

Chapter 9

Lertap, Excel, and SPSS

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This chapter's objective is to impart some helpful pointers on using Lertap within Excel, getting Lertap and SPSS to communicate, fixing font problems which occasionally arise, and importing data from other systems.

How Lertap worksheets are linked

By now readers are well aware of the two main steps to using Lertap's Run option: "Interpret CCs lines", and "Elmillon item analysis". Before these two actions can be used, a Lertap Excel workbook must contain a worksheet called "Data", and a worksheet called "CCs".

It might be useful to examine what happens when Lertap's Run options are taken.

When "Interpret CCs lines" is used, new worksheets are added to the workbook by Lertap. Only one of these, a sheet called "Freqs", will be visible—the others, called "Sub" worksheets, will be hidden from view, waiting for Elmillon to run.

The Freqs worksheet may be deleted at any time. None of the Lertap procedures requires information from the Freqs worksheet.

The hidden Sub worksheets, on the other hand, are vital to the functioning of Elmillon, as well as some other procedures. If the Sub worksheets are unhidden and deleted, the "Elmillon item analysis" will be unsuccessful. Should this happen, "Interpret CCs lines" must be used again.

When Elmillon runs, it creates more worksheets. For example, it always creates a worksheet called "Scores", a sheet which has two sections—test scores, and summary statistics. The Scores worksheet is required by such Lertap procedures as the histogrammer, the scatterplotter, and the external criterion analyser.

It is generally safe to delete columns from the Scores worksheet without major consequences, but *the rows in this sheet should not be tampered with*. If by chance something were to happen to one or more of the rows of the Scores

sheet, the functioning of all those procedures which look to Scores for information, such as the histogrammer, the scatterplotter, and the external criterion analyser, will be jeopardised. *The rows in the Scores sheet should not be tampered with.*

Experienced Excel users may be tempted to get into the Scores sheet, and have Excel sort it in some manner. This should not be done. There is a one-to-one correspondence between the rows in the Scores sheet and the rows in the Data sheet; sorting the Scores sheet will destroy this crucial linkage.

Lertap has an icon on its toolbar which will sort scores. It does this by first making a copy of the Scores sheet, which it calls "Sorted". Once the Sorted sheet is ready, all Lertap sorts are done on it. This is the pattern which should be followed if users want to use the results in the Scores worksheet: have Lertap make its Sorted copy, or use Excel to make your own copy using your preferred name, and then work with the copy.

The rows at the bottom of the Scores sheet have "headers" in the first column, such as "n", "Min", "Median", and so on, and these too should be left as Lertap creates them. One or two Lertap procedures search down the first column of the Scores sheet, looking for the statistic they need, such as "n".

Besides making and controlling the Scores worksheet, Elmillon also creates worksheets with item and subtest results. Each subtest, cognitive or affective, will usually have two statistics worksheets, such as "Stats1f" and "Stats1b". Cognitive subtests will generally have a third worksheet with upper-lower results, called "Stats1ul".

Only one of these statistics worksheets is used by another procedure. It's the "b" sheet, such as Stats1b. The procedure which creates the item response charts requires the "b" sheet(s) in order to do its job.

The histogrammer will make two worksheets if the Analysis ToolPak is installed. One of these, the "L" sheet, as in Histo1L, feeds the second histogram sheet, the "E" sheet. Once the E sheet is made, either or both of the histogram worksheets may be deleted without consequence.

Changing the Data and CCs sheets

Changes may be made at any time to the Data and CCs sheets. However, any changes made in these worksheets will not automatically ripple through to the other sheets. If a change is made in one of the sheets, or in both, "Interpret CCs lines" and "Elmillon item analysis" must be used again.

When "Interpret CCs lines" is run a second time, Lertap will warn that it is about to delete the results worksheets, also called the secondary worksheets—by which it means Freqs, Scores, Stats1f, and so on. In fact, every worksheet in the workbook will be deleted, except Data and CCs, unless they are first renamed.

If wanted, worksheets may be saved from this automatic deletion process by renaming them. A suggested procedure for doing this is to put something in front of the original name. For example, if you want to save the Stats1ul sheet, rename it as OrigStats1ul, or Orig1ul—don't use a name which begins with the letters "stat".

