Spreadware Statistics Menu

version 4.2

by

Spreadware™

for Microsoft Excel Version 5 or Later
(32-bit Windows and PowerPC Native)

Spreadware
PO Box 4552 • Palm Desert CA 92261-4552 USA
619/772-1758 Fax: 619/772-1759

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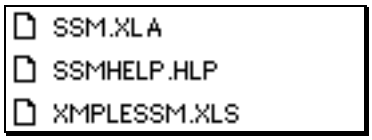
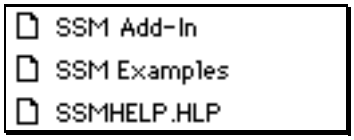


Windows version files.



Macintosh version files.

Installation

This on-line version of *Spreadware Statistics Menu* consists of the necessary program file, help file and example file, as well as a ReadNow introduction and this SSM documentation. *Spreadware Statistics Menu* requires a computer running Microsoft Excel 5.0 or later. It is optimized for the 32-bit Windows NT/95 and PowerPC Macintosh operating systems, while maintaining Windows 3.1 compatibility. Use the following instructions to install on your Macintosh or Windows machine:

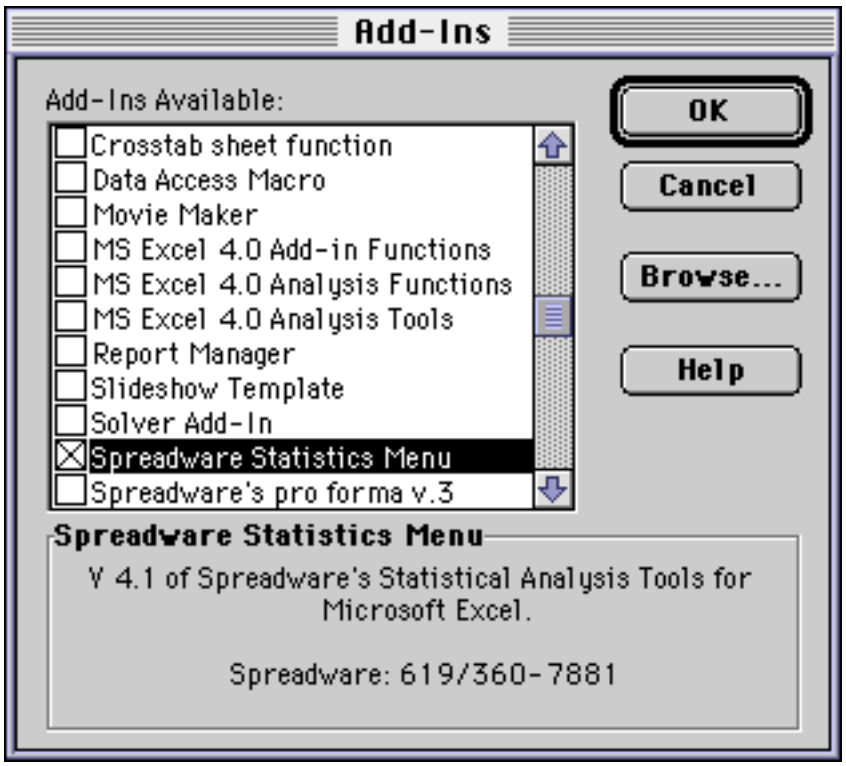
Install *Spreadware Statistics Menu* on Macintosh

1 Drag the add-in file **SSM Add-in** into the **Macro Library** folder, which is located in the **Microsoft Excel** folder located on your hard drive. (Depending on your setup, your **Microsoft Excel** folder may be within the folder titled **Microsoft Office**.)

2 Drag the help file **SSMHELP.HLP** into the **Microsoft Excel** folder. (Depending on your setup, your **Microsoft Excel** folder may be within the folder titled Microsoft Office.)

3 Launch Excel.

4 Select **Add-Ins...** from under the **Tools** menu.



5 The item **Spreadware Statistics Menu** will appear in the dialog. Select the check box.

6 Select **OK**.

7 The **Stats** menu will now appear on the standard Excel menu bar, when you have a worksheet document open.

8 To test if you have properly installed the help file, select **Help...** from the **Stats** menu. (To test statistics routines, open the **SSM Examples** file.)

Spreadware Statistics Menu is now installed.

Install *Spreadware Statistics Menu* on Windows

1 Launch Windows' **File Manager** program.

2 Under the File Manager **Window** menu, select **New Window**. This will place two windows on your File Manager desktop.

3 Hold down the **Shift** key, and keep it held down while you select **Tile** from under the **Window** menu. This will place two views side-by-side. In one window, activate the **excel** directory. In the other window, activate the directory where you have the **Spreadware Statistics Menu** (**SSM**) files.

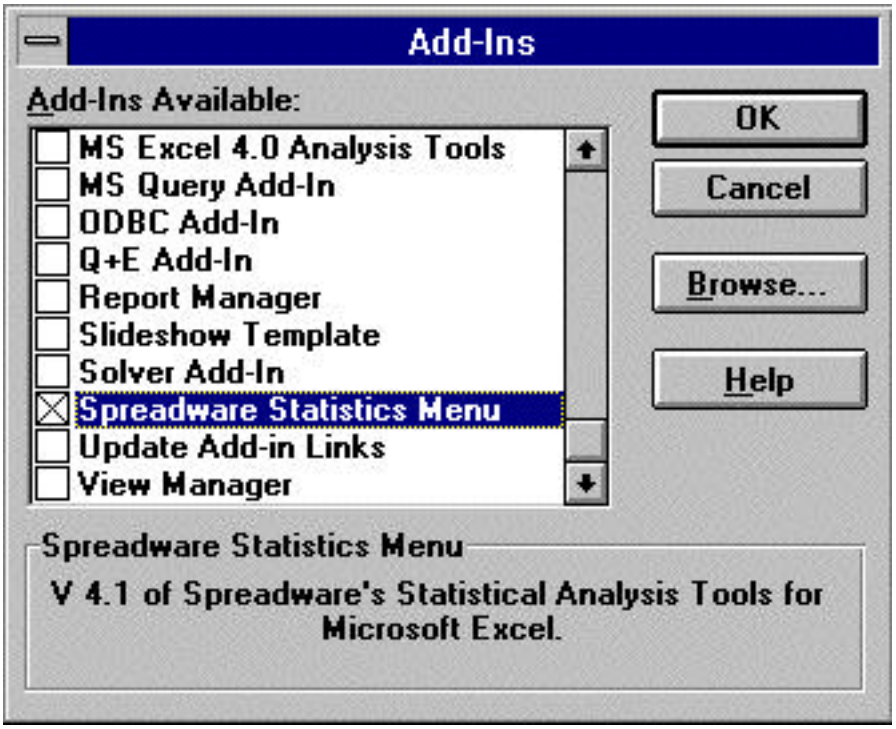
4 Drag the add-in file **SSM.XLA** into the **library** directory, which is located in the **excel** directory. (Depending on your setup, your Microsoft Excel directory may be within a directory titled **msoffice**, or similarly titled directory.) [1]

[1] If you are running Excel on a server, you will still have a **excel** directory on your desktop

5 Select the help file **SSMHELP.HLP** and drag into the **excel** directory, usually the directory that contains the Microsoft Excel (**EXCEL.EXE**) *application*. This directory is sometimes located in your Microsoft Office (**msoffice**) directory.

6 Launch Excel. (You can **Exit** File Manager first, if you desire.)

7 Select **Add-Ins...** from under the **Tools** menu.



8 The item **Spreadware Statistics Menu** will appear in the dialog. Select the check box.

9 Select **OK**.

10 The **Stats** menu will now appear on the standard Excel menu bar, when you have a worksheet document open.

11 To test if you have properly installed the help file, select **Help...** from the **Stats** menu. (To test statistics routines, open the example [**XMPLESSM.XLS**] file.)

Spreadware Statistics Menu is now installed.

Understanding

We know how most of you like to get right to work with *Spreadware Statistics Menu*, but if you can take a few minutes to read this short little diatribe, it will help you in understanding the tool you are using.

History

Spreadware Statistics Menu for Microsoft Excel has been around since 1991, with this being the fourth major iteration. The idea was to produce a statistics application within Microsoft Excel, the most commonly used data collection and analysis package. Our initial package was a request by users such as yourself, and we knew we were going in the right direction when users sent in their registration cards with notes like:

"I can give up Minitab!"

"No more StatView"

"Thank you!"

"How does this thing work?"

"Thanks for keeping the price down."

"Could you give me a dot plot like that in Minitab"

"Goodbye to the overpriced StatView."

"I do not have to do all my work in SPSS anymore."

"Need a curve fit."

"Fisher's Exact"

"I need the Fisher's Exact test."

"You have great customer service."

and on, and on, and...

You liked it, which made us proud.

We had to rewrite this application from scratch with the advent of Microsoft Excel 5, Windows 95, PowerPC Macintosh, and for future compatibility. This also gave us the opportunity to add the features you requested, and write a program to address the present and future 32-bit operating systems.

We are also proud to say that we have managed to maintain a product that is available to both the Windows and Macintosh users.

From the ability to generate 40 statistics, to well over 100, *Spreadware Statistics Menu* has evolved to better serve users like yourself. And now, we top it off with range wizards that make data selection easier, and your statistics package of choice easier, which explains why MacWEEK liked it so much: "...seamless integration...many users will find Statistics Menu contains all the routines they will ever need."

Thanks

Spreadware Statistics Menu is here because of your support and input. We are truly grateful and hope you will continue to provide us with the information we need to help better serve you today and in the future.

Highlights

- Simple 1,2,3 method of calling routines: select data, click where output is to go, and choose the routine **- or -** Simple 1 step method when you have the range wizard activated: choose the routine.
- Adds over 100 procedures to Excel's power.
- All routines are provided a VBA call for the development of custom analysis systems.
- Output uses standard formatting used in science, education and industry.
- Provides virtually all statistics commonly discussed in statistics classes.
- Provides virtually all statistics commonly used in testing and measurement.
- Provides virtually all statistics most users ever need.
- Simplified access to some of Excel's statistical abilities.
- Cross-platform compatibility.
- Utilities to help setup, clean and format data.
- Complete on-line help and extensive documentation.
- Built in suggestion feature so you can contribute to the next version.
- User focused development and enhancement.

Programmability

One of the features that has been available since the beginning is the programmability of *Spreadware Statistics Menu*. This allows you to call our routines from an application or macro you have designed to create your own custom analysis tool. This is used by a small, but significant number of our users who want to save themselves valuable time by incorporating our routines into their automation, and avoid the effort of duplicating something they know works, and works well.

All users can take advantage of this feature. Consider designing your own routine, if you:

- Run a routine on continuous or multiple data sets.
- Run one routine, then another.
- Have data automatically fed to your system.
- Repeat a process over and over.
- Want to lead the pack.

We have provided an example of how some of this basic code can be written in our programming section, as well as a ”live” example that is in the example file that comes with this application.

of Note

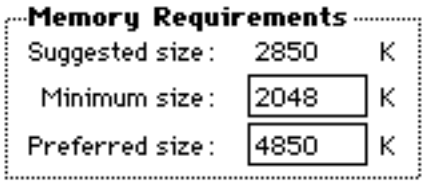
- Most error trapping is turned off. You should not encounter an error, unless you are not setting up the routine properly (an error we do catch and will notify you about), but if you do encounter an error, and can not figure it out, give us a call.
- Selection and result screen shots in this manual have been occasionally cut off to fit on these pages, but the complete view of every image in this book is available in the example file.
- *Our* favorite feature is the new **Suggestions...** command. We have always created our products based on your demands, suggestions and complaints. It is extremely important that we receive your feedback, so we have made it easier for you to send/fax us a suggestion. We really want to here from you, frequently.
- Education as to how to apply statistics, we do not provide. Programs that cost five times ours do provide a statistics text as part of the package, but we figure with the savings we provide, you can pick up a statistics text to suit your specific needs from your local university, college, public library or bookstore. In other words, we want to sell you good software, while letting someone else provide you with a good education.
- Occasionally, the first time you run a routine during a session, you may experience a slower operation than successive runnings of the routine. Why? To keep the memory a bit cleaner, we only load some of the routines as they are needed, since almost none of our users use all of the features, all of the time.

Speed/Performance

This subject gets it own section because of its extreme importance to some users, Macintosh users. The program does a great deal of thinking and calculation work when it generates statistics, and is usually very quick.

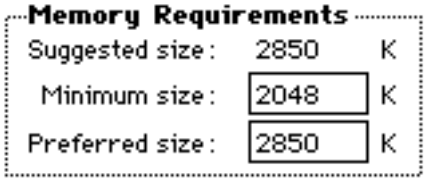
Spreadware tests its products on a variety of machines with various configurations. Excel is a Windows first product, and seems to run respectably on all configurations we tested, even an old 386SX with 4 megs of RAM running Windows 3.1. The more RAM and the newer the chip (486, Pentium...), the better the software runs. Since Microsoft wrote Windows and Excel, they know how to make them operate together under various configurations. Microsoft did not write the Macintosh operating system, so Macintosh users must optimize their configuration.

Macintosh users can get great performance, if they have set up Excel properly. For example: When tested on an older 20mhz ‘040, a complete test that took only a few second under our test configuration, which is the memory’s **Preferred size** set to 4850 k.



Our memory configuration.

The question: What would happen if we set the memory's **Preferred size** back to the installation default of 2850 k? The answer: *It took over ten times as long.*



Standard memory configuration.

The results: Our research indicates that no matter how fast a machine you are using, Macintosh users can greatly benefit from setting the memory's **Preferred size** to a higher allocation than the standard allotment.

Where do you find this allocation on your Macintosh? Select the Excel icon on the desktop, then select **Get Info** from the **File** menu. Make sure Excel is not running before you make any changes.

Good

It is our goal that you use statistics for good. What do we mean? Do you care? What we mean is that you use statistics to try to decipher truth, the reality, or honesty, behind bantered thoughts. There are those who would use numbers to create bogus statistics that infer a truth is a lie, and a lie is the truth, but most of you are honest, and that we are proud of and encourage. Those few that are not should remember that the truth will always outlive a lie, no matter how pretty you make it look. As for caring about all of this, most of you are honest for a reason, because you believe. And for those who ambivalent, how do you know where the lies end and the truth begins - about who you are?

Final Note: No matter what routines you run, you *should* read the introduction to **Descriptive Statistics**, as information in those few paragraphs will help you better understand the terminology used. The basic information is excerpted:

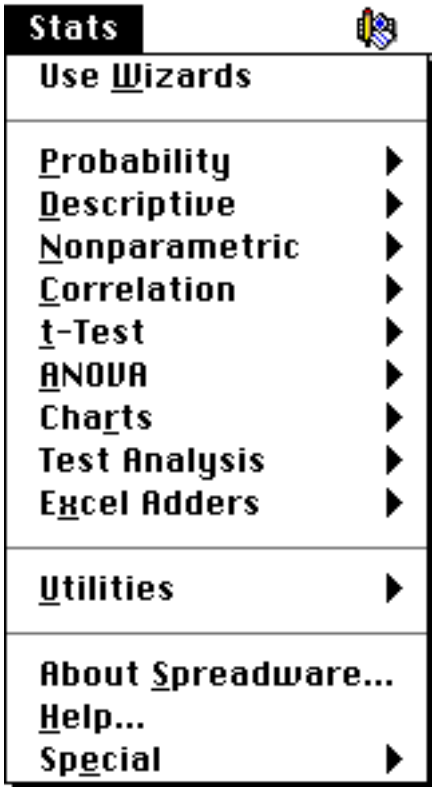
Level of Measurement

Nominal measurement: Using nominal measurement you would assign a number based on the set to which the case belongs. With this form of measurement, for example, a female could be assigned 1, while the male is assigned 2; a nominal measurement of color could represent red, green and yellow as 1, 2 and 3, respectively.

Ordinal measurement: These numerical assignments are based on order. For example, in the measurement of computer speed, the fastest would be labeled 1, the next fastest 2, the next fastest 3... the slowest n. For you race fans, the winner of the race is labeled 1, the second place finisher is 2... the last place finisher is n.

Interval measurement: The numerical assignments of interval measurement are based on an observed amount. For example, if you were evaluating test scores using interval measurement, you would use the actual test scores. Perhaps you are doing a measurement based on age, which means you would use the actual age. Is the measurement based on strength? You could use the actual measurement; 103 lbs pushed, 104 lbs, 101 lbs, 133 lbs, etc.

Ratio measurement: This form of measurement uses ratios as a form of measure, thereby requiring multiple measurements to come up with the measures. For example, in our pervious strength measurement example, we may want to measure relative strength, which means we would not only have to know the strength measurement, but also the weight measurement. If the person who had a strength measurement of 133 lbs had a ratio measurement of 64%, we know they weighed 203 lbs, and we needed to know this weight to calculate our ratio measurement. Ratio measure for the strength example above? 54%, 71%, 62%, 64%, etc.



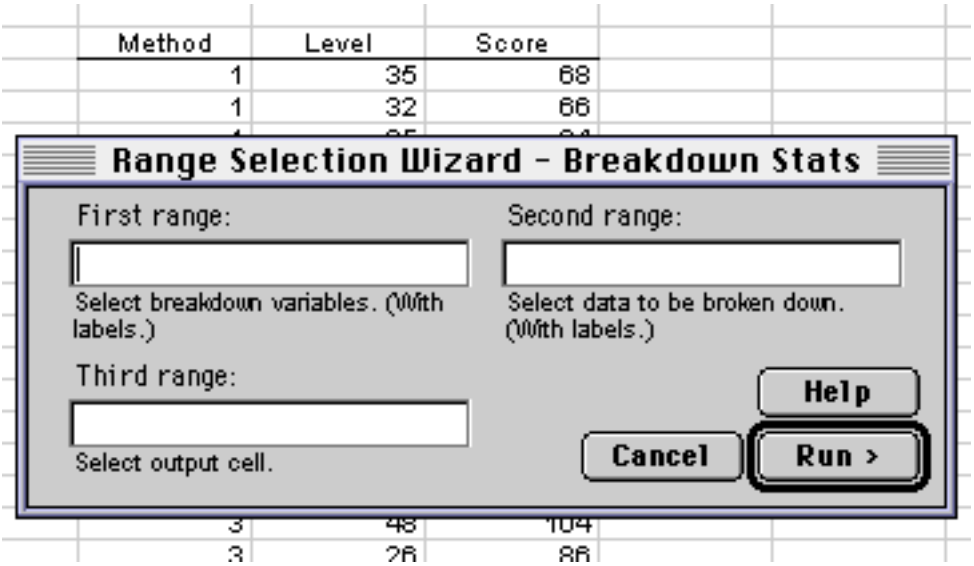
The powerful, fun and easy-to-use Spreadware Statistics Menu will bring fun and joy to your life, as well as the ability to calculate the statistical evidence to prove your quality of life is greatly improving.

The check next to **Use Wizards** *means the option is activated.*

Range Wizards

Range wizards, a feature we think you will enjoy. These dialogs make it easier for the average user to select the data necessary to run a desired routine. It is your choice: use the wizards or use the old method, or mix it up for a little excitement.

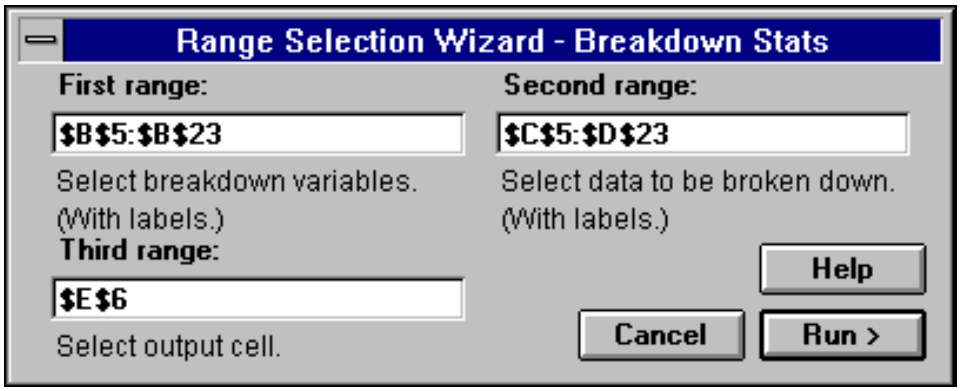
If you wonder why it is the first item on the **Stats** menu, it is because the key equivalent commands do not work if the first menu item contains a submenu. Sounds a bit strange, but those are the rules we must accept to achieve our high degree of integration with Excel.



Range Wizard *waiting to be filled.*

To enter the needed range into the dialog, you can type in the address, but we suggest you just select the range on the worksheet behind the dialog, which will automatically fill in the dialog. You can move the dialogs anywhere that is convenient to make your selections on the active worksheet.

Under each range field we have included a brief description of the type of data you need to select, and whether or not labels should be selected with this data. The description is brief, but space is a bit limited.



Range Wizard, *with data and ready to run.*

After you have entered the ranges into the wizard dialog, select **Run >** to generate the statistics you desire. If you select **Help**, you will get this information on the range wizard. (The ability to jump to a description of the routine you are running is provided, which will give you additional information on what type of data your range selection should contain.) Select **Cancel** to stop everything, if you have changed your mind.

This is a new feature we have added for your convenience. Like everything about this program, we are open to suggestions on how you might like to see it improved.

Use Wizards

The feature, when activated, presents you with an interactive dialog that helps you select the range(s) needed for analysis, as well as the output cell.

Turn it on/off

1) Select **Use Wizards** from the **Stats** menu.

2) When a check mark appears next to the menu item **Use Wizards**, the feature is active. If no check mark is visible, you have selected to use the manual selection method.

3) If you are using the feature, select the routine you want to use and the wizard dialog will appear. If you are not using the feature, make sure you have used manual setup selection of ranges properly.

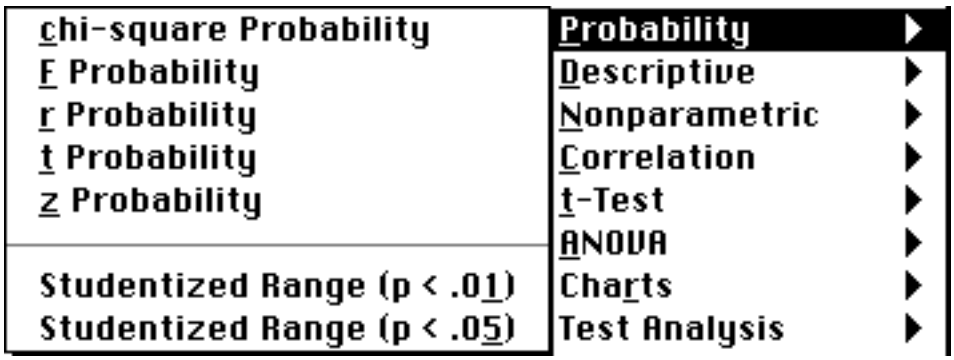
Related Procedures

VBA Programming Call: `wizTurnOff, wizTurnOn`

See this border? ->
The setup instructions with this border to the right are the setup

instructions for those using the wizards option.

Experienced users often find it easier to use the manual method after they become familiar with what data is required to run a routine, but until then the wizards are our newest way of helping you.



Probability Statistics

The probability value, also known as the alpha or significance, is a common statistic. These probability routines provide quick access to the calculation of probability values for major statistical tests.

Interpretation of probability is easy to understand. For example: If you have a probability of .03 as a result, you would expect the occurrence of a differing test statistic to occur only three times out of every hundred. A value of .003 would suggest that a difference would occur only three times out of every thousand. It is fairly common that a probability of .05 or smaller is deemed statistically significant.

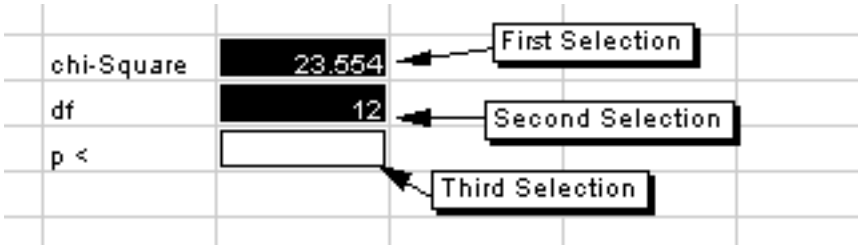
These probability routines in their simplest form will calculate one probability at a time, but we know many users want to calculate hundreds of probabilities at one time. *Spreadware Statistics Menu* can quickly calculate many values if you set your data up in columnar fashion. For example: If you wanted to calculate 7 t Probabilities, you can easily do so. (See the Multiple Runs section later in this chapter.)

The single or multiple run method will work for any of the probability routines. You can easily calculate one probability at a time, or hundreds.

The decimal formatting for the statistics provided by the probability routines is based on the **Statistic Display** decimal format setting in the **Descriptive Preferences** dialog.

chi-square Probability

Calculates the chi-square probability, given chi-square and its associated degrees of freedom.



Information required to generate **chi-square Probability**

Setup & Run: Manual

1) Select the cell, or range of cells, containing the chi-square value.

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell, or range of cells, containing the degrees of freedom.

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **chi-square Probability** from the **Probability** submenu.

Setup & Run: Range Wizard

1) Select **Probability > chi-square Probability** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

chi-Square	23.554
df	12
p <	0.023

chi-square Probability *output.*

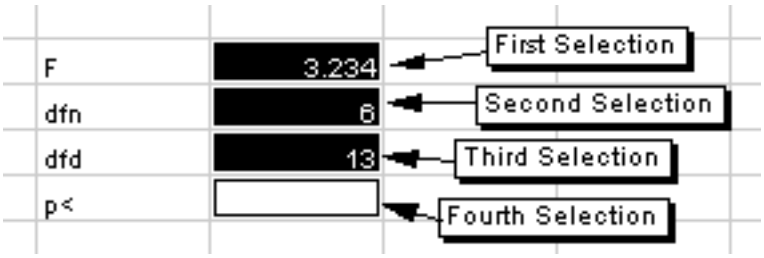
Related Procedures

Nonparametric: Contingency Table
VBA Programming Call: `probMenuchiSq`

Hints and such: Remember, by selecting a range of data instead of a single cell you can quickly calculate many chi-square probabilities. (See **Multiple Runs**.)

F Probability

Calculates the F probability, given F and its associated degrees of freedom.



Information required to generate **F Probability**.

Setup & Run: Manual

1) Select the cell, or range of cells, containing the F value.

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell, or range of cells, containing the numerator degrees of freedom.

4) Select the cell, or range of cells, containing the denominator degrees of freedom.

5) Select the cell where you want your output placed.

6) Let go of the **CTRL**/**COMMAND** key.

7) Go to the **Stats** menu and select **F Probability** from the **Probability** submenu.

Setup & Run: Range Wizard

1) Select **Probability > F Probability** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `RangeWizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

F	3.234
dfn	6
dfd	13
p<	0.036

F Probability *output.*

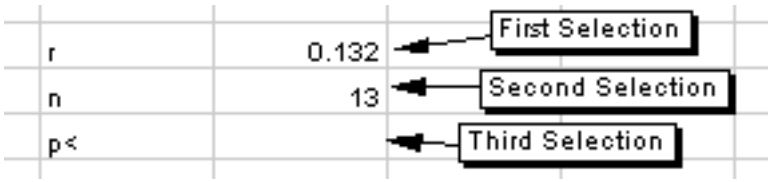
Related Procedures

Correlation: Multiple Regression; Partial Correlation
ANOVA: Analysis of Covariance; Multi-way ANOVA; Repeated Measures; Two-way No Replications; Homogeneity tests
VBA Programming Call: `probMenuF`

Hints and such: Remember, by selecting a range or data instead of a single cell you can quickly calculate many F probabilities. (See **Multiple Runs**.)

r Probability

Calculates the r probability, given r and its associated sample size (n).



Information required to generate **r Probability**.

Setup & Run: Manual

1) Select the cell, or range of cells, containing the r value.
2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*
3) Select the cell, or range of cells, containing the sample size used to determine the r value.
4) Select the cell where you want your output placed.
5) Let go of the **CTRL**/**COMMAND** key.
6) Go to the **Stats** menu and select **r Probability** from the **Probability** submenu.

Setup & Run: Range Wizard

1) Select **Probability > r Probability** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

r	0.132
n	13
p<	0.667

r Probability *output.*

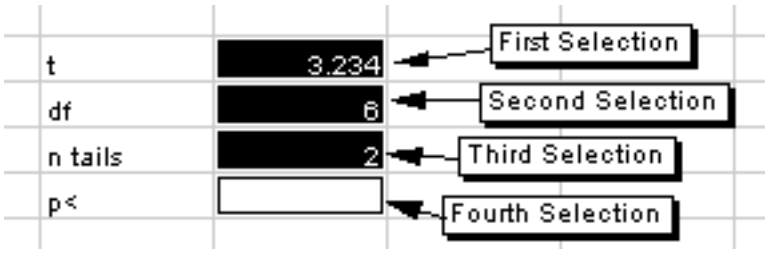
Related Procedures

Correlation: Correlation Matrix; Partial Correlation; Pearson r
t-Test: Dependent t-Test
VBA Programming Call: `probMenur`

Hints and such: Remember, by selecting a range or data instead of a single cell you can quickly calculate many r probabilities. (See **Multiple Runs**.)

t Probability

Calculates the t probability, given t, its associated degrees of freedom and the number of tails.



Information required to generate **t Probability**.

Setup & Run: Manual

1) Select the cell, or range of cells, containing the t value.

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell, or range of cells, containing the associated degrees of freedom.

4) Select the cell, or range of cells, containing the number of tails.

5) Select the cell where you want your output placed.

6) Let go of the **CTRL/COMMAND** key.

7) Go to the **Stats** menu and select **t Probability** from the **Probability** submenu.

Setup & Run: Range Wizard

1) Select **Probability > t Probability** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

t	3.234
df	6
n tails	2
p<	0.018

t Probability *output.*

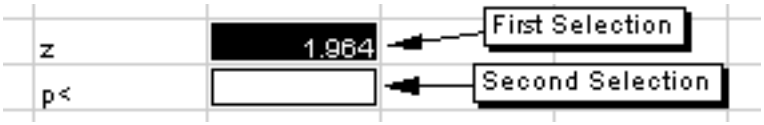
Related Procedures

ANOVA: Orthogonal Contrasts
Correlation: Multiple Regression
t-Test: Dependent t-Test; Independent t-Test; Student's t
VBA Programming Call: `probMenut`

Hints and such: Remember, by selecting a range or data instead of a single cell you can quickly calculate many t probabilities. (See **Multiple Runs**.)

z Probability

Calculates the z probability, given z.



Information required to generate **z Probability**.

Setup & Run: Manual

1) Select the cell, or range of cells, containing the z value.

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **z Probability** from the **Probability** submenu.

Setup & Run: Range Wizard

1) Select **Probability > z Probability** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

z	1.964
p<	0.025

z Probability *output.*

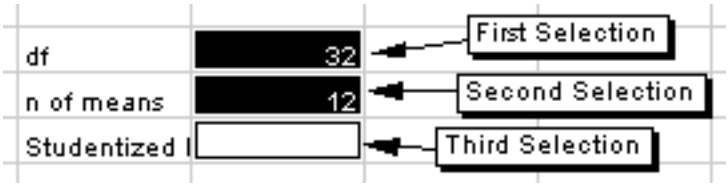
Related Procedures

Nonparametric: Mann-Whitney U; Proportion Test
VBA Programming Call: `probMenuz`

Hints and such: Remember, by selecting a range or data instead of a single cell you can quickly calculate many z probabilities. (See **Multiple Runs**.)

Studentized Range (p< .01)
Studentized Range (p< .05)

Calculates the studentized range for an alpha of .01 or .05, depending on the menu option you choose.



Information required to generate **Studentized Range**.

Setup & Run: Manual

1) Select the cell, or range of cells, containing the degrees of freedom.

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell, or range of cells, containing the number of means.

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Studentized Range (p< .01)** or **Probability > Studentized Range (p< .05)** from the **Probability** submenu.

Setup & Run: Range Wizard

1) Select **Probability > Studentized Range (p< .01)** or **Probability > Studentized Range (p< .05)** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

df	32
n of means	12
Studentized I	5.930

Studentized Range *output.*

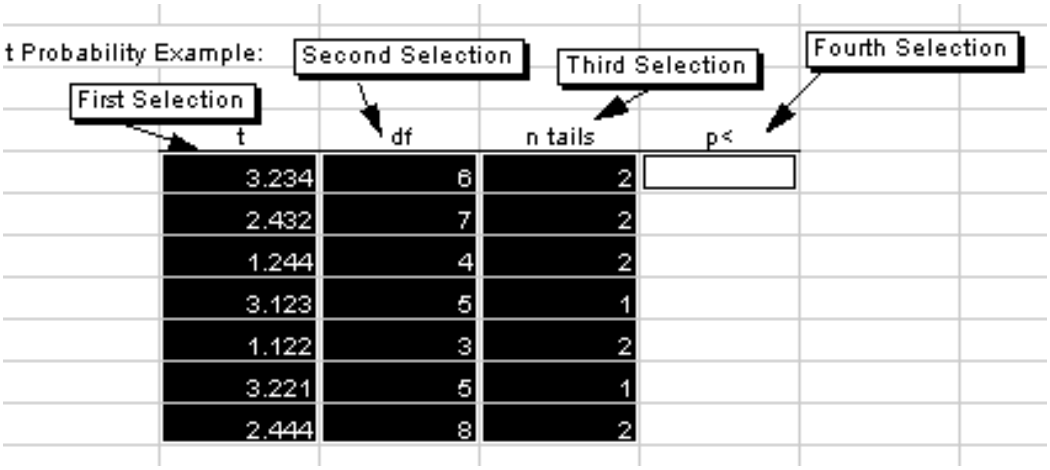
Related Procedures

ANOVA: Newman-Keuls Comparisons
VBA Programming Call: `probMenu01Studentized, probMenu05Studentized`

Hints and such: Remember, by selecting a range or data instead of a single cell you can quickly calculate many studentized range statistics. (See **Multiple Runs**.)

Multiple Runs

With the release of version 4.0, you can now run multiple tests at once. Select as many rows as necessary with your first selection, and that is the number of probabilities that will be calculated. The following is a t Probability example:



Information required to generate **t Probability**.

Setup & Run: Manual

1) Select the range of cells containing the t value.

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the range of cells containing the associated degrees of freedom.

4) Select the range of cells containing the number of tails.

5) Select the cell where you want your output placed.

6) Let go of the **CTRL**/**COMMAND** key.

7) Go to the **Stats** menu and select **t Probability** from the **Probability** submenu.

Setup & Run: Range Wizard

1) Select **Probability > t Probability** from the **Stats** menu.

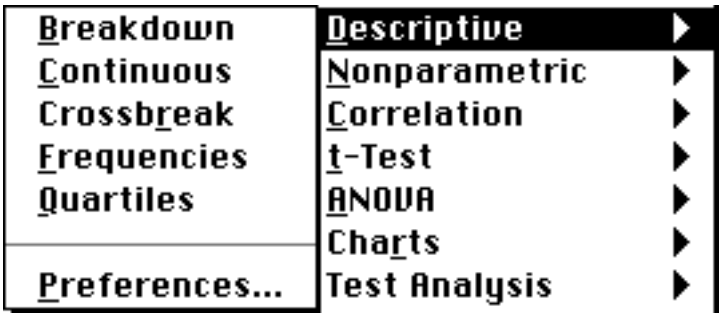
2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

t	df	n tails	p<
3.234	6	2	0.018
2.432	7	2	0.045
1.244	4	2	0.281
3.123	5	1	0.013
1.122	3	2	0.344
3.221	5	1	0.012
2.444	8	2	0.040

t Probability *output.*

Users like you made this suggestion. Offer your own, to make this program even better. *This method works with all probability routines.*



Descriptive Statistics

As the name entails, descriptive statistics describe the characteristics of a set of data. They are the most common of the statistics performed, and are usually the first statistics applied to a set of data. This group of statistics is largely concerned with the summary of calculation.

The descriptive you would use on any particular set of data depends on the data type, and the level of measurement the data was assessed. The are four primary means by which data is measured:

Nominal measurement: Using nominal measurement you would assign a number based on the set to which the case belongs. With this form of measurement, for example, a female could be assigned 1, while the male is assigned 2; a nominal measurement of color could represent red, green and yellow as 1, 2 and 3, respectively.

Ordinal measurement: These numerical assignments are based on order. For example, in the measurement of computer speed, the fastest would be labeled 1, the next fastest 2, the next fastest 3... the slowest n. For you race fans, the winner of the race is labeled 1, the second place finisher is 2... the last place finisher is n.

Interval measurement: The numerical assignments of interval measurement are based on an observed amount. For example, if you were evaluating test scores using interval measurement, you would use the actual test scores. Perhaps you are doing a measurement based on age, which means you would use the actual age. Is the measurement based on strength? You could use the actual measurement; 103 lbs pushed, 104 lbs, 101 lbs, 133 lbs, etc.

Ratio measurement: This form of measurement uses ratios as a form of measure, thereby requiring multiple measurements to come up with the measures. For example, in our pervious strength measurement example, we may want to measure relative strength, which means we would not only have to know the strength measurement, but also the weight measurement. If the person who had a strength measurement of 133 lbs had a ratio measurement of 64%, we know they weighed 203 lbs, and we needed to know this weight to calculate our ratio measurement. Ratio measure for the strength example above? 54%, 71%, 62%, 64%, etc.

