CMFRI

Winter School on
Impact of Climate Change on Indian Marine Fisheries

Lecture Notes

Part 2

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STATISTICAL PACKAGE FOR SOCIAL SCIENTISTS - A PREPARATORY EXPOSITION

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Introduction

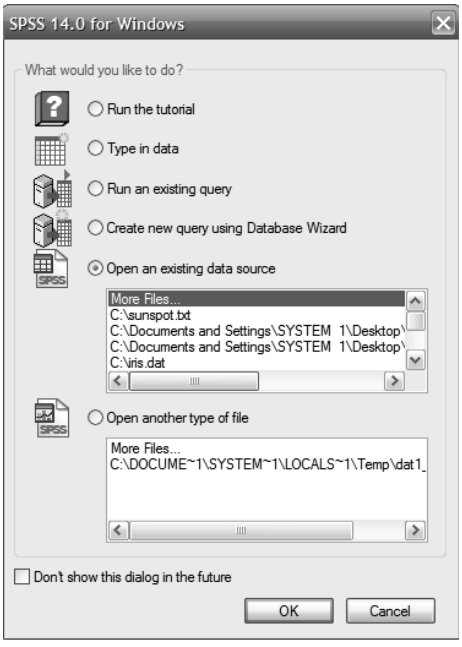
SPSS is a package developed originally for social scientists using large mainframe computers. Since then it has been refined and redeveloped for different types of architecture including Windows. It is an extensive package with facilities for data entry, data manipulation and statistical analysis in a graphical environment. It has modules for survey analysis, graphical display and time series. The package has been considerably improved to include logistic regression and repeated measures analysis and much more which probably can be explored while experiencing the functionalities of the package.

Getting Started

This exposition is aimed at taking the reader through the preliminaries of the package with an aim to make him/ her feel assured of the preparatory pangs like data import/ transfer and export/ saving. Most of these steps and windows can be accessed/ viewed in earlier versions of SPSS too. The examples and screen shots are select collation from a real session done with the sole purpose of demonstrating the various facets of the package with uniformity and flow.

The package can be accessed from the **Start** menu and selecting **All Programs** and then **SPSS for Windows** and **SPSS14 for Windows**. Ignore, by selecting **OK**, any error messages that may appear on the screen until you see Figure 1. Select the option **Don't show this dialog in the future** and this dialogue-box will not appear again. You can then remove the screen by selecting the **Cancel** button.

Figure - 1

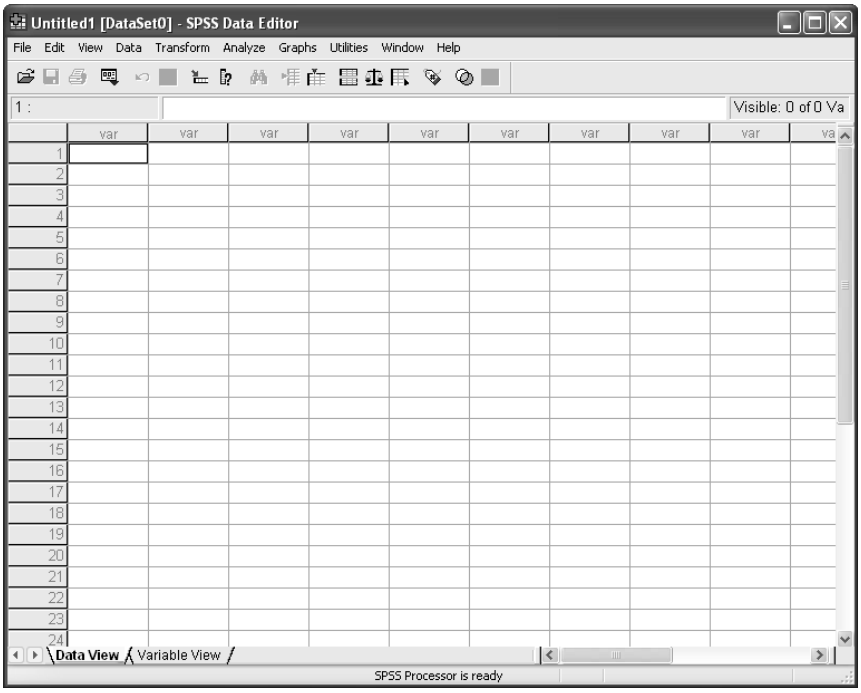


Please wait until Figure 2 then appears on the screen. [For information - to exit SPSS, click on the **File** option on the menu bar and choose **Exit** and confirm your intention]

Default SPSS Windows

The default image, which should be visible, is shown in Figure 2. The main window, **Untitled1 [DataSet0] - SPSS Data Editor,** with the **Data View** tab highlighted allows numeric data entry direct into the spreadsheet using the default options. If you are not in this view then select the correct **Tab** at the bottom of the screen before proceeding further. The **Variable View** tab will be discussed later in the tutorial for inputting of non-numeric data and other uses. Maximize this window image if you prefer.

Figure - 2



Notation

In the sections that follow, the actions you must perform are shown in **bold**, as too are the default values chosen by **SPSS.** ***Italic*** is used to denote items whose names/values you may choose. It is preferred that variable names start with a letter and are kept as short and simple as possible.

For information:

A sequence of actions using the drop-down menus will be denoted by →. For example, **Data→Insert Variable...** would mean "Click-left on the **Data** option on the drop-down menu and select the option **Insert Variable...** (by clicking-left again)".

Data Entry

If **SPSS** has been set up correctly the first empty column in the first row will be outlined in the **Untitled1 [DataSet0] - SPSS Data Editor** window. Enter the following three columns of data into the spreadsheet (the data dimensions being 8 columns and 12^0 rows, with the first row being the variable names)

Year	Month code	month	oilsardine	Mackerel	Kerala total	sst	Chlorophyll
1997	1	JAN	2164	10798	48743	27.95857143	1.1557
1997	2	FEB	16043	5738	59900	28.14	1.59508
1997	3	MAR	11981	6008	58922	29.27142857	0.815337
1997	4	APR	8968	3201	49769	30.15571429	3.47977
1997	5	MAY	8217	4160	45006	30.17857143	2.21777
1997	6	JUN	1120	2429	26136	29.52	3.33698
1997	7	JUL	5740	9049	28104	28.46714286	0.775625
1997	8	AUG	1838	7257	47069	28.02428571	1.43846
1997	9	SEP	7328	16589	57652	28.53857143	1.06579
1997	10	OCT	21919	10387	74325	29.46714286	2.17776
1997	11	NOV	6612	4240	39380	29.54714286	1.06579
1997	12	DEC	1706	2573	39768	29.21714286	1.48941
1998	1	JAN	1289	2093	32569	28.85	1.1557
1998	2	FEB	2296	2048	27642	29.01428571	0.712894
1998	3	MAR	4974	2919	43667	29.73571429	0.775625
1998	4	APR	2699	4287	43778	30.68	0.718546
1998	5	MAY	2203	2362	36631	31.09285714	2.21777
1998	6	JUN	8542	2319	36886	29.37	16.7595
1998	7	JUL	2637	3236	35385	28.16	13.192
1998	8	AUG	7672	21580	86532	27.8	3.14315
1998	9	SEP	13712	8934	52487	28.17571429	9.40961
1998	10	OCT	6889	3845	40704	28.39428571	3.33698
1998	11	NOV	22509	5068	78819	28.62428571	3.47977
1998	12	DEC	2373	2808	27596	28.49857143	0.815337
1999	1	JAN	9662	2347	44428	28.25571429	1.59508
1999	2	FEB	8665	1319	34286	28.41857143	1.23454
1999	3	MAR	5791	3638	42796	29.56428571	1.43846
1999	4	APR	5325	2466	34920	29.76857143	1.1557
1999	5	MAY	263	11531	36511	29.20428571	1.84048
1999	6	JUN	9417	7943	39565	28.55428571	18.6066
1999	7	JUL	7711	8087	34158	27.75857143	11.6915
1999	8	AUG	10654	9579	76723	27.54428571	21.4233
1999	9	SEP	30662	8629	63820	28.19714286	4.40898
1999	10	OCT	15088	10804	55748	28.12428571	1.78038
1999	11	NOV	26622	14783	74745	28.61285714	1.09354
1999	12	DEC	13292	1343	43073	28.46714286	0.518182
2000	1	JAN	11107	5278	42002	27.97	1.08595
2000	2	FEB	15625	2165	42459	28.29285714	0.781984
2000	3	MAR	12374	3832	45642	29.09428571	0.72823
2000	4	APR	28959	1689	59597	29.76142857	0.943045
2000	5	MAY	13122	3597	45654	29.86857143	14.925
2000	6	JUN	26938	3462	46613	28.29714286	5.03917

