has been computed as the simple average of several parts, the standard error for the part is contained in cell A1, the standard error for the whole is contained in cell B1, and the number of parts that contribute to the overall are contained in cell C1.

WgtPartWholeDiffSE(PartSE, PartWgt, WholeSE, WholeWgt)

' Computes the SE for a part whole difference when parts contribute proportional to weight

Example: WgtPartWholeDiffSE(A1, B1, C1, D1)

This function calculates the standard error of the difference between a part and the whole, assuming the whole has been computed as the weighted average of several parts, the standard error for the part is contained in cell A1, the weight of the part is contained in cell B1, the standard error for the whole is contained in cell C1, and the sum of the weights of all the parts that contribute to the overall are contained in cell D1.

SEofDiffIndSamples(StdErr1, StdErr2)

' Computes standard error of difference between independent samples

Example: SEofDiffIndSamples(A1, A2)

This function treats the values in cells A1 and A2 as if they were the errors from two independent samples, and combines them using the following formula: $\sqrt{A1^2 + A2^2}$. It returns the standard error of the difference between the two samples. It returns the equivalent of "=SQRT(A1^2+A2^2)".

ImpVariance(Statistics As Range)

' Computes Imputation Variance for any set of statistics

Example: ImpVariance(A1:A5)

This function treats the values in cells A1 to A5 as resulting from 5 different analysis using each time a different plausible value. It calculates the equivalent of the imputation variance as given by the following

formula: $\left(1+\dfrac{1}{c}\right)*Var(A1:A5)$, and where "c" is the number of elements in the range A1:A5. It returns the

equivalent of "=(1+1/COUNT(A1:A5))*VAR(A1:A5)".