We know, you are wondering why you need to know all of this. Well, actually, you do not need to, if you know what you are doing, but we thought it would not hurt to offer an explanation of what were are doing every once in a while. We profess not to be an instructional statistics package (and with the money you

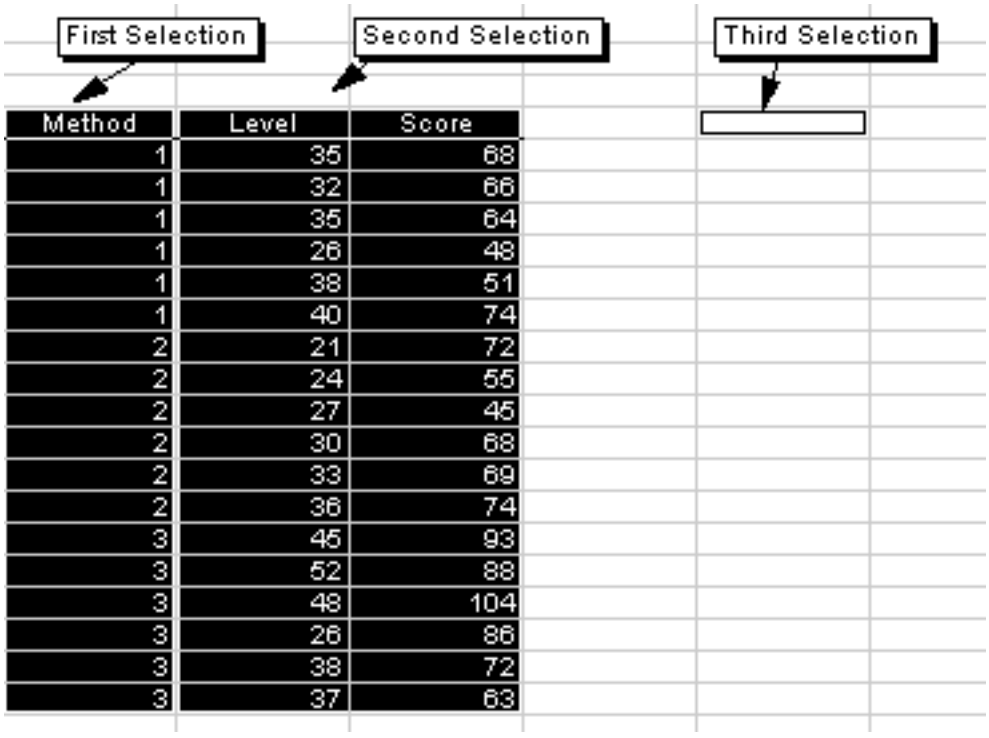
saved in buying *Spreadware Statistics Menu* you can afford to get yourself more than a couple of text books for reference), but we needed to make comment because we will be using the previous terms within this documentation. When you are wondering what descriptive routine best fits you data, look at the description for the routine and you will see the previous terms. For example, the breakdown routines describes how you can breakdown interval level variables by ordinal variables. Most of you will know what routine you want, but when you know the type of data you have, you will know the alternatives available.

Breakdown

The breakdown descriptive routine generates descriptive statistics for an unlimited number of variables, broken down by one, two or three nominal or ordinal variables.

If you run the routine with more than one breakdown variable, the routine handles the breakdown variables together. To have each breakdown variable analyzed separately, you should run the routine multiple instances using each breakdown variable independently.

The output that is generated is dependent on the options you selected in the **Descriptive Preferences** dialog.



Method	Level	Score
1	35	68
1	32	66
1	35	64
1	26	48
1	38	51
1	40	74
2	21	72
2	24	55
2	27	45
2	30	68
2	33	69
2	36	74
3	45	93
3	52	88
3	48	104
3	26	86
3	38	72
3	37	63

Information required to generate **Breakdown**

Setup & Run: Manual

1) Select up to three breakdown variables. (Include labels in selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select data to be broken down. (Include labels in selection.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL/COMMAND** key.

6) Go to the **Stats** menu and select **Breakdown** from the **Descriptive** submenu.

Setup & Run: Range Wizard

1) Select **Descriptive > Breakdown** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Method	Level	Score
1	35	68
1	32	66
1	35	64
1	26	48
1	38	51
1	40	74
2	21	72
2	24	55
2	27	45
2	30	68
2	33	69
2	36	74

Level		
Method	*N*	*M*
1	6	
2	6	
3	6	

Score		
Method	*N*	*M*
1	6	
2	6	
3	6	

Breakdown *output. For a complete view of the output, look at the example file, or run the routine.*

Related Procedures

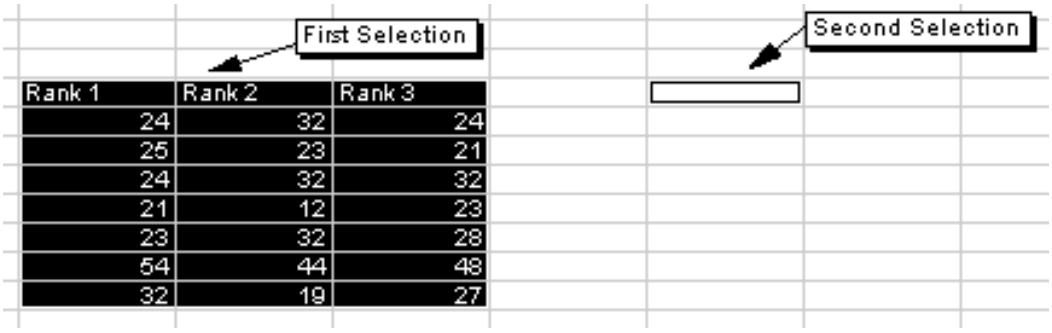
Descriptive: Continuous; Crossbreak; Frequencies
VBA Programming Call: `descMenuBreakdown`

Continuous

The continuous descriptive routine generates descriptive statistics for an unlimited number of variables. Apply this routine to any data you desire, but normally interval measurements or ratio measurements are analyzed using this method.

If you run the routine with more than one data set selected, the routine handles the variables successively. To have each variable analyzed separately, you should run the routine multiple instances using each variable independently.

The output that is generated is dependent on the options you selected in the **Descriptive Preferences** dialog.



Information required to generate **Continuous**

Setup & Run: Manual

1) Select data sets. (Labels suggested. If no label selected, automatically labeled Group 1, Group 2... Group n.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Continuous** from the **Descriptive** submenu.

Setup & Run: Range Wizard

1) Select **Descriptive > Continuous** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Rank 1	Rank 2	Rank 3
24	32	24
25	23	21
24	32	32
21	12	23
23	32	28
54	44	48
32	19	27

	Rank 1	*Rank 2*	*Rank 3*
N	7	7	7
Minimum	21.000	12.000	21.000
Maxmum	54.000	44.000	48.000
Range	33.000	32.000	27.000
Mean	29.000	27.714	29.000
Median	24.000	32.000	27.000
Mode	24.000	32.000	No Mode
Sum	203.000	194.000	203.000

Continuous *output. For a complete view of the output, look at the example file, or run the routine.*

Related Procedures

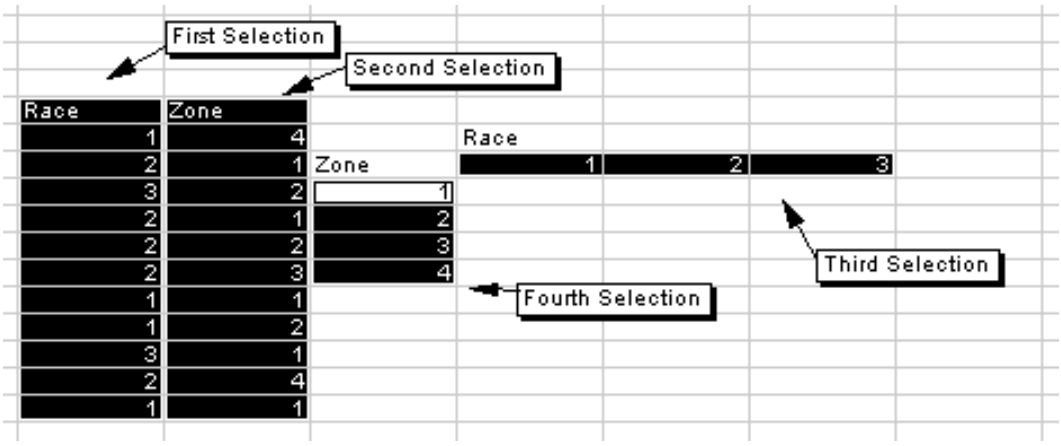
Descriptive: Breakdown; Quartiles
VBA Programming Call: `descMenuContinuous`

Crossbreak

The crossbreak descriptive routine generates frequency and percentage counts for each combination of the variables, as well as a test for the difference between the variables. The routine is set up to breakdown one nominal or ordinal variable by another nominal or ordinal variable.

The output that is generated is dependent on the options you selected in the **Descriptive Preferences** dialog.

In making your third and fourth selections, you must have entered criteria data into these ranges for a proper crossbreak. The reason this was done was so you can pick and choose the variables.



Information required to generate **Crossbreak**

Setup & Run: Manual

1) Select first data set. (Labels suggested.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select second data set. (Choose labels as you did in first selection.)

4) Select the first criteria range, which is the criteria from the first data set - horizontal.

5) Select the second criteria range, which is the criteria from the second data set - vertical.

6) Let go of the **CTRL**/**COMMAND** key.

7) Go to the **Stats** menu and select **Crossbreak** from the **Descriptive** submenu.

Setup & Run: Range Wizard

1) Select **Descriptive > Crossbreak** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Race	Zone					
1	4		Race			
2	1	Count				
3	2	Row %				
2	1	Column %				
2	2	Total %				
2	3	*Zone*	*1*	*2*	*3*	*Ro*
1	1	1	2	2	1	
1	2		40.00%	40.00%	20.00%	10
3	1		50.00%	40.00%	50.00%	4
2	4		18.18%	18.18%	9.09%	4
1	1	2	1	1	1	
			33.33%	33.33%	33.33%	10
			25.00%	20.00%	50.00%	2

Crossbreak *output. For a complete view of the output, look at the example file, or run the routine.*

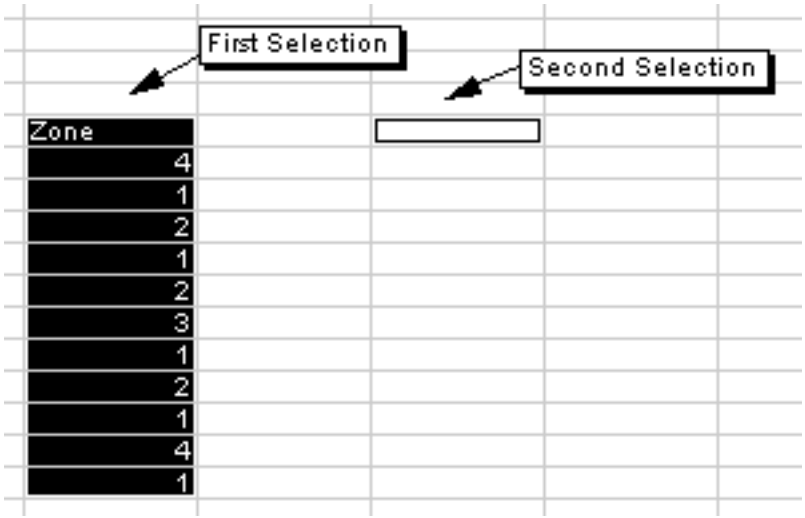
Related Procedures

Descriptive: Breakdown; Frequencies
Nonparametric: Contingency Table
VBA Programming Call: `descMenuCrossbreak`

Frequencies

The frequencies descriptive routine generates frequency descriptive statistics for an unlimited number of variables, as long as additional sets of data uses the same criteria as the first set. If additional data sets have unique criteria, select and run each set independently. (The example provided is of a single data set.) We suggest you run this routine on nominal measurements or ordinal measurements.

The output that is generated is dependent on the options you selected in the **Descriptive Preferences** dialog.



Information required to generate **Frequencies**

Setup & Run: Manual

1) Select the data set. (Include labels in selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Frequencies** from the **Descriptive** submenu.

Setup & Run: Range Wizard

1) Select **Descriptive > Frequencies** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Zone		Zone			
4		*Interval*	*Frequency*	*Cumulative*	*Perce*
3		1	2	2	18
2		2	4	6	36
1		3	3	9	27
2		4	2	11	18
3					
3					
2					
2					

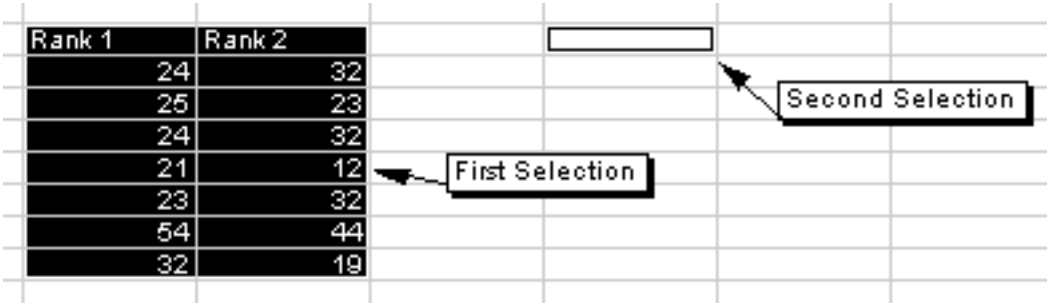
Frequencies *output. For a complete view of the output, look at the example file, or run the routine.*

Related Procedures

Descriptive: Breakdown; Crossbreak
VBA Programming Call: `descMenuFrequencies`

Quartiles

The quartiles descriptive routine generates quartile descriptive statistics for an unlimited number of interval measurement or ratio measurement data sets. Labeling of output is optional, as selected in the **Descriptive Preferences** dialog.



Information required to generate **Quartiles**

Setup & Run: Manual

1) Select the data set. (Include labels in selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Quartiles** from the **Descriptive** submenu.

Setup & Run: Range Wizard

1) Select **Descriptive > Quartiles** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Rank 1	Rank 2
24	32
25	23
24	32
21	12
23	32
54	44

	Rank 1	*Rank 2*
N	7.000	7.00
Minimum	21.000	12.00
Quartile 1 (25	23.500	21.00
Quartile 2 (50	24.000	32.00
Quartile 3 (75	28.500	32.00
Maximum	54.000	44.00

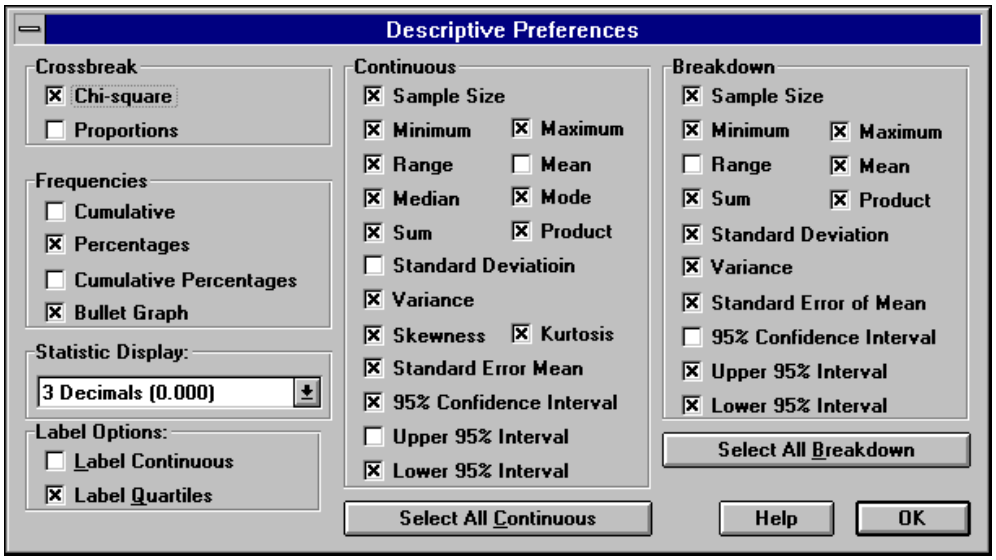
Quartiles *output.*

Related Procedures

Descriptive: Breakdown; Continuous
VBA Programming Call: `descMenuQuartiles`

Preferences...

What do you prefer? By selecting **Stats > Descriptive > Preferences...** you can pick and choose the statistics you desire. In order for us to run some of our routines, we needed to have an internal label option. We have made these options available to you within the preferences dialog. If you would like label options on additional routines, or want to see additional statistics, please let us know.



The choice of statistics generated is yours, as well as some labeling options.

Check Boxes

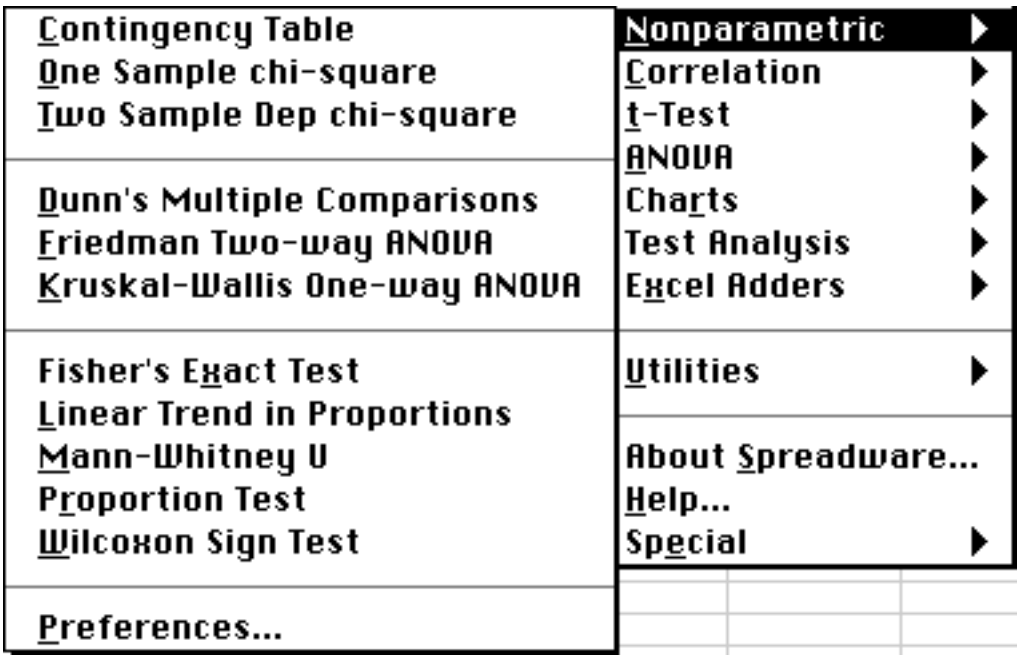
Checking a check box will ensure the statistic you selected will be provided

Select All Continuous
Select All Breakdown

Push either one of these buttons, and all of the statistics for that category will be selected.

Statistic Display

Select how you want statistical output displayed. This setting will determine how output is formatted for most statistics, not just the descriptive.



Nonparametric Statistics

Statistical techniques for comparing populations that are based on a ordering of the sample measurements according to their magnitude. These techniques, which require fewer or less stringent assumptions concerning the nature of the probability distributions of the populations, are called nonparametric statistical methods.

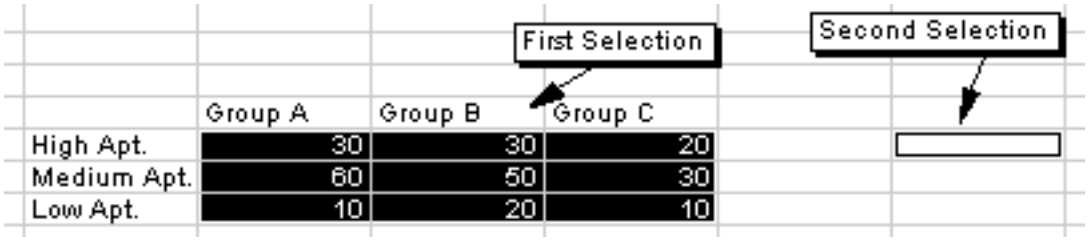
Nominal measurements and ordinal measurements are the standard measure for nonparametric statistics, though a number of the routines we have provided will also work with interval measurements and ratio measurements.

The statistical tests produce a significance level indicated by a p < result. It is common that a probability level of .05 or less is considered significant.

The decimal formatting for many of the statistics provided by the nonparametric routines is based on the **Statistic Display** decimal format setting in the **Descriptive Preferences** dialog.

Contingency Table

Selecting a range of crossbreaked frequency data allows you to generate chi-square and contingency coefficient statistics. The data selected should consist of nominal measurement or ordinal measurement data.



	Group A	Group B	Group C
High Apt.	30	30	20
Medium Apt.	60	50	30
Low Apt.	10	20	10

Information required to generate **Contingency Table**

Setup & Run: Manual

1) Select the data set. (Do not select labels.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL/COMMAND** key.

5) Go to the **Stats** menu and select **Contingency Table** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Contingency Table** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

	Group A	Group B	Group C			
High Apt.	30	30	20		chi-square	4.643
Medium Apt.	60	50	30		df	4
Low Apt.	10	20	10		p <	0.326
					Contingency	0.132

Contingency Table *output.*

Related Procedures

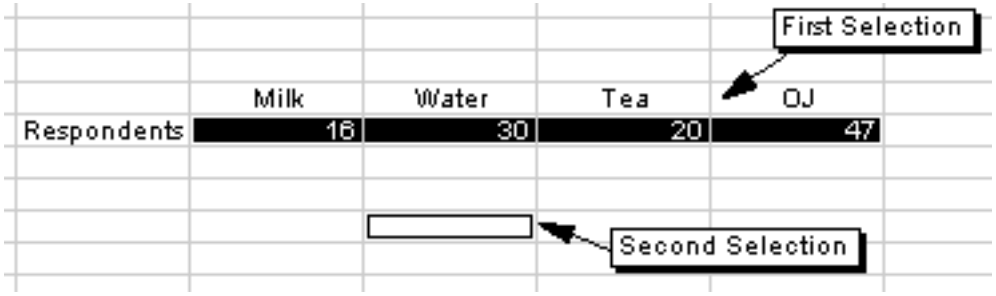
Descriptive: Crossbreak; Frequencies

Nonparametric: One Sample chi-square; Two Sample Dependent chi-square; Fisher's Exact
VBA Programming Call: `nonParMenuConTable`

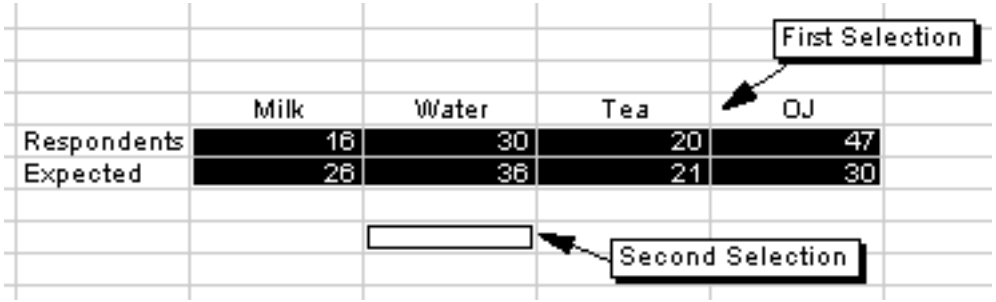
One Sample chi-square

There are two ways of running this routine; with or without expected frequencies supplied. If expected frequencies are not supplied, they are calculated automatically. The routine determines if you have provided expected frequencies by the number of rows you select in your first selection. A single row selection tells the routine you want it to calculate the expected frequencies, while a two row selection tells the routine you have provided the expected frequencies. (The expected values that are automatically calculated are the total number of observed values divided by the number of categories.)

The selected data is compared to the normally expected frequencies of occurrence in each category. The comparing of these values is called "goodness-of-fit," with the resulting statistics helping you determine that goodness.



Information required to generate **One Sample chi-square -** *expected frequency data not supplied.*



Information required to generate **One Sample chi-square -** *expected frequency data supplied.*

Setup & Run: Manual

1) Select the frequency data set. (Do not select labels.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **One Sample chi-square** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > One Sample chi-square** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

	Milk	Water	Tea	OJ
Respondents	16	30	20	47
		chi-square	20.274	
		df	3	
		p <	0.000	

One Sample chi-square *output - expected frequencies not supplied.*

	Milk	Water	Tea	OJ
Respondents	16	30	20	47
Expected	26	36	21	30
		chi-square	14.527	
		df	3	
		p <	0.002	

One Sample chi-square *output - expected frequencies supplied.*

Related Procedures

Nonparametric: Contingency Table; Two Sample Dependent chi-square
VBA Programming Call: `nonParMenu1SampleChiSq`

Two Sample Dependent chi-square (McNemar Test)

This test is often used when subjects act as their own control in “before and after” types of tests, which is one of the reasons this test is limited to only two categories. (This test is also referred to as the McNemar Test.)

Nominal measurements are used in this test.

Information required to generate **Two Sample Dependent chi-square**.

Setup & Run: Manual

1) Select the frequency data set. (Do not select labels.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Two Sample Dependent chi-square** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Two Sample Dependent chi-square** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

	Buy	Sell
Buy	35	6
Sell	56	22
	Expected Fre	28.500
	chi-square	2.526
	df	1
	p <	0.112

Two Sample Dependent chi-square *output.*

Related Procedures

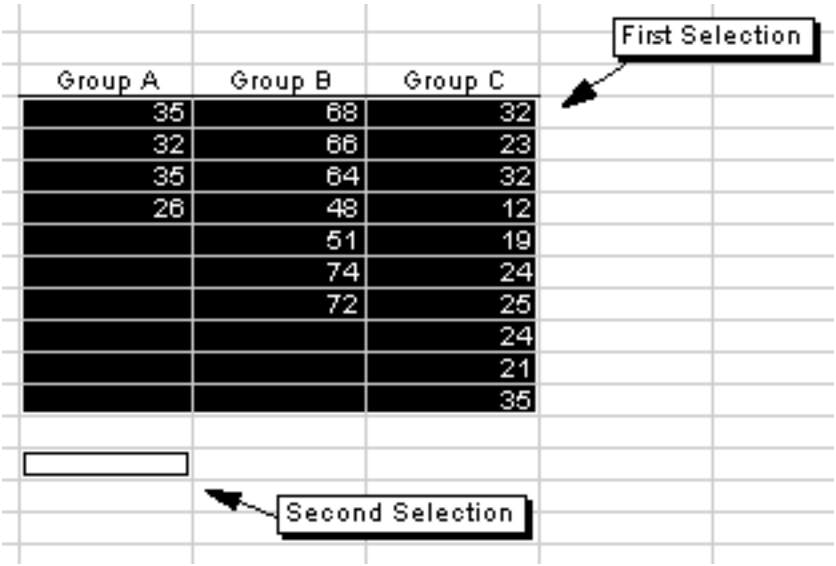
Nonparametric: Contingency Table; One Sample chi-square
VBA Programming Call: `nonParMenu2SampleChiSq`

Dunn's Multiple Comparisons

This test is used to determine whether any pairs of categorized data are significantly different, following a Kruskal-Wallis One-way ANOVA, which makes this test a Kruskal-Wallis One-way ANOVA post hoc.

Use the same data you used for the Kruskal-Wallis One-way ANOVA routine, and the Dunn's Multiple Comparisons creates the ranks and analyzes every possible pair of ranks.

Set the desired alpha level in the **Nonparametric Preferences** dialog.



Information required to generate **Dunn's Multiple Comparisons**.

Setup & Run: Manual

1) Select the data set. (Do not select labels.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Dunn's Multiple Comparisons** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Dunn's Multiple Comparisons** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Group A	Group B	Group C
35	68	32
32	66	23
35	64	32
26	48	12
	51	19
	74	24
	72	25
		24
		21
		35

Group	*Group*	*Difference*	*Criterea*	*Significance*
1	2	7.000	8.620	Not Significant
1	3	4.900	8.136	Not Significant
2	3	11.900	6.777	Significant

Dunn's Multiple Comparisons *output.*

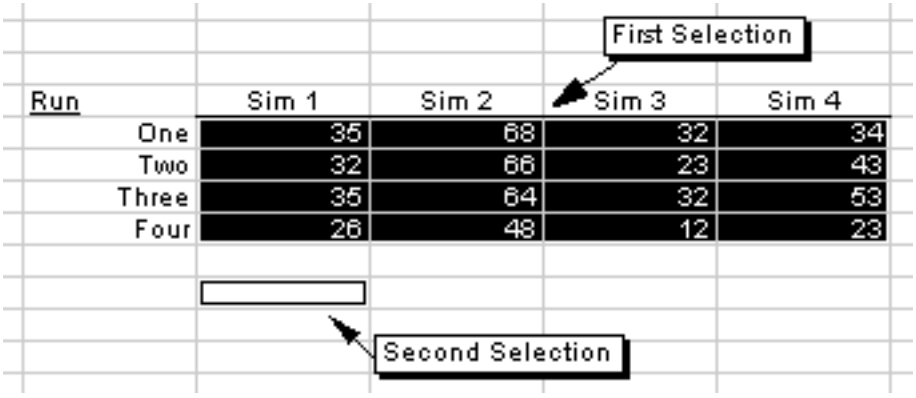
Related Procedures

Nonparametric: Kruskal-Wallis One-way ANOVA
ANOVA: Newman-Keuls Comparisons; Orthogonal Contrasts; Scheffé post hoc
VBA Programming Call: `nonParMenuDunns`

Friedman Two-way ANOVA

Have more than two matched samples, each with an equal number of entities? Really, you do? Well, then you might be interested in trying our Friedman Two-way ANOVA, which requires that you have at least ordinal measurement data.

Samples of data can be matched by measuring the same subjects to various conditions, or by randomly assigning matched subjects to such conditions. The analysis is performed on ranks with each sample, which the routine automatically calculates and uses to determine the statistics.



Information required to generate **Friedman Two-way ANOVA**.

Setup & Run: Manual

1) Select the data set. (Do not select labels.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Friedman Two-way ANOVA** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Friedman Two-way ANOVA** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Run	Sim 1	Sim 2	Sim 3	Sim 4
One	35	68	32	34
Two	32	66	23	43
Three	35	64	32	53
Four	26	48	12	23
	chi-square	10.800		
	N	4		
	k	4		
	Lookup probability in appropriate table.			

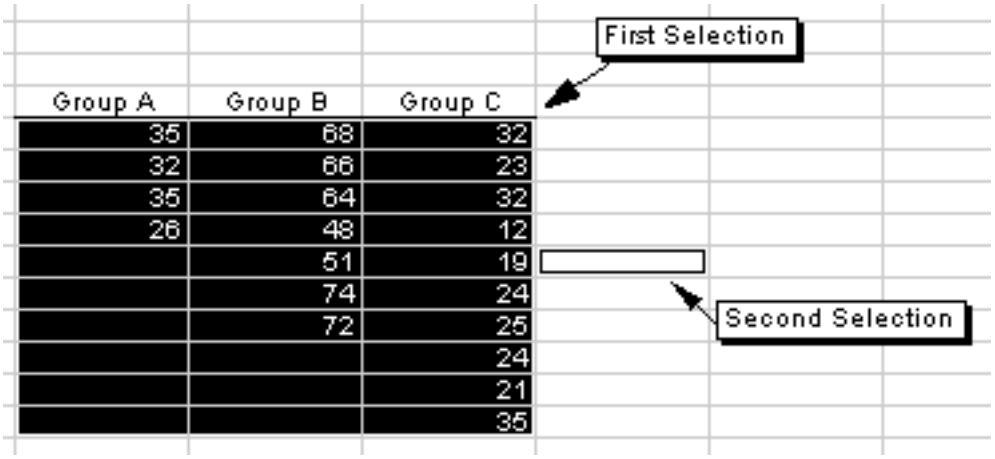
Friedman Two-way ANOVA *output.*

Related Procedures

Nonparametric: Kruskal-Wallis One-way ANOVA
ANOVA: Multi-way ANOVA; Repeated Measures ANOVA; Two-way No Replications
VBA Programming Call: `nonParMenuFriedman2Way`

Kruskal-Wallis One-way ANOVA

Have two or more independent samples from the same population? If you can answer yes, Kruskal-Wallis One-way ANOVA may be your routine of choice. Only other requirement we have is that you have at least ordinal measurement data.



Group A	Group B	Group C
35	68	32
32	66	23
35	64	32
26	48	12
	51	19
	74	24
	72	25
		24
		21
		35

Information required to generate **Kruskal-Wallis One-way ANOVA**.

Setup & Run: Manual

1) Select the data set. (Do not select labels.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL/COMMAND** key.

5) Go to the **Stats** menu and select **Kruskal-Wallis One-way ANOVA** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Kruskal-Wallis One-way ANOVA** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Group A	Group B	Group C		
35	68	32		
32	66	23		
35	64	32		
26	48	12		
	51	19	H	15.518
	74	24	df	2
	72	25	p <	0.000
		24		
		21		
		35		

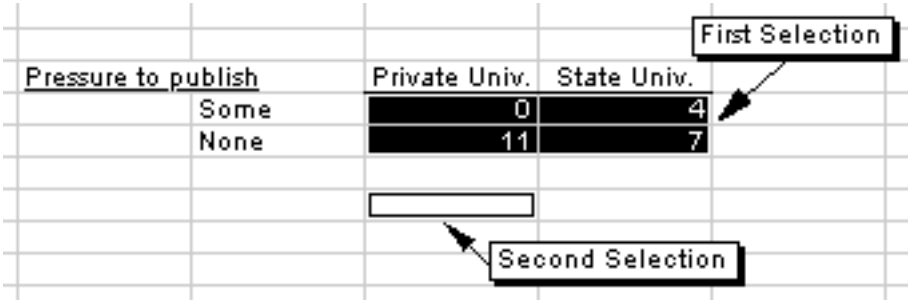
Kruskal-Wallis One-way ANOVA *output.*

Related Procedures

Nonparametric: Kruskal-Wallis One-way ANOVA
ANOVA: Multi-way ANOVA; Repeated Measures ANOVA; Two-way No Replications
VBA Programming Call: `nonParMenuKruskalWallis`

Fisher's Exact Test

If you have nominal measurement or ordinal measurement data and have a small sample size (less than 30) you may want to use the hypergeneometric probability distribution, also known as the Fisher's exact distribution. See our simple example? It assumes that there are two independent random samples and that each observation can be classified into one of two categories, which we called Some and None. With equal sample sizes of 11, what is the probability of getting a 0,4 split between the two samples? 0.045, according to the Fishers exact distribution.



Information required to generate **Fisher's Exact**.

Setup & Run: Manual

1) Select the observed data set. (Do not select labels.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Fisher's Exact** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Fisher's Exact** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Pressure to publish		Private Univ.	State Univ.
	Some	0	4
	None	11	7
		p <	0.045

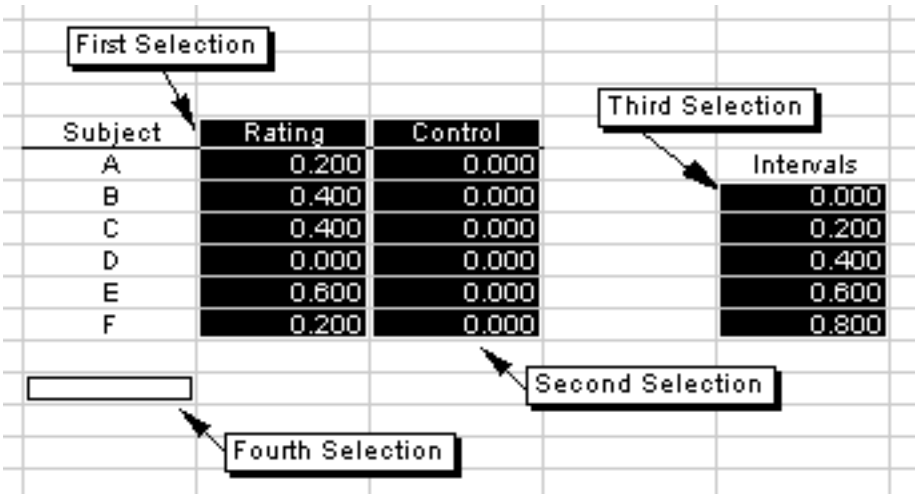
Fisher's Exact *output.*

Related Procedures

Descriptive: Crossbreak; Frequencies
Nonparametric: One Sample chi-square; Two Sample Dependent chi-square
VBA Programming Call: `nonParMenuFishersExact`

Linear Trend in Proportions

Take two sets of interval measurement data, and a range of the possible intervals, and you can calculate the linear trend in proportions for the two data sets. A table of frequency table is produced, which is used to calculate the z-value for the test, and its one-tailed and two-tailed probability values.



Information required to generate **Linear Trend in Proportions**.

Setup & Run: Manual

1) Select the first group data set. (Labels must be selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second group data set. (Labels must be selected.)

4) Select the range of possible intervals. (Without label selected.)

5) Select the cell where you want your output placed.

6) Let go of the **CTRL**/**COMMAND** key.

7) Go to the **Stats** menu and select **Linear Trend in Proportions** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Linear Trend in Proportions** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Subject	Rating	Control			
A	0.200	0.000		Intervals	
B	0.400	0.000		0.000	
C	0.400	0.000		0.200	
D	0.000	0.000		0.400	
E	0.600	0.000		0.600	
F	0.200	0.000		0.800	
Linear Trend in Proportions					
Interval	*0*	*0.2*	*0.4*	*0.6*	*0.8*
Rating	1	2	2	1	0
Control	6	0	0	0	0
Total	7	2	2	1	0
z Value	-2.571				
One-tailed p	0.005				
Two-tailed p	0.010				

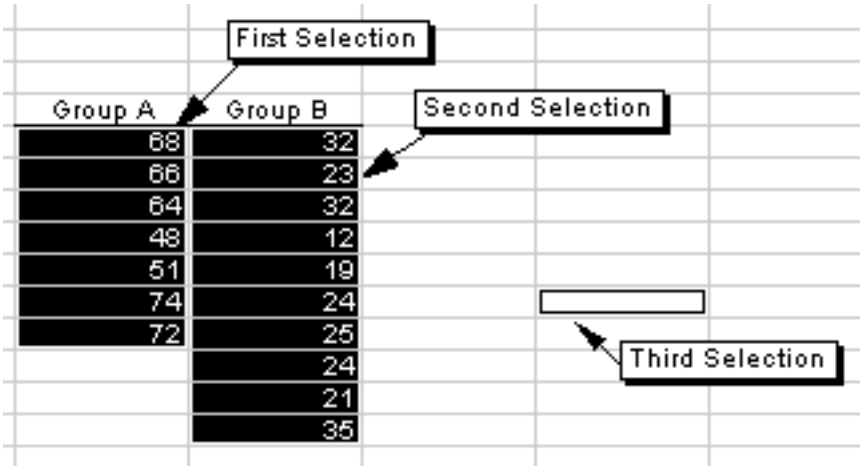
Linear Trend in Proportions *output.*

Related Procedures

Nonparametric: Proportion Test
VBA Programming Call: `nonParMenuLinearTrendinProps`

Mann-Whitney U

A nonparametric test for the difference between two sets of interval measurement data, under the assumption the sets of data come from independent observations (the first data is not measured on the same entities as the second data set). Mann-Whitney U is often used in place of the t-Test when data is badly skewed.