Year	Month code	month	oilsardine	Mackerel	Kerala total	sst	Chlorophyll
2000	7	JUL	49414	2252	58843	27.65571429	4.23542
2000	8	AUG	11428	3176	74315	27.41714286	7.89502
2000	9	SEP	20633	3362	55702	27.94	10.8457
2000	10	OCT	17641	1919	49515	28.72857143	4.90867
2000	11	NOV	25573	745	47473	28.97428571	1.16986
2000	12	DEC	8597	2377	36298	28.34285714	0.918132
2001	1	JAN	6537	2402	32947	28.04142857	1.33493
2001	2	FEB	7347	1129	26572	28.31142857	1.37667
2001	3	MAR	7081	2166	33019	29.19285714	0.972663
2001	4	APR	14283	1520	35765	30.03428571	0.722598
2001	5	MAY	15894	790	40985	30.20142857	9.70774
2001	6	JUN	11867	1146	28226	28.65857143	2.90212
2001	7	JUL	17590	2633	40412	27.80428571	4.11085
2001	8	AUG	15177	3704	70109	26.98714286	5.74943
2001	9	SEP	15368	1210	64822	27.72	0.918132
2001	10	OCT	20001	1789	52771	28.35714286	10.1286
2001	11	NOV	14365	935	50376	28.86285714	3.47744
2001	12	DEC	11827	1374	38135	28.62285714	0.956651
2002	1	JAN	10551	1110	52092	28.31285714	0.920593
2002	2	FEB	4123	3693	32460	28.41428571	1.72478
2002	3	MAR	5800	1423	32501	29.34142857	0.936253
2002	4	APR	16579	1284	42278	30.26142857	0.695176
2002	5	MAY	9049	1680	33068	30.04	3.13685
2002	6	JUN	9951	536	24413	28.89714286	2.94478
2002	7	JUL	17219	2710	40210	28.17	19.46
2002	8	AUG	14880	1191	59169	27.48857143	5.74943
2002	9	SEP	37251	4161	85064	28.32714286	7.04024
2002	10	OCT	29594	1304	65127	28.92571429	1.68665
2002	11	NOV	49121	2760	79725	29.09285714	0.861453
2002	12	DEC	15350	1556	43412	28.84714286	1.06736
2003	1	JAN	17065	1358	45217	28.25285714	0.861914
2003	2	FEB	16852	1201	49516	28.52857143	1.19247
2003	3	MAR	31683	1652	55889	29.74428571	0.985244
2003	4	APR	14096	2964	36449	30.41428571	0.663178
2003	5	MAY	11187	1845	45030	30.42714286	9.70774
2003	6	JUN	22772	2015	54273	29.42714286	4.37136
2003	7	JUL	13146	2683	25629	28.23	13.9812
2003	8	AUG	14189	3835	51982	28.07714286	3.2039
2003	9	SEP	23153	5098	52253	28.31571429	17.1568
2003	10	OCT	51363	6041	94733	28.64	5.32919
2003	11	NOV	36644	3644	74517	28.82285714	1.08247
2003	12	DEC	12222	2690	37805	28.37428571	0.588376

Year	Month code	month	oilsardine	Mackerel	Kerala total	sst	Chlorophyll
2004	1	JAN	17924	738	44881	28.32714286	0.987224
2004	2	FEB	11406	1119	41604	29.48428571	1.42619
2004	3	MAR	15478	2979	62697	30.34571429	1.33172
2004	4	APR	8667	1384	46880	29.63857143	0.940146
2004	5	MAY	11046	1837	44196	28.54857143	2.15283
2004	6	JUN	5754	269	27372	27.92714286	1.84319
2004	7	JUL	26737	4512	46501	27.57571429	4.73062
2004	8	AUG	10825	4167	59778	28.00285714	2.82243
2004	9	SEP	24449	15048	73691	28.67428571	5.53495
2004	10	OCT	31339	14809	71802	28.96285714	4.20154
2004	11	NOV	29653	1410	48536	28.34428571	1.3531
2004	12	DEC	31428	5739	48901	28.04142857	1.38722
2005	1	JAN	10124	1804	21423	28.42857143	0.835333
2005	2	FEB	12266	1056	33224	29.02142857	1.21194
2005	3	MAR	31748	1008	46888	30.17857143	0.951414
2005	4	APR	8667	1384	46880	28.17571429	1.42963
2005	5	MAY	11046	1837	44196	28.62428571	1.71465
2005	6	JUN	8819	6407	32292	28.41857143	9.70774
2005	7	JUL	11808	3381	26487	29.20428571	9.86626
2005	8	AUG	12302	4442	52508	27.75857143	30.2002
2005	9	SEP	30619	12669	68050	28.19714286	6.41821
2005	10	OCT	11048	3208	40531	28.12428571	6.38736
2005	11	NOV	26757	5407	54622	28.46714286	4.35151
2005	12	DEC	43592	7895	69114	29.19285714	1.36511
2006	1	JAN	21759	5771	46744	28.65857143	1.36292
2006	2	FEB	20246	2248	37993	26.98714286	1.27417
2006	3	MAR	12072	1360	42533	28.35714286	0.834216
2006	4	APR	9943	2329	41333	28.86285714	2.4887
2006	5	MAY	17729	1638	49849	28.62285714	2.18389
2006	6	JUN	15206	5169	38998	28.41428571	14.929
2006	7	JUL	19889	1266	33541	29.34142857	9.86626
2006	8	AUG	11036	4977	58870	30.26142857	4.82528
2006	9	SEP	18393	4549	58230	28.64	3.32627
2006	10	OCT	33047	9625	79580	27.57571429	4.17407
2006	11	NOV	31031	1387	56594	28.67428571	2.22998
2006	12	DEC	15917	4784	47637	28.04142857	1.37097

By default the names given to these three columns are **var00001, var00002** and **var00003**.