Preparing a Lertap workbook for hibernation

It's possible for a Lertap workbook to come to have a dozen or even more secondary worksheets. Users who have completed their analyses may want to save storage space on their computer or server by deleting the results sheets, knowing they can always recreate them with the "Interpret CCs lines" and "Elmillion item analysis" options.

The left-most icon on the Lertap toolbar, the X to the left of the yellow smiley face, is there for just this purpose.

From Lertap to SPSS

Any Lertap worksheet may be made to work with SPSS, the Statistical Package for the Social Sciences¹. The 8-ball towards the right-hand side of Lertap's toolbar eases the process of preparing a Lertap worksheet so that it may be used in SPSS.

We'll work through an example.

We have a data set named MSLQ1.xls. Its Data worksheet contains information collected from 139 undergraduate students studying at Curtin University's Faculty of Education. The data in the worksheet are from the students' responses to a survey, an instrument which asked them for two types of information: demographic information, such as gender, age, and course of study, and information about their study habits and strategies. The latter information was collected by using the University of Michigan's Motivated Strategies for Learning Questionnaire, the MSLQ (Pintrich, *et al*, 1991; see Chapter 3 section, "A large-scale survey").

The version of the MSLQ used in this study had 10 affective scales, or subtests. Four of the scales used items which had to be reversed before they were scored.

Lertap was used to create the 10 scale scores for each student, and to get the response- and item-level reports which are its forte, such as Stats1f and Stats1b.

Once the scales were shown to have adequate alpha values, some of their scores were added to the Data worksheet. For example, one of the scales had Title=(SelfReg), with Name=(Self-regulation). SelfReg consisted of 12 items scattered throughout the data set in non-contiguous columns, with two of its items requiring reverse scoring. Lertap found SelfReg's alpha reliability to be 0.77, a value which confirmed that the scale's scores could be used as a "consistent" affective measure.

It was decided to use SPSS in order to see if there might be a relationship between course of study and SelfReg. We needed to export a Lertap worksheet to SPSS, but we had some preparatory work to do first. Course of study was coded in column 4 of the Data sheet, and had a column header of "Degree". The SelfReg scores were in column 4 of Lertap's Scores worksheet. It's only possible to export one worksheet, and here we had the relevant variables in two different sheets. What to do?

Easy. We used Lertap's Move option to copy SelfReg from the Scores worksheet to the Data sheet. For some reason, Lertap put SelfReg into column 71 of the

¹ The SPSS website is www.spss.com

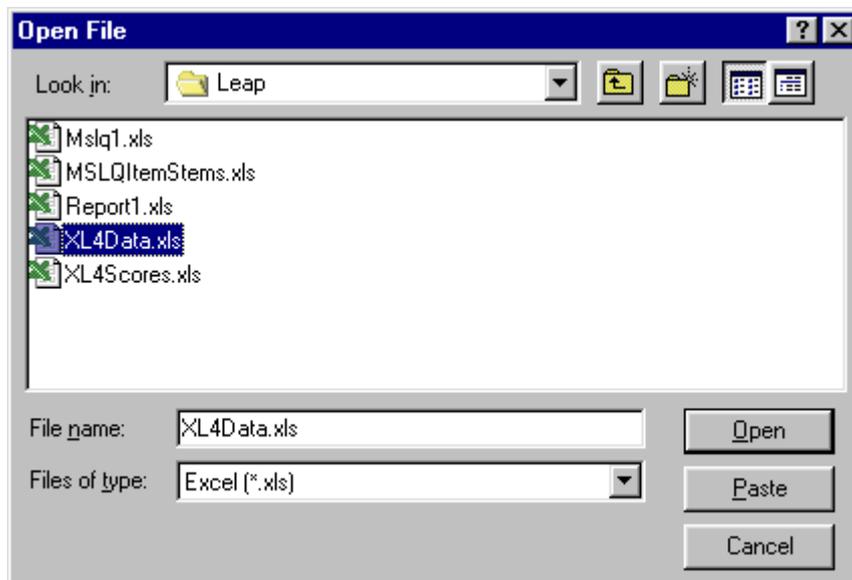
Data worksheet, even though columns 68-70 were empty. We used Excel to move SelfReg to column 68.

Then, with the Data sheet as our active worksheet, our highlighted worksheet, we clicked on Lertap's 8-ball. Lertap said it would save the Data worksheet as an Excel 4 sheet, having a title of XL4Data, and it did.