Information required to generate **Mann-Whitney U**.

Setup & Run: Manual

1) Select the first variable data set. (Without label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second variable data set. (Without label selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Mann-Whitney U** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Mann-Whitney U** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Group A	Group B			
68	32			
66	23			
64	32			
48	12			
51	19			
74	24		Mann-Whitne	0.000
72	25		z Value	-3.416
	24		One tailed p	0.000
	21		Two tailed p	0.001
	35			

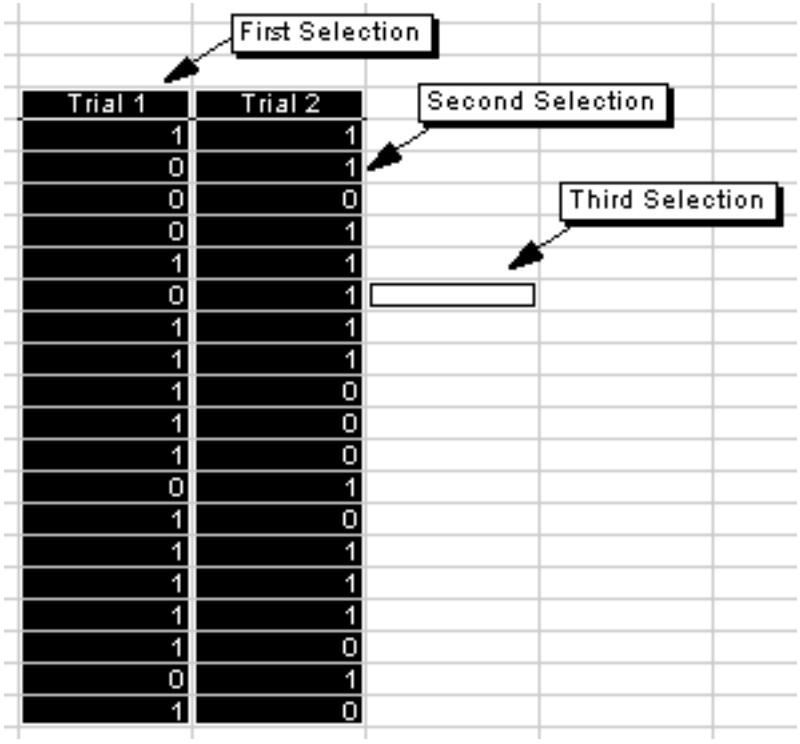
Mann-Whitney U *output.*

Related Procedures

Nonparametric: Wilcoxon Sign Test
t-Test: Independent t-Test
VBA Programming Call: `nonParMenuMannWU`

Proportion Test

A nonparametric test applied to two sets of dichotomous data (data where there are only two possibilities; such as true/false, or male/female, or...



Trial 1	Trial 2
1	1
0	1
0	0
0	1
1	1
0	1
1	1
1	1
1	0
1	0
1	0
0	1
1	0
1	1
1	1
1	1
1	0
0	1
1	0

Information required to generate **Proportion Test**.

Setup & Run: Manual

1) Select the first variable data set. (Select label at your discretion.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second variable data set. (Make same label selection as first data set.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Proportion Test** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Proportion Test** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Trial 1	Trial 2		
1	1		
0	1		
0	0		
0	1		
1	1		
0	1	Proportion 1	0.684
1	1	Proportion 2	0.632
1	1	z Value	0.342
1	0	p <	0.366
1	0		
1	0		
0	1		
1	0		
1	1		
1	1		
1	1		
1	0		
0	1		
1	0		

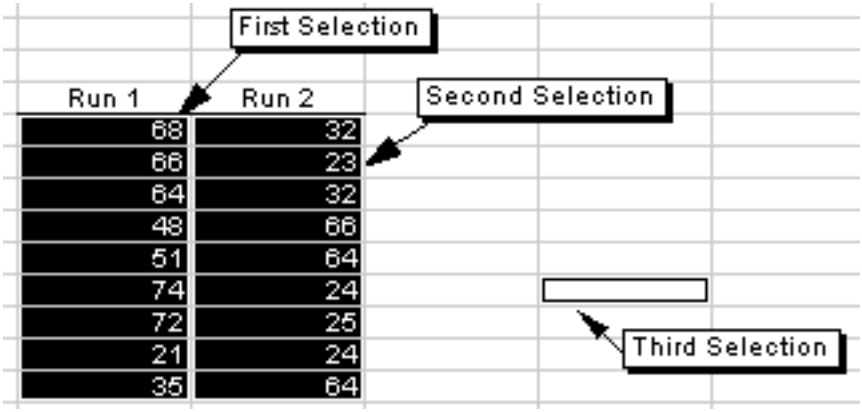
Proportion Test *output.*

Related Procedures

Descriptive: Breakdown; Crossbreak
VBA Programming Call: `nonParMenuPropTest`

Wilcoxon Sign Test

A nonparametric test for the difference between two sets of interval measurement data, under the assumption the sets of data come from related observations (the first data is measured on the same entities as the second data set). Wilcoxon Sign Test is often used in place of the t-Test when data is badly skewed.



Information required to generate **Wilcoxon Sign Test**.

Setup & Run: Manual

1) Select the first variable data set. (Without label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second variable data set. (Without label selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Wilcoxon Sign Test** from the **Nonparametric** submenu.

Setup & Run: Range Wizard

1) Select **Nonparametric > Wilcoxon Sign Test** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Run 1	Run 2			
68	32			
66	23			
64	32			
48	66			
51	64			
74	24		Sign-test	6
72	25		Matched pai	0
21	24		z Value	-1.955
35	64		One-tailed p	0.025
			Two-tailed p	0.051

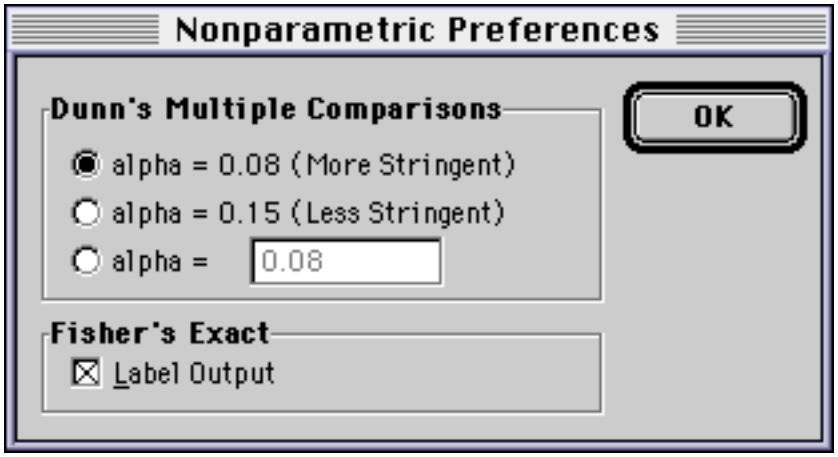
Wilcoxon Sign Test *output.*

Related Procedures

Nonparametric: Mann-Whitney U
t-Test: Dependent t-Test
VBA Programming Call: `nonParMenuWilcoxonSign`

Preferences...

What do you prefer? By selecting **Stats > Nonparametric > Preferences...** you can set the alpha of the Dunn's Multiple Comparisons. You can also choose whether or not the Fisher's Exact output is labeled.



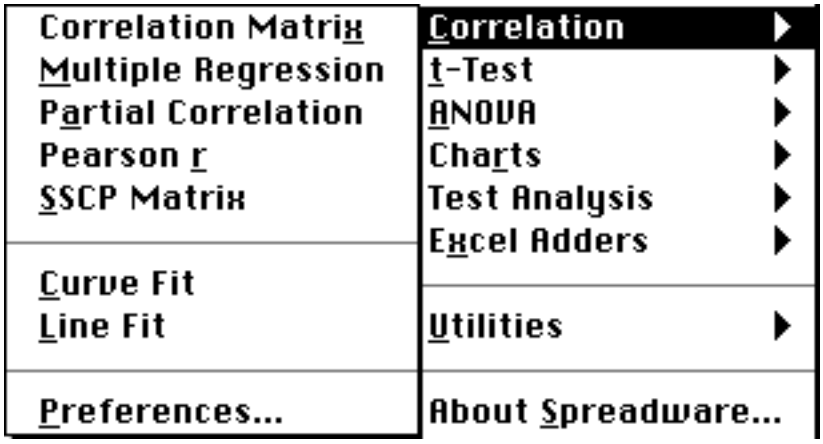
Set an alpha, choose a label.

Dunn's Multiple Comparisons alpha

The standard 0.08 and less stringent 0.15 are offered as option buttons, but if you would like to set your own alpha select the last option button and type in the alpha of your desire.

Fisher's Exact

Checking a check box will make sure your result is labeled. If you would like this option for additional routines, let us know.



Correlation Statistics

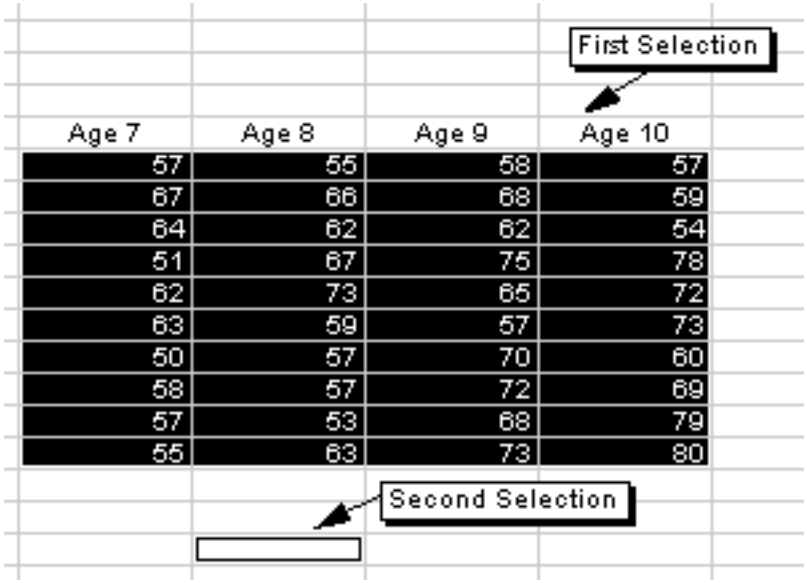
The nice thing about titles, honest titles, is that you can infer the meaning of what is being described in a couple of words. The title correlation statistics is one of those accurate and honest titles. The statistics provided in this section try to provide insight into the relationship between sets of data, how the data correlates.

The correlation routines are applied to interval measurement and ratio measurement data. The statistics produced are bivariate, those that look at a relationship between two variables, and multivariate, those that look at a relationship between one variable and two or more variables.

The decimal formatting for many of the statistics provided by the correlation routines is based on the **Statistic Display** decimal format setting in the **Descriptive Preferences** dialog.

Correlation Matrix

With data consisting of two or more adjacent columns, with each variable occupying its own column, this routine calculates a correlation matrix. The statistics provide all possible Pearson product moment correlations between each pair of variables in the data set. If so chosen in the **Correlation Preferences** dialog, you can have probability and sample size calculated for each variable.



Information required to generate **Correlation Matrix**.

Setup & Run: Manual

1) Select the data set. (With labels selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Correlation Matrix** from the **Correlation** submenu.

Setup & Run: Range Wizard

1) Select **Correlation > Correlation Matrix** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Age 7	Age 8	Age 9	Age 10		
57	55	58	57		
67	66	68	59		
64	62	62	54		
51	67	75	78		
62	73	65	72		
63	59	57	73		
50	57	70	60		
58	57	72	69		
57	53	68	79		
55	63	73	80		

	Age 7	*Age 8*	*Age 9*	*Age 10*
Age 7	1.000			
Age 8	0.277	1.000		
Age 9	-0.540	0.204	1.000	
Age 10	-0.337	0.126	0.449	1.000

Correlation Matrix *output.*

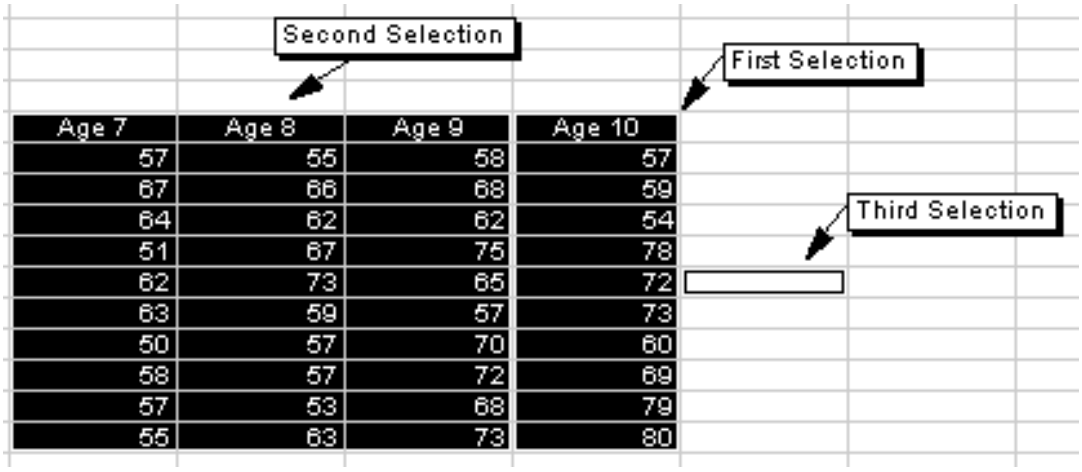
Related Procedures

Descriptive: Crossbreak
Nonparametric: Contingency Table
Correlation: Pearson r; SSCP Matrix
VBA Programming Call: `corrMenuCorrMatrix`

Multiple Regression

Two or more adjacent columns of variables that act as predictors for a single variable, the predicted variable. Indices of relationship between the predictors and the predicted variable, a testing of significance of the relationship, and the contributions each predictor makes to the relationship are provided.

Options in the **Correlation Preferences** dialog allow you to select the confidence level, as well as choose whether you want full entry, backward entry or forward entry regression treatments. Full entry creates a single multiple regression using all predictor variables at once. Backward entry creates a full entry regression, then systematically backs out predictor variables until it gets to the single, smallest predictor. Forward entry starts with the single, smallest predictor variable, then steps systematically to full entry regression.



Age 7	Age 8	Age 9	Age 10
57	55	58	57
67	66	68	59
64	62	62	54
51	67	75	78
62	73	65	72
63	59	57	73
50	57	70	60
58	57	72	69
57	53	68	79
55	63	73	80

Information required to generate **Multiple Regression**.

Setup & Run: Manual

1) Select the predictor variables data set. (With label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the predicted variable data set. (With labels selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Multiple Regression** from the **Correlation** submenu.

Setup & Run: Range Wizard

1) Select **Correlation > Multiple Regression** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Age 7	Age 8	Age 9	Age 10
57	55	58	57
67	66	68	59
64	62	62	54
51	67	75	78
62	73	65	72
63	59	57	73
50	57	70	60
58	57	72	69
57	53	68	79
55	63	73	80

Forward Step Number 1

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.337
R Square	0.114
Adjusted R S	0.003
Standard Erro	9.812
Observations	10.000

ANOVA

	df	*SS*	*MS*	*F*
Regression	1.000	98.748	98.748	
Residual	8.000	770.152	96.269	
Total	9.000	868.900		

	Coefficients	*Standard Error*	*t Stat*	*P-val*
Intercept	102.757	34.359	2.991	

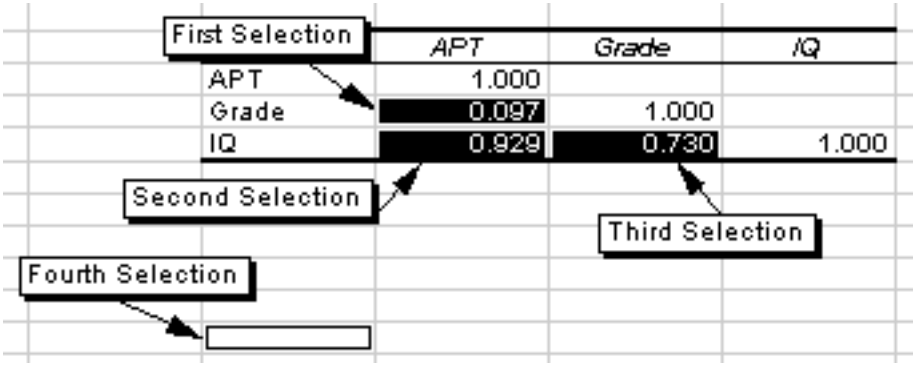
Multiple Regression *output.*

Related Procedures

Descriptive: Crossbreak
Nonparametric: Contingency Table
Correlation: Pearson r; SSCP Matrix
VBA Programming Call: `corrMenuMultipleRegression`

Partial Correlation

Partial correlations indicates the relationship between two variables when the effect of a third intervening variable is removed. Often, this gives a much clearer picture of the relationship between two variables. The routine calculates all possible partial correlations for the different correlations, as well as the partial correlation squared.



Information required to generate **Partial Correlation**.

Setup & Run: Manual

1) Select the first correlation. (No label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second correlation. (No label selected.)

4) Select the third correlation. (No label selected.)

5) Select the cell where you want your output placed.

6) Let go of the **CTRL**/**COMMAND** key.

7) Go to the **Stats** menu and select **Partial Correlation** from the **Correlation** submenu.

Setup & Run: Range Wizard

1) Select **Correlation > Partial Correlation** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

	APT	*Grade*	*IQ*
APT	1.000		
Grade	0.097	1.000	
IQ	0.929	0.730	1.000

Partial Correlatic	*r*	*r Squared*
r12.3	-2.299	5.285
r13.2	1.262	1.592
r23.1	1.738	3.020

Partial Correlation *output.*

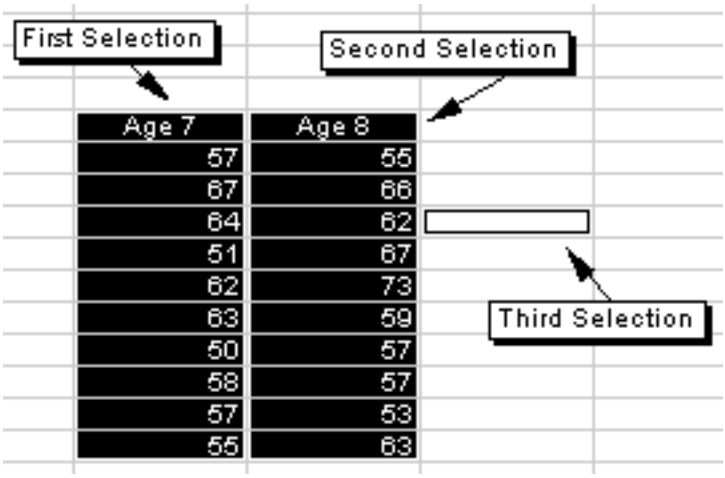
The output is labeled to show what correlation was tested. r12.3 means the relation between the first and second variables was tested, with the effects of the third variable removed.

Related Procedures

Correlation: Multiple Regression
VBA Programming Call: `corrMenuPartialCorr`

Pearson r

The Pearson r routine generates Pearson product moment correlation and related statistics for two continuous variables. Options in the **Correlation Preferences** dialog allow you to select the statistics you want.



Information required to generate **Pearson r**.

Setup & Run: Manual

1) Select the first variables data set. (Label optional.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second variable data set. (Select label as first selection.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL/COMMAND** key.

6) Go to the **Stats** menu and select **Pearson r** from the **Correlation** submenu.

Setup & Run: Range Wizard

1) Select **Correlation > Pearson r** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Age 7	Age 8		
57	55		
67	66		
64	62	r	0.277
51	67	r Squared	0.077
62	73	p <	0.439
63	59	n	10
50	57	Slope	0.249
58	57	Intercept	43.135
57	53		
55	63		

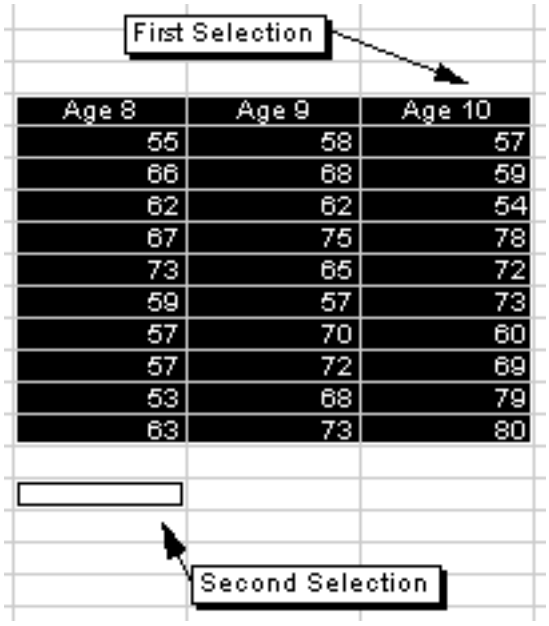
Pearson r *output.*

Related Procedures

Descriptive: Crossbreak
Nonparametric: Contingency Table
Correlation: Correlation Matrix
Charts: XY Trend Chart
VBA Programming Call: `corrMenuPearsonR`

SSCP Matrix

Returns a matrix of sum of squares cross product (SSCP) for a range of continuous data, setup as two or more adjacent columns, with each variable occupying its own column.



Information required to generate **SSCP Matrix**.

Setup & Run: Manual

1) Select the first variables data set. (Label optional.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want the output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **SSCP Matrix** from the **Correlation** submenu.

Setup & Run: Range Wizard

1) Select **Correlation > SSCP Matrix** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Age 8	Age 9	Age 10
55	58	57
66	68	59
62	62	54
67	75	78
73	65	72
59	57	73
57	70	60
57	72	69
53	68	79
63	73	80
345.6	70.4	68.8
70.4	345.6	246.2
68.8	246.2	868.9

SSCP Matrix *output.*

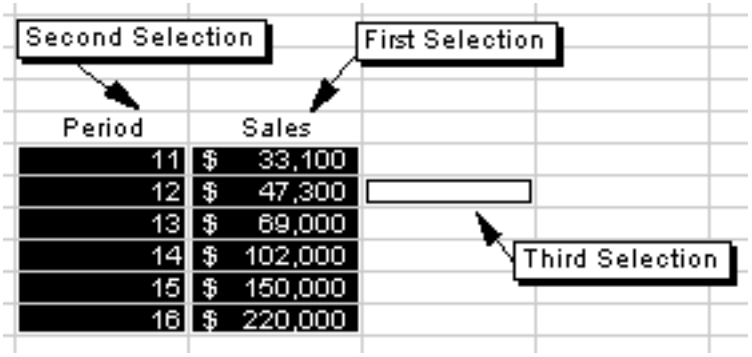
Related Procedures

Descriptive: Crossbreak
Nonparametric: Contingency Table
Correlation: Pearson r; Correlation Matrix
VBA Programming Call: `corrMenuSSCPMatrix`

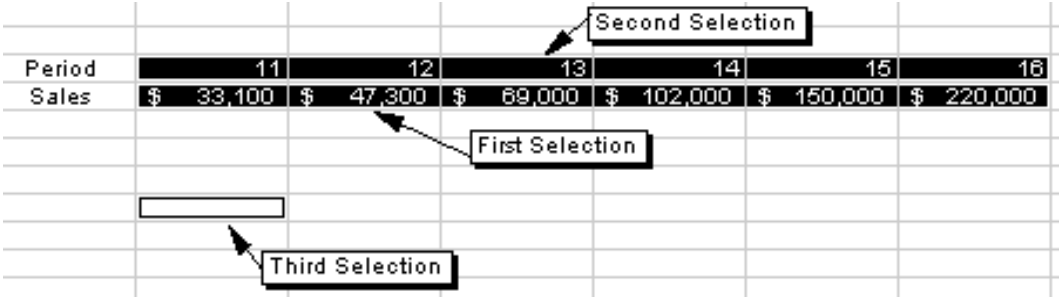
Curve Fit

Calculates an exponential curve that fits the variables, and returns the statistics that describe that curve. Requires a range of dependent variables, and the independent variable that they are a function of (also stated as the known y's and the known x's). In some cases, your data may be more appropriate for the **Line Fit** routine.

This is one of the few routines were the data can be columnwise *or* rowwise.



Information required to generate **Curve Fit**, *running columnwise.*



Information required to generate **Curve Fit**, *running rowwise.*

Setup & Run: Manual

1) Select the dependent variable data set. (No labels selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the independent variable data set. (No labels selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Curve Fit** from the **Correlation** submenu.

Setup & Run: Range Wizard

1) Select **Correlation > Curve Fit** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Period	Sales		
11	$ 33,100		
12	$ 47,300	Slope	1.463
13	$ 69,000	Intercept	495.305
14	$ 102,000	r Squared	1.000
15	$ 150,000	F	20896.801
16	$ 220,000	df	4

Curve Fit *output, columnwise.*

Period	11	12	13	14	15	16
Sales	$ 33,100	$ 47,300	$ 69,000	$ 102,000	$ 150,000	$ 220,000
	Slope	1.463				
	Intercept	495.305				
	r Squared	1.000				
	F	20896.801				
	df	4				

Curve Fit *output, rowwise.*

Related Procedures

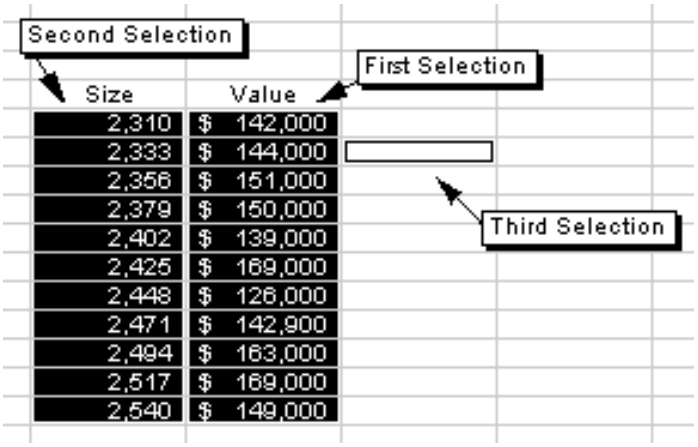
Correlation: Multiple Regression; Line Fit

VBA Programming Call: **`corrMenuCurveFit`**

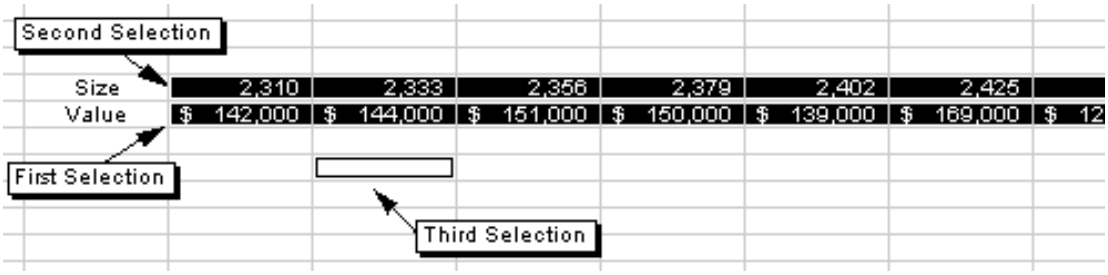
Line Fit

Calculates a line that fits the variables using the least squares method, and returns the statistics that describe that line. Requires a range of dependent variables, and the independent variable that they are a function of (also stated as the known y's and the known x's). In some cases, your data may be more appropriate for the **Curve Fit** routine.

This is one of the few routines were the data can be columnwise *or* rowwise.



Information required to generate **Line Fit**, *running columnwise.*



Information required to generate **Line Fit**, *running rowwise.*

Setup & Run: Manual

1) Select the dependent variable data set. (No labels selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the independent variable data set. (No labels selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Line Fit** from the **Correlation** submenu.

Setup & Run: Range Wizard

1) Select **Correlation > Line Fit** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Size	Value		
2,310	$ 142,000		
2,333	$ 144,000	Slope	56.838
2,356	$ 151,000	Intercept	11704.348
2,379	$ 150,000	r Squared	0.108
2,402	$ 139,000	F	1.091
2,425	$ 169,000	df	9
2,448	$ 126,000		
2,471	$ 142,900		
2,494	$ 163,000		
2,517	$ 169,000		
2,540	$ 149,000		

Line Fit *output, columnwise.*

Size	2,310	2,333	2,356	2,379	2,402	2,425	2
Value	$ 142,000	$ 144,000	$ 151,000	$ 150,000	$ 139,000	$ 169,000	$ 126
		Slope	56.838				
		Intercept	11704.348				
		r Squared	0.108				
		F	1.091				
		df	9				

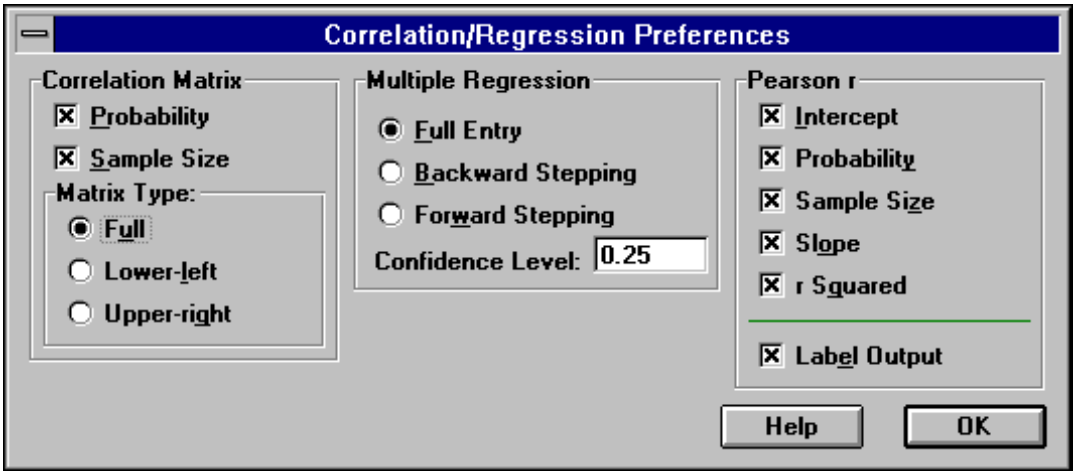
Line Fit *output, rowwise.*

Related Procedures

Correlation: Multiple Regression; Curve Fit
VBA Programming Call: `corrMenuLineFit`

Preferences...

What do you prefer? Selecting **Stats > Correlation > Preferences...** gives you options on how you want a routine to run, and what statistics you want generated.



You prefer...

Correlation Matrix

Hit the checkboxes if you want probability and sample size statistics to be generated in your matrix.

Correlation Matrix > Matrix Type:

Select the type of matrix you want. **Full** gives you a complete matrix, where the lower-left mirrors the upper-right. **Lower-left** give you the matrix in a lower-left perspective, and the **Upper-right** gives you a matrix from the...

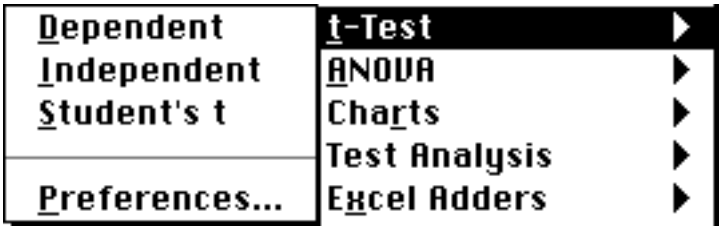
Multiple regression

Confidence level allows you set the regression confidence at your desired test level.

Full Entry creates a single multiple regression using all predictor variables at once. **Backward Stepping** creates a full entry regression, then systematically backs out predictor variables until it gets to the single, smallest predictor. **Forward Stepping** starts with the single, smallest predictor variable, then steps systematically to full entry regression.

Pearson r

Select the statistics you want generated, and whether or not you want the output labeled.



t-Test Statistics

Under the **Excel Adders** submenu you will find some t-Tests for your convenience, however you will not find the t-Tests we provide. Usually t-tests are applied to means obtained from two measurements, however, we provide a method of testing an observed mean against a hypothetical mean.

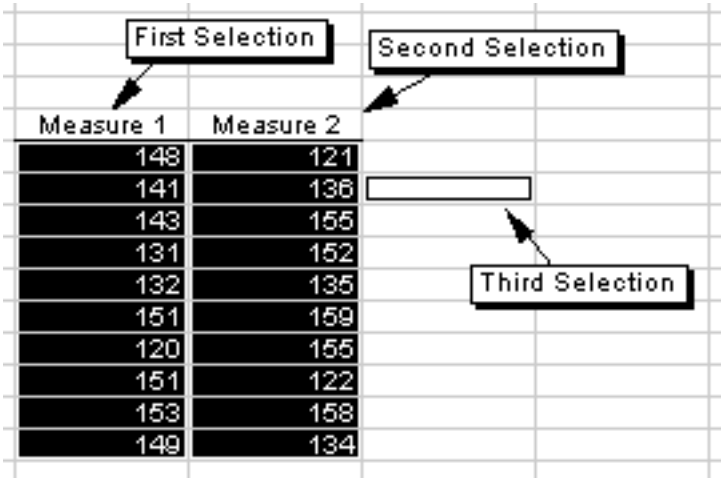
It is assumed that the data being tested is either interval measurement or ratio measurement data.

The decimal formatting for many of the statistics provided by the t-Test routines is based on the **Statistic Display** decimal format setting in the **Descriptive Preferences** dialog.

Dependent

Calculates the dependent t-test for two measurements of the same subjects. Each data set must occupy its own column, and it is assumed that the measurements are related, that to some extent the second measurement is dependent upon the first. For example; if children were timed for speed, the second measurement of the same children done one month later would be somewhat dependent on what they were timed on the first measurement.

Options in the **t-Test Preferences** dialog allow you to select the statistics you want generated.



Information required to generate **Dependent.**

Setup & Run: Manual

1) Select the first variables data set. (Label optional.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the dependent variable data set. (Select label as with first selection.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Dependent** from the **t-Test** submenu.

Setup & Run: Range Wizard

1) Select **t-Test > Dependent** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Measure 1	Measure 2		
148	121		
141	136	t	0.124
143	155	df	9
131	152	One-tailed p	0.452
132	135	Two-tailed p	0.904
151	159	r	-0.233
120	155		
151	122		
153	158		
149	134		

Dependent *output.*

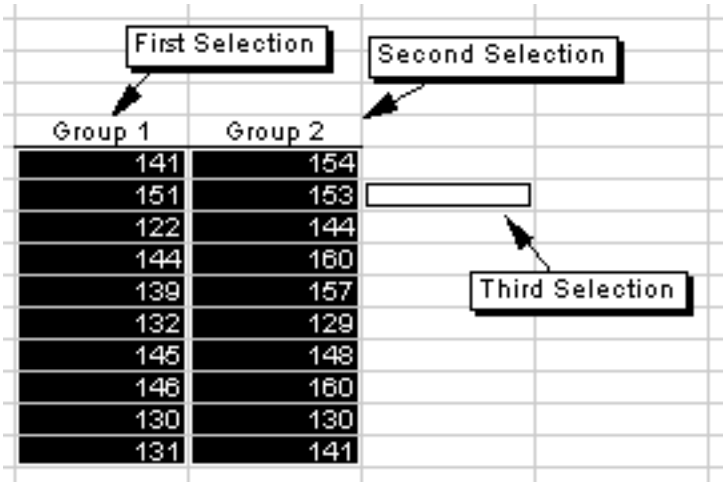
Related Procedures

Nonparametric: Contingency Table
t-Tests: Independent; Student's t
VBA Programming Call: `tTestMenuDepTTest`

Independent

Calculates the independent t-test for two measurements of different subjects. Each data set must occupy its own column, and it is assumed that the measurements are not related, that to no extent is the second measurement dependent upon the first. For example; if children were timed for speed, the second measurement done on a different set of children would bear no dependency on the first measurement.

Options in the **t-Test Preferences** dialog allow you to select the statistics you want generated.



Information required to generate **Independent**.

Setup & Run: Manual

1) Select the first variables data set. (Label optional.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the dependent variable data set. (Select label as with first selection.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Independent** from the **t-Test** submenu.

Setup & Run: Range Wizard

1) Select **t-Test > Independent** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Group 1	Group 2		
141	154		
151	153	t	2.061
122	144	df	18
144	160	One-tailed p	0.027
139	157	Two-tailed p	0.054
132	129		
145	148		
146	160		
130	130		
131	141		

Independent *output.*

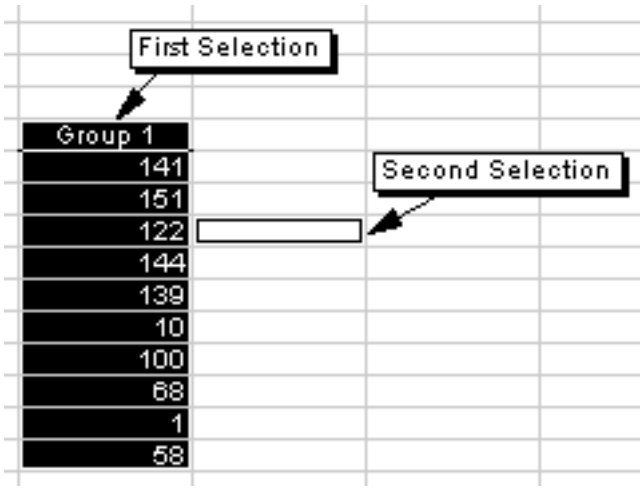
Related Procedures

Nonparametric: Contingency Table
t-Tests: Dependent; Student's t
VBA Programming Call: `tTestMenuIndepTTest`

Student's t

Though there are Student's t statistics within Excel , we have provided a routine that calculates the Student's t for a single variable. The value of the hypothetical mean used to determine this t is set in the **t-Test Preferences** dialog.