Each row of this data represents the year and month with corresponding month code along with the oil sardine landing estimates (tons) and Indian mackerel landings (tons) and Sea Surface Temperature (SST) in degrees Celsius and lastly the Chlorophyll content in mg/m^3 off Kerala coast. The variables given in the first row of the data can very well be used to name the variables in lieu of their default names.

Move to the **Variable View** window (click-left on the tab at the bottom of the window) to see Figure 3 and replace the default names by those suggested above in the **Name** column. Move back to the **Data View** window to see Figure 4. Do not worry about the contents of the other columns, shown in **Variable View**, they will be discussed as the need arises.

Figure - 3

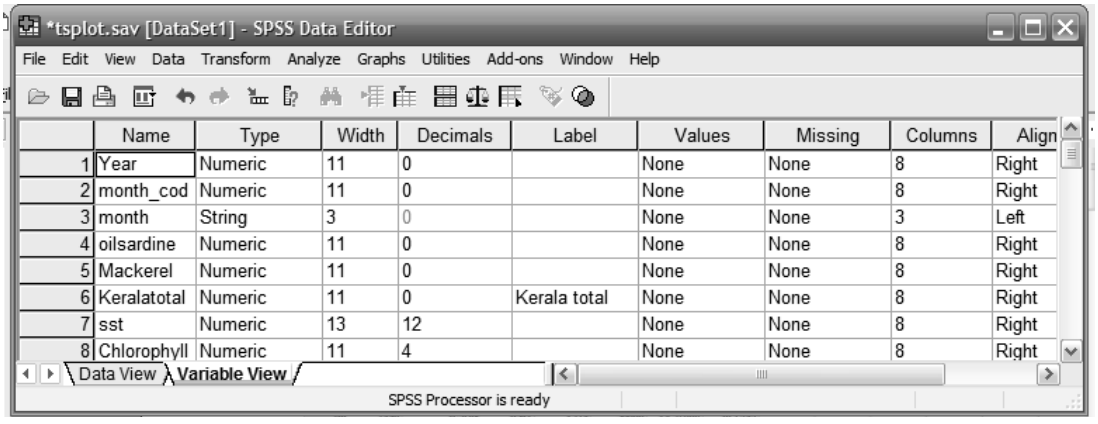
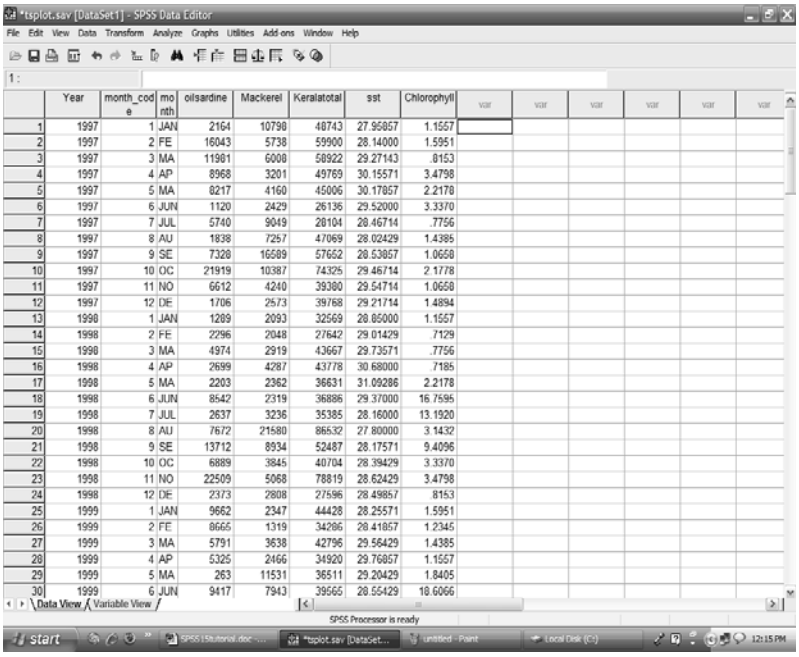


Figure - 4



Saving Your Work

Although entering the data in Section 5 did not take too long it is always wise to save any work you have done. Saving your work should be a frequent operation whenever you use a PC.

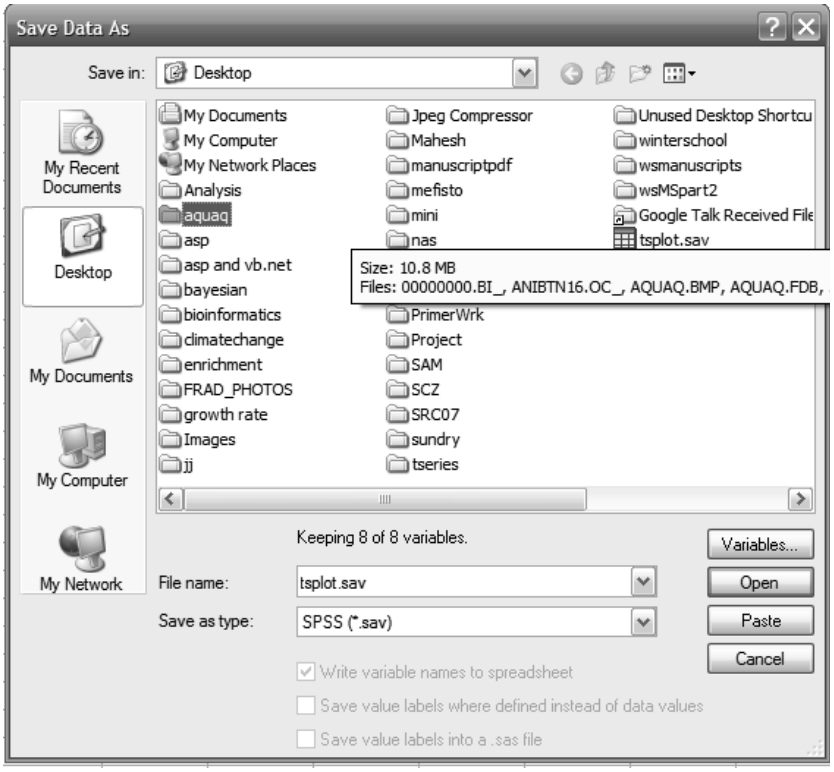
Exercise 1

Several types of files, subsets of variables, or commands can be saved. Here you will be creating a **SPSS Save** file (***.sav***) which will create a file in compressed form containing the complete set of data, names and formats.

Choose **File→Save As…** from the main drop-down menu. The **:Save Data As** dialogue box appears (as shown in Figure 5). If necessary, choose the correct folder (**My Documents\....**), then type a relevant filename e.g. ***tsplot*** in the **File name** box. [Note that the default file extension is given as ***.sav***] Click on **Save** and the data will be saved.

The dialogue box will close automatically after the file has been saved.