As with our other t-Test routines, the data is assumed to be of interval measurement or ratio measurement.



Information required to generate **Student's t**.

Setup & Run: Manual

1) Select the variables data set. (Label optional.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Student's t** from the **t-Test** submenu.

Setup & Run: Range Wizard

1) Select **t-Test > Student's t** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Group 1		
141		
151		
122	t	0.371
144	df	10
139	One-tailed p	0.359
10	Two-tailed p	0.718
100		
68		
1		
58		

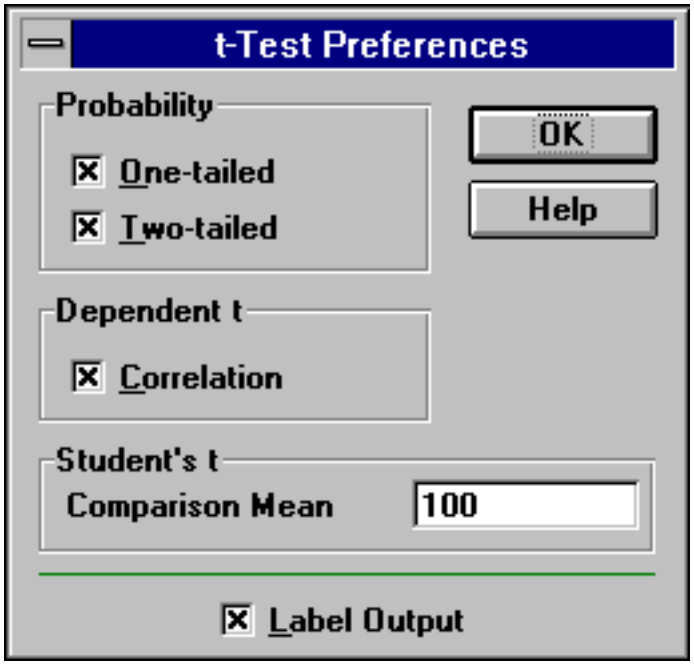
Student's t *output.*

Related Procedures

Nonparametric: Contingency Table
t-Tests: Dependent; Independent
VBA Programming Call: `tTestMenuStudentst`

Preferences...

Selecting **Stats > t-Test > Preferences...** gives you a choice of the statistics generated, and if they are labeled.



You want tails...

Probability

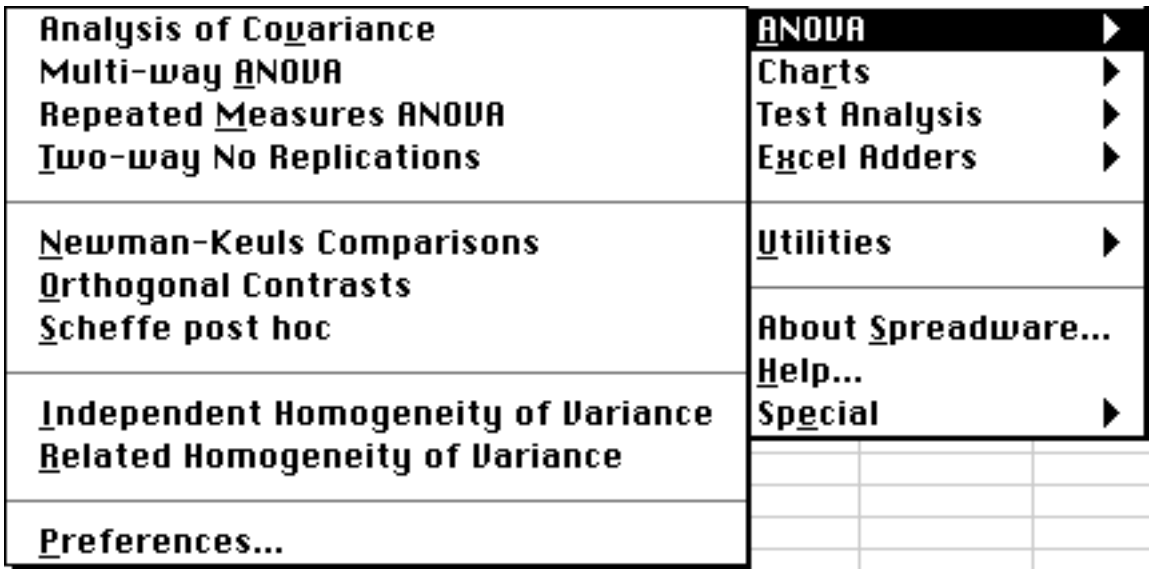
Pretty darn simple. If you want a one-tailed probability statistic, select the one-tailed check box. If you want a two-tailed probability statistic in addition, or instead of, select the...

Dependent t

How dependent is the dependent variable, run the correlation statistic.

Student's t Comparison Mean

In order to run our single variable Student's t, you need to provide a comparison mean, and the preferences dialog is where that comparison is set. Change as analysis dictates.



ANOVA Statistics

ANOVA: Analysis of variance. These routines allow you to compare two or more population means, as demonstrated by the F statistic. This type of analysis uses sample data to compare several treatments to determine if they achieve different results.

ANOVA is usually applied using nominal measurements as factors and interval measurements or ratio measurements as dependent variables. We have provided an array of ANOVA routines for varying analytical situations.

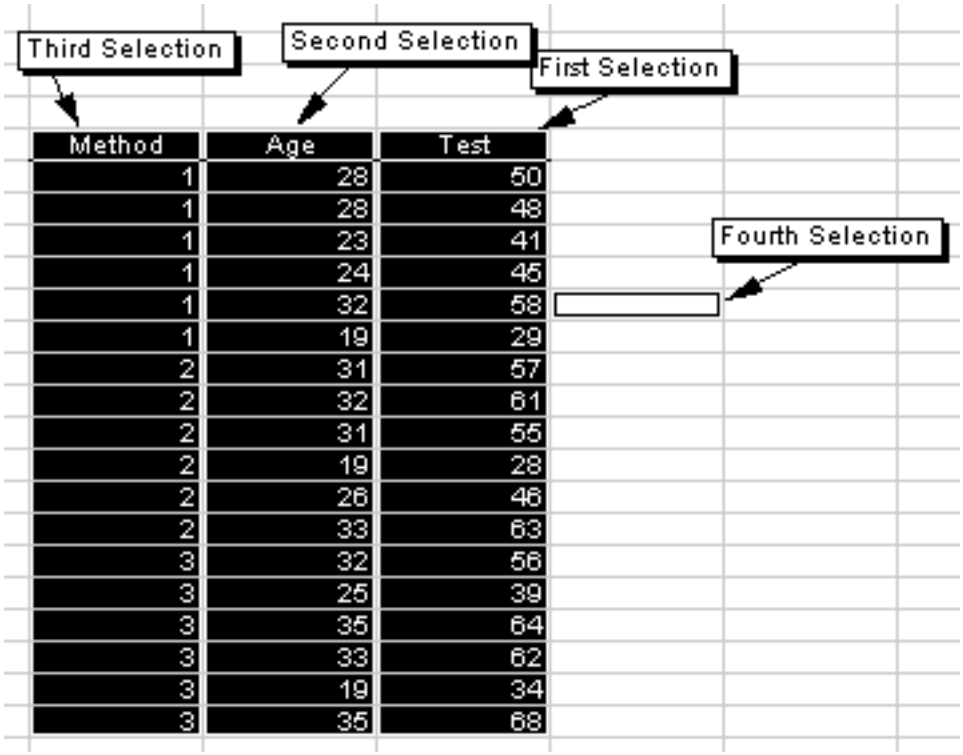
The decimal formatting for many of the statistics provided by the ANOVA routines is based on the **Statistic Display** decimal format setting in the **Descriptive Preferences** dialog.

Analysis of Covariance

Generates an analysis of covariance (ANCOVA) for a model of one factor with one dependent variable. The three variable are broken down as a nominal factor variable, an interval measurement or ratio measurement dependent variable, and an interval measurement or ratio measurement covariate.

ANCOVA is useful in determining the effect of a factor on a dependent variable when the influence of another variable is removed from the dependent variable, which allows for statistical control over an experimental situation.

As part of the routine, a test for the homogeneity of r is provided.



Method	Age	Test
1	28	50
1	28	48
1	23	41
1	24	45
1	32	58
1	19	29
2	31	57
2	32	61
2	31	55
2	19	28
2	26	46
2	33	63
3	32	56
3	25	39
3	35	64
3	33	62
3	19	34
3	35	68

Information required to generate **ANCOVA**.

Setup & Run: Manual

1) Select the dependent variable data set. (With label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the covariate data set. (With label selected.)

4) Select the factor data set. (With label selected.)

5) Select the cell where you want your output placed.

6) Let go of the **CTRL**/**COMMAND** key.

7) Go to the **Stats** menu and select **ANCOVA** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > ANCOVA** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Method	Age	Test
1	28	50
1	28	48
1	23	41
1	24	45
1	32	58
1	19	29
2	31	57
2	32	61
2	31	55
2	19	28
2	26	46
2	33	63
3	32	56
3	25	39
3	35	64
3	33	62
3	19	34
3	35	68

Analysis of Covariance			
Source	*SS*	*df*	*MS*
Dependent: Test			
Between	244.111	2	122.056
Error	2311.000	15	154.067
Total	2555.111	17	
Covariate: Age			
Between	55.444	2	27.722
Error	455.500	15	30.367
Total	510.944	17	
Test adjusted for Age			
Between	0.855	2	0.428
Error	91.395	14	6.528
Total	92.250	16	
Homogeneity of r			
Between	10.892	2	5.446

ANCOVA *output.*

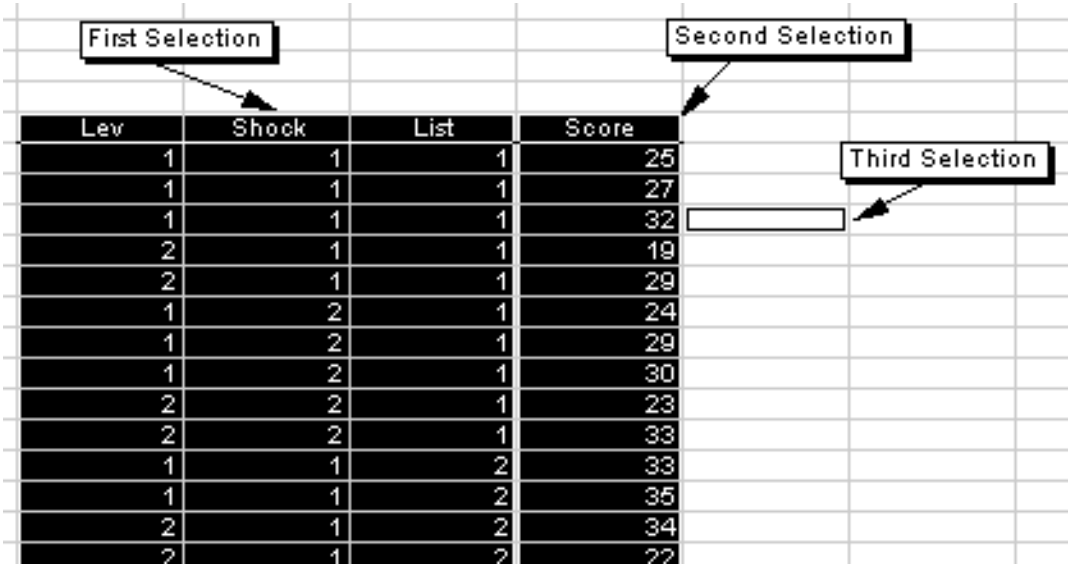
Related Procedures

Descriptive: Breakdown
ANOVA: Multi-wat ANOVA
VBA Programming Call: `anovaMenuANCOVA`

Multi-way ANOVA

Generates an analysis of variance (ANOVA) for a one, two or three grouping factor model, analyzed against an interval measurement or ratio measurement dependent variable.

A setting in the **ANOVA Preferences** allows you the option of automatically generating breakdown descriptive on the grouping variables with your multi-way ANOVA model.



Lev	Shock	List	Score
1	1	1	25
1	1	1	27
1	1	1	32
2	1	1	19
2	1	1	29
1	2	1	24
1	2	1	29
1	2	1	30
2	2	1	23
2	2	1	33
1	1	2	33
1	1	2	35
2	1	2	34
2	1	2	22

Information required to generate **Multi-way ANOVA**.

Setup & Run: Manual

1) Select the grouping factor variable(s) data set. (With label(s) selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the dependent data set. (With label selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Multi-way ANOVA** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > Multi-way ANOVA** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Lev	Shock	List	Score
1	1	1	25
1	1	1	27
1	1	1	32
2	1	1	19
2	1	1	29
1	2	1	24
1	2	1	29
1	2	1	30
2	2	1	23
2	2	1	33
1	1	2	33
1	1	2	35
2	1	2	34
2	1	2	22
2	1	2	30
1	2	2	35
1	2	2	23
1	2	2	28

Analysis of Variance of Score by Lev by Shock by List

Source	*SS*	*df*	*MS*	*F*
Lev	3.564	1	3.564	
Shock	0.800	1	0.800	
List	57.800	1	57.800	
Lev x Shock	39.253	1	39.253	
Lev x List	5.403	1	5.403	
Shock x List	5.000	1	5.000	
Lev x Shock x	22.880	1	22.880	
Error	308.500	12	25.708	
Total	443.200	19		

Score

Lev	*Shock*	*List*	*N*	*Minim*
1	1	1	3	2
1	1	2	2	3

Multi-way ANOVA *output.*

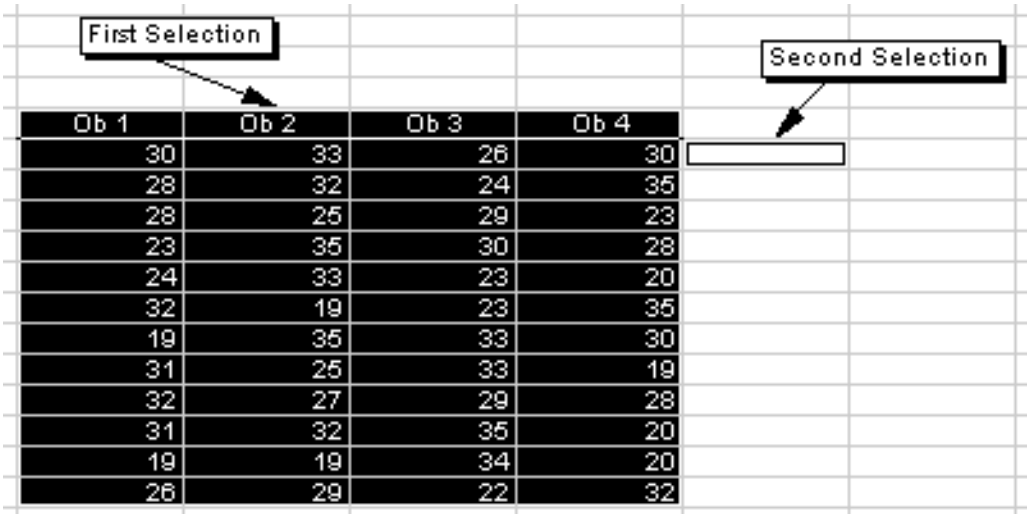
Related Procedures

Descriptive: Breakdown
ANOVA: Analysis of Covariance
VBA Programming Call: `anovaMenuMultiway`

Repeated Measures ANOVA

Generates a repeated measures analysis of variance (ANOVA) for a set of repeated dependent variables, which makes this test useful in determining if there is a difference between a set of multiple measurements on the same entities.

A setting in the **ANOVA Preferences** allows you the option of automatically generating continuous descriptive statistics on the Repeated Measures.



Ob 1	Ob 2	Ob 3	Ob 4
30	33	26	30
28	32	24	35
28	25	29	23
23	35	30	28
24	33	23	20
32	19	23	35
19	35	33	30
31	25	33	19
32	27	29	28
31	32	35	20
19	19	34	20
26	29	22	32

Information required to generate **Repeated Measures ANOVA**.

Setup & Run: Manual

1) Select the repeated dependent variables data set. (Label selection is suggested, especially if the **Continuous** option is selected in the preferences dialog.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Repeated Measures ANOVA** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > Repeated Measures ANOVA** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Ob 1	Ob 2	Ob 3	Ob 4
30	33	26	30
28	32	24	35
28	25	29	23
23	35	30	28
24	33	23	20
32	19	23	35
19	35	33	30
31	25	33	19
32	27	29	28
31	32	35	20
19	19	34	20
26	29	22	32

Repeated Measures Analysis of Variance

Source	*SS*	*df*	*MS*
Subjects	199.167	11	18.10
Treatments	37.500	3	12.50
Error	1048.000	33	31.75
Total	1284.667	47	

	Ob 1	*Ob 2*	*Ob 3*
N	12	12	1
Minimum	19.000	19.000	22.00
Maxmum	32.000	35.000	35.00
Range	13.000	16.000	13.00
Mean	26.917	28.667	28.41
Median	28.000	30.500	29.00

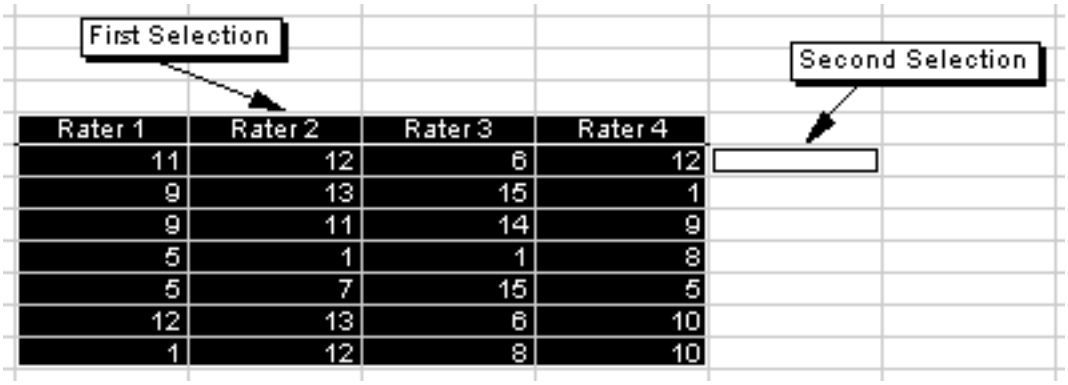
Repeated Measures ANOVA *output.*

Related Procedures

Descriptive: Continuous
ANOVA: Analysis of Covariance; Two-way No Replications
VBA Programming Call: `anovaMenuRepMeasures`

Two-way No Replications

Determine the differences between raters who happen to be rating the same entities. To tell the difference between the raters and the entities rated, you can apply the two-way no replications ANOVA. Additionally, statistics to estimate the inter-rater reliability are provide through the use of the interclass correlation coefficient.



Rater 1	Rater 2	Rater 3	Rater 4
11	12	6	12
9	13	15	1
9	11	14	9
5	1	1	8
5	7	15	5
12	13	6	10
1	12	8	10

Information required to generate **Two-way No Replications**.

Setup & Run: Manual

1) Select the dependent variables data set. (Label selection is suggested.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Two-way No Replications** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > Two-way No Replications** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Rater 1	Rater 2	Rater 3	Rater 4
11	12	6	12
9	13	15	1
9	11	14	9
5	1	1	8
5	7	15	5
12	13	6	10
1	12	8	10

Two-way ANOVA without Replications

Source	*SS*	*df*	*MS*
Ratees (Rows	141.929	6	23.6
Raters (Colun	27.821	3	9.2
Remainder	328.929	18	18.2
Total	498.679	27	
Interclass r	0.069		
Avg Interclas	0.227		

Two-way No Replications *output.*

Related Procedures

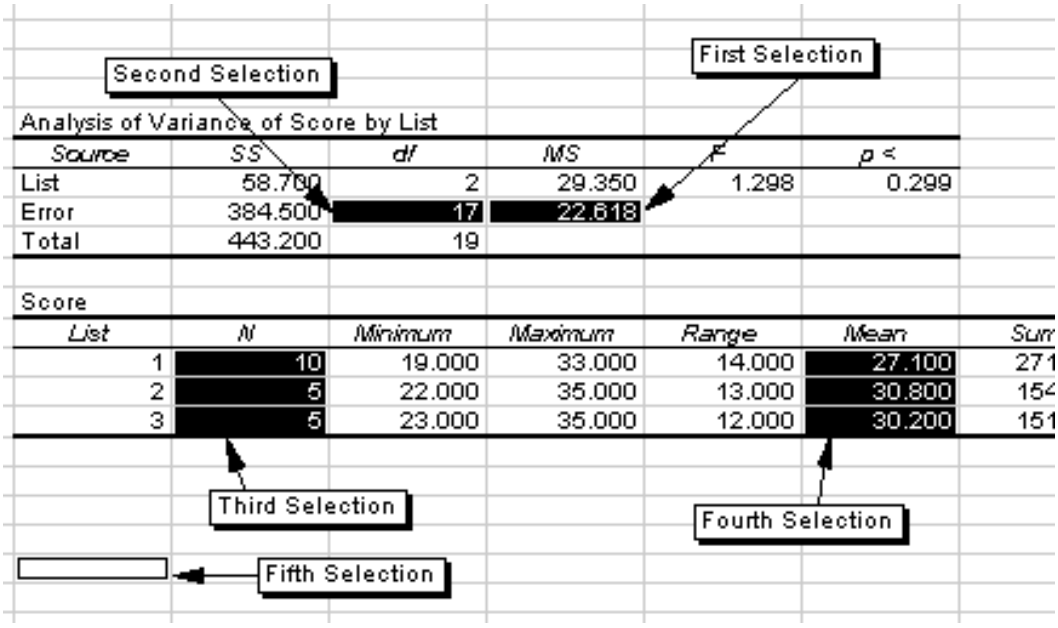
Descriptive: Continuous
ANOVA: Repeated Measures ANOVA
VBA Programming Call: `anovaMenu2WayNoReps`

Newman-Keuls Comparisons

Newman-Keuls comparisons is a test of the test. Since a significant F in an ANOVA *may* not provide sufficient information as to which groups the significance difference is between, this test determines the significance of every possible pair of means in the data.

After you have generated a significant ANOVA, you can run the Newman-Keuls comparisons to determine whether the difference between pairs of means is significant. The test can be run with an alpha of .01 or .05, depending on the option selection in the **ANOVA Preferences** dialog.

The routine we used to generate the ANOVA statistics necessary to run the Newman-Keuls comparison example was the **Multi-way ANOVA**.



Information required to generate **Newman-Keuls Comparisons**.

Setup & Run: Manual

1) Select the mean square (MS) Error. (Do not select label.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the associated degrees of freedom (df) for the MS Error. (Do not select label.)

4) Select the associated sample size (N) data. (Do not select label.)

5) Select the associated Mean data to be tested. (Do not select label.)

6) Select the cell where you want your output placed.

7) Let go of the **CTRL/COMMAND** key.

8) Go to the **Stats** menu and select **Newman-Keuls Comparisons** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > Newman-Keuls Comparisons** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Analysis of Variance of Score by List

Source	*SS*	*df*	*MS*	*F*
List	58.700	2	29.350	1.298
Error	384.500	17	22.618	
Total	443.200	19		

Score

List	*N*	*Minimum*	*Maximum*	*Range*
1	10	19.000	33.000	14.000
2	5	22.000	35.000	13.000
3	5	23.000	35.000	12.000

Newman-Keuls Multiple Comparisons

Mean 1	*Mean 2*	*Difference*	*0.05 Criteria*	*Significance*
27.100	30.200	3.100	6.381	Not Significant
27.100	30.800	3.700	7.763	Not Significant
30.200	30.800	0.600	6.381	Not Significant

Newman-Keuls Comparisons *output.*

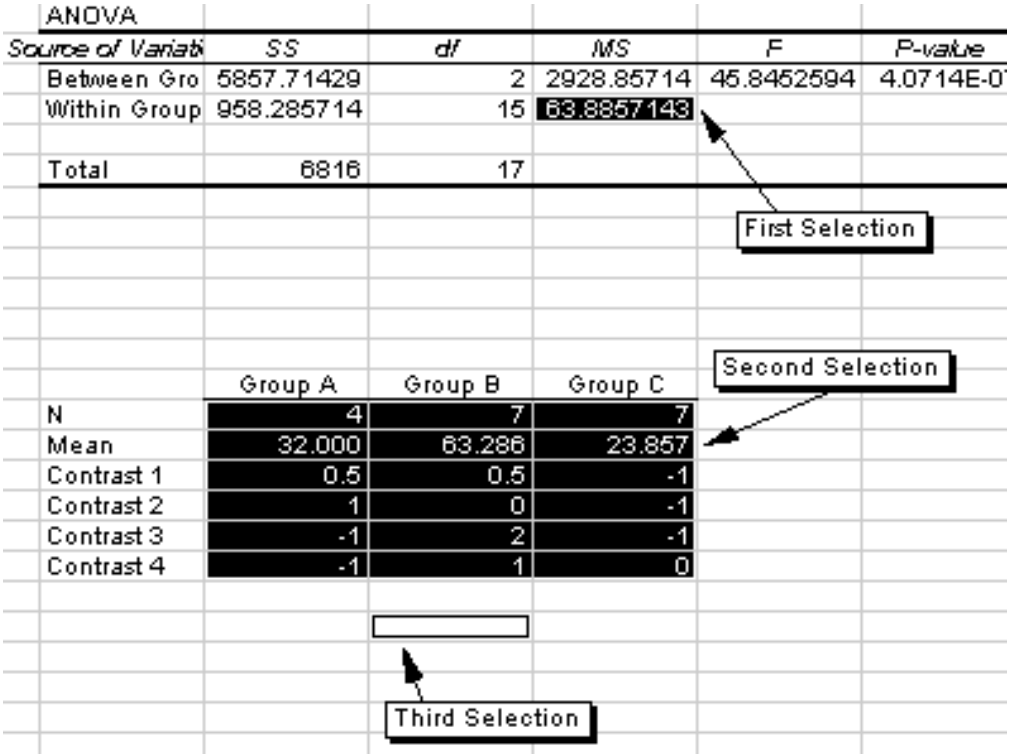
Related Procedures

ANOVA: Orthogonal Contrasts; Scheffé post hoc
VBA Programming Call: `anovaMenuNewmanKeuls`

Orthogonal Contrasts

Orthogonal Contrasts is a test of the test. Since a significant F in an ANOVA *may* not provide sufficient information as to which groups the significance difference is between, this test allows for the testing of various hypotheses about group differences.

The routine we used to generate the ANOVA statistics necessary to run the orthogonal contrasts example was the **ANOVA: Single Factor**, under the **Excel Adders** submenu. The contrast table was constructed as displayed. In our example: Contrast 1 indicates that Group C is tested against Group A and Group B; the second contrast indicates that Group A is tested against Group C; the third contrast indicates that Group B is tested against Group A and Group C; the fourth contrast indicates that Group A is tested against Group B.



Information required to generate **Orthogonal Contrasts**.

Setup & Run: Manual

1) Select the mean square (MS) Error. (Do not select label.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the data set as shown, with sample sizes, means and contrast vectors. (Do not select labels.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Orthogonal Contrasts** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > Orthogonal Contrasts** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

ANOVA				
Source of Variati	*SS*	*df*	*MS*	*F*
Between Gro	5857.71429	2	2928.85714	46.8452594
Within Group	958.285714	15	63.8857143	
Total	6816	17		

	Group A	Group B	Group C	
N	4	7	7	
Mean	32.000	63.286	23.857	
Contrast 1	0.5	0.5	-1	
Contrast 2	1	0	-1	
Contrast 3	-1	2	-1	
Contrast 4	-1	1	0	

t	*df*	*p* <
6.061	15	0.000
1.625	15	0.125
9.010	15	0.000
6.245	15	0.000

Orthogonal Contrasts *output.*

Related Procedures

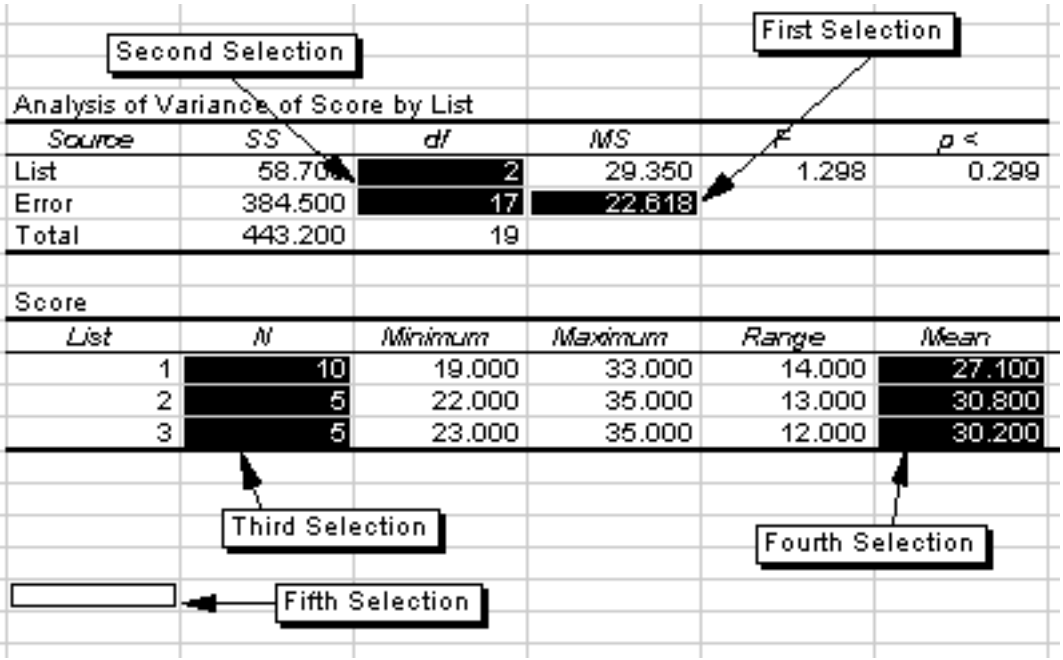
ANOVA: Newman-Keuls Comparisons; Scheffé post hoc
VBA Programming Call: `anovaMenuOrthogContrasts`

Scheffé post hoc

Scheffé post hoc is a test of the test. Since a significant F in an ANOVA *may* not provide sufficient information as to which groups the significance difference is between, this test enables us to compare combinations of cell means in exploring main effect, or to explore interaction effects by making a pairwise comparisons between cell means.

After you have generated a significant ANOVA, you can run the Scheffé post hoc. The test can be run with any alpha you desire, depending on what you entered in the **ANOVA Preferences** dialog.

The routine we used to generate the ANOVA statistics necessary to run the Scheffé post hoc example was the **Multi-way ANOVA**.



Information required to generate **Scheffé post hoc**.

Setup & Run: Manual

1) Select together the source and Error degrees of freedom (df). (Do not select label.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the associated mean square (MS) Error. (Do not select label.)

4) Select the associated sample size (N) data. (Do not select label.)

5) Select the associated Mean data to be tested. (Do not select label.)

6) Select the cell where you want your output placed.

7) Let go of the **CTRL**/**COMMAND** key.

8) Go to the **Stats** menu and select **Scheffé post hoc** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > Scheffé post hoc** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Analysis of Variance of Score by List

Source	*SS*	*df*	*MS*	*F*	*p <*
List	58.700	2	29.350	1.298	0.299
Error	384.500	17	22.618		
Total	443.200	19			

Score

List	*N*	*Minimum*	*Maximum*	*Range*	*Mean*	*Sum*	*F*
1	10	19.000	33.000	14.000	27.100	271.000	###
2	5	22.000	35.000	13.000	30.800	154.000	###
3	5	23.000	35.000	12.000	30.200	151.000	###

Scheffé Tests

Ho:	*Comparison*	*Comparison Sq*	*Standard Error*	*F Observed*	*F Criterion*	*Significance*
1 = 2	-3.700	13.690	6.785	2.018	7.183	Not Significant
1 = 3	-3.100	9.610	6.785	1.416	7.183	Not Significant
2 = 3	0.600	0.360	9.047	0.040	7.183	Not Significant
1 = (2+3)/2	-6.800	46.240	18.094	2.556	7.183	Not Significant
2 = (1+3)/2	4.300	18.490	24.879	0.743	7.183	Not Significant
3 = (1+2)/2	2.500	6.250	24.879	0.251	7.183	Not Significant

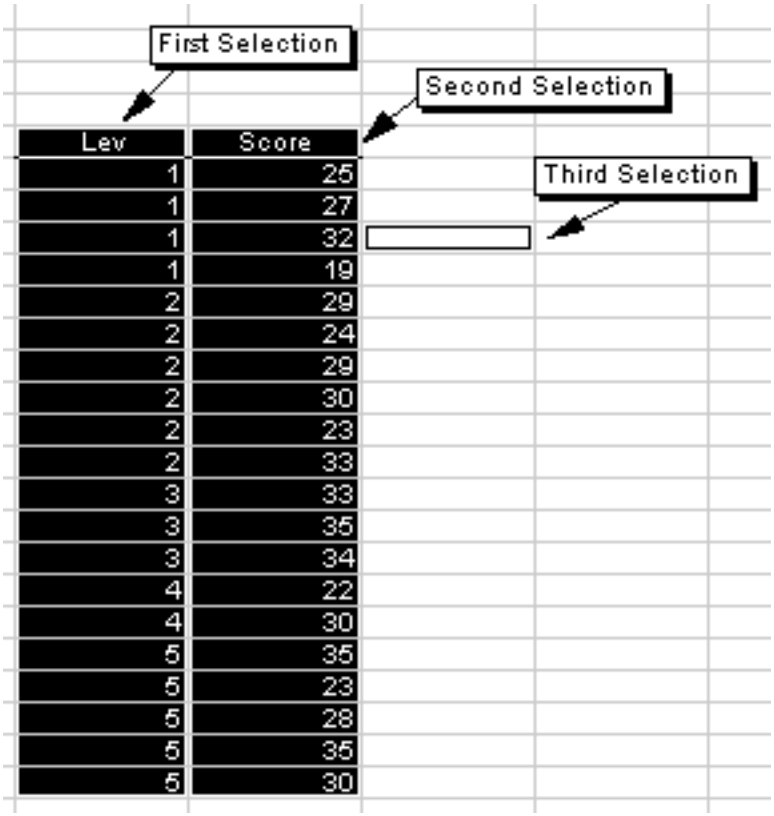
Scheffé post hoc *output.*

Related Procedures

ANOVA: Newman-Keuls Comparisons; Orthogonal Contrasts
VBA Programming Call: `anovaMenuScheffe`

Independent Homogeneity of Variance

Run an independent homogeneity of variance test for all possible group combinations of one or more grouping variables on one or more dependent variables. It is expected that your dependent data is of interval measurement or ratio measurement level.



Lev	Score
1	25
1	27
1	32
1	19
2	29
2	24
2	29
2	30
2	23
2	33
3	33
3	35
3	34
4	22
4	30
5	35
5	23
5	28
5	35
5	30

Information required to generate **Independent Homogeneity of Variance**.

Setup & Run: Manual

1) Select the grouping variable data set(s). (Include label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the dependent variable data set(s). (Include label selection.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **Independent Homogeneity of Variance** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > Independent Homogeneity of Variance** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Lev	Score
1	25
1	27
1	32
1	19
2	29
2	24
2	29
2	30
2	23
2	33
3	33
3	35
3	34
4	22
4	30
5	35
5	23
5	28

Test for homogeneity of indepenent variances: Score

Lev	*Var*	*df*	*F*	*p* <
1	28.917	3	2.008	0.231
2	14.400	5		
1	28.917	3	28.917	0.034
3	1.000	2		
1	28.917	3	1.107	0.370
4	32.000	1		
1	28.917	3	1.125	0.439
5	25.700	4		
2	14.400	5	14.400	0.066
3	1.000	2		
2	14.400	5	2.222	0.196

Independent Homogeneity of Variance *output.*

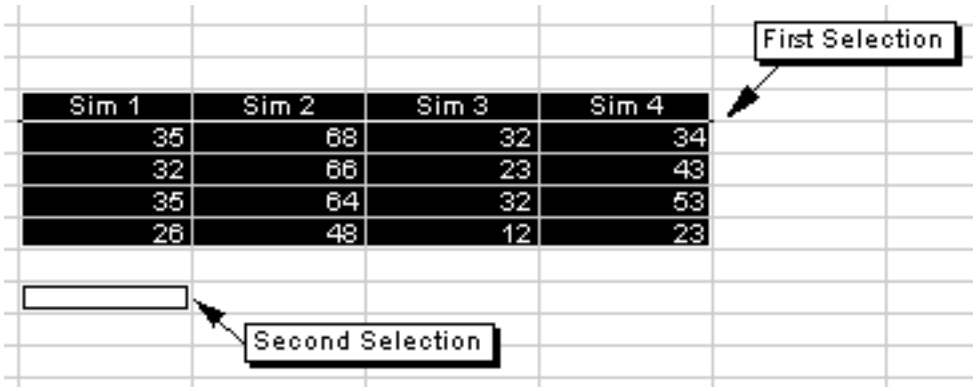
Related Procedures

ANOVA: Related Homogeneity of Variance
VBA Programming Call: `anovaMenuIndepHomog`

Related Homogeneity of Variance

Prior to the application of a repeated measures ANOVA, you can run a related homogeneity of variance test. This test is useful in determining one of the fundamental assumptions of ANOVA, that there is homogeneity of variance.

The test requires there be more than one variable or more than one measurement of one variable. It is expected that your data is of interval measurement or ratio measurement level.



Information required to generate **Related Homogeneity of Variance**.

Setup & Run: Manual

1) Select the variable data set. (Include label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Related Homogeneity of Variance** from the **ANOVA** submenu.

Setup & Run: Range Wizard

1) Select **ANOVA > Related Homogeneity of Variance** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sim 1	Sim 2	Sim 3	Sim 4		
35	68	32	34		
32	66	23	43		
35	64	32	53		
26	48	12	23		
Test for homogeneity of related variances					
Variable	*Variance*	*r*	*df*	*t*	*p* <
Sim 1	18.000	0.928	2	4.449	0.047
Sim 2	83.667				
Sim 1	18.000	0.992	2	14.569	0.005
Sim 3	90.250				
Sim 1	18.000	0.756	2	3.837	0.062
Sim 4	163.583				
Sim 2	83.667	0.880	2	0.155	n.s.
Sim 3	90.250				
Sim 2	83.667	0.674	2	0.846	n.s.
Sim 4	163.583				
Sim 3	90.250	0.719	2	0.806	n.s.
Sim 4	163.583				

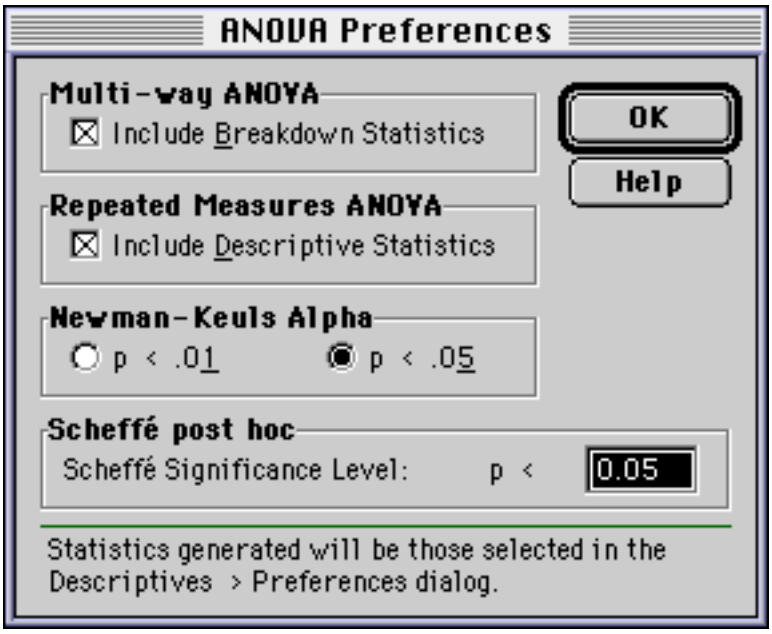
Related Homogeneity of Variance *output.*

Related Procedures

ANOVA: Independent Homogeneity of Variance
VBA Programming Call: `anovaMenuRelatedHomog`

Preferences...

Selecting **Stats > ANOVA > Preferences...** lets you choose how your statistics are determined.



What would you like with that ANOVA?

Multi-way ANOVA

By selecting the option to include breakdown statistics with your repeated measures ANOVA, you will have the descriptive statistics selected under the **Descriptive Preferences: Breakdown** supplied with your multi-way ANOVA results.

Repeated Measures ANOVA

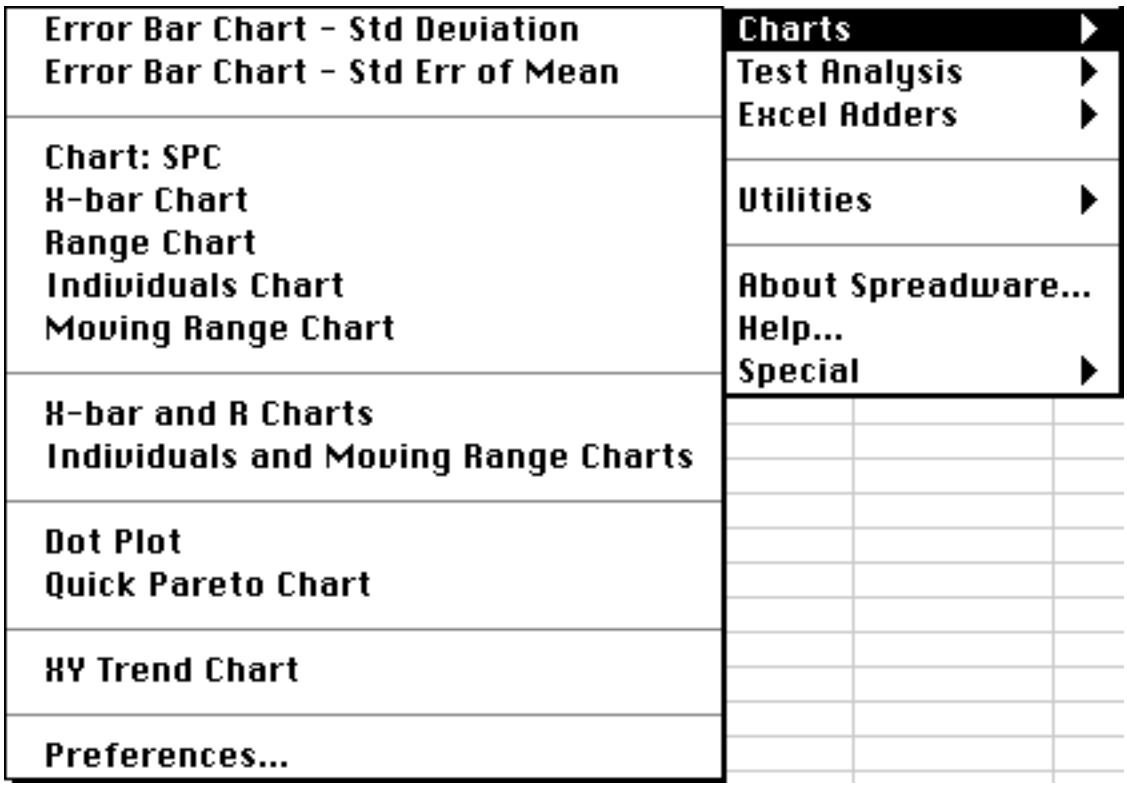
By selecting the option to include descriptive statistics with your repeated measures ANOVA, you will have the descriptive statistics selected under the **Descriptive Preferences: Continuous** supplied with your repeated measures ANOVA results.

Newman-Keuls Alpha

You have the ability to select an alpha of .01 or .05.

Scheffé post hoc

Select the significance level you want applied to the Scheffé post hoc by entering your desired alpha.



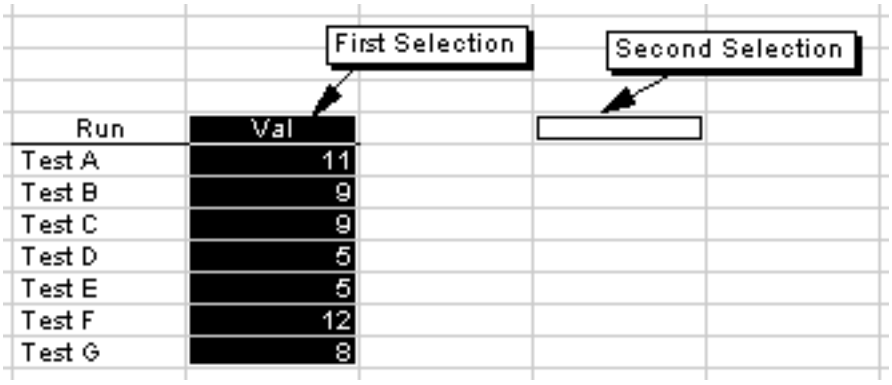
Charts

This set of routines creates a variety of charts, and the data underlying the graphical presentation.

The decimal formatting for many of the statistics provided by the Charts routines is based on the **Statistic Display** decimal format setting in the **Descriptive Preferences** dialog.

Error Bar Chart - Std Deviation

This routine takes a range of data and generates a table based on a standard deviation for each data point, both an upper and a lower. This information is then used to present the information graphically with an error bar chart.



Information required to generate **Error Bar Chart- Standard Deviation**.

Setup & Run: Manual

1) Select the variable data set. (Include label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Error Bar Chart- Std Deviation** from the **Charts** submenu.

Setup & Run: Range Wizard

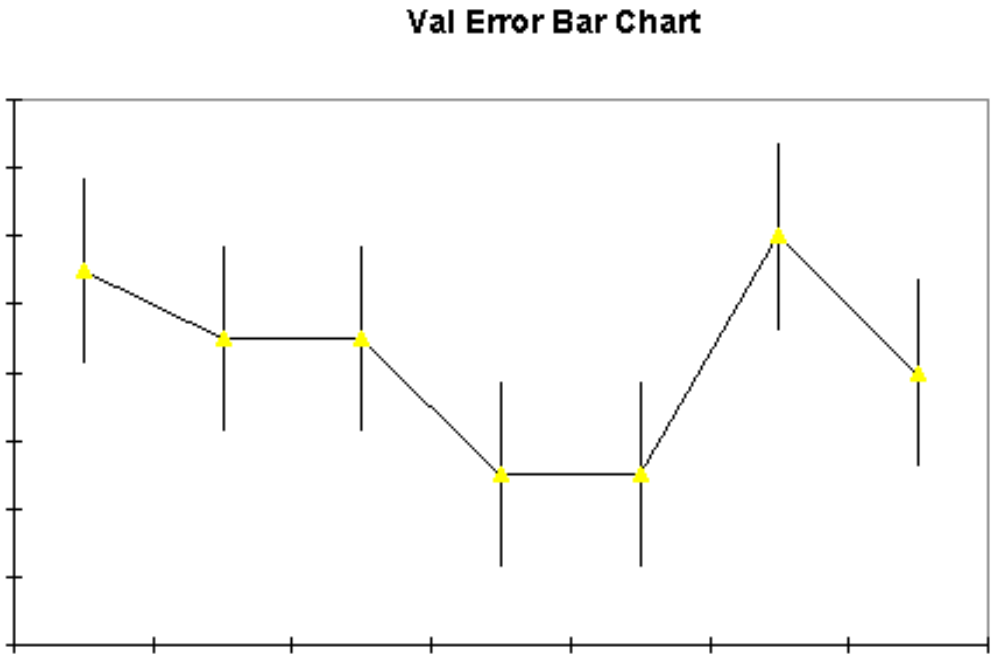
1) Select **Charts > Error Bar Chart- Std Deviation** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Run	Val		*Upper Error*	*Lower Error*	*Val*
Test A	11		13.699	8.301	11
Test B	9		11.699	6.301	9
Test C	9		11.699	6.301	9
Test D	5		7.699	2.301	5
Test E	5		7.699	2.301	5
Test F	12		14.699	9.301	12
Test G	8		10.699	5.301	8

Error Bar Chart- Standard Deviation *output.*



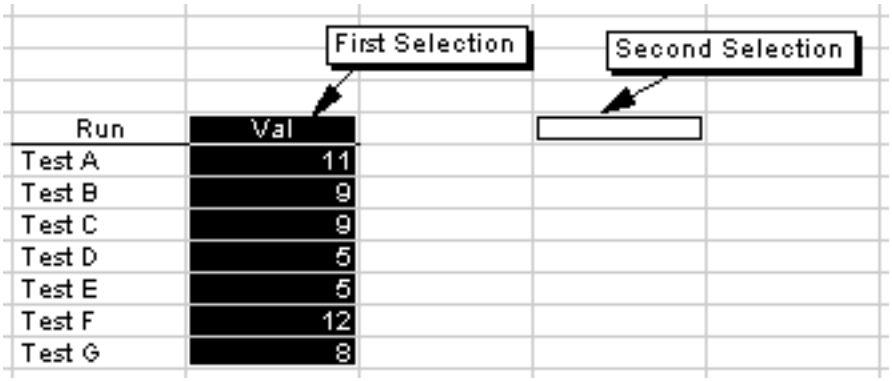
Error Bar Chart- Standard Deviation *chart creation.*

Related Procedures

Descriptive: Breakdown; Crossbreak
Charts: Error Bar Chart - Std Err of Mean
VBA Programming Call: `chartMenuErrorBarStdDev`

Error Bar Chart - Std Err of Mean

This routine takes a range of data and generates a table based on a standard error of mean for each data point, both an upper and a lower standard error. This information is then used to present the information graphically with an error bar chart.



Information required to generate **Error Bar Chart- Standard Error of Mean**.

Setup & Run: Manual

1) Select the variable data set. (Include label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Error Bar Chart- Std Err of Mean** from the **Charts** submenu.

Setup & Run: Range Wizard

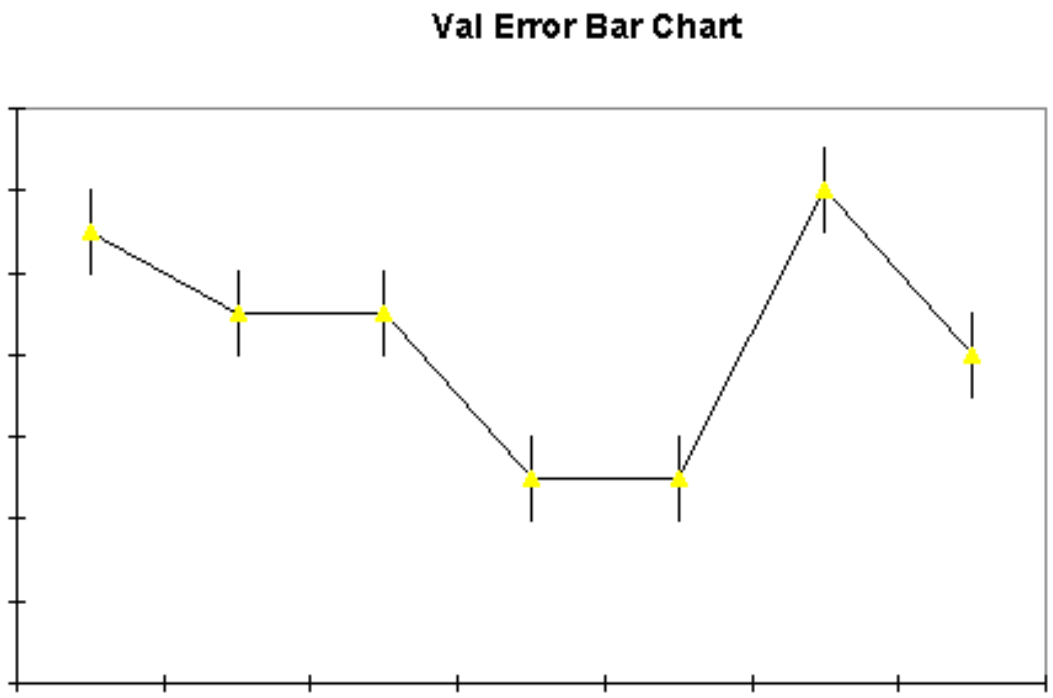
1) Select **Charts > Error Bar Chart- Std Err of Mean** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Run	Val		*Upper Error*	*Lower Error*	*Val*
Test A	11		12.020	9.980	11
Test B	9		10.020	7.980	9
Test C	9		10.020	7.980	9
Test D	5		6.020	3.980	5
Test E	5		6.020	3.980	5
Test F	12		13.020	10.980	12
Test G	8		9.020	6.980	8

Error Bar Chart- Standard Error of Mean *output.*



Error Bar Chart- Standard Error of Mean *chart creation.*

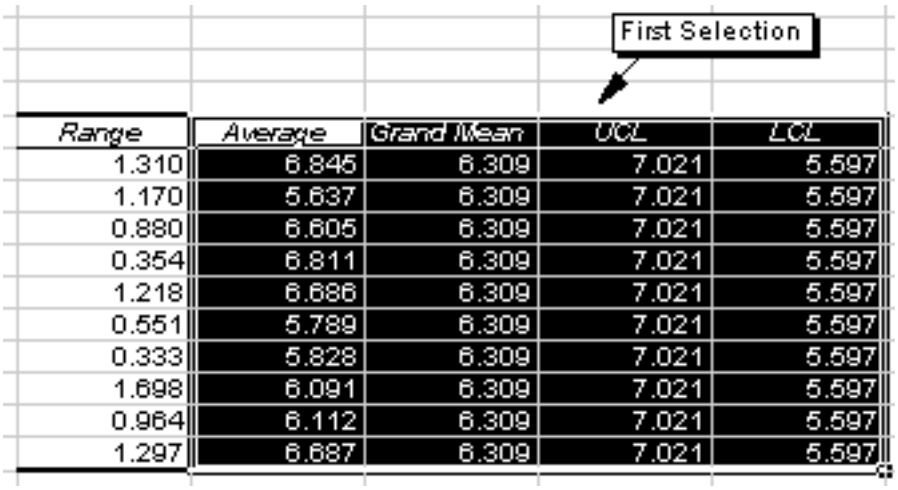
Related Procedures

Descriptive: Breakdown; Crossbreak
Charts: Error Bar Chart - Std Deviation
VBA Programming Call: `chartMenuErrorBarStdErr`

Chart: SPC

If you have generated the data, we have a routine that can quickly create your statistical process control (SPC) chart. The routine requires four pieces of data: upper control limit (UCL); lower control limit (LCL); relevant mean; and the data under control (average, range mean, etc.).

If you need this information calculated, you may be interested in using the X-bar, range, individuals or moving range routines.



Range	Average	Grand Mean	UCL	LCL
1.310	6.845	6.309	7.021	5.597
1.170	5.637	6.309	7.021	5.597
0.880	6.605	6.309	7.021	5.597
0.354	6.811	6.309	7.021	5.597
1.218	6.686	6.309	7.021	5.597
0.551	5.789	6.309	7.021	5.597
0.333	5.828	6.309	7.021	5.597
1.698	6.091	6.309	7.021	5.597
0.964	6.112	6.309	7.021	5.597
1.297	6.687	6.309	7.021	5.597

Information required to generate **Chart: SPC**.

This routines has a special feature: You can make anywhere from one to four selections, as long as you have a total of four columns of data. When you are using the Range Wizards, set the **Preferences...** to the number of ranges you want to select. (Multiple range selection is the same as that for any other routine.)

Setup & Run: Manual

1) Select the chart parameter data set. (Include label selection.)

2) Go to the **Stats** menu and select **Chart: SPC** from the **Charts** submenu.

Setup & Run: Range Wizard

1) Select **Charts > Chart: SPC** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

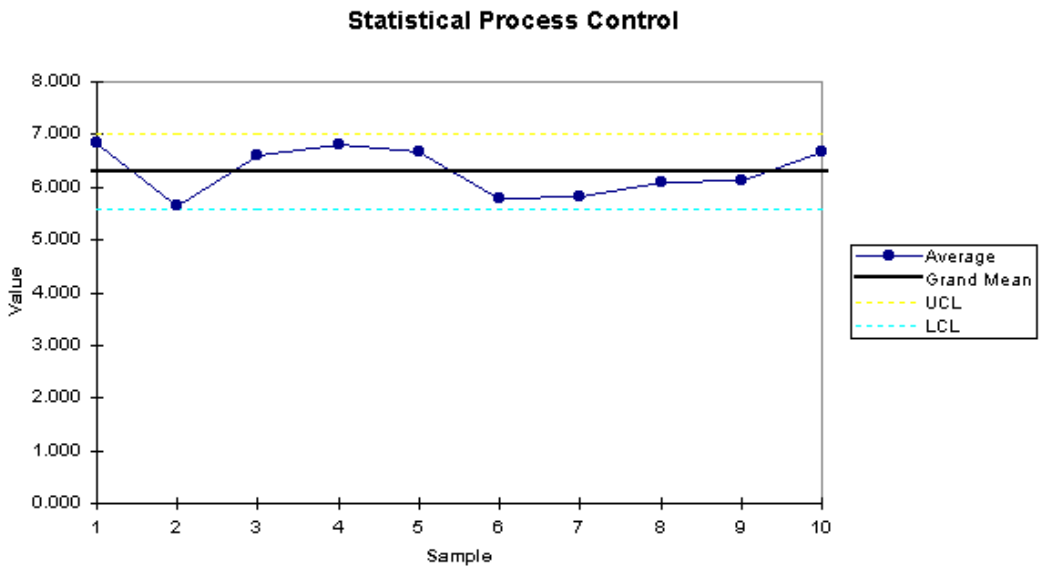


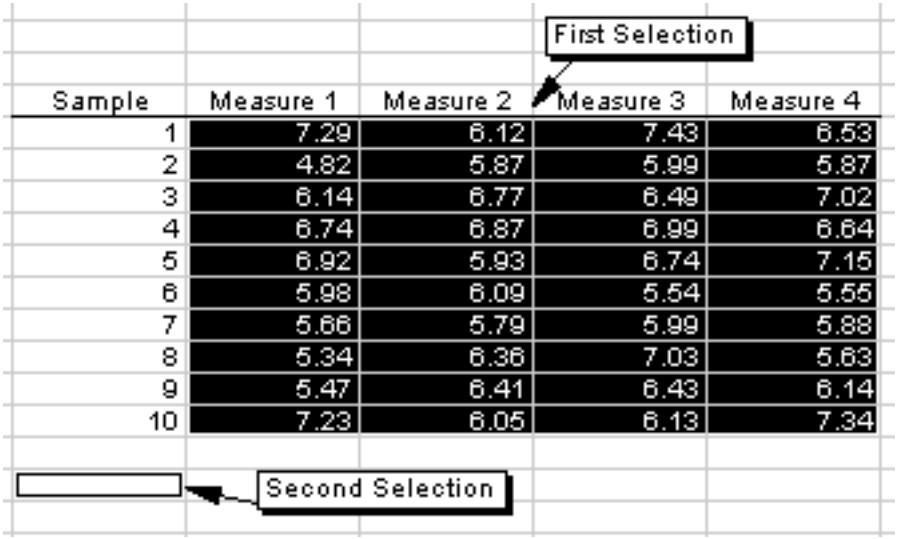
Chart: SPC *chart creation.*

Related Procedures

Charts: X-bar Chart; Range Chart; X-bar and R Charts
VBA Programming Call: `chartMenuSPCChart`

X-bar Chart

The x-bar chart, also known as the average chart, is a common chart, especially in statistical process control analysis. This routines takes your measurement data - up to 10 measurements and an unlimited number of samples - and calculates the mean average (grand mean) and control limits based on industry standards.



Sample	Measure 1	Measure 2	Measure 3	Measure 4
1	7.29	6.12	7.43	6.53
2	4.82	5.87	5.99	5.87
3	6.14	6.77	6.49	7.02
4	6.74	6.87	6.99	6.64
5	6.92	5.93	6.74	7.15
6	5.98	6.09	5.54	5.55
7	5.66	5.79	5.99	5.88
8	5.34	6.36	7.03	5.63
9	5.47	6.41	6.43	6.14
10	7.23	6.05	6.13	7.34

Information required to generate **X-bar Chart**.

Setup & Run: Manual

1) Select the measurements data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **X-bar Chart** from the **Charts** submenu.

Setup & Run: Range Wizard

1) Select **Charts > X-bar Chart** from the **Stats** menu.

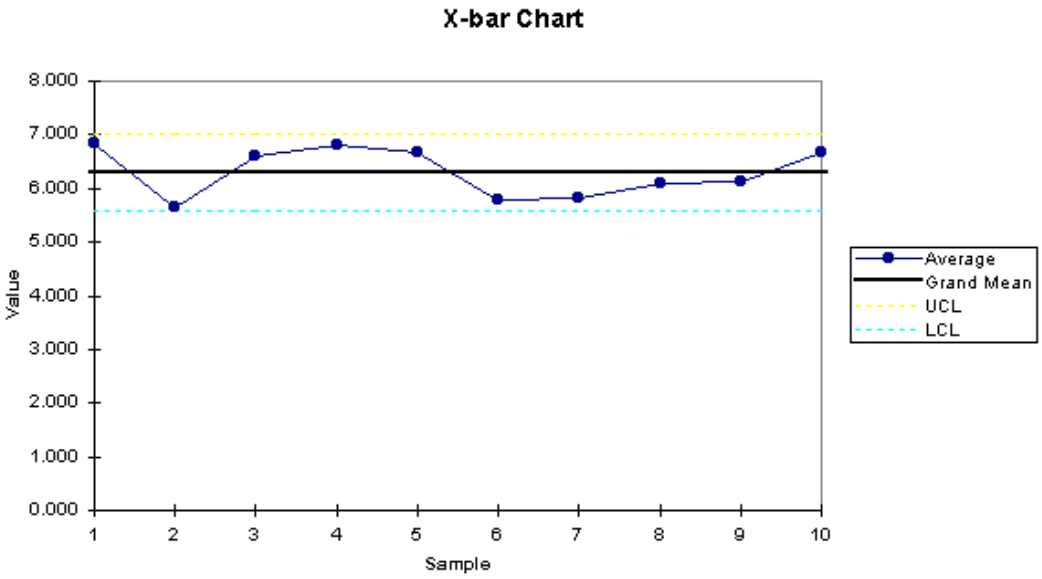
2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sample	Measure 1	Measure 2	Measure 3	Measure 4
1	7.29	6.12	7.43	6.53
2	4.82	5.87	5.99	5.87
3	6.14	6.77	6.49	7.02
4	6.74	6.87	6.99	6.64
5	6.92	5.93	6.74	7.15
6	5.98	6.09	5.54	5.55
7	5.66	5.79	5.99	5.88
8	5.34	6.36	7.03	5.63
9	5.47	6.41	6.43	6.14
10	7.23	6.05	6.13	7.34

Range	*Average*	*Grand Mean*	*UCL*	*LCL*
1.310	6.845	6.309	7.021	5.597
1.170	5.637	6.309	7.021	5.597
0.880	6.605	6.309	7.021	5.597
0.354	6.811	6.309	7.021	5.597
1.218	6.686	6.309	7.021	5.597
0.551	5.789	6.309	7.021	5.597
0.333	5.828	6.309	7.021	5.597
1.698	6.091	6.309	7.021	5.597
0.964	6.112	6.309	7.021	5.597
1.297	6.687	6.309	7.021	5.597

X-bar Chart *output.*



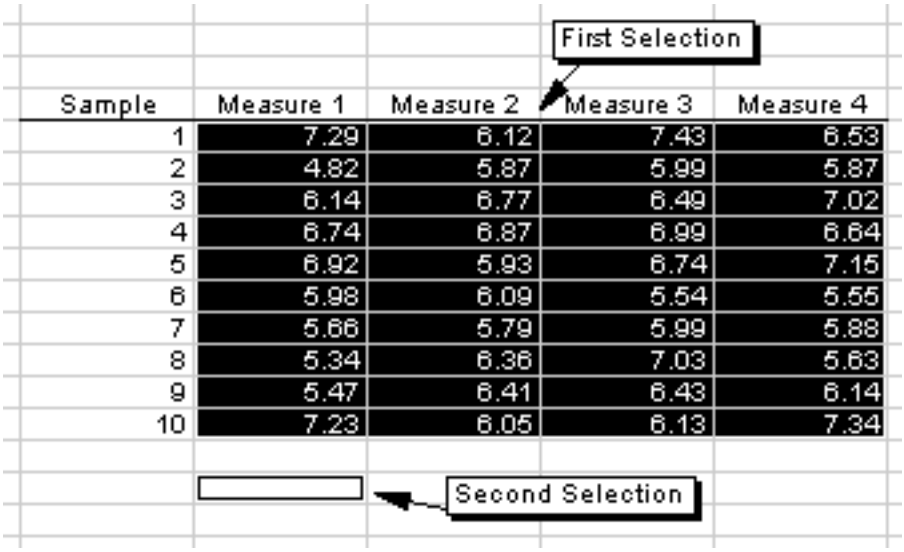
X-bar Chart *chart creation.*

Related Procedures

Charts: Chart: SPC; Range Chart; X-bar and R Charts
VBA Programming Call: `chartMenuSPCXBarChart`

Range Chart

The range chart, also known as the R chart, is a common chart, especially in statistical process control analysis. This routines takes your measurement data - up to 10 measurements and an unlimited number of samples - and calculates the range average and control limits based on industry standards.



Sample	Measure 1	Measure 2	Measure 3	Measure 4
1	7.29	6.12	7.43	6.53
2	4.82	5.87	5.99	5.87
3	6.14	6.77	6.49	7.02
4	6.74	6.87	6.99	6.64
5	6.92	5.93	6.74	7.15
6	5.98	6.09	5.54	5.55
7	5.66	5.79	5.99	5.88
8	5.34	6.36	7.03	5.63
9	5.47	6.41	6.43	6.14
10	7.23	6.05	6.13	7.34

Information required to generate **Range Chart**.

Setup & Run: Manual

1) Select the measurements data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Range Chart** from the **Charts** submenu.

Setup & Run: Range Wizard

1) Select **Charts > Range Chart** from the **Stats** menu.

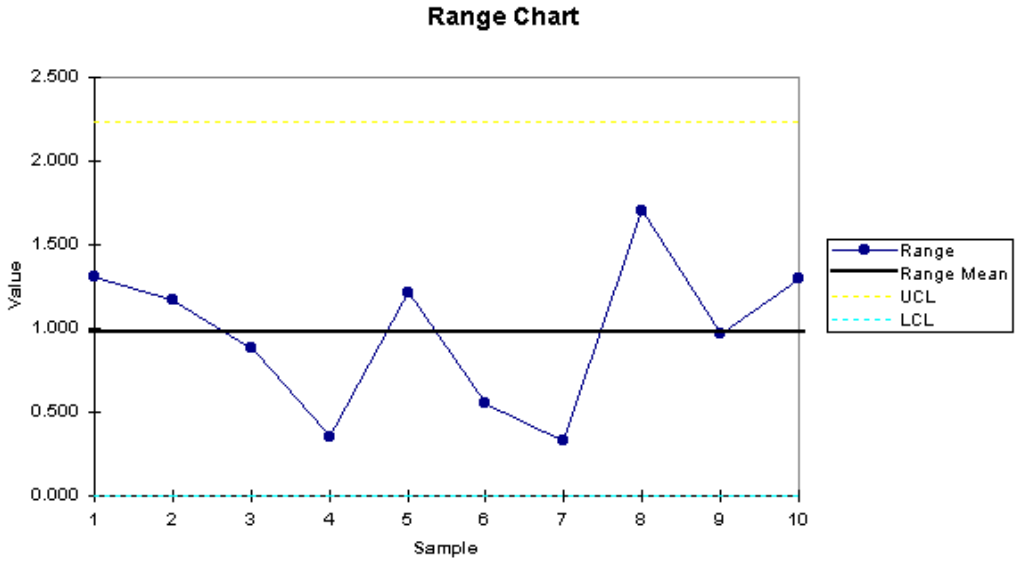
2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sample	Measure 1	Measure 2	Measure 3	Measure 4
1	7.29	6.12	7.43	6.53
2	4.82	5.87	5.99	5.87
3	6.14	6.77	6.49	7.02
4	6.74	6.87	6.99	6.64
5	6.92	5.93	6.74	7.15
6	5.98	6.09	5.54	5.55
7	5.66	5.79	5.99	5.88
8	5.34	6.36	7.03	5.63
9	5.47	6.41	6.43	6.14
10	7.23	6.05	6.13	7.34

Range	*Range Mean*	*UCL*	*LCL*
1.310	0.977	2.230	0.000
1.170	0.977	2.230	0.000
0.880	0.977	2.230	0.000
0.354	0.977	2.230	0.000
1.218	0.977	2.230	0.000
0.551	0.977	2.230	0.000
0.333	0.977	2.230	0.000
1.698	0.977	2.230	0.000
0.964	0.977	2.230	0.000
1.297	0.977	2.230	0.000

Range Chart *output.*



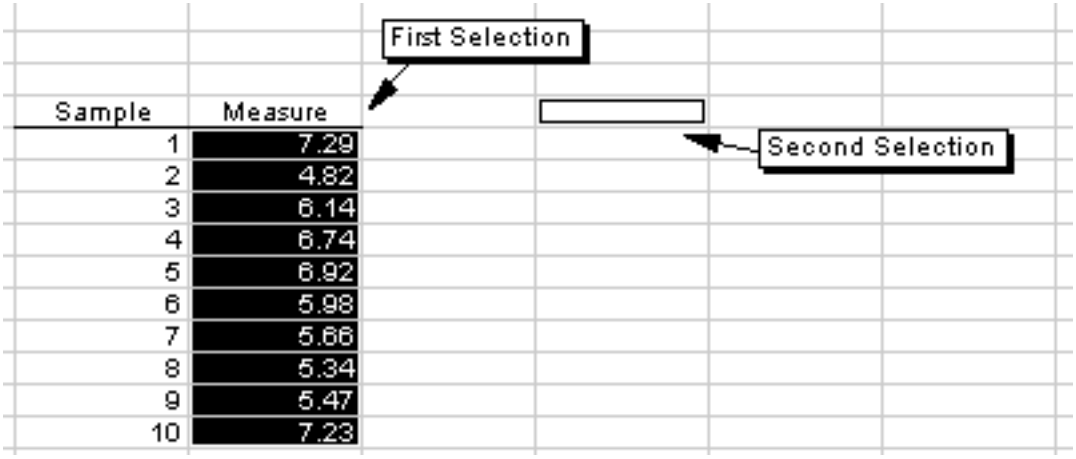
Range Chart *chart creation.*

Related Procedures

Charts: Chart: SPC; X-bar Chart; X-bar and R Charts
VBA Programming Call: `chartMenuSPCRangeChart`

Individuals Chart

The individuals chart is a popular statistical process control analysis chart, usually used in conjunction with the Moving Range Chart. This routines takes your single column of data - unlimited number of samples - and calculates the moving range (MR), data average and control limits based on industry standards.



Information required to generate **Individuals Chart**.

Setup & Run: Manual

1) Select the measurements data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Individuals Chart** from the **Charts** submenu.

Setup & Run: Range Wizard

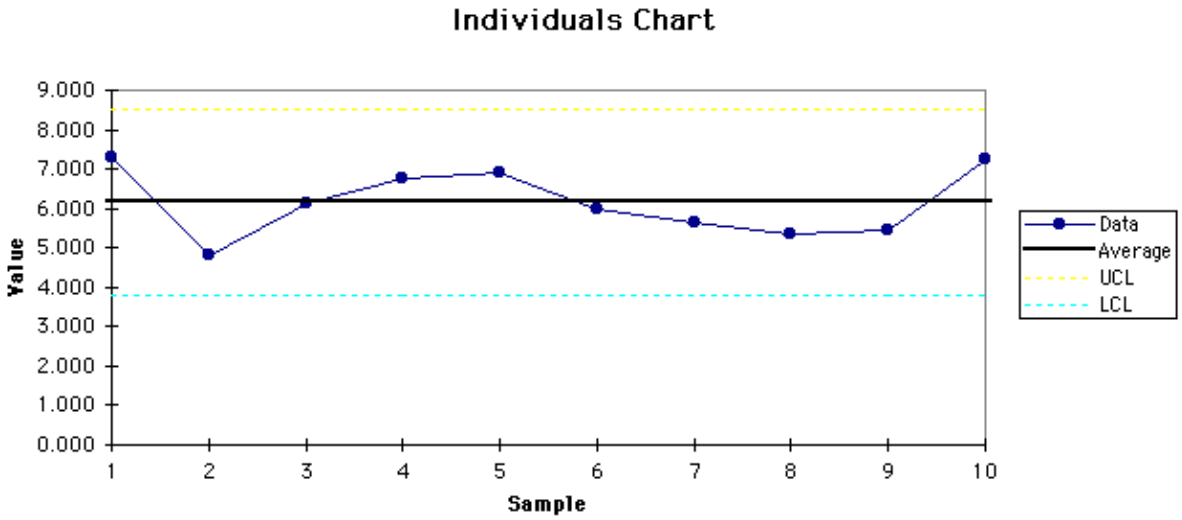
1) Select **Charts > Individuals Chart** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sample	Measure		*Data*	*MR*	*Average*	*UCL*	*LCL*
1	7.29		7.290		6.157	8.535	3.780
2	4.82		4.820	2.470	6.157	8.535	3.780
3	6.14		6.137	1.317	6.157	8.535	3.780
4	6.74		6.742	0.605	6.157	8.535	3.780
5	6.92		6.917	0.175	6.157	8.535	3.780
6	5.98		5.976	0.940	6.157	8.535	3.780
7	5.66		5.657	0.320	6.157	8.535	3.780
8	5.34		5.336	0.320	6.157	8.535	3.780
9	5.47		5.466	0.129	6.157	8.535	3.780
10	7.23		7.235	1.769	6.157	8.535	3.780

Individuals Chart *output.*



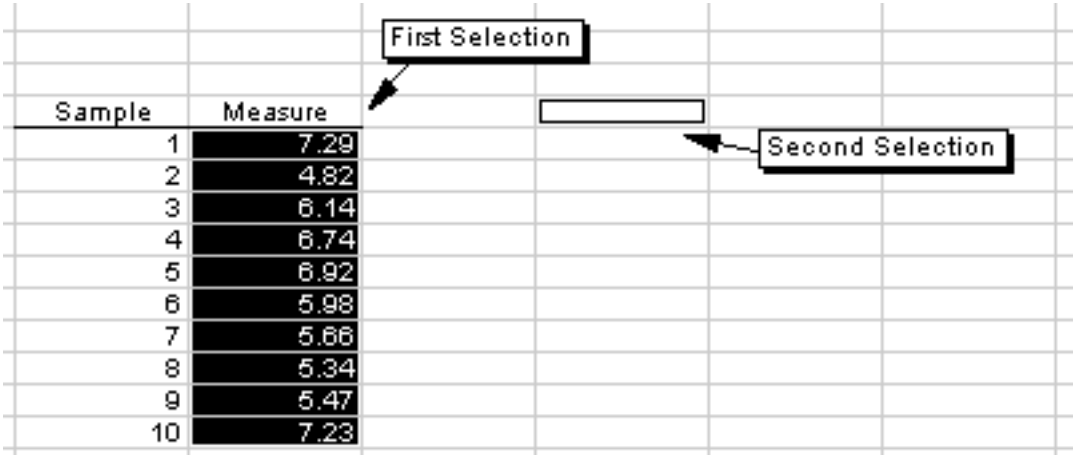
Individuals Chart *chart creation.*

Related Procedures

Charts: Chart: SPC; Moving Range Chart; Individuals and Moving Range Charts
VBA Programming Call: `chartMenuSPCIndivChart`

Moving Range Chart

The moving range chart is a popular statistical process control analysis chart, usually used in conjunction with the Individuals Chart. This routines takes your single column of data - unlimited number of samples - and calculates the moving range (MR), moving range average (MR Average) and control limits based on industry standards.