Figure - 5



Reading in a SAVED data set

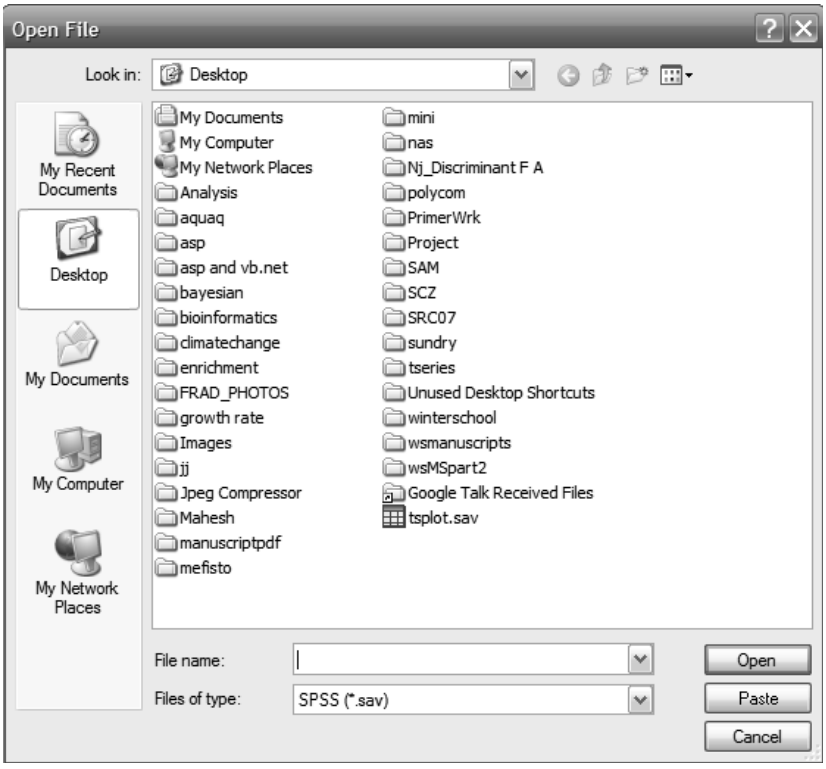
While we deal with data sets it is a good time to learn how to read in a previously saved SPSS data set. Follow Exercise 2 and exit from SPSS, check that the file exists and then restart the program and retrieve the saved file you have just created.

If you have **SPSS** installed on your personal PC you would be able to open the file **My Documents\...*tsplot.sav*** from within the file manager.

Exercise 2

- Choose **File→Exit** from the main menu. Using any method you know (ie look at the contents of the folder **My Documents** on the desktop) check the file ***tsplot.sav*** exists.
- **Invoke the package again and wait for the software to be reloaded**. (described in Section 2)
- Select **File→Open→Data…** from the main menu bar. This will show the **Open File** dialogue box similar to Figure 6. Check you are looking at the correct folder and filename **My Documents\...*tsplot.sav*** and select **Open**
- Check that the ***tsplot.sav*** **- SPSS Data Viewer** is as shown in Figure 4.

Figure - 6



Listing the Data

One of the first things that you should always do with the values you have input is confirm that the program will be working on the data values exactly as you intended. You can easily make a mistake by typing **100** in place of **1.00** and this would make your results very strange. As your data is in a spreadsheet you can do this by checking the values straight from the screen. However, you may wish to create a paper listing and take it away with you to check. Follow through the next exercise in order to list and check your data.

Exercise 3

From the main menu bar choose **Analyze→Reports→Case Summaries** to produce the dialogue-box shown in Figure 7. Highlight the word oilsardine from the selection on the left-hand side and then click on the

button to select the variable as required to be listed. Repeat for ***mackerel*** etc.. Click on the **OK** button. The maximised **Output1 - SPSS Viewer** window will become visible. Scroll up and down through it to check that it looks like Figure 8. Note that the data is listed in the order in which you selected the variables e.g. alphabetic. This window could then be printed.

Correct any mistakes if necessary, and re-save the data file using **File→Save**. This will automatically overwrite the file **My Documents\...*tsplot.sav***.

Figure - 7

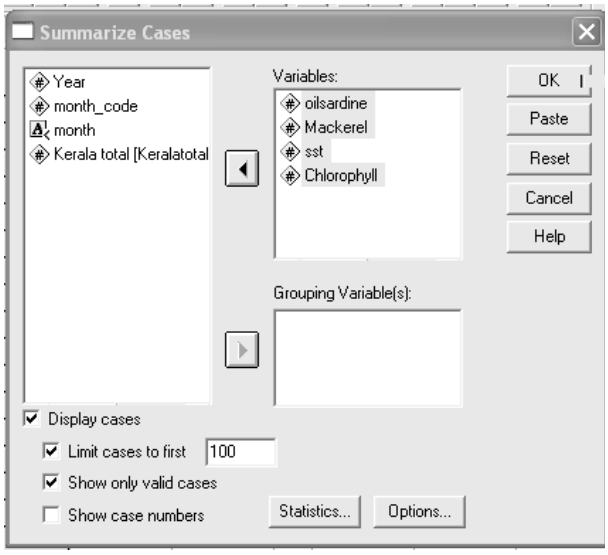
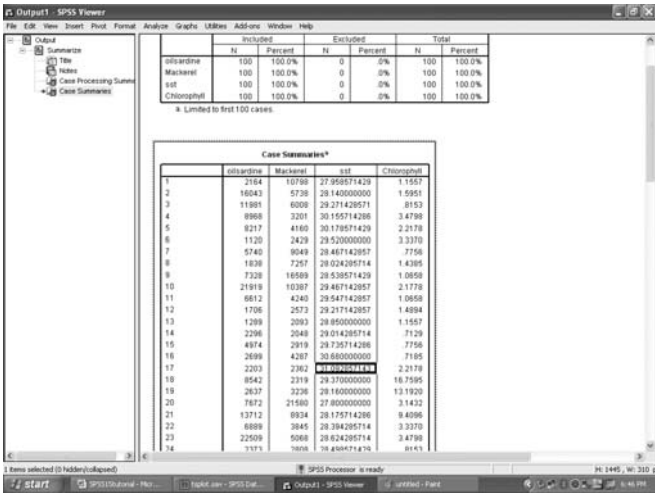


Figure - 8



Exploring the Data

There are several techniques for helping you to summarise your data. Checking data means or plotting appropriate pairs of variables quickly give you an image of the spread of the data. Both of these checks can be made by following Exercises 4 & 5.

Exercise 4

1. Data Means:

Choose the **Analyze→Descriptive Statistics→Descriptives** menu to get a dialogue-box as shown in to Figure 9 below. Select the variables ***oilsardine*** and ***Mackerel*** in the same way as you did in the previous exercise and then click on **OK**. Check the contents of the **Output1 - SPSS Viewer** window against Figure 10. The summary statistics produced are the default actions of the command but as you will see from the syntax (command language) printed in Figure 33 the underlying command is getting quite complex.