Information required to generate **Moving Range Chart**.

Setup & Run: Manual

1) Select the measurements data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Moving Range Chart** from the **Charts** submenu.

Setup & Run: Range Wizard

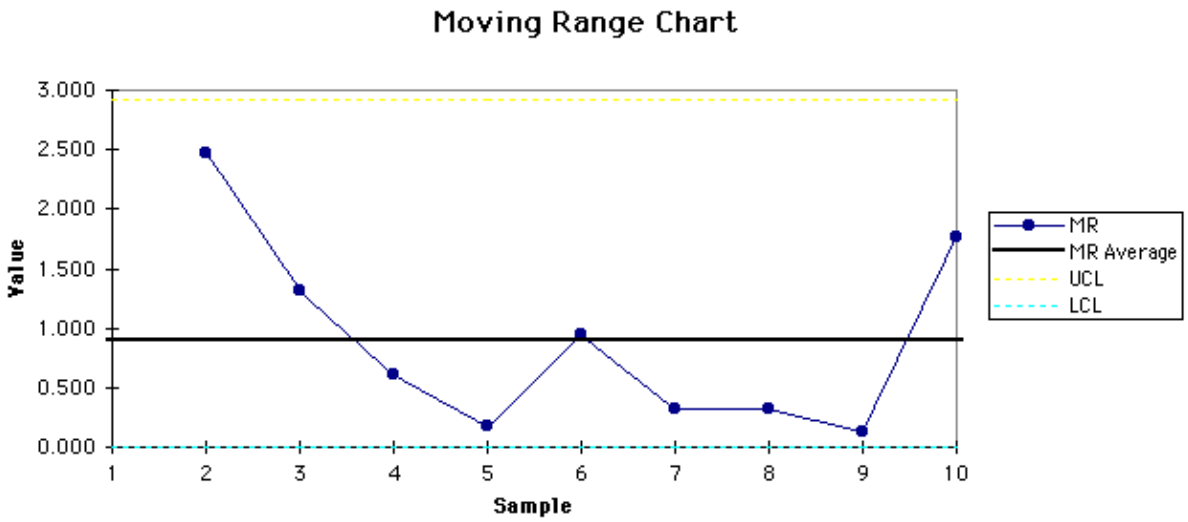
1) Select **Charts > Moving Range Chart** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sample	Measure		*MR*	*MR Average*	*UCL*	*LCL*
1	7.29			0.894	2.921	0.000
2	4.82		2.470	0.894	2.921	0.000
3	6.14		1.317	0.894	2.921	0.000
4	6.74		0.605	0.894	2.921	0.000
5	6.92		0.175	0.894	2.921	0.000
6	5.98		0.940	0.894	2.921	0.000
7	5.66		0.320	0.894	2.921	0.000
8	5.34		0.320	0.894	2.921	0.000
9	5.47		0.129	0.894	2.921	0.000
10	7.23		1.769	0.894	2.921	0.000

Moving Range Chart *output.*



Moving Range Chart *chart creation.*

Related Procedures

Charts: Chart: SPC; Individuals Chart; Individuals and Moving Range Charts
VBA Programming Call: `chartMenuSPCMRChart`

X-bar and R Charts

Successively creates the X-bar Chart then the Range Chart, as described previously, using the same measurements. (See descriptions of **X-bar Chart** and **Range Chart**.)

Range	Average	Grand Mean	UCL	LCL	Range	Range Mean	UCL	LCL
1.310	6.845	6.309	7.021	5.597	1.310	0.977	2.230	0.000
1.170	5.637	6.309	7.021	5.597	1.170	0.977	2.230	0.000
0.880	6.605	6.309	7.021	5.597	0.880	0.977	2.230	0.000
0.354	6.811	6.309	7.021	5.597	0.354	0.977	2.230	0.000
1.218	6.686	6.309	7.021	5.597	1.218	0.977	2.230	0.000
0.551	5.789	6.309	7.021	5.597	0.551	0.977	2.230	0.000
0.333	5.828	6.309	7.021	5.597	0.333	0.977	2.230	0.000
1.698	6.091	6.309	7.021	5.597	1.698	0.977	2.230	0.000
0.964	6.112	6.309	7.021	5.597	0.964	0.977	2.230	0.000
1.297	6.687	6.309	7.021	5.597	1.297	0.977	2.230	0.000

X-bar and R Charts *output. Range data is placed to the right of the x-bar data.*

Related Procedures

Charts: Chart: SPC; X-bar Chart; Range Chart
VBA Programming Call: `chartMenuSPCXBarRCharts`

Individuals and Moving Range Charts

Successively creates the Individuals Chart then the Moving Range Chart, as described previously, using the same measurements. (See descriptions of **Individuals Chart** and **Moving Range Chart**.)

Data	MR	Average	UCL	LCL	MR	MR Average	UCL	LCL
7.290		6.157	8.535	3.780		0.894	2.921	0.000
4.820	2.470	6.157	8.535	3.780	2.470	0.894	2.921	0.000
6.137	1.317	6.157	8.535	3.780	1.317	0.894	2.921	0.000
6.742	0.605	6.157	8.535	3.780	0.605	0.894	2.921	0.000
6.917	0.175	6.157	8.535	3.780	0.175	0.894	2.921	0.000
5.976	0.940	6.157	8.535	3.780	0.940	0.894	2.921	0.000
5.657	0.320	6.157	8.535	3.780	0.320	0.894	2.921	0.000
5.336	0.320	6.157	8.535	3.780	0.320	0.894	2.921	0.000
5.466	0.129	6.157	8.535	3.780	0.129	0.894	2.921	0.000
7.235	1.769	6.157	8.535	3.780	1.769	0.894	2.921	0.000

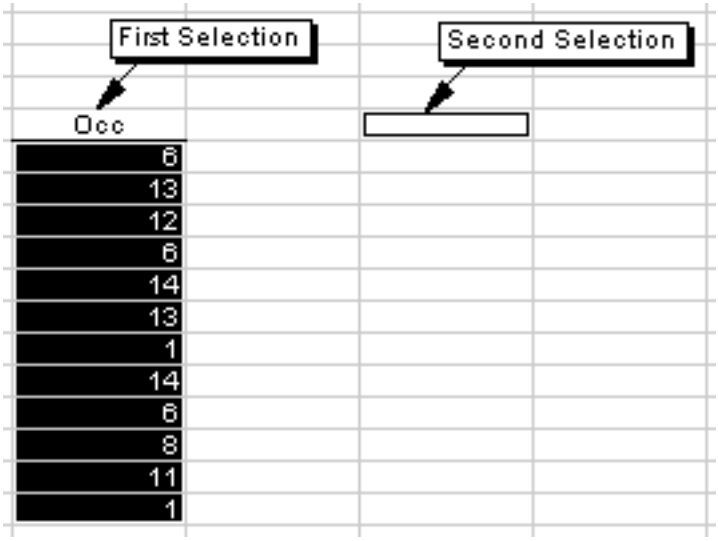
Individuals and Moving Range Charts *output. Moving range data is placed to the right of individuals data.*

Related Procedures

Charts: Chart: SPC; Individuals Chart; Moving Range Chart
VBA Programming Call: `chartMenuSPCIndivMRCharts`

Dot Plot

The dot plot is useful at helping to locate outliers, unusual data, and is best situated for small amounts of data. The dot plot creates a dot for each piece of data in the data set, plotting with the x-axis (horizontal) representing the data point measure, and the y-axis (vertical) representing the frequency of that data point.



Information required to generate **Dot Plot**.

Setup & Run: Manual

1) Select the variable data set. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Dot Plot** from the **Charts** submenu.

Setup & Run: Range Wizard

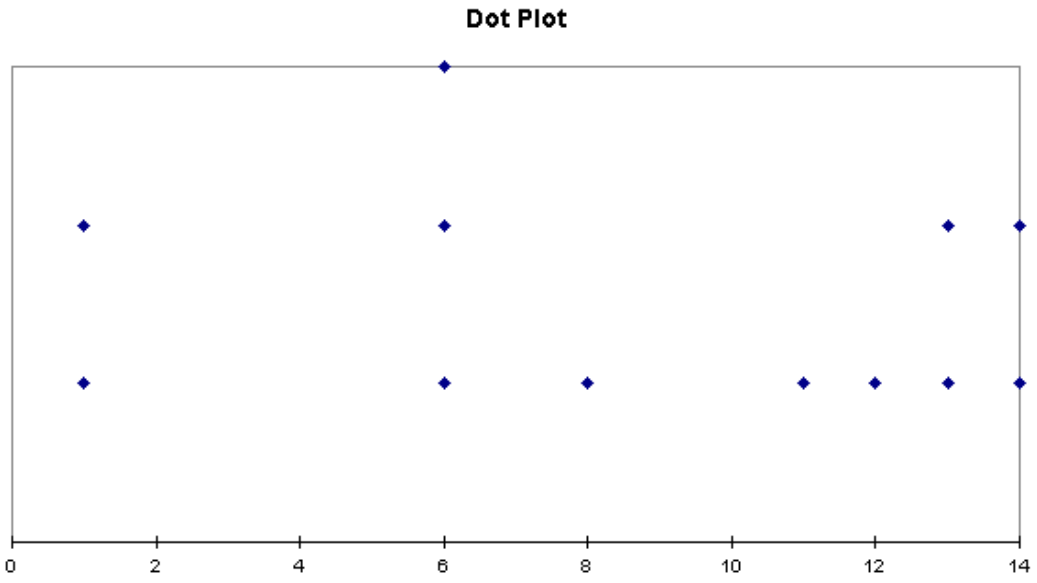
1) Select **Charts > Dot Plot** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Occ		Data	Points
6		1	1
13		1	2
12		6	1
6		6	2
14		6	3
13		8	1
1		11	1
14		12	1
6		13	1
8		13	2
11		14	1
1		14	2

Dot Plot *output.*



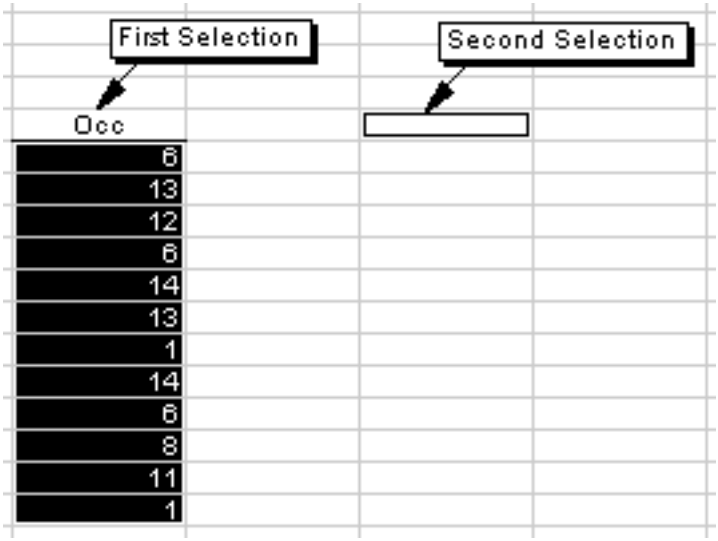
Dot Plot *chart creation.*

Related Procedures

Descriptive: Frequencies
Charts: Quick Pareto Chart
Excel Adders: Histogram
VBA Programming Call: `chartMenuDotPlot`

Quick Pareto Chart

This routine quickly creates a Pareto chart, which is a sorted histogram. Data is presented in descending frequency order in the output table, and in the quick graph placed under the output table.



Information required to generate **Quick Pareto Chart**.

Setup & Run: Manual

1) Select the variable data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

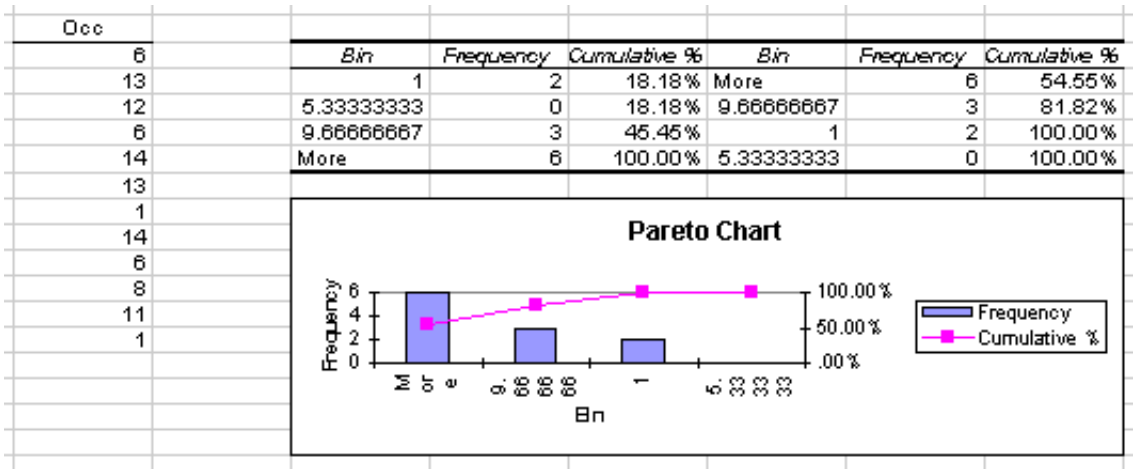
5) Go to the **Stats** menu and select **Quick Pareto Chart** from the **Charts** submenu.

Setup & Run: Range Wizard

1) Select **Charts > Quick Pareto Chart** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.



Occ
6
13
12
6
14
13
1
14
6
8
11
1

Bin	Frequency	Cumulative %	Bin	Frequency	Cumulative %
1	2	18.18%	More	6	54.55%
5.33333333	0	18.18%	9.66666667	3	81.82%
9.66666667	3	45.45%	1	2	100.00%
More	6	100.00%	5.33333333	0	100.00%

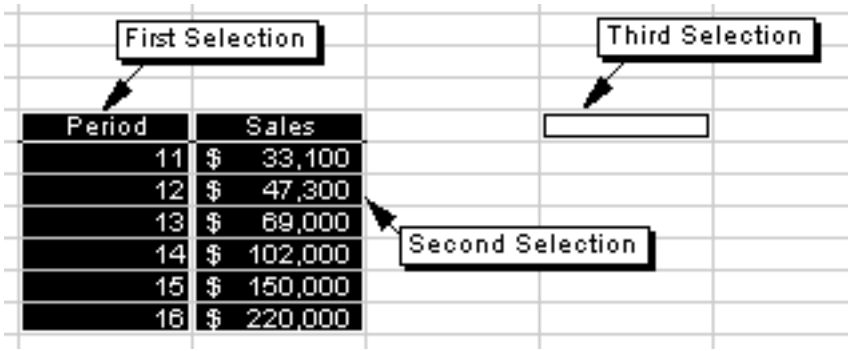
Quick Pareto Chart *output.*

Related Procedures

Descriptive: Frequencies
Charts: Dot Plot
Excel Adders: Histogram
VBA Programming Call: `chartMenuQuickPareto`

XY Trend Chart

The XY Trend Chart uses two continuous variables to calculate a trend, and a table of trend values. The trend values are plotted against the actual data in a linear regression.



Period	Sales
11	$ 33,100
12	$ 47,300
13	$ 69,000
14	$ 102,000
15	$ 150,000
16	$ 220,000

Information required to generate **XY Trend Chart**.

Setup & Run: Manual

1) Select the first variable data set. (With label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second variable data set. (With label selection.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL/COMMAND** key.

6) Go to the **Stats** menu and select **XY Trend Chart** from the **Charts** submenu.

Setup & Run: Range Wizard

1) Select **Charts > XY Trend Chart** from the **Stats** menu.

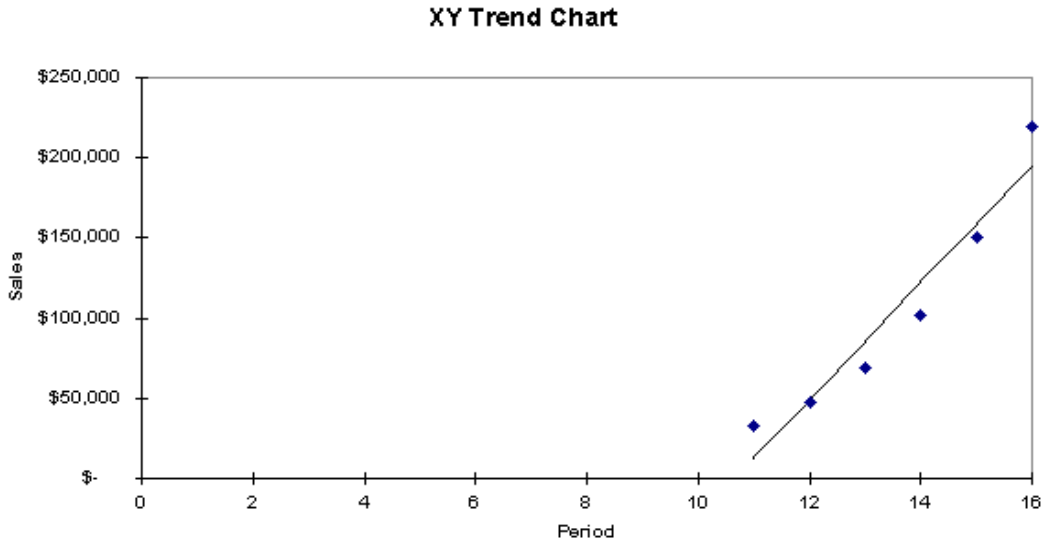
2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Period	Sales
11	$ 33,100
12	$ 47,300
13	$ 69,000
14	$ 102,000
15	$ 150,000
16	$ 220,000

Period	*Sales*	*Trend Value*
11	$ 33,100	12452.381
12	$ 47,300	48898.095
13	$ 69,000	85343.810
14	$ 102,000	121789.524
15	$ 150,000	158235.238
16	$ 220,000	194680.952

XY Trend Chart *output.*



XY Trend Chart *chart creation.*

Related Procedures

Descriptive: Crossbreak
Nonparametric: Contingency Table
Correlation: Correlation Matrix; Pearson r; Curve Fit; Line Fit
VBA Programming Call: `chartMenuXYTrendChart`

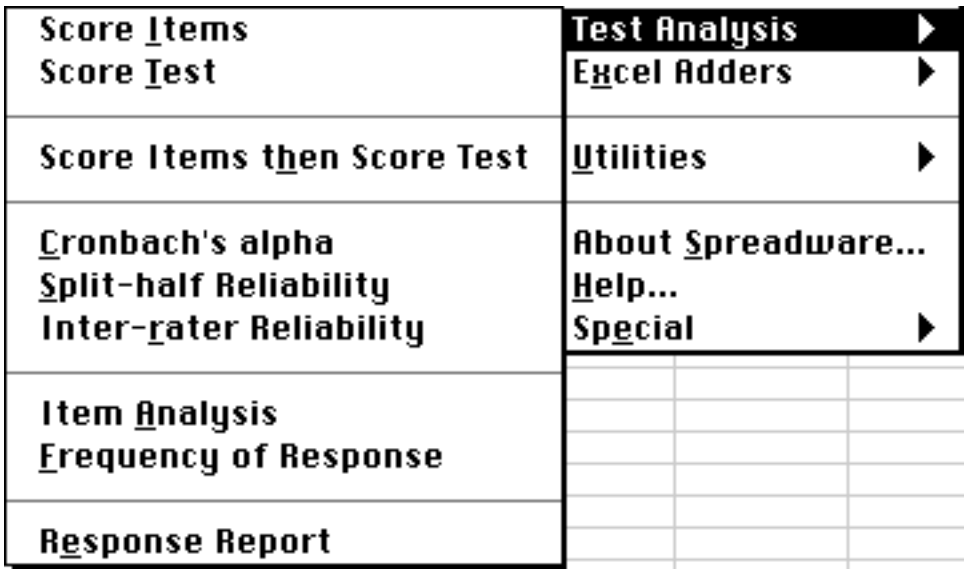
Preferences...

Selecting **Stats > Charts > Preferences...** lets you define which Range Wizard will be presented if you have the Use Wizards option selected when you choose **Chart: SPC**.

How many ranges?

Chart: SPC - Range Wizard Setting

Select the drop-down menu and choose how many ranges you want to select with the Range Wizard when using the **Chart: SPC** routine. (If you are not using the Range Wizard, this setting makes no difference. Why? The system can figure out how many ranges you have selected, and whether or not you have the required four columns of information.)



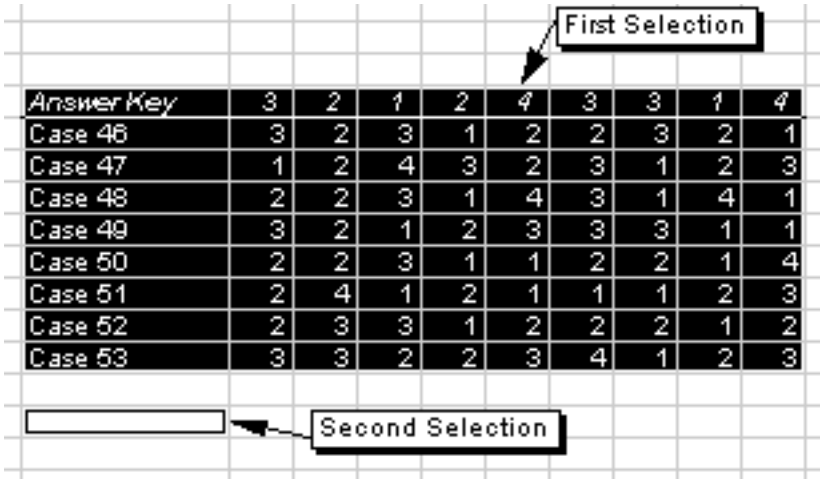
Test Analysis

A fun set of routines to make your life much easier, especially if you are involved in testing of any kind. Survey? Questionnaire? Aptitude? Rating? Evaluation? Whatever you want to call it, if you are involved in testing you will find these routines useful and time saving.

The decimal formatting for some of the statistics provided by the Test Analysis routines is based on the **Statistic Display** decimal format setting in the **Descriptive Preferences** dialog.

Score Items

This routine takes a matrix of test results, with the answer key making up the top row of the data, and creates a right/wrong matrix, where 1 represents a correct answer and 0 represents an incorrect answer. With this matrix, and the design of identity in the first column of data, you can then score the test, using the **Score Test** routine.



Answer Key	3	2	1	2	4	3	3	1	4
Case 46	3	2	3	1	2	2	3	2	1
Case 47	1	2	4	3	2	3	1	2	3
Case 48	2	2	3	1	4	3	1	4	1
Case 49	3	2	1	2	3	3	3	1	1
Case 50	2	2	3	1	1	2	2	1	4
Case 51	2	4	1	2	1	1	1	2	3
Case 52	2	3	3	1	2	2	2	1	2
Case 53	3	3	2	2	3	4	1	2	3

Information required to generate **Score Items**.

Setup & Run: Manual

1) Select the response data, with the first row representing the answer key and the first column the subject identification. (Proper label selection required.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Score Items** from the **Test Analysis** submenu.

Setup & Run: Range Wizard

1) Select **Test Analysis > Score Items** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Answer Key	3	2	1	2	4	3	3	1	4
Case 46	3	2	3	1	2	2	3	2	1
Case 47	1	2	4	3	2	3	1	2	3
Case 48	2	2	3	1	4	3	1	4	1
Case 49	3	2	1	2	3	3	3	1	1
Case 50	2	2	3	1	1	2	2	1	4
Case 51	2	4	1	2	1	1	1	2	3
Case 52	2	3	3	1	2	2	2	1	2
Case 53	3	3	2	2	3	4	1	2	3
Right/Wrong Matrix									
Case 46	1	1	0	0	0	0	1	0	0
Case 47	0	1	0	0	0	1	0	0	0
Case 48	0	1	0	0	1	1	0	0	0
Case 49	1	1	1	1	0	1	1	1	0
Case 50	0	1	0	0	0	0	0	1	1
Case 51	0	0	1	1	0	0	0	0	0
Case 52	0	0	0	0	0	0	0	1	0
Case 53	1	0	0	1	0	0	0	0	0

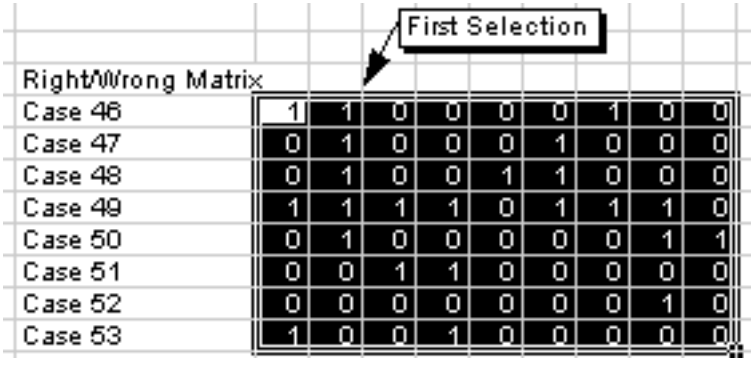
Score Items *output.*

Related Procedures

Test Analysis: Score Test; Score Items then Score Test
VBA Programming Call: `testAnalysisMenuScoreItems`

Score Test

After you have created a right/wrong matrix with the **Score Items** routine, you can then score the test. The output - scores - is placed to the right of the right/wrong matrix you select.



Information required to generate **Score Test**.

Setup & Run: Manual

1) Select right/wrong matrix. (No label selection.) Output is automatically placed to the right of the matrix you select.

2) Go to the **Stats** menu and select **Score Test** from the **Test Analysis** submenu.

Setup & Run: Range Wizard

1) Select **Test Analysis > Score Test** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Right/Wrong Matrix										Score
Case 46	1	1	0	0	0	0	1	0	0	3
Case 47	0	1	0	0	0	1	0	0	0	2
Case 48	0	1	0	0	1	1	0	0	0	3
Case 49	1	1	1	1	0	1	1	1	0	7
Case 50	0	1	0	0	0	0	0	1	1	3
Case 51	0	0	1	1	0	0	0	0	0	2
Case 52	0	0	0	0	0	0	0	1	0	1
Case 53	1	0	0	1	0	0	0	0	0	2

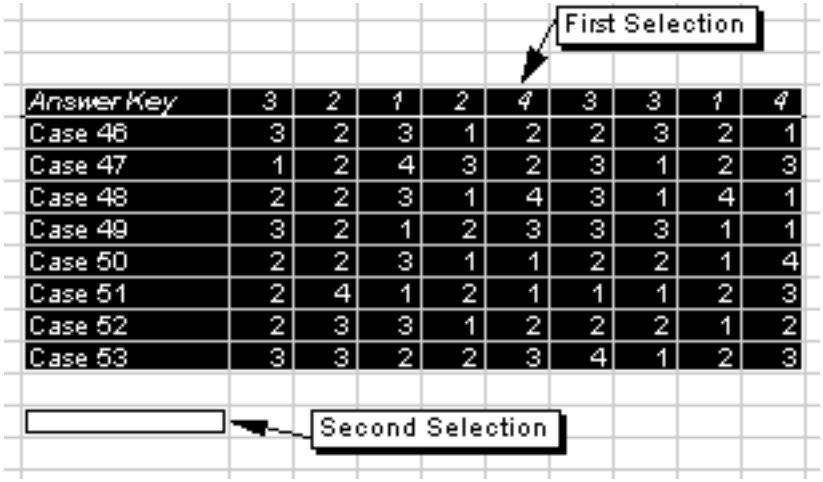
Score Test *output.*

Related Procedures

Test Analysis: Score Items; Score Items then Score Test
VBA Programming Call: `testAnalysisMenuScoreTest`

Score Items then Score Test

This routine requires you set up the data as in the **Score Items** routine. With the data set up properly, the selection of this menu item automatically creates the right/wrong matrix, then produces the scores for the matrix. (See **Score Items** and **Score Test** routines for complete description.)



Answer Key	3	2	1	2	4	3	3	1	4
Case 46	3	2	3	1	2	2	3	2	1
Case 47	1	2	4	3	2	3	1	2	3
Case 48	2	2	3	1	4	3	1	4	1
Case 49	3	2	1	2	3	3	3	1	1
Case 50	2	2	3	1	1	2	2	1	4
Case 51	2	4	1	2	1	1	1	2	3
Case 52	2	3	3	1	2	2	2	1	2
Case 53	3	3	2	2	3	4	1	2	3

Information required to generate **Score Items then Score Test**.

Answer Key	3	2	1	2	4	3	3	1	4	
Case 46	3	2	3	1	2	2	3	2	1	
Case 47	1	2	4	3	2	3	1	2	3	
Case 48	2	2	3	1	4	3	1	4	1	
Case 49	3	2	1	2	3	3	3	1	1	
Case 50	2	2	3	1	1	2	2	1	4	
Case 51	2	4	1	2	1	1	1	2	3	
Case 52	2	3	3	1	2	2	2	1	2	
Case 53	3	3	2	2	3	4	1	2	3	
Right/Wrong Matrix										Score
Case 46	1	1	0	0	0	0	1	0	0	3
Case 47	0	1	0	0	0	1	0	0	0	2
Case 48	0	1	0	0	1	1	0	0	0	3
Case 49	1	1	1	1	0	1	1	1	0	7
Case 50	0	1	0	0	0	0	0	1	1	3
Case 51	0	0	1	1	0	0	0	0	0	2
Case 52	0	0	0	0	0	0	0	1	0	1
Case 53	1	0	0	1	0	0	0	0	0	2

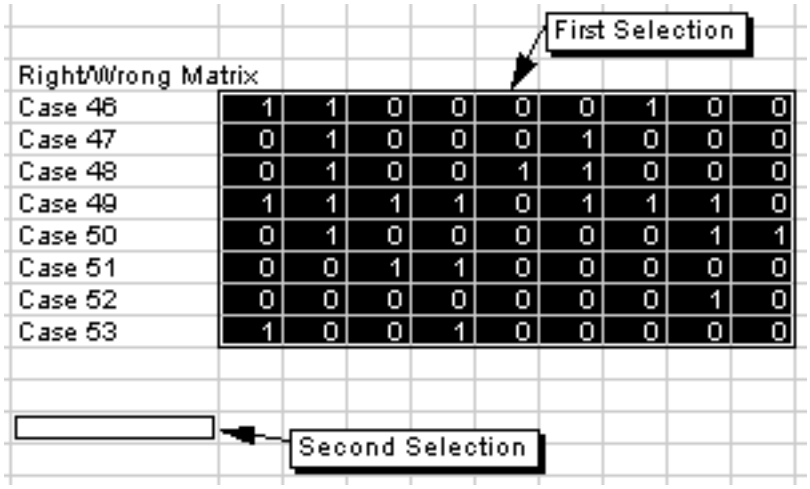
Score Items then Score Test *output.*

Related Procedures

Test Analysis: Score Items; Score Test
VBA Programming Call: `testAnalysisMenuScoreItemsTest`

Cronbach's alpha

Produces the Cronbach's alpha reliability for a matrix of responses. Data is set up as the right/wrong matrix, with columns representing items, and rows representing subjects.



Information required to generate **Cronbach's alpha**.

Setup & Run: Manual

1) Select response data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Cronbach's alpha** from the **Test Analysis** submenu.

Setup & Run: Range Wizard

1) Select **Test Analysis > Cronbach's alpha** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Right/Wrong Matrix									
Case 46	1	1	0	0	0	0	1	0	0
Case 47	0	1	0	0	0	1	0	0	0
Case 48	0	1	0	0	1	1	0	0	0
Case 49	1	1	1	1	0	1	1	1	0
Case 50	0	1	0	0	0	0	0	1	1
Case 51	0	0	1	1	0	0	0	0	0
Case 52	0	0	0	0	0	0	0	1	0
Case 53	1	0	0	1	0	0	0	0	0
Cronbach's alpha	0.430								

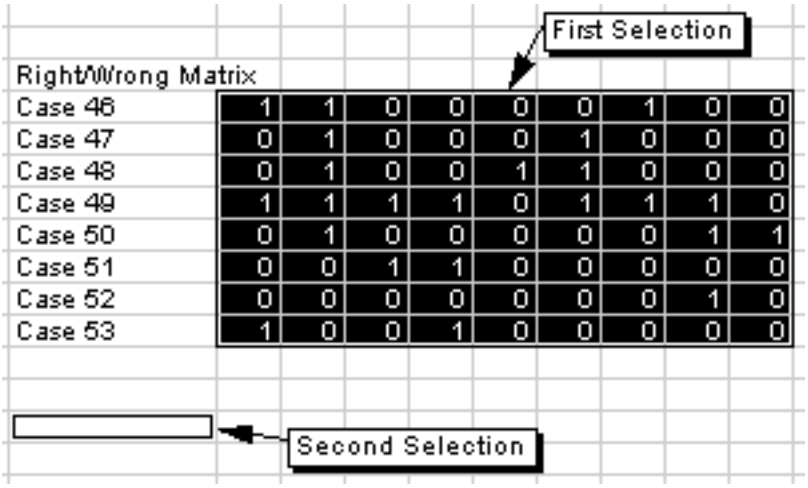
Cronbach's alpha *output.*

Related Procedures

Test Analysis: Split-half Reliability; Inter-rater Reliability
VBA Programming Call: `testAnalysisMenuCronbachsAlpha`

Split-half Reliability

Produces the split-halves reliability for a matrix of responses. Data is set up as the right/wrong matrix, with columns representing items, and rows representing subjects.



Information required to generate **Split-half Reliability**.

Setup & Run: Manual

1) Select response data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL/COMMAND** key.

5) Go to the **Stats** menu and select **Split-half Reliability** from the **Test Analysis** submenu.

Setup & Run: Range Wizard

1) Select **Test Analysis > Split-half Reliability** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Right/Wrong Matrix									
Case 46	1	1	0	0	0	0	1	0	0
Case 47	0	1	0	0	0	1	0	0	0
Case 48	0	1	0	0	1	1	0	0	0
Case 49	1	1	1	1	0	1	1	1	0
Case 50	0	1	0	0	0	0	0	1	1
Case 51	0	0	1	1	0	0	0	0	0
Case 52	0	0	0	0	0	0	0	1	0
Case 53	1	0	0	1	0	0	0	0	0
Split-half r	0.592								
Spearman-Brown (	0.744								

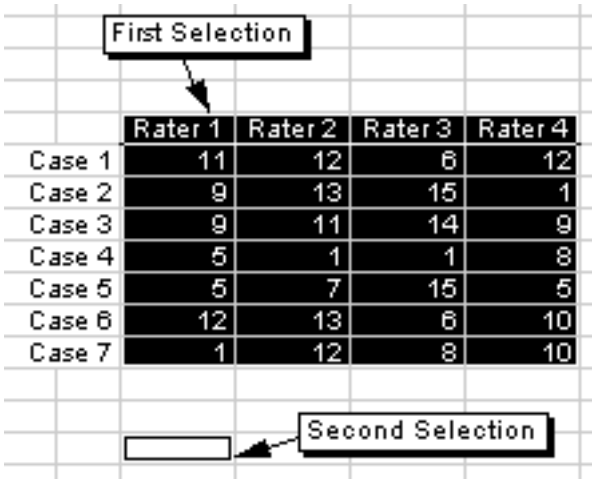
Split-half Reliability *output.*

Related Procedures

Test Analysis: Cronbach's alpha; Inter-rater Reliability
VBA Programming Call: `testAnalysisMenuSplitHalves`

Inter-rater Reliability

Produces the inter-rater reliability for a set of judge's ratings, based on the intraclass correlation coefficient and inter-rater reliability of the averaged ratings across all judges. It is assumed the data is set up similar to the right/wrong matrix, with columns representing raters, and rows representing subjects (ratees).



Information required to generate **Inter-rater Reliability**.

Setup & Run: Manual

1) Select raters data sets. (Label selection is suggested.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Inter-rater Reliability** from the **Test Analysis** submenu.

Setup & Run: Range Wizard

1) Select **Test Analysis > Inter-rater Reliability** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

	Rater 1	Rater 2	Rater 3	Rater 4
Case 1	11	12	6	12
Case 2	9	13	15	1
Case 3	9	11	14	9
Case 4	5	1	1	8
Case 5	5	7	15	5
Case 6	12	13	6	10
Case 7	1	12	8	10

Two-way ANOVA without Replications

Source	*SS*	*df*	*MS*	*F*	*p <*
Ratees (I	141.929	6	23.655	1.294	0.309
Raters (C	27.821	3	9.274	0.507	0.682
Remainc	328.929	18	18.274		
Total	498.679	27			
Interclas	0.069				
Avg Inte	0.227				

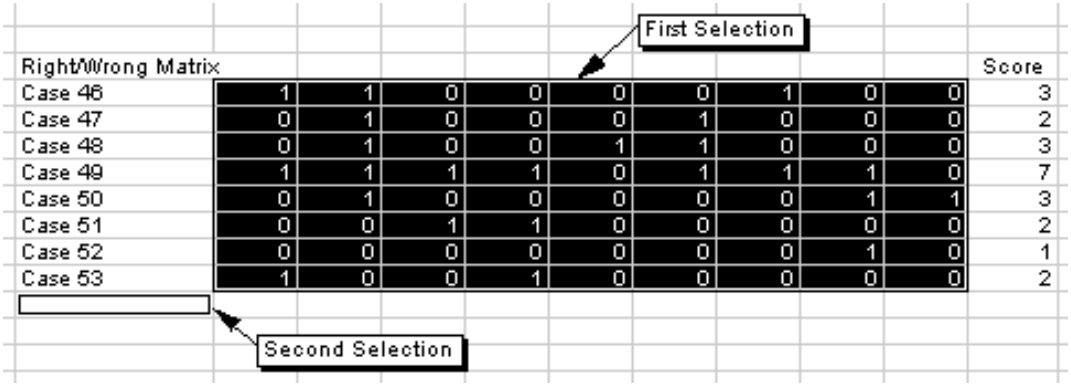
Inter-rater Reliability *output.*

Related Procedures

Test Analysis: Cronbach's alpha; Split-half Reliability
VBA Programming Call: `anovaMenu2WayNoReps`

Item Analysis

Conducts an item analysis on a matrix of responses, calculating the item difficulty and item discrimination indices. Data is set up as the right/wrong matrix, with columns representing items, and rows representing subjects/cases. The scores for these items is expected - and required - to be to the right of the matrix you select.



Information required to generate **Item Analysis**.

Setup & Run: Manual

1) Select item data, with score information to the immediate right of the selection. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Item Analysis** from the **Test Analysis** submenu.

Setup & Run: Range Wizard

1) Select **Test Analysis > Item Analysis** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Right/Wrong Matrix										Score
Case 46	1	1	0	0	0	0	1	0	0	3
Case 47	0	1	0	0	0	1	0	0	0	2
Case 48	0	1	0	0	1	1	0	0	0	3
Case 49	1	1	1	1	0	1	1	1	0	7
Case 50	0	1	0	0	0	0	0	1	1	3
Case 51	0	0	1	1	0	0	0	0	0	2
Case 52	0	0	0	0	0	0	0	1	0	1
Case 53	1	0	0	1	0	0	0	0	0	2
Item Difficulty	0.375	0.625	0.250	0.375	0.125	0.375	0.250	0.375	0.125	
Item Discriminatio	0.515	0.554	0.555	0.363	0.028	0.515	0.726	0.363	0.028	

Item Analysis *output.*

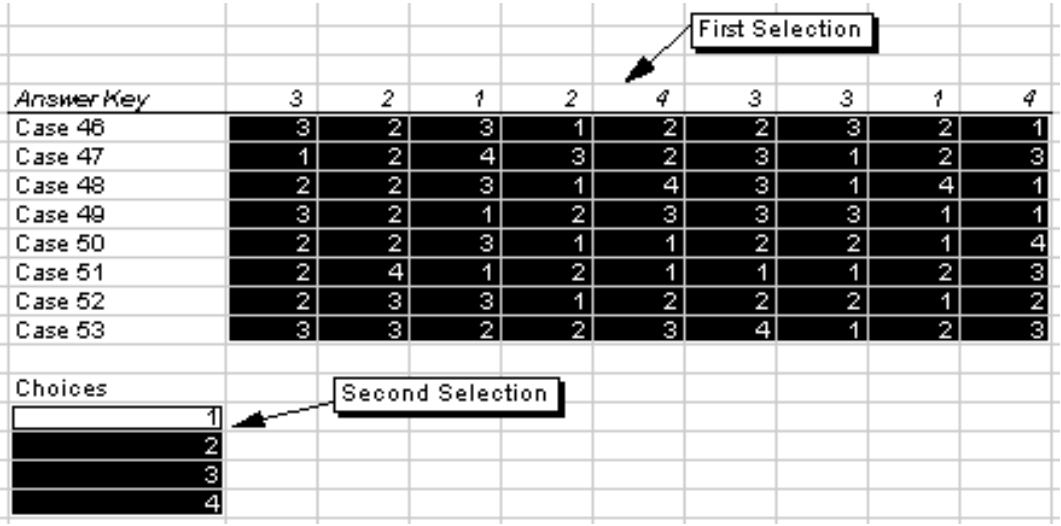
Related Procedures

Test Analysis: Frequency of Response
VBA Programming Call: `testAnalysisMenuItemAnalysis`

Frequency of Response

Conducts a frequency of response analysis on a matrix of possible responses. To generate these frequencies, the second output selection is a range that must contain all of the alternative responses available, and frequency of response will be placed to the right of criteria range.

Data is set up with columns representing responses, and rows representing the respondents.



Answer Key	3	2	1	2	4	3	3	1	4
Case 46	3	2	3	1	2	2	3	2	1
Case 47	1	2	4	3	2	3	1	2	3
Case 48	2	2	3	1	4	3	1	4	1
Case 49	3	2	1	2	3	3	3	1	1
Case 50	2	2	3	1	1	2	2	1	4
Case 51	2	4	1	2	1	1	1	2	3
Case 52	2	3	3	1	2	2	2	1	2
Case 53	3	3	2	2	3	4	1	2	3

Choices
1
2
3
4

Information required to generate **Frequency of Response**.

Setup & Run: Manual

1) Select response data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the completed criteria range, and output will be placed to the right.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Frequency of Response** from the **Test Analysis** submenu.

Setup & Run: Range Wizard

1) Select **Test Analysis > Frequency of Response** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Answer Key	*3*	*2*	*1*	*2*	*4*	*3*	*3*	*1*	*4*
Case 46	3	2	3	1	2	2	3	2	1
Case 47	1	2	4	3	2	3	1	2	3
Case 48	2	2	3	1	4	3	1	4	1
Case 49	3	2	1	2	3	3	3	1	1
Case 50	2	2	3	1	1	2	2	1	4
Case 51	2	4	1	2	1	1	1	2	3
Case 52	2	3	3	1	2	2	2	1	2
Case 53	3	3	2	2	3	4	1	2	3
Choices									
1	1	0	2	4	2	1	4	3	3
2	4	5	1	3	3	3	2	4	1
3	3	2	4	1	2	3	2	0	3
4	0	1	1	0	1	1	0	1	1

Frequency of Response *output.*

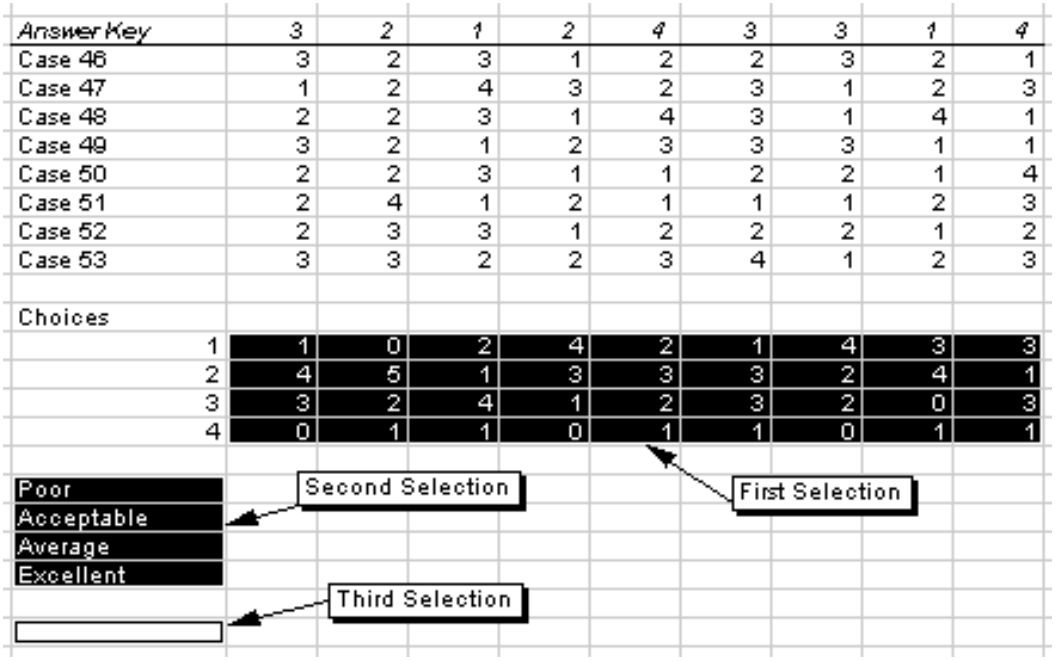
Related Procedures

Descriptive: Frequencies
Test Analysis: Item Analysis
VBA Programming Call: `testAnalysisMenuFreqOfResp`

Response Report

After you have conducted a frequency of response analysis you can generate a response report that will categorize the results, list frequencies, percentage breakdown and a bullet graph.

Data used to generate the response report is the output of the frequencies of analysis run. The second selection should be how you want the results categorized.



Information required to generate **Response Report**.

Setup & Run: Manual

1) Select frequency of response output data. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the classification range, listing all possible alternatives. (You must enter the labels into this range before selection.)

4) Select the cell where you want the output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6)) Go to the **Stats** menu and select **Response Report** from the **Test Analysis** submenu.

Setup & Run: Range Wizard

1) Select **Test Analysis > Response Report** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.

(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

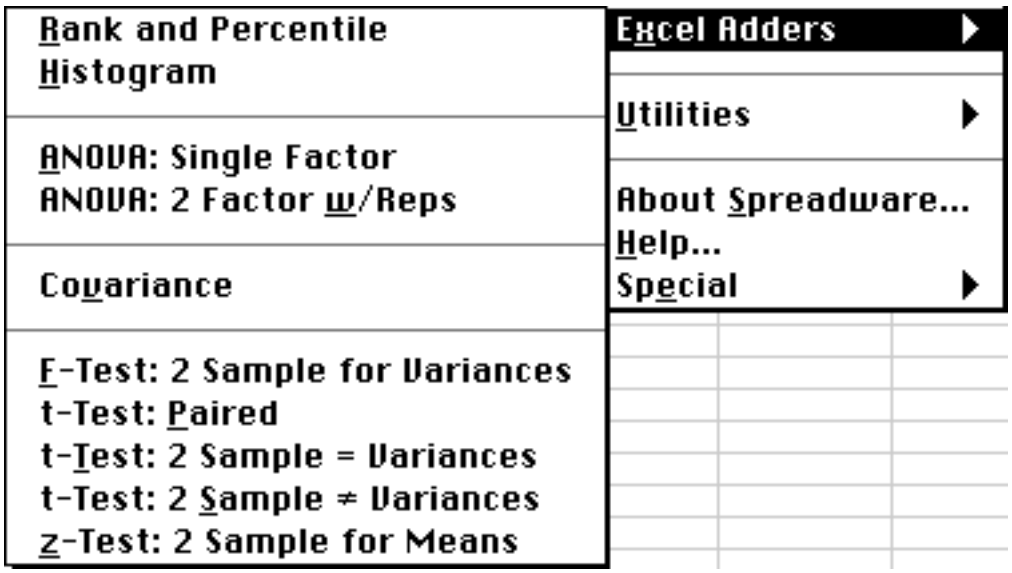
3) Select **Run >** button and you are done.

Choices									
1	1	0	2	4	2	1	4	3	3
2	4	5	1	3	3	3	2	4	1
3	3	2	4	1	2	3	2	0	3
4	0	1	1	0	1	1	0	1	1
Poor									
Acceptable									
Average									
Excellent									
Item 1									
Poor	1	12.50%	••						
Acceptable	4	50.00%	••••••••••						
Average	3	37.50%	•••••••						
Excellent	0	0.00%							
Item 2									
Poor	0	0.00%							
Acceptable	5	62.50%	••••••••••••						
Average	2	25.00%	•••••						
Excellent	1	12.50%	••						
Item 3									
Poor	2	25.00%	•••••						
Acceptable	1	12.50%	••						
Average	4	50.00%	••••••••••						

Response Report *output.*

Related Procedures

Descriptive: Frequencies
Test Analysis: Frequency of Response
VBA Programming Call: `testAnalysisMenuResponseRep`



Excel Adders

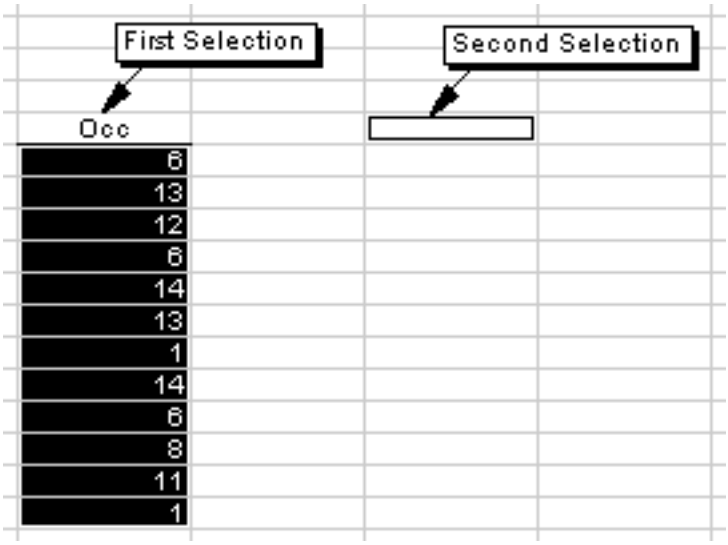
These are some of the statistical routines built into Excel that our users have found useful to include with our application. These routines have been enhanced, making them a bit more accessible, and formatting of some of the output has been improved to conform with the rest of *Spreadware Statistics Menu*.

We will not go into great depth about these routines, since information has been provided with your Excel application. (But if you want more, look at our **Suggestion...** routine.) Additional options may be available for these routines, if you access them with the **Use Wizards** option activated.

The decimal formatting for a few of the statistics provided by the Excel Adders routines is based on the **Statistic Display** decimal format setting in the **Descriptive Preferences** dialog.

Rank and Percentile

Calculates percentile rankings for a set of one or more variables.



Information required to generate **Rank and Percentile**.

Setup & Run: Manual

1) Select the data set(s). (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Rank and Percentile** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > Rank and Percentile** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Occ		Point	Column1	Rank	Percent
6		5	14	1	90.90%
13		8	14	1	90.90%
12		2	13	3	72.70%
6		6	13	3	72.70%
14		3	12	5	63.60%
13		11	11	6	54.50%
1		10	8	7	45.40%
14		1	6	8	18.10%
6		4	6	8	18.10%
8		9	6	8	18.10%
11		7	1	11	.00%
1		12	1	11	.00%

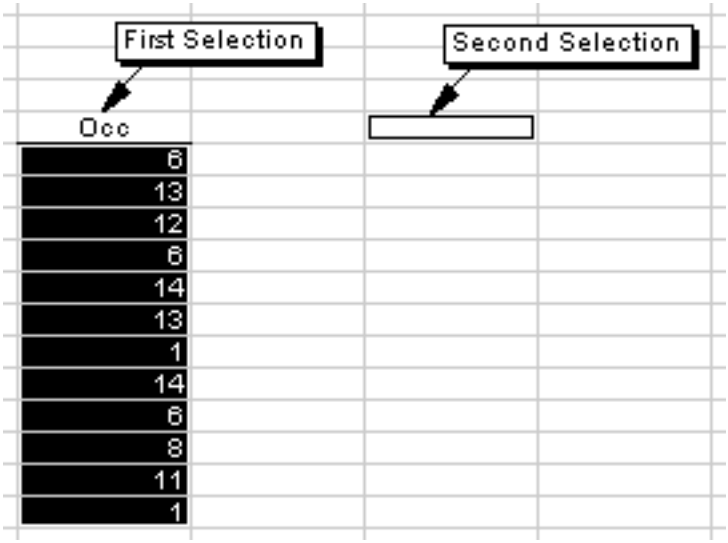
Rank and Percentile *output.*

Related Procedures

Descriptive: Quartiles
VBA Programming Call: `xlAddersMenuRankPerc`

Histogram

Calculates histogram statistics, and generates a histogram chart.



Information required to generate **Histogram**.

Setup & Run: Manual

1) Select the data set. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL/COMMAND** key.

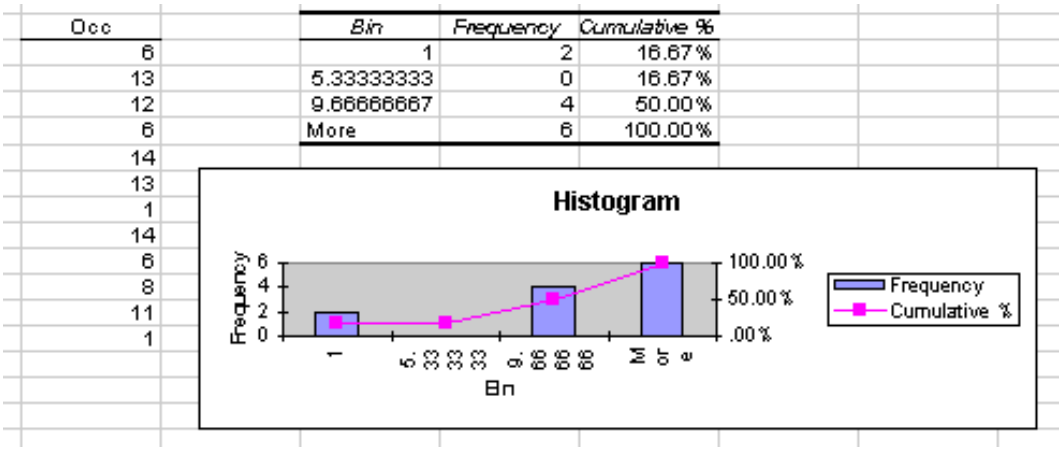
5) Go to the **Stats** menu and select **Histogram** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > Histogram** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.



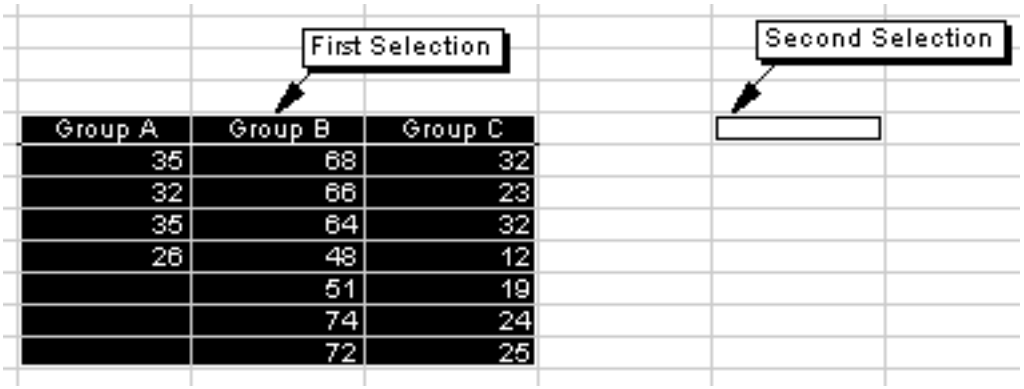
Histogram *output.*

Related Procedures

Descriptive: Frequencies
Charts: Dot Plot; Quick Pareto Chart
VBA Programming Call: `xlAddersMenuHistogram`

ANOVA: Single Factor

Calculates a one-way ANOVA. The data is required to occupy adjacent columns, with each column representing a different group in the analysis. (The size of each group does not have to be equal.)



Information required to generate **ANOVA: Single Factor**.

Setup & Run: Manual

1) Select the data set(s). (With labels selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **ANOVA: Single Factor** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > ANOVA: Single Factor** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Group A	Group B	Group C
35	68	32
32	66	23
35	64	32
26	48	12
	51	19
	74	24
	72	25

Anova: Single Factor

SUMMARY

Groups	*Count*	*Sum*	*Average*
Group A	4.000	128.000	32.000
Group B	7.000	443.000	63.286
Group C	7.000	167.000	23.857

ANOVA

Source of Variati	*SS*	*df*	*MS*
Between Gro	5857.714	2.000	2928.857
Within Group	958.286	15.000	63.886
Total	6816.000	17.000	

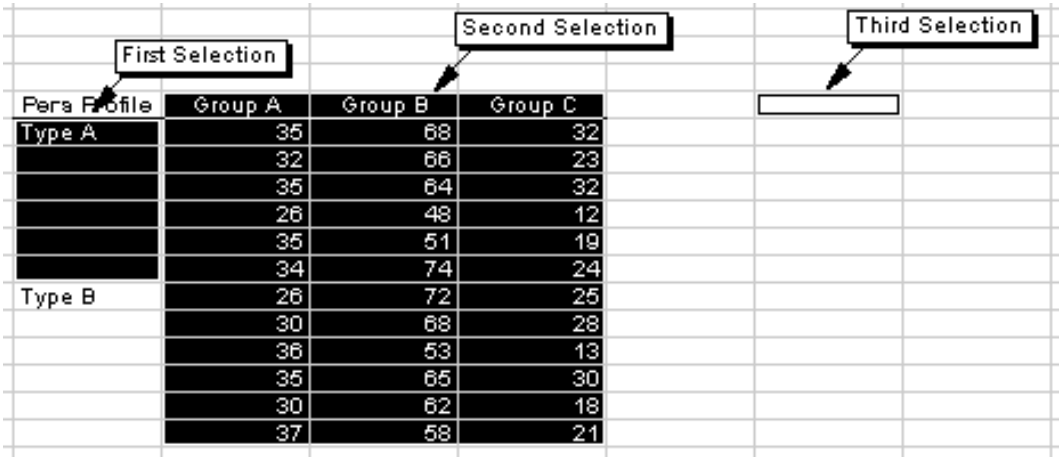
ANOVA: Single Factor *output.*

Related Procedures

ANOVA: Multi-way ANOVA
VBA Programming Call: `xlAddersMenuANOVA1`

ANOVA: 2 Factor w/Reps

Calculates a two-way ANOVA with replications. The first selection is the number of rows in a grouping variable. The second selection is the columns of dependent variables, with each column representing a different level of the grouping factor.



Pers Profile	Group A	Group B	Group C
Type A	35	68	32
	32	66	23
	35	64	32
	26	48	12
	35	51	19
	34	74	24
Type B	26	72	25
	30	68	28
	36	53	13
	35	65	30
	30	62	18
	37	58	21

Information required to generate **ANOVA: 2 Factor w/Reps**.

Setup & Run: Manual

1) Select the number of rows contained in a grouping.

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the columns containing the dependent variables. (With labels selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL/COMMAND** key.

6) Go to the **Stats** menu and select **ANOVA: 2 Factor w/Reps** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > ANOVA: 2 Factor w/Reps** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Pers Profile	Group A	Group B	Group C
Type A	35	68	32
	32	66	23
	35	64	32
	26	48	12
	35	51	19
	34	74	24
Type B	26	72	25
	30	68	28
	36	53	13
	35	65	30
	30	62	18
	37	58	21

Anova: Two-Factor With Replication

SUMMARY	Group A	Group B	G
Type A			
Count	6.000	6.000	
Sum	197.000	371.000	
Average	32.833	61.833	
Variance	12.567	103.367	
Type B			
Count	6.000	6.000	
Sum	194.000	378.000	
Average	32.333	63.000	
Variance	18.667	47.200	
Total			
Count	12.000	12.000	
Sum	391.000	749.000	
Average	32.583	62.417	

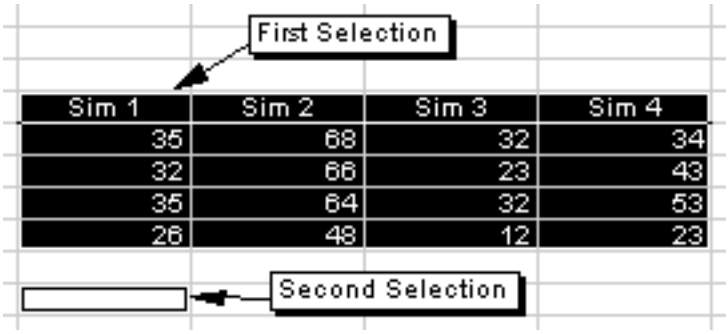
ANOVA: 2 Factor w/Reps *output.*

Related Procedures

ANOVA: Multi-way ANOVA; Two Factor No Replications
VBA Programming Call: `xlAddersMenuANOVA2`

Covariance

Calculates a covariance matrix for a set of interval measurement or ratio measurement data.



Information required to generate **Covariance**.

Setup & Run: Manual

1) Select the data sets. (With labels selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Covariance** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > Covariance** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sim 1	Sim 2	Sim 3	Sim 4	
35	68	32	34	
32	66	23	43	
35	64	32	53	
26	48	12	23	

	Sim 1	*Sim 2*	*Sim 3*	*Sim 4*
Sim 1	18.000			
Sim 2	36.000	83.667		
Sim 3	40.000	76.500	90.250	
Sim 4	41.000	78.833	87.417	163.583

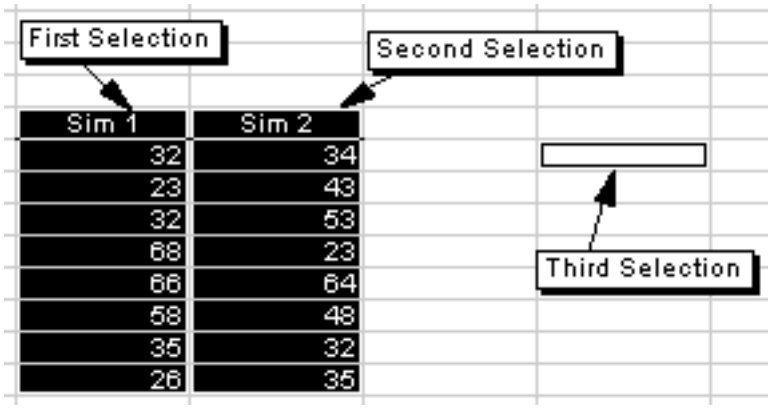
Covariance *output.*

Related Procedures

Correlation: Correlation Matrix; SSCP Matrix
VBA Programming Call: `xlAddersMenuCovariance`

F-Test: 2 Sample for Variances

Calculates a two-sample F test for a set of two variables.



Information required to generate **F-Test: 2 Sample for Variances**.

Setup & Run: Manual

1) Select the first data set. (With label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second data set. (With label selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **F-Test: 2 Sample for Variances** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > F-Test: 2 Sample for Variances** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sim 1	Sim 2
32	34
23	43
32	53
68	23
66	64
58	48
35	32
26	35

F-Test Two-Sample for Variances

	Sim 1	*Sim 2*
Mean	42.500	41.500
Variance	338.857	173.429
Observations	8.000	8.000
df	7.000	7.000
F	1.954	
P(F<=f) one-t	0.198	
F Critical one	3.787	

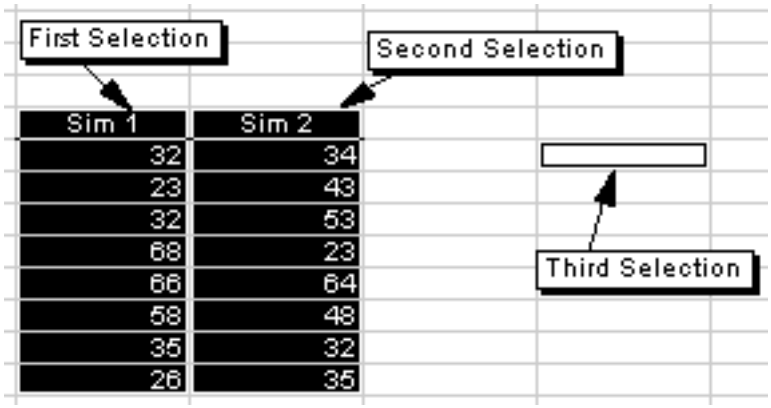
F-Test: 2 Sample for Variances *output.*

Related Procedures

ANOVA: Multi-way ANOVA
VBA Programming Call: `xlAddersMenuFTestEqual`

t-Test: Paired

Calculates a paired t-test for two paired measurements. Usually, such data are two measurements on the same entities.



Information required to generate **t-Test: Paired**.

Setup & Run: Manual

1) Select the first data set. (With label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second data set. (With label selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **t-Test: Paired** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > t-Test: Paired** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sim 1	Sim 2
32	34
23	43
32	53
68	23
66	64
58	48
35	32
26	35

t-Test: Paired Two Sample for Means

	Sim 1	*Sim 2*
Mean	42.500	41.500
Variance	338.857	173.429
Observations	8.000	8.000
Pearson Corr	0.156	
Hypothesized	0.000	
df	7.000	
t Stat	0.135	
P(T<=t) one-t	0.448	
t Critical one-	1.895	
P(T<=t) two-t.	0.896	
t Critical two-	2.365	

t-Test: Paired *output.*

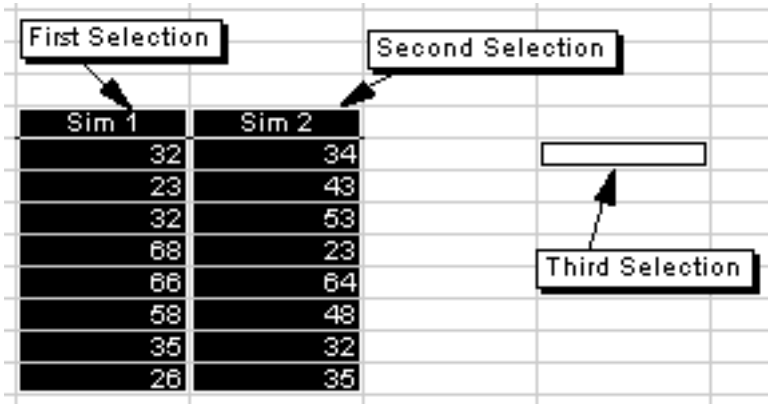
Related Procedures

t-Test: Dependent
VBA Programming Call: `xlAddersMenuPairedtTest`

t-Test: 2 Sample = Variances

Calculates a two sample t-test for groups with equal variances.

Prior to using this routine, we suggest you test the homogeneity of variance assumption using **ANOVA > Independent Homogeneity of Variance**.



Information required to generate **t-Test: 2 Sample = Variances**.

Setup & Run: Manual

1) Select the first variable data set. (With label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second variable data set. (With label selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **t-Test: 2 Sample = Variances** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > t-Test: 2 Sample = Variances** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sim 1	Sim 2
32	34
23	43
32	53
68	23
66	64
58	48
35	32
26	35

t-Test: Two-Sample Assuming Equal Variances

	Sim 1	*Sim 2*
Mean	42.500	41.500
Variance	338.857	173.429
Observations	8.000	8.000
Pooled Varia	256.143	
Hypothesized	0.000	
df	14.000	
t Stat	0.125	
P(T<=t) one-t	0.451	
t Critical one-	1.761	
P(T<=t) two-t.	0.902	
t Critical two-	2.145	

t-Test: 2 Sample = Variances *output.*

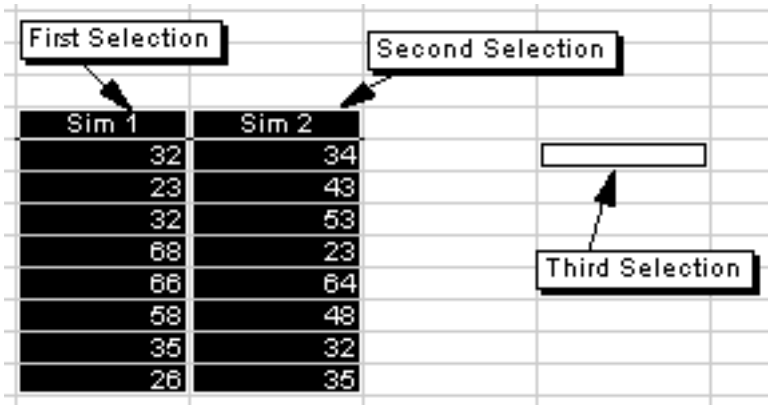
Related Procedures

ANOVA: Independent Homogeneity of Variance
Excel Adders: t-Test: 2 Sample ≠ Variances
VBA Programming Call: `xlAddersMenuTTestEqual`

t-Test: 2 Sample ≠ Variances

Calculates a two sample t-test for groups with unequal variances.

Prior to using this routine, we suggest you test the homogeneity of variance assumption using **ANOVA > Independent Homogeneity of Variance**.



Information required to generate **t-Test: 2 Sample ≠ Variances**.

Setup & Run: Manual

1) Select the first variable data set. (With label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second variable data set. (With label selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL**/**COMMAND** key.

6) Go to the **Stats** menu and select **t-Test: 2 Sample ≠ Variances** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > t-Test: 2 Sample ≠ Variances** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sim 1	Sim 2
32	34
23	43
32	53
68	23
66	64
58	48
35	32
26	35

t-Test: Two-Sample Assuming Unequal Variances

	Sim 1	*Sim 2*
Mean	42.500	41.500
Variance	338.857	173.429
Observations	8.000	8.000
Hypothesized	0.000	
df	13.000	
t Stat	0.125	
P(T<=t) one-t	0.451	
t Critical one-	1.771	
P(T<=t) two-t.	0.902	
t Critical two-	2.160	

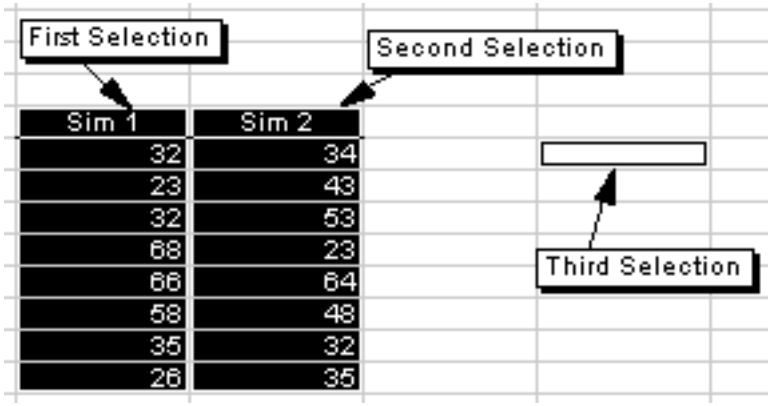
t-Test: 2 Sample ≠ Variances *output.*

Related Procedures

t-Test: Independent
ANOVA: Independent Homogeneity of Variance
Excel Adders: t-Test: 2 Sample = Variances
VBA Programming Call: `xlAddersMenuTTestunEqual`

z-Test: 2 Sample for Means

Calculates a two sample z-test for groups. The sample means are used as the known means.



Information required to generate **z-Test: 2 Sample for Means**.

Setup & Run: Manual

1) Select the first variable data set. (With label selected.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the second variable data set. (With label selected.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL/COMMAND** key.

6) Go to the **Stats** menu and select **z-Test: 2 Sample for Means** from the **Excel Adders** submenu.

Setup & Run: Range Wizard

1) Select **Excel Adders > z-Test: 2 Sample for Means** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Sim 1	Sim 2
32	34
23	43
32	53
68	23
66	64
58	48
35	32
26	35

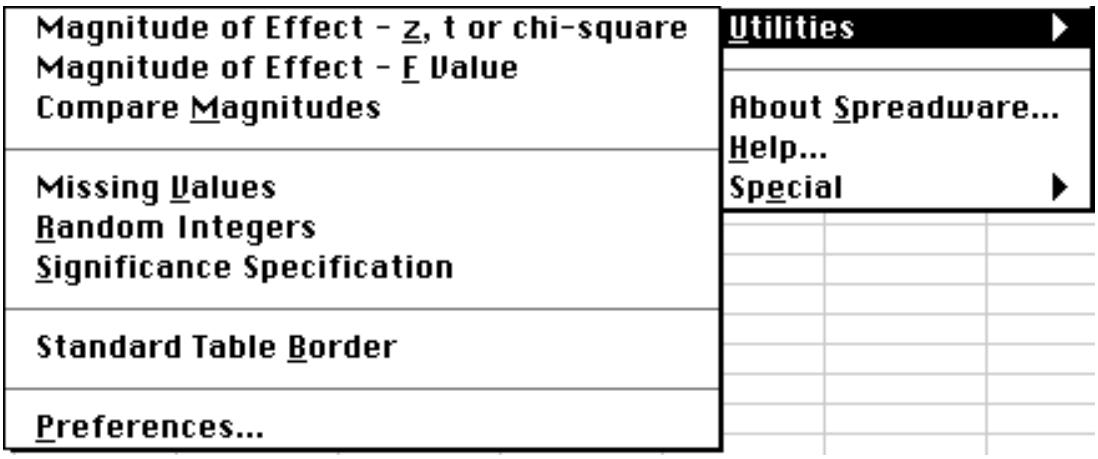
z-Test: Two Sample for Means

	Sim 1	*Sim 2*
Mean	42.500	41.500
Known Variar	338.857	173.429
Observations	8.000	8.000
Hypothesized	0.000	
z	0.125	
P(Z<=z) one-t	0.450	
z Critical one	1.645	
P(Z<=z) two-t	0.225	
z Critical two-	1.960	

z-Test: 2 Sample for Means *output.*

Related Procedures

t-Test: Independent
VBA Programming Call: `xlAddersMenuzTest`

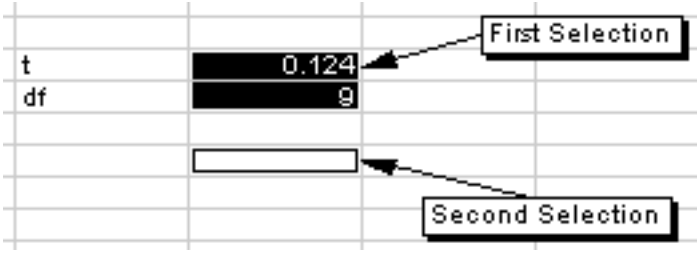


Utilities

These utilities are provided to help you massage data when necessary, as well as doing some basic testing and formatting of data.

Magnitude of Effect - z, t or chi-square

Allows for the determination of the magnitude of effect of z, t and chi-square. This helps to resolve the "Significance of significance" problem in which it is desired to know the actual magnitude of any statistical significance that is obtained in a statistical analysis.



Information required to generate **Magnitude of Effect - z, t or chi-square**.

Setup & Run: Manual

1) Select the two cell range of data containing z, t or chi-square and its associated degrees of freedom. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Magnitude of Effect - z, t or chi-square** from the **Utilities** submenu.