Figure - 9

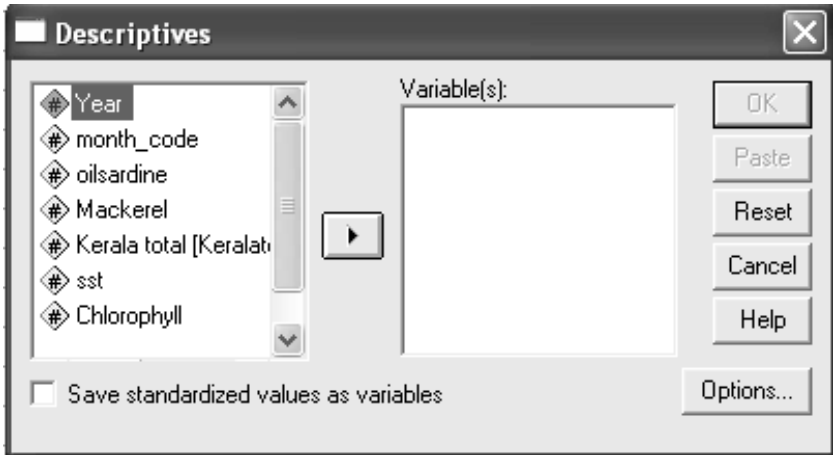
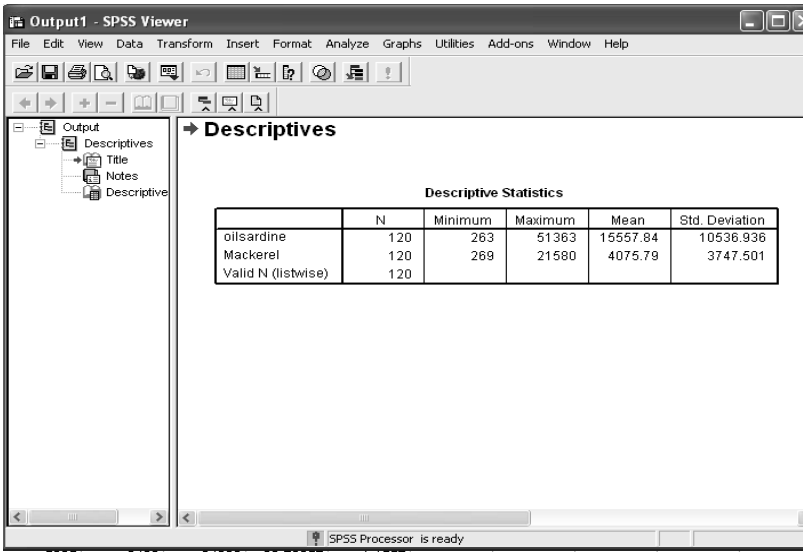


Figure - 10



Exercise 5

2. Scatterplots:

From the main menu select **Graphs→Scatter/Dot ...** This will produce a further dialogue-box as shown in Figure 11. Select the **Simple Scatter** plot and click on the **Define** button to produce Figure 12. Select ***oilsardine*** as the **Y-axis** and ***Mackerel*** as the **X-axis** using the method in Exercise 3 and then click on **OK**. The **Output1 - SPSS Viewer** window now contains this simple scatterplot (as shown in Figure 13).

Figure - 11

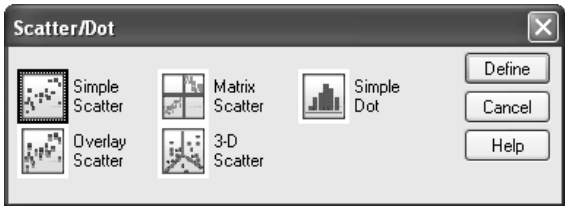


Figure - 12

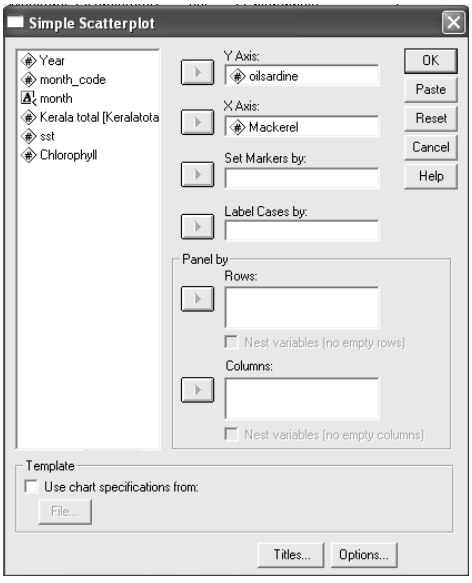
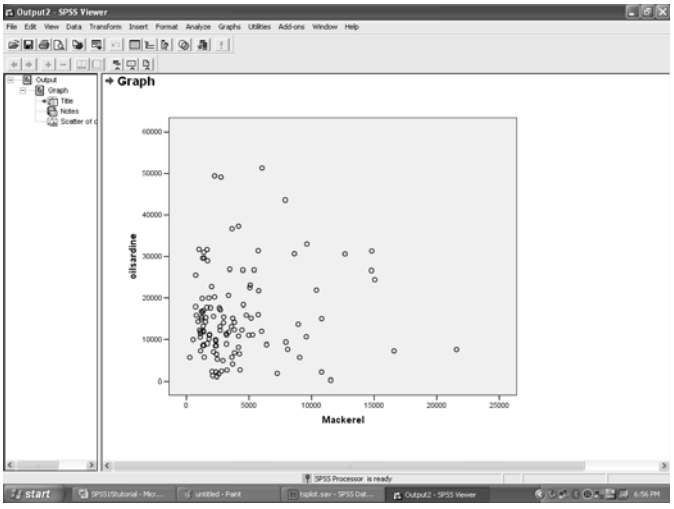


Figure - 13



Saving Results

It is possible to print the contents of the **Output1 - SPSS Viewer** window directly and the output can be saved for convenient printing post analysis too. Try the following exercise to save the contents of the **Output1 - SPSS Viewer** window so that you can print it out in your own machine after this session. [Another method of saving results would be to **Cut** and **Paste** the relevant sections into a Word document – you may find this easier when doing your own analysis]

Exercise 6

If necessary, move into the **Output1 - SPSS Viewer** window and click in it. Select **File→Save As** which will give the dialogue-box similar to that shown in Figure 14. Confirm that your folder **My Documents\...** is selected and then supply a suitable **File name** such as ***tsplot***. [Note that the default file extension is given as ***.spo***] Click on **Save** and the complete contents of the output window will be saved and the default window name changed to **My Documents\...*tsplot.spo***. It is possible to save the graphs separately in a special format that can be imported into a Word Processor, such as Word 2000, however, for most reports this quality is sufficient.

Exit from **SPSS** [**File→Exit**] but you do not need to save the contents of any other window.

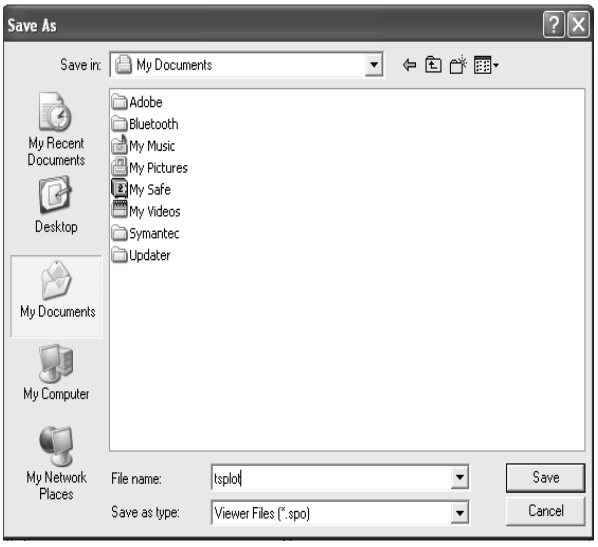


Figure - 14

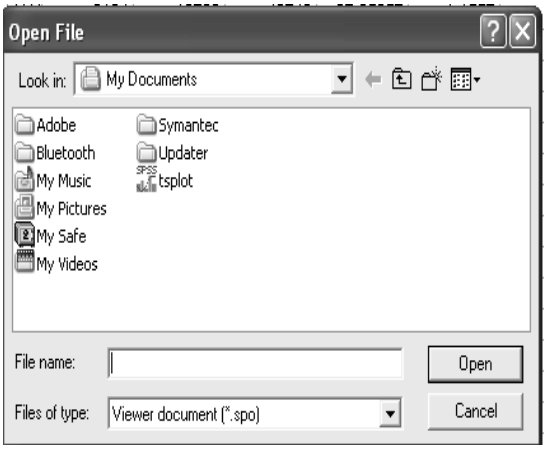


Figure - 15

Exercise 7

To print the output file **My Documents\... *\splot.spo***, once saved, you can read it back into **SPSS** from the **File→Open→Output…** menu and choose the correct file as shown in Figure 15. Try it now before going on to the next set of data.

Exit from **SPSS** [**File→Exit**] so that you have a clean session for the start of the next exercise.

Reading Data From A Separate File

A data set that you wish to analyse may have been entered using a text editor, a database or into another spreadsheet facility. This example assumes that the data, with which you have been supplied, in **My Documents\...*\oil_mackerel.txt*** is in an ASCII (plain text) file created using an editor such as **Notepad.** There are many methods to read (or input) data into **SPSS** but for the purposes of this session, it is assumed that data values are separated by one or more spaces but that character values have no spaces between them. This is called **Freefield or free form** data.

Other forms of data entry are also possible though not considered for extensive use in this study. For example, **Excel** spreadsheets can be opened directly into **SPSS** and you may prefer to explore this facility in your own time.

Transformations and Calculations on Data

Transforming data with special limitations like unstable variance or not amenable to assumptions originally made for the analysis has been much in practice. The following exercise demonstrates the manipulation of data values. Many other calculations and transformations are possible but can be explored in your own time.

Exercise 8

Select **Transform→Compute variable** from the main menu to get the dialogue box shown in Figure 16. Complete the dialogue-box in the following way:

- Enter the name of the new variable ***log_os*** in the **Target Variable** box
- Type in the expression ***log(oilsardine)*** in the **Numeric Expression** box.
- Click on **OK** and return to the **Untitled - SPSS Data Editor** window and check that one or two observations, of the new variable ***log_os***, have been calculated correctly.
- Calculate the number of "incorrect" (or not "yes") answers to show you understand how to use this facility.

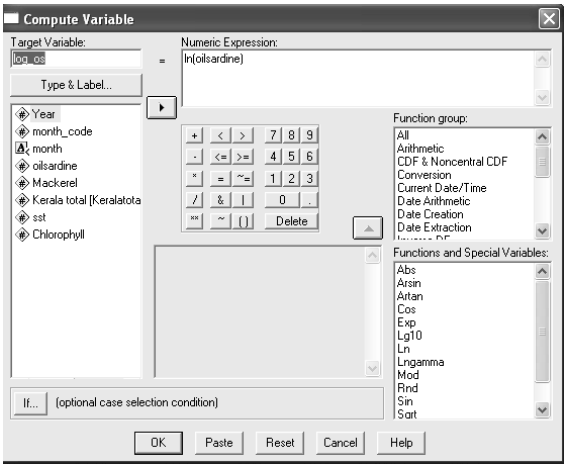


Figure - 16

Creating Subgroups of Data

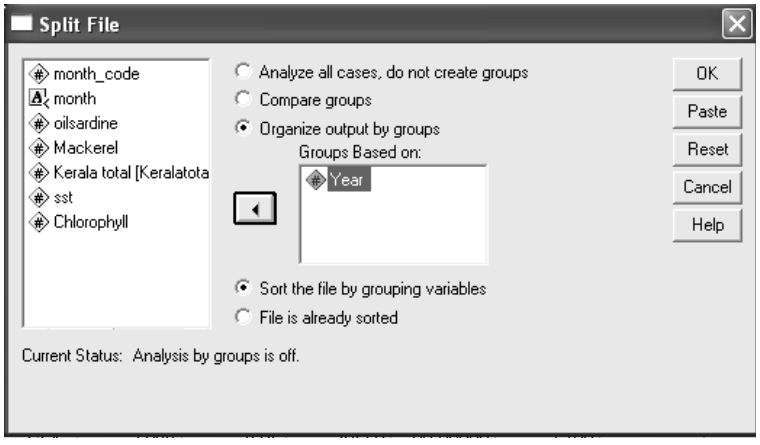
If you want to repeat an analysis for each subset of observations, it is possible to **split** the file into the groups required and then do the analysis automatically on each group.
To demonstrate this facility try the following exercise to consider the mean of the percentage data for all schools together and then for each school individually.

Exercise 9

Calculate the overall means of the variables ***oilsardine, Mackerel*** and ***sst***. Then split the file into the four different schools as follows:

- From the main menu select **Data→Split File** to get Figure 17.
- Select the option **Organise output by groups**.
- Select the variable ***year*** and move it into the **Groups Based on:** box. Your screen should now look like Figure 17.
- Click on **OK** as usual. Notice that the data in the **Untitled - SPSS Data Editor** window has been sorted by ***year*** and that it lists the ***1997*** school first.
- Repeat the calculations with the same variables and see that ten separate mean values (one for each ***year***) have been calculated for each variable.

Figure - 17



Exercise 10

Be aware that the data file is considered to be split into the groups for any following analysis so complete the next exercise to show how to remove the grouping indicator. Very simply, follow the previous exercise but this time select the option

Analyze all cases, do not create groups.

Notice that the box entitled **Groups Based on:** has become dimmed. Click on **OK**. You need to be aware of the **status** of the data set that you are analysing so that you always work with the data intended.

Exit from **SPSS** [**File→Exit**] but again you do not need to save the contents of any window.

Data Summary

If survey data are being analysed, almost the first thing that is required is to display the data in tabular form. This has the added bonus of being a way of checking categorical data. The following exercises demonstrate methods of tabulating data.

Exercise 11

This exercise demonstrates simple one-way frequency tables. Select **Analyze→Descriptive Statistics→Frequencies... .** Select variable ***year*** to demonstrate Figure 18 then click on **OK**. Examine the output. Repeat with other variables as you wish, removing the previous selection by highlighting the variable name in the **Variable(s):** box and click on the  button. If you have more time select the **Statistics** and **Charts** buttons and try the options for more descriptive statistics and bar charts.

Exercise 12

Crosstabulations can be produced using a different menu selection. This time choose **Analyze→Descriptive Statistics→Crosstabs...** to produce Figure 19. Select a variable to appear in the row dimension and another to appear in the column dimension e.g. ***year*** and ***month***. Click on **OK** and examine the output again. Can you interpret the results OK? Try adding the **Expected** values and the **Row percentages** to the **Cells** and calculate the **Chi- square** (look at **Statistics**).