Setup & Run: Range Wizard

1) Select **Utilities > Magnitude of Effect - z, t or chi-square** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Magnitude R	0.041
df	9
Magnitide Variance	0.002
Standard dif. between m	0.083
Proportion Misclassified	0.017
Lower 95% Confidence I	0.530
Upper 95% Confidence I	0.578

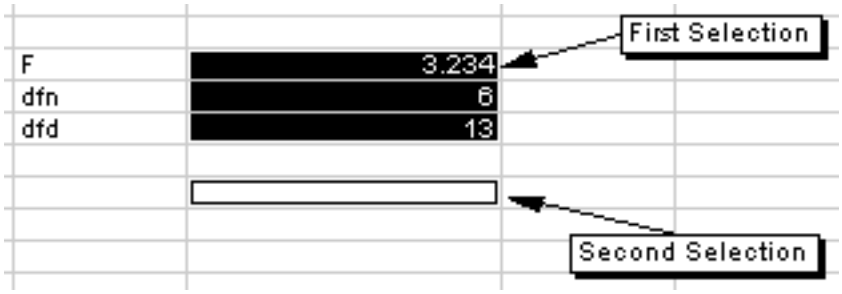
Magnitude of Effect - z, t or chi-square *output.*

Related Procedures

Utilities: Magnitude of Effect - F Value; Compare Magnitudes
VBA Programming Call: `utilitiesMenuMagOfEffectztchi`

Magnitude of Effect - F Value

Allows for the determination of the magnitude of effect of F value. This helps to resolve the "Significance of significance" problem in which it is desired to know the actual magnitude of any statistical significance that is obtained in a statistical analysis.



Information required to generate **Magnitude of Effect - F Value**.

Setup & Run: Manual

1) Select the three cell range of data containing F value and its associated degrees of freedom for the numerator and associated degrees of freedom for the denominator. (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your output placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Magnitude of Effect - F Value** from the **Utilities** submenu.

Setup & Run: Range Wizard

1) Select **Utilities > Magnitude of Effect - F Value** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

F	3.234	
dfn	6	
dfd	13	
	Magnitude R	0.774
	df	13
	Magnitide Variance	0.599
	Standard dif. between m	2.443
	Proportion Misclassified	0.389
	Lower 95% Confidence I	0.555
	Upper 95% Confidence I	0.871

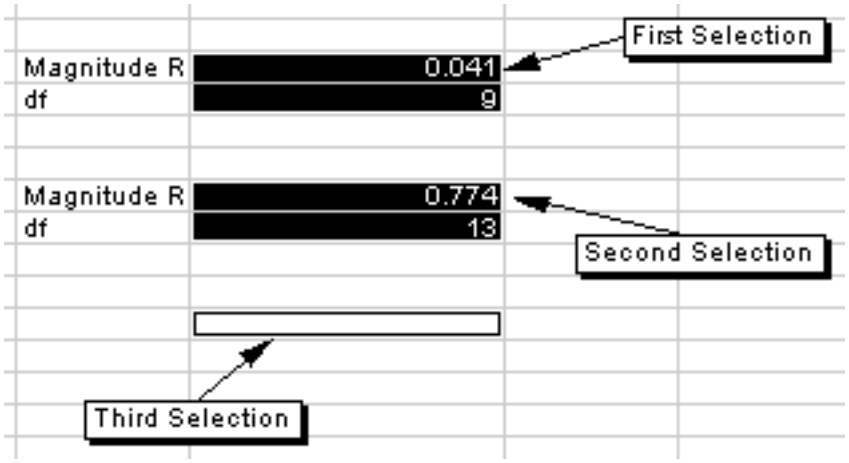
Magnitude of Effect - F Value *output.*

Related Procedures

Utilities: Magnitude of Effect - z, t or chi-square; Compare Magnitudes
VBA Programming Call: `utilitiesMenuMagOfEffectfValue`

Compare Magnitudes

Allows you to compare your magnitudes of effect, two at a time. (To derive the magnitude statistics for comparison, use one or both of the **Magnitude of Effect** routines.)



Information required to generate **Compare Magnitudes**.

Setup & Run: Manual

1) Select the two cell range of data containing the first magnitude and associated degrees of freedom (df). (No label selection.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the two cell range of data containing the second magnitude and associated degrees of freedom (df). (No label selection.)

4) Select the cell where you want your output placed.

5) Let go of the **CTRL/COMMAND** key.

6) Go to the **Stats** menu and select **Compare Magnitudes** from the **Utilities** submenu.

Setup & Run: Range Wizard

1) Select **Utilities > Compare Magnitudes** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

Magnitude R	0.041	
df	9	
Magnitude R	0.774	
df	13	
	z test	-2.087
	p <	0.018

Compare Magnitudes *output.*

Related Procedures

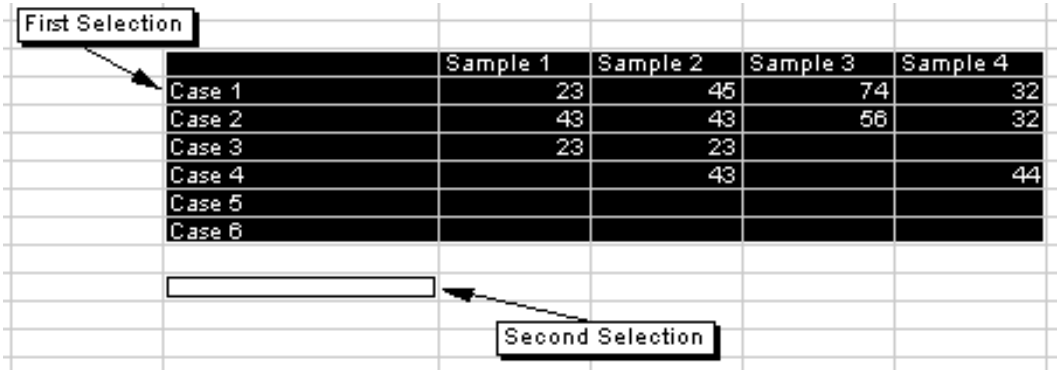
Utilities: Magnitude of Effect - z, t or chi-square; Magnitude of Effect - F Value
VBA Programming Call: `utilitiesMenuCompareMagnitudes`

Missing Values

This routine helps you replace missing values in your data set. Since there is a separate output range, your data is recreated with values replaced without adversely effect your original data set.

For information on the numerous methods available in replacing missing variables, refer to information on the **Utility Preferences**.

Formatting for the missing values will be the same as the format for the last piece of data in your selection - Case 6, Sample 4 in the following example.



	Sample 1	Sample 2	Sample 3	Sample 4
Case 1	23	45	74	32
Case 2	43	43	56	32
Case 3	23	23		
Case 4		43		44
Case 5				
Case 6				

Information required to generate **Missing Values**.

Setup & Run: Manual

1) Select the complete data set that contains the missing values. (Label selection is dependent on your settings in the preferences dialog.)

2) Windows users hold down the **CTRL** key. Macintosh users hold down the **COMMAND** (⌘) key. *Keep this key held down while you are making the rest of your selections.*

3) Select the cell where you want your recreated data placed.

4) Let go of the **CTRL**/**COMMAND** key.

5) Go to the **Stats** menu and select **Missing Values** from the **Utilities** submenu.

Setup & Run: Range Wizard

1) Select **Utilities > Missing Values** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See Range Wizard section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

	Sample 1	Sample 2	Sample 3	Sample 4
Case 1	23	45	74	32
Case 2	43	43	56	32
Case 3	23	23		
Case 4		43		44
Case 5				
Case 6				

	Sample 1	Sample 2	Sample 3	Sample 4
Case 1	23	45	74	32
Case 2	43	43	56	32
Case 3	23	23	75	33
Case 4	38	43	69	44
Case 5	44	35	56	33
Case 6	28	25	67	42

Missing Values *output.*

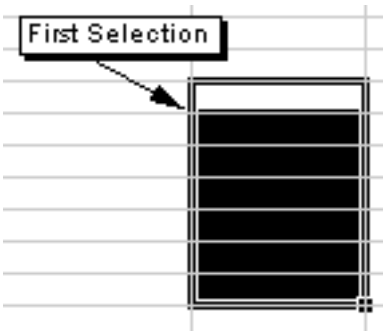
Related Procedures

Utilities: Random Integers
VBA Programming Call: `utilitiesMenuMissingValues`

Random Integers

This routine will place random integers anywhere you want.

The minimum and maximum values are set in the **Utility Preferences** dialog.



Information required to generate **Random Integers**.

Setup & Run: Manual

1) Select the range where you want the random integers placed. (No label selection, unless you want it overwritten.)

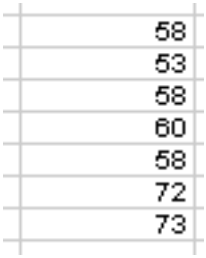
2) Go to the **Stats** menu and select **Random Integers** from the **Utilities** submenu.

Setup & Run: Range Wizard

1) Select **Utilities > Random Integers** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.



Random Integers *output.*

Related Procedures

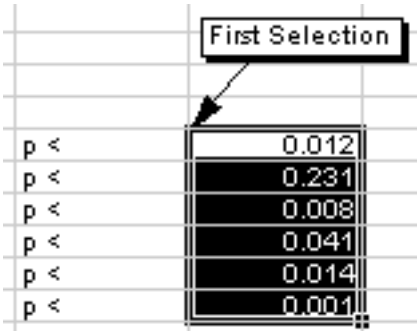
Utilities: Missing Values
VBA Programming Call: `utilitiesMenuRandomValueGen`

Significance Specification

Formats selected cells to highlight significance. As the two examples demonstrate, the routine can be run on a single cell, or a range of cells. The format is as follows:

Three asterisks (***) is significance at the .001 level.
Two asterisks (**) is significance at the .01 level.
One asterisk (*) is significance at the .05 level.
No asterisk is not very significant.

Remember: This is a formatting of the data, the cell still contains live data.



Information required to generate **Significance Specifications**.

Setup & Run: Manual

1) Select the cell or range of cells containing the probability value. (No label selection.)

2) Go to the **Stats** menu and select **Significance Specifications** from the **Utilities** submenu.

Setup & Run: Range Wizard

1) Select **Utilities > Significance Specifications** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

p <	0.012*

p <	0.012*
p <	0.231
p <	0.008**
p <	0.041*
p <	0.014*
p <	0.001***

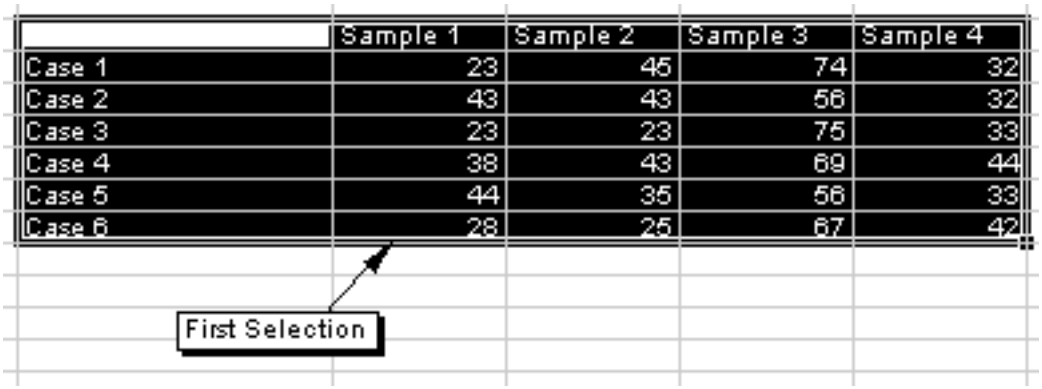
Significance Specifications *output.*

Related Procedures

Utilities: Standard Table Border (We can't think of anything else?)
VBA Programming Call: `utilitiesMenuSigSpec`

Standard Table Border

Takes any range of data you select and applies our standard border format, which expects the first row to be a label heading row.



Information required to generate **Standard Table Border**.

Setup & Run: Manual

1) Select the range you want formatted.

2) Go to the **Stats** menu and select **Standard Table Border** from the **Utilities** submenu.

Setup & Run: Range Wizard

1) Select **Utilities > Standard Table Border** from the **Stats** menu.

2) Complete the **Range Wizard** dialog as requested.
(See `Range Wizard` section if you need additional dialog information.)
(For additional information on the ranges needed, see **Setup & Run: Manual**.)

3) Select **Run >** button and you are done.

	Sample 1	*Sample 2*	*Sample 3*	*Sample 4*
Case 1	23	45	74	32
Case 2	43	43	56	32
Case 3	23	23	75	33
Case 4	38	43	69	44
Case 5	44	35	56	33
Case 6	28	25	67	42

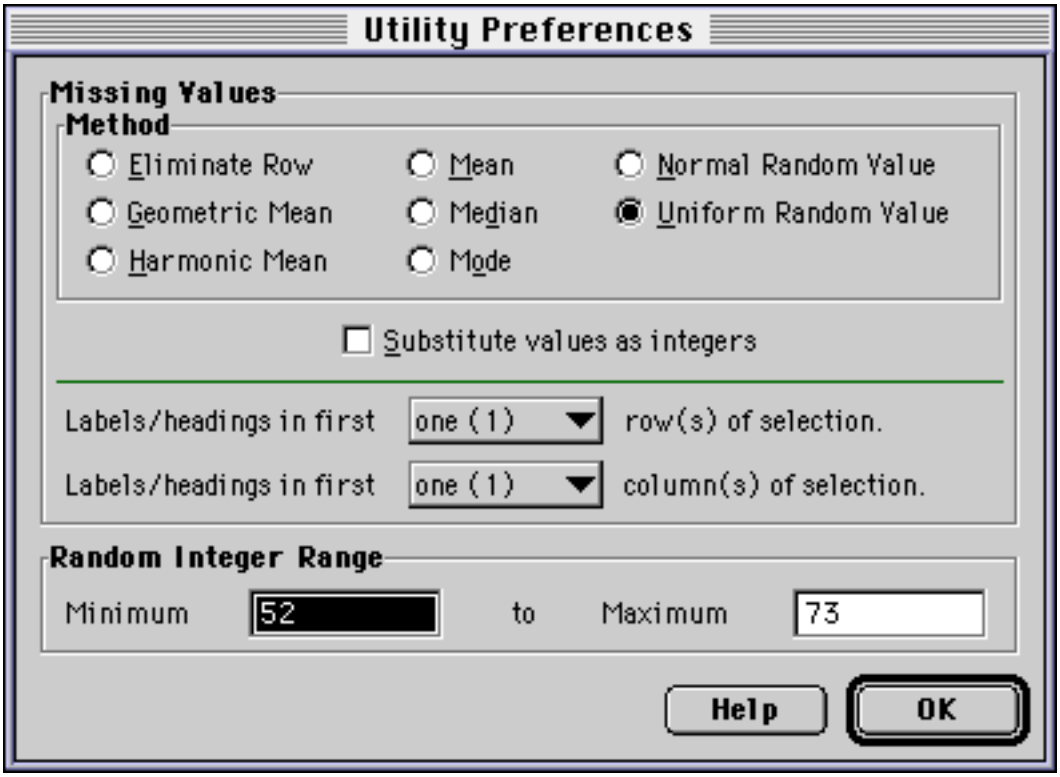
Standard Table Border *output.*

Related Procedures

Utilities: Significance Specifications (If you regard it as a formatting option.)
VBA Programming Call: `utilitiesMenuTableBorder`

Preferences...

Selecting **Stats > Utilities > Preferences...** lets you define how you play with data.



You want numbers how?

Missing Values

Check the box if you want the missing values to be replaced with integers.

Set the number of rows and columns you will be selecting that contain labeling information, which means they will be ignored by the missing value routine, but placed appropriately in the output range.

Methods How missing values will be handled.
Eliminate Row: Eliminates any row containing a missing value.
Geometric Mean: Substitutes missing values with the variables geometric mean.
Harmonic Mean: Substitutes missing values with the variables harmonic mean.
Mean: Substitutes missing values with the variables mean.
Median: Substitutes missing values with the variables median.
Mode: Substitutes missing values with the variables mode.
Normal Random Value: Substitutes missing values with a normal random value, falling within the minimum and maximum range of the variable.
Uniform Random Value: Substitutes missing values with a uniform random value, falling within the minimum and maximum range of the variable.

Random Integer Range

Allows you to set the minimum and maximum values that will be used by the random integer generator.

Remainders

In sewing, remainders is that leftover stuff. Well, we have remainders too, that stuff that does not easily fit in a category, so we give them their own category. (We are going to get our legal staff working on a copyright, patent, ownership, sponsorship, trust, endowment of the new use of this term ~~immediately~~ ~~tomorrow~~ ~~pretty soon~~ whenever.)

About Spreadware...

You are curious. You are wondering. You need to know what version of *Spreadware Statistics Menu* you are using. You need to give us a call. You want to send us a basketball, and need our address. You need to know some of the basics about us or the product you are using, select **About Spreadware...** from the **Stats** menu.

Help...

Select **Help...** from the **Stats** menu and wait for the help engine to get up and running. Topics abound; the **Help...** file is the manual on-line.

Suggestion...

Our favorite feature. We have always created our products based on user demand, user suggestion and user complaint. It is extremely important that we receive your feedback, so we have made it easier for you to send/fax us a suggestion. We really want to here from you, ***frequently***.

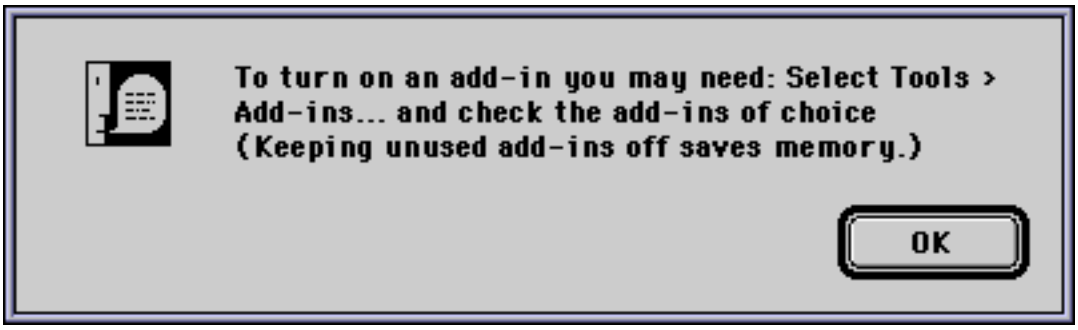
Select the **Suggestion...** menu item from the **Stats** menu, and a suggestion form is created. On the form is a box, where you are invited to write your comments. Print it out and let us have it, so you can continue to make Spreadware products useful and valuable tools.

Remember: The more information you provide us, the closer this program will come to your desires.

In case we have not made this perfectly clear: WE DEPEND ON YOUR SUGGESTIONS! WE NEED YOUR SUGGESTIONS! WE ARE WAITING FOR YOU SUGGESTIONS! What is included in the next release is up to you.

Turn Off All Add-ins Except Stats

Sometimes users have a lot of add-ins turned on that are not being used. If you have some turned on that are not being used, it is a waste of valuable resources. This command will turn off all add-ins, then turn *Spreadware Statistics Menu* on again.



We offer a reminder, then clean up your house.

You will usually find out quickly if you turned off an add-in you need, because the feature you are looking for will not be available, or you will receive a message telling you the add-in is not loaded. (We find most users do not notice most that are turned off.)

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Programming

For those of you who wish to use our wonderful routines to create yourself a custom analytical tool, we have made the process simpler. (We are not going to teach you how to program, but we can help, and we can create custom systems for you.) Most of you who are calling our routines from your code are familiar with the process, and know enough about programming to get the magic working. Here is how we have made the process a bit easier:

1) Turn the range wizard off and have your code select the appropriate ranges, or turn the range wizard on.

2) Call the routine from within your code.

3) Setup and call any additional routine you want to run. (Repeat as necessary.)

4) Reset the range wizard, if necessary.

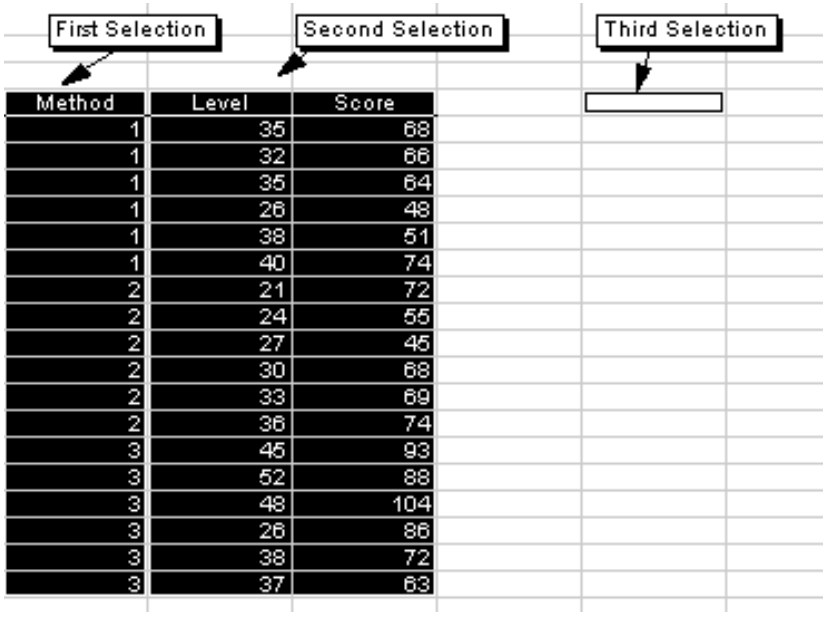
Keep in mind that the preference settings that will be used in generating statistics are those selected at the time your code calls our routines.

No matter how we describe this, those of you who program will read nothing, you will look at the example, which follows. (And knowing how impatient you coders can be, the code for the following example is on the **exampleCode** sheet of the included example file.)

Code Setup/Example

There are many ways of calling our code. We will deal with the most common. The expected assumption is that *Spreadware Statistics Menu* is installed, and turned on as an add-in. (You can have your code turn our add-in on and off as needed, but you probably already knew that.)

Let us use the **Descriptive > Breakdown** example. The **Setup & Run: Manual** description tells us that we need three selections and what they constitute.



Method	Level	Score
1	35	68
1	32	66
1	35	64
1	26	48
1	38	51
1	40	74
2	21	72
2	24	55
2	27	45
2	30	68
2	33	69
2	36	74
3	45	93
3	52	88
3	48	104
3	26	86
3	38	72
3	37	63

Information required to generate **Breakdown**

Instead of making these selections manually, then selecting the routine from the Stats menu, we want to do it automatically:

```
Application.Run "wizTurnOff"       'Turns range wizard off
Range("B5:B23,C5:D23,F6").Select   'Selects data ranges
Application.Run "descMenuBreakdown" 'Calls Breakdown Routine
Application.Run "wizTurnOn"        'Turns range wizard off
```

In a bit more detail:

First we turn the wizard off:

```
Application.Run "wizTurnOff"       'Turns range wizard off
```

Then we make the range selection. Note the order of the selection - it must follow the order in which you would select manually:

```
Range("B5:B23,C5:D23,F6").Select   'Selects data ranges
```

We call the routine we are setting up:

```
Application.Run "descMenuBreakdown" 'Calls Breakdown Routine
```

We turn the wizard back on.

```
Application.Run "wizTurnOn"        'Turns range wizard off
```

Same, but different:

The following code makes the exact same call in a different fashion:

```
Application.Run "wizTurnOff"       'Turns range wizard off
Range(Range(Cells(5, 2), Cells(23, 2)).Address & "," & _
  Range(Cells(5, 3), Cells(23, 4)).Address & "," & _
  Cells(6, 6).Address).Select      'Selects data ranges
Application.Run "descMenuBreakdown"      'Calls Breakdown Routine
Application.Run "wizTurnOn"        'Turns range wizard off
```

There are many ways of selecting your data, giving you great flexibility in finding, manipulating and moving information. **Additional code examples are included in the** Example **file provided with the application, and the on-line** Help**....**

Using the range wizards:

```
Application.Run "wizTurnOn"        'Turns range wizard off
Application.Run "descMenuBreakdown" 'Calls Breakdown Routine
```

The simplest code of all is when you call one of our routines with the range wizard turned on - the work is done for you.

There are many, many ways of writing code, these are just a few simple examples. Working samples of this code are contained in the example file that came with the program, in a sheet named **exampleCode**.

> If you are encountering problems, you may not be selecting the range properly before calling your routine. In order to test this, End the routine after your range selection to see if the ranges are properly selected.

The best way to learn how to program in Excel's Visual Basic for Applications (VBA) is to turn on the macro recorder, do something, then review the code.

Routine Calls in Visual Basic

We have told you how to setup the code, so now you need a list of the calls necessary to run the desired routine(s). After the explanation of the range wizard function, a complete list of the VBA calls is in order of appearance in the manual. For example:

Probability Statistics	Chapter/Menu
chi-square Probability	Routine Name/Submenu item
`probMenuchiSq`	Code to call routine

Now, assuming you will be turning the range wizard off, you will need to make the range selections before the routine is called. (See previous section.) The ranges that need to be selected before the routine is called are described and pictured under the **Setup & Run: Manual** description of each routine.

Range Wizards

Use Wizards

By calling `wizTurnOn`, you are turning the range wizards on. By calling `wizTurnOff`, you are turning the range wizards off. (Let us know if we can make it any easier.)

```
wizTurnOff

wizTurnOn
```

It is usual in your custom code, that you will turn the wizards off at the beginning of the routine, then back on at the end of the routine, unless you want to incorporate the range selection in the custom routine.

Probability Statistics

chi-square Probability

```
probMenuchiSq
```

F Probability

```
probMenuF
```

r Probability

```
probMenur
```

t Probability

```
probMenut
```

z Probability

```
probMenuz
```

Studentized Range (p< .01)

```
probMenu01Studentized
```

Studentized Range (p< .05)

```
probMenu05Studentized
```

Descriptive Statistics

Breakdown

```
descMenuBreakdown
```

Continuous

```
descMenuContinuous
```

Crossbreak

descMenuCrossbreak

Frequencies

descMenuFrequencies

Quartiles

descMenuQuartiles

Nonparametric Statistics

Contingency Table

nonParMenuConTable

One Sample chi-square

nonParMenu1SampleChiSq

Two Sample Dependent chi-square (McNemar Test)

nonParMenu2SampleChiSq

Dunn's Multiple Comparisons

nonParMenuDunns

Friedman Two-way ANOVA

nonParMenuFriedman2Way

Kruskal-Wallis One-way ANOVA

nonParMenuKruskalWallis

Fisher's Exact Test

nonParMenuFishersExact

Linear Trend in Proportions

nonParMenuLinearTrendinProps

Mann-Whitney U

nonParMenuMannWU

Proportion Test

nonParMenuPropTest

Wilcoxon Sign Test

nonParMenuWilcoxonSign

Correlation Statistics

Correlation Matrix

`corrMenuCorrMatrix`

Multiple Regression

`corrMenuMultipleRegression`

Partial Correlation

`corrMenuPartialCorr`

Pearson r

`corrMenuPearsonR`

SSCP Matrix

`corrMenuSSCPMatrix`

Curve Fit

`corrMenuCurveFit`

Line Fit

`corrMenuLineFit`

t-Test Statistics

Dependent

`tTestMenuDepTTest`

Independent

`tTestMenuIndepTTest`

Student's t

`tTestMenuStudentst`

ANOVA Statistics

Analysis of Covariance

`anovaMenuANCOVA`

Multi-way ANOVA

`anovaMenuMultiway`

Repeated Measures ANOVA

`anovaMenuRepMeasures`

Two-way No Replications

`anovaMenu2WayNoReps`

Newman-Keuls Comparisons

`anovaMenuNewmanKeuls`

Orthogonal Contrasts

`anovaMenuOrthogContrasts`

Scheffé post hoc

`anovaMenuScheffe`

Independent Homogeneity of Variance

`anovaMenuIndepHomog`

Related Homogeneity of Variance

`anovaMenuRelatedHomog`

Charts

Error Bar Chart - Std Deviation

`chartMenuErrorBarStdDev`

Error Bar Chart - Std Err of Mean

`chartMenuErrorBarStdErr`

Chart: SPC

`chartMenuSPCChart`

X-bar Chart

`chartMenuSPCXBarChart`

Range Chart

`chartMenuSPCRangeChart`

Individuals Chart

`chartMenuSPCIndivChart`

Moving Range Chart

`chartMenuSPCMRChart`

X-bar and R Charts

`chartMenuSPCXBarRCharts`

Individuals and Moving Range Charts

`chartMenuSPCIndivMRCharts`

Dot Plot

`chartMenuDotPlot`

Quick Pareto Chart

`chartMenuQuickPareto`

XY Trend Chart

`chartMenuXYTrendChart`

Test Analysis

Score Items

`testAnalysisMenuScoreItems`

Score Test

`testAnalysisMenuScoreTest`

Score Items then Score Test

`testAnalysisMenuScoreItemsTest`

Cronbach's alpha

`testAnalysisMenuCronbachsAlpha`

Split-half Reliability

`testAnalysisMenuSplitHalves`

Inter-rater Reliability

`anovaMenu2WayNoReps`

Item Analysis

`testAnalysisMenuItemAnalysis`

Frequency of Response

`testAnalysisMenuFreqOfResp`

Response Report

`testAnalysisMenuResponseRep`

Excel Adders

Rank and Percentile

`xlAddersMenuRankPerc`

Histogram

`xlAddersMenuHistogram`

ANOVA: Single Factor

`xlAddersMenuANOVA1`

ANOVA: 2 Factor w/Reps

`xlAddersMenuANOVA2`

Covariance

`xlAddersMenuCovariance`

F-Test: 2 Sample for Variances

`xlAddersMenuFTestEqual`

t-Test: Paired

`xlAddersMenuPairedtTest`

t-Test: 2 Sample = Variances

`xlAddersMenuTTestEqual`

t-Test: 2 Sample ≠ Variances

`xlAddersMenuTTestunEqual`

z-Test: 2 Sample for Means

`xlAddersMenuzTest`

Utilities

Magnitude of Effect - z, t or chi-square

`utilitiesMenuMagOfEffectztchi`

Magnitude of Effect - F Value

`utilitiesMenuMagOfEffectfValue`

Compare Magnitudes

`utilitiesMenuCompareMagnitudes`

Missing Values

`utilitiesMenuMissingValues`

Random Integers

`utilitiesMenuRandomValueGen`

Significance Specification

`utilitiesMenuSigSpec`

Standard Table Border

`utilitiesMenuTableBorder`

Remainders

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`aboutSSM`

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`statsHelp`

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Turn Off All Add-ins Except Stats

`statsOnRestOff`

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Features

Probabilities

Significance of chi-square
Significance of F
Significance of r
Significance of t
Significance of z
Studentized Range Statistic (p < .01)
Studentized Range Statistic (p < .05)

____
Produce one at a time, or select a range to generate probability statistics on up to 16,000+ items immediately.

Descriptive Statistics

Breakdown Descriptives
Can breakdown by up to 3 categorical variables an unlimited number of variables.
Sample Size
Minimum
Maximum
Range
Mean
Sum
Product
Standard Deviation
Variance
Standard Error of the Mean
95% Confidence Interval
Upper 95% Confidence Interval
Lower 95% Confidence Interval

____
Produce only the statistics you desire, or easily select All in the Preferences dialog.

Continuous Descriptives
Handles unlimited number of variables
Sample Size
Minimum
Maximum
Range
Mean
Median
Mode
Sum
Product
Standard Deviation
Variance

Skewness
Kurtosis
Standard Error of the Mean
95% Confidence Interval
Upper 95% Confidence Interval
Lower 95% Confidence Interval

____
Produce only the statistics you desire, or easily select All in the Preferences dialog.

Crossbreak
Two-way categorical tables with unlimited number of categories in each of the two categorical variables.
Cell counts
Row counts
Column counts
Row percents
Column percents
Total percents
Chi-square test
Degrees of freedom
Probability
Contingency coefficient or phi coefficient (depends on the number of categories)

Frequencies
Frequency for each categorical or nominal value
Cumulative Frequency
Percent for each categorical or nominal value
Cumulative Percent
Bullet Graph suitable for pasting into word processors

____
Select the statistics you want. You only need to select the data, we quickly do the rest.

Quartiles
Sample Size
Minimum
Quartile 1 (25th %tile)
Quartile 2 (50th %tile)
Quartile 3 (75th %tile)
Maximum

Nonparametric Statistics

Contingency Table
Chi-square test
Degrees of freedom
Probability
Contingency coefficient or phi coefficient (depends on the number of categories)

One Sample Chi-Square
Expected frequencies can be either calculated by the program or provided by the user.
Chi-square
Degrees of freedom
Probability

Two Sample Dependent Chi-Square
Expected frequency
Chi-square
Degrees of freedom
Probability

Dunn's Multiple Comparisons
Mean rank difference between groups
Significant criterion value
Significance

Friedman Two-Way ANOVA
Chi-square
Sample Size
Group N

Fisher's Exact Test
Hypergeneometric probability distribution

Kruskal-Wallis One-Way ANOVA
H Value
Degrees of freedom
Probability

Linear Trend in Proportions
Table of interval counts and totals
z value
One-tailed probability
Two-tailed probability

Mann-Whitney U
Mann-Whitney U
z value
Probability

Proportion Test
Proportion for each variable
z value
Probability

Wilcoxon Sign Test
Wilcoxon Sign Test
Matched Pairs

Correlation Routines

Correlation Matrix
User choice of one of the following:
Full Matrix
Lower-Left Matrix
Upper-Right Matrix
Sample Size Option

Multiple Regression
User choice of either full entry, forward stepping, or backward stepping
Multiple R
R Square
Adjusted R Square
Standard Error
Observations
ANOVA Source Table of Regression
For the intercept and each predictor variable:
Coefficients
Standard Error

t value
Probability
Lower 95% Confidence Interval
Upper 95% Confidence Interval

Partial Correlation
Partial r for each possible relationship between three variables
Partial r squared

Pearson r
r
r squared
Probability
Slope
Intercept
Sample Size Option

SSCP Matrix
Full sums of squares cross-products matrix

Curve Fit
Calculates an exponential curve that fits the variables.
Slope
Intercept
r Squared
F
Degrees of Freedom

Line Fit
Calculates a line that fits the variables.
Slope
Intercept
r Squared
F
Degrees of Freedom

t-Test Routines

Dependent t-Test
t value
Degrees of Freedom
One-Tailed Probability
Two-Tailed Probability
Correlation

Independent t-Test
t value
Degrees of Freedom
One-Tailed Probability
Two-Tailed Probability

Student's t
A single continuous variable can be compared to any specified mean.
t value
Degrees of Freedom
One-Tailed Probability
Two-Tailed Probability

Analysis of Variance Routines

Full Source Tables including Sums of Squares, Degrees of Freedom, Mean Squares, F values, and Probabilities with associated breakdown descriptive statistics for:
Analysis of Covariance
Multi-Way ANOVA (1 to 3 factors)
Repeated Measures
Two-Way with No Replication

Newman-Keuls Comparisons
Table which for each possible pair of means provides:
Means
Difference between means
Criterion difference for .01 or .05 alpha
Significance

Orthogonal Contrasts
t value
Degrees of Freedom
Two-Tailed Probability

Scheffé Post Hoc Tests
Tests each group against every other group and each group against all other groups.
Scheffé Comparison
Comparison Squared
F value
F criterion
Significance

Independent Homogeneity of Variance Test
Tests each group against every other group.
Variance
F
Degrees of Freedom
Probability

Dependent Homogeneity of Variance Test
Tests each variable against every other variable.
Variance
r value
t value
Degrees of Freedom
Probability

Charts

Error Bar Chart - Std Deviation
Standard Deviation
Supporting data table
Chart

Error Bar Chart - Std Err of Mean
Standard Error of Mean
Supporting data table
Chart

Chart: SPC
Quickly create a statistical process control (SPC) chart.
Chart

X-bar Chart
Also known as an average chart.
Calculates table of:
Upper control limits (UCL)
Lower control limits (LCL)
Mean
Grand mean
then generates an
SPC Chart

Range Chart
Also known as an R chart.
Calculates table of:
Upper control limits (UCL)
Lower control limits (LCL)
Range
Range Mean
then generates an
SPC Chart

Individuals Chart
Calculates table of:
Upper control limits (UCL)
Lower control limits (LCL)
Moving Range
Average
then generates an
SPC Chart

Moving Range Chart
Calculates table of:
Upper control limits (UCL)
Lower control limits (LCL)
Moving Range
Moving Average
then generates an
SPC Chart

x-Bar and R Chart
Calculates Average (x-Bar) and Range (R) charts successively, using the same data set.
Calculates table of data and control limits.
then generates multiple
SPC Charts

Individuals and Moving Range Chart
Calculates Individuals and Moving Range charts successively, using the same data set.
Calculates table of data and control limits.
then generates multiple
SPC Charts

Dot Plot
Table of individual frequency count for each piece of data in the data set.
Dot Plot Chart

Quick Pareto Chart
Quickly creates a Pareto chart, a sorted histogram.
Data table.
Pareto Chart

XY Trend Chart
Calculates table of linear trend values.
Includes linear trend line.
XY Trend Chart

Test Analysis Routines

Item Scoring
Scores raw item data based on an answer key and creates a right-wrong matrix of dichotomously scored (1 & 0) items.

Test Scoring
Sums the rows of a right-wrong matrix to create total test scores.

Cronbach's alpha
Produces Cronbach's alpha reliability for a matrix of item responses.

Split-Half Reliability
Produces split-half reliability for a matrix of item responses.

Inter-Rater Reliability
Source Table for 2-Way ANOVA With No Replications
Intraclass Correlation
Average Intraclass Correlation

Item Analysis
Item Difficulty for each item in a matrix of item responses
Item Discrimination for each item in a matrix of item responses

Frequency of Response
Frequencies for each possible alternative of each item in a matrix of item responses

Response Report
Produces a report for each item in a matrix of item data suitable for pasting into a word processing program that includes for each item
Label for Each Alternative
Frequency of Response for Each Alternative
Percentage of Response for Each Alternative
Bullet Graph Reflecting the Percentage of Response for Each Alternative

Excel Adders

Produces results as described in the Excel manuals for the following routines:
Rank and Percentile
Histogram
ANOVA: Single Factor
ANOVA: 2 Factor w/ Reps
Covariance
F-Test: 2 Sample for Variances
t-Test: Paired
t-Test: 2 Sample Equal Variances
t-Test: 2 Sample Unequal Variances
z-Test: 2 Sample for Means

Utilities

Magnitude of Effect
Missing Values
8 Methods to help you deal with missing values.
Random Integers
Significance Specification
Modifies format to highlight significance levels.
Table Border

Features Index