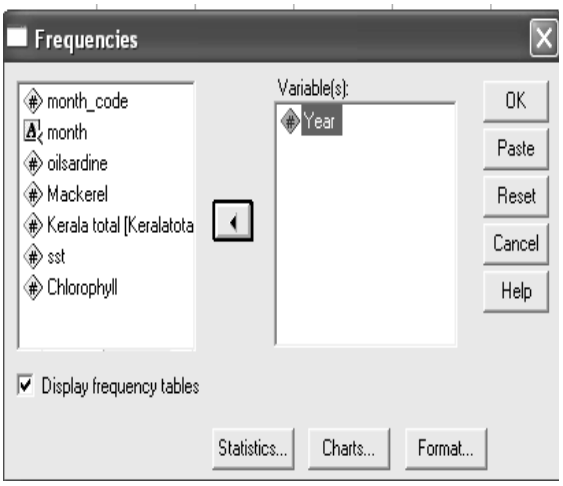


Figure - 18

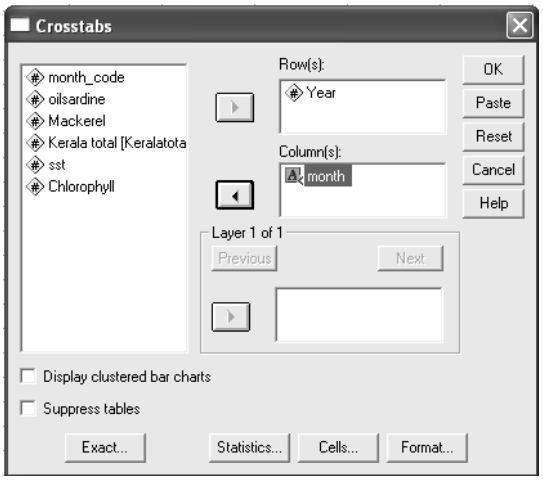


Figure - 19

Statistical Analysis - Regression

SPSS contains many facilities to perform statistical analyses. All should be used initially under the guidance of a statistician as there are many ways of producing the wrong analysis.

The following exercise uses **LINEAR REGRESSION** to perform simple regressions.

Exercise 13

The **SPSS** file **My Documents*tsplot.sav*** has as well an opportunity to try out simple linear regression between two variables viz. ***oilsardine*** and ***sst***

Using the plotting command investigate the relationship between the dependent variable, ***Oilsardine*** , and one of the independent variables, ***sst***. (To see how the oilsardine landings varies with time).

Can you suggest a relationship between ***oilsardine*** and ***sst***? From the main drop-down menu select **Analyze→Regression→Linear** and choose ***oilsardine*** as the dependent and ***sst*** as the independent variables (see Figure 20). Click on **OK**.

Look at the output but do not worry if you are unable to interpret this or any other statistical output. This tutorial is showing you the methods that can be used in SPSS when necessary and does not attempt to teach you statistical techniques.

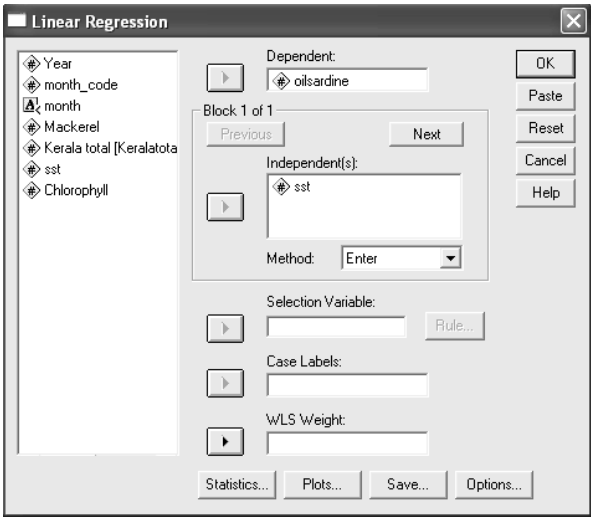


Figure - 20

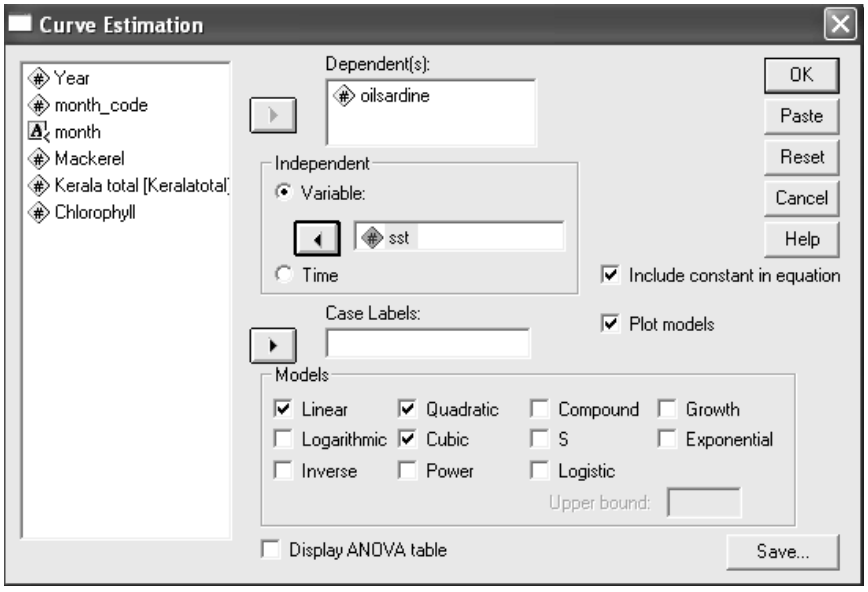
The following exercise uses **CURVE ESTIMATION** to perform more complex regressions.

Exercise 14

Repeat the plot between another pair of variables ***oilsardine*** and ***sst***. By eye, it does not look as if a linear regression would be the best fit between these variables ***oilsardine*** and ***sst*** but you can try it anyway. This time you will use a different method.

Select **Analyze→Regression→Curve Estimation...** and choose ***oilsardine*** and ***sst*** as appropriate (see Figure 21). Using all the default selections, fit the curve.Notice that a plot is automatically prepared with both the observed data and the fitted linear regression being plotted together. It does not appear to be a good fit, so repeat this part of the exercise selecting the **Quadratic** and then finally the **Cubic** options in the the **Models** selection box. This is also known as "polynomial regression".

Figure - 21



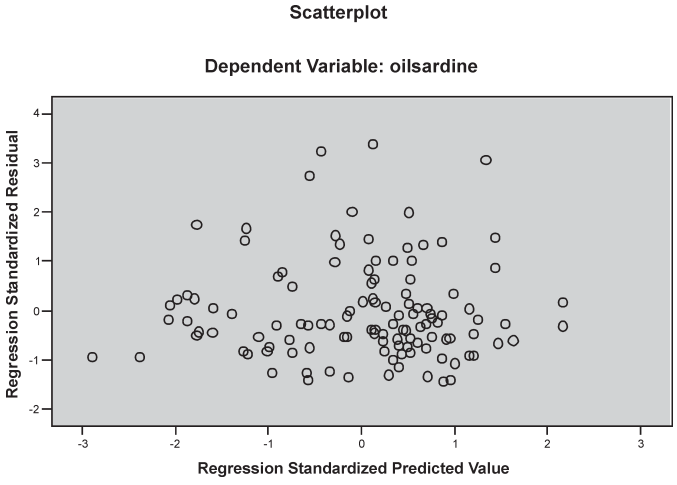
Exercise 15

When regression analysis has been performed it is usual to want to save the predicted (or fitted) values and residuals and plot them against each other to check that they are randomly scattered about zero. **SPSS** allows you to both save and plot at the same time.

Select **Analyze→Regression→Linear…** and choose the simple regression of ***oilsardine*** on ***sst***. This time, however, click on the **Save** button and select **Standardised Predicted Values** and **Standardised Residuals**.

Click on **Continue** to return to the previous screen and then click on **Plots**.

Choose ****ZPRED*** as the X-variable and ****ZRESID*** as the Y-variable. Click on **Continue** and then **OK.** Look at the **Output1 - SPSS Viewer**



Analysis of Variance

SPSS also has many commands to perform analysis of variance dependent on your data collection. This exercise demonstrates a simple analysis of variance of a balanced designed experiment.

Exercise 18

Let us use the same file that has been created called **My Documents*tsplot.sav***. Open this into the **SPSS Data Editor** window (saving the previous results if required) and look at the data. The file contains information on the ***landings of oilsardine*** for a period of ten years. Analyse the data in the following way assuming that ***monthly*** estimates are randomized. (these are no true situations, for practice only)

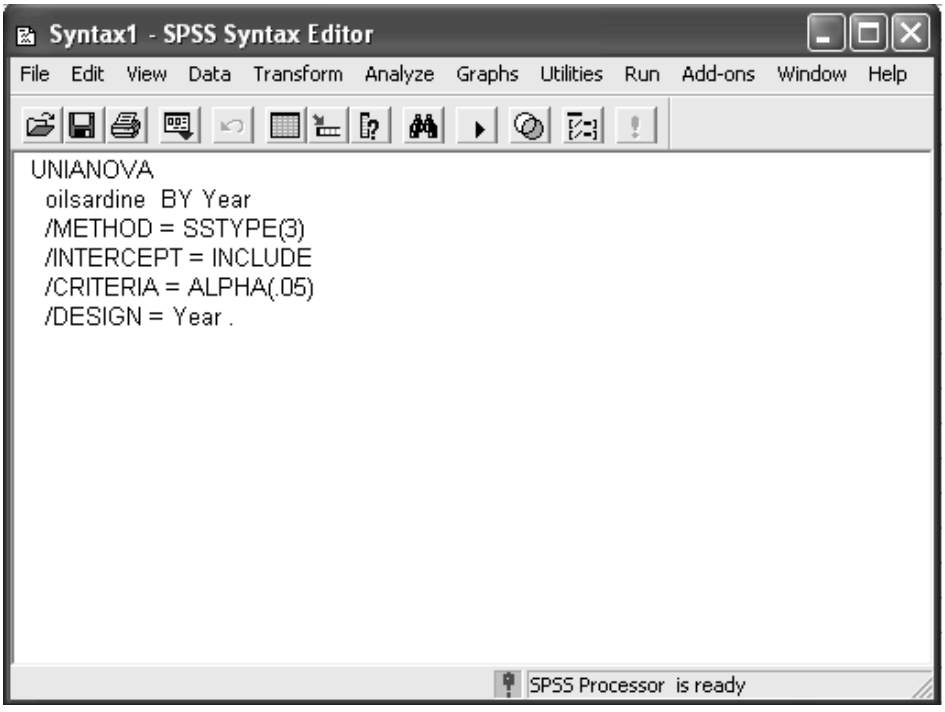
Select **Analyze→General Linear Model→Univariate** and in the resulting window select ***oilsardine*** as the dependent variable and then ***year*** as the fixed factor to be defined. This time, rather than run the commands automatically (using **OK**), **Paste** the commands into the **Syntax1 - SPSS Syntax Editor** window, as shown in Figure 22, where you can see the default **Design** sub-command as follows:

DESIGN year .

Now run the commands shown in this window by clicking on **Run→Current** [or use **Ctrl-R**] and look at the results in the **Output1 – SPSS Viewer** window.

In order to display the means for ***year***, return to the **Univariate** dialogue-box (via **Analyze→General Linear Model→Univariate** menu), select the **Options** button and choose the factors required, and continue as before defining the appropriate (second) design. This time, highlight and run just this **Selection** of the **Syntax1 – SPSS Syntax editor** window.

Figure - 22

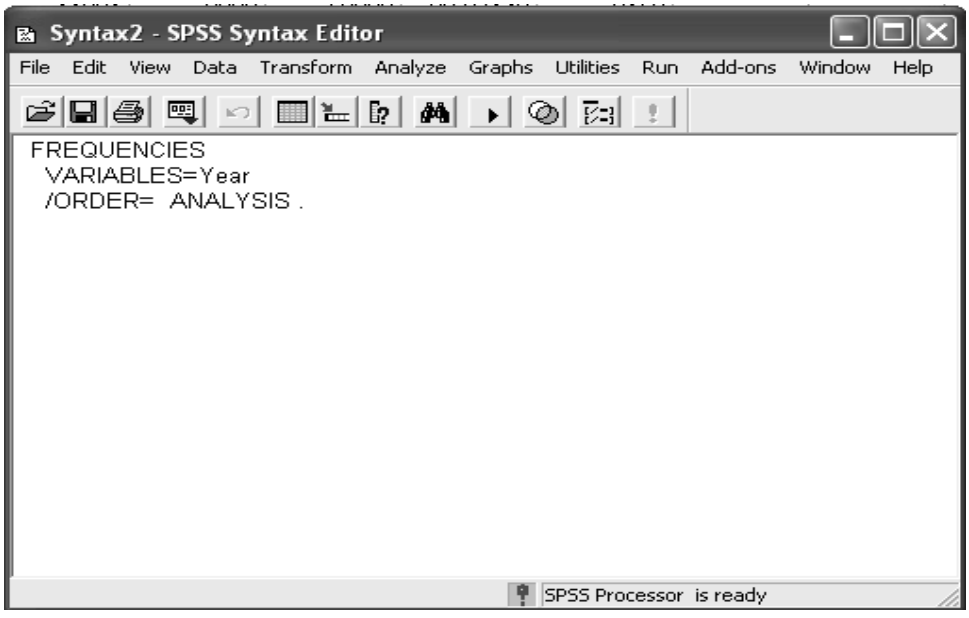


Saving Command Syntax

A copy of all of the syntax (**SPSS** command language) used to produce the analysis required is automatically saved in a file called **SPSS.JNL**. However, this file is usually overwritten every time **SPSS** is invoked.

It is also possible to direct certain parts of the syntax to a separate file for future reference, for example, you may want to repeat the exact analysis on a new set of data containing the same variables etc. As shown in the previous exercise there is a **Paste** button available. Having run a particular dialogue-box (e.g. **Descriptive Statistics**) and decided that this would be needed for a subsequent data set you can return to this box and select **Paste**. A new icon will appear on the taskbar which if you open it should contain similar information to that shown in Figure 23.

Figure - 23



It is possible to save the contents of the **Syntax - SPSS Syntax Editor** window for use at a future date. If you want to save any of the command syntax that you have pasted into the window before exiting then move into the **Syntax - SPSS Syntax Editor** window and click on **File→Save As…**. Give a suitable name to the file which is given the default extension of ***.sps***. This can be reused in a later session opening the file straight into the **Syntax1 - SPSS Syntax Editor** window and using **Run→Current** [or use **Ctrl-R**].

Using the HELP menu

All statistical analysis packages include an extensive **Help** system. If you have time, make use of the drop-down menu and look at the **Statistics Coach** facility that is loaded in this PC lab. It may not be available in the public PC labs but is a simple introduction to basic analysis.

When finished use **File→Exit** saving any files you might like to refer to at a later date.