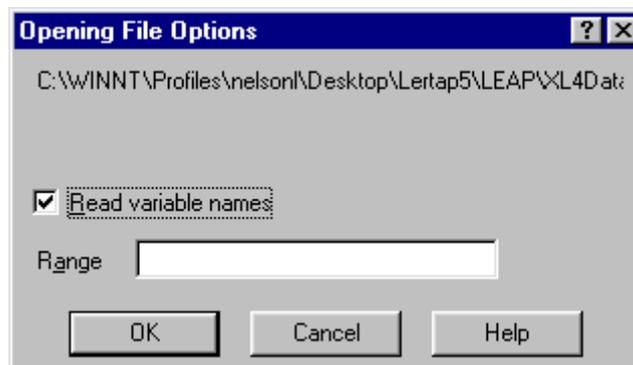
As mentioned in the next chapter, Lertap fixed the XL4Data sheet so that it had only one row of header information at the top, not the two which it had in the original workbook. It did this to maximise compatibility with SPSS, a system which wants to have a single row of headers, nothing more.

We looked at the XL4Data sheet to satisfy ourselves that it seemed okay. Then we closed it. We closed it as we were going to go to SPSS to open it, and knew we'd be likely to get a "sharing violation" if we didn't close Excel's copy.

We started SPSS 10, and used its File / Open / Data / option, going to the right folder on our computer, and telling it to look for Excel files, as shown below:



We clicked on Open, and got the following box:

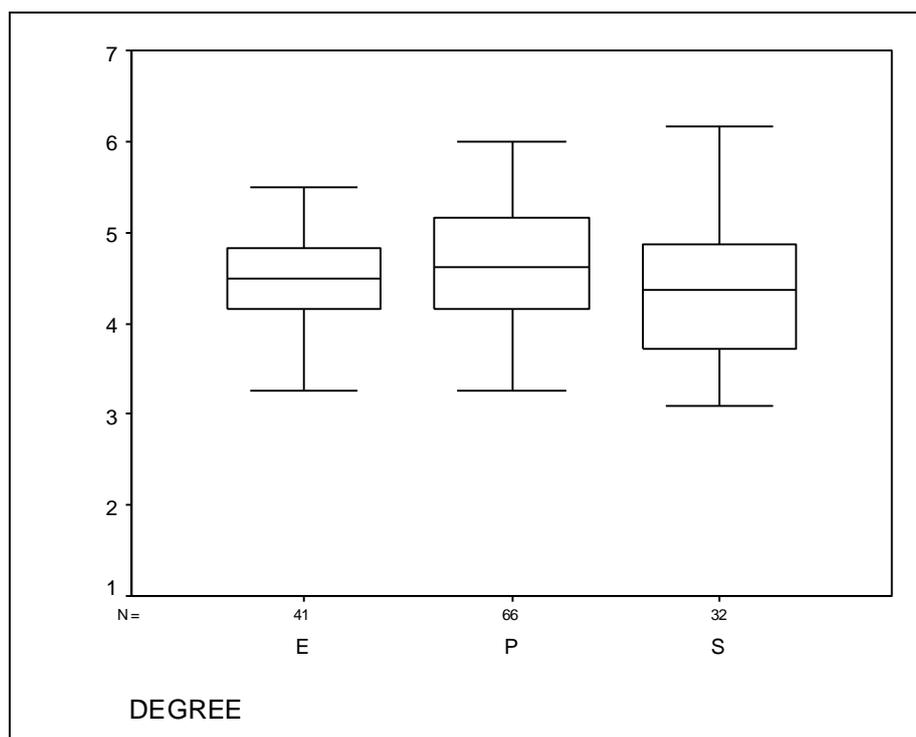


Note the tick in the Read variable names box? This is important. It gets SPSS to interpret the first row of the in-coming Excel worksheet as a header row.

We clicked on OK; there being no need to fill in the Range box.

SPSS said some unpleasant things about our XL4Data.xls file, giving us a variety of "invalid data" statements. Mostly it was referring to our DOB column in the Lertap Data worksheet, which we used for date of birth information. Many of the dates were missing, or typed in as a text value instead of an Excel date. This was not of particular concern for what we wanted to do, and so we proceeded.

We like Boxplots, and asked SPSS to make one, plotting SelfReg scores for each of the three Degree values. Here's what we got:



We then went on to do some means comparisons. By the time we had finished our analyses, we had copied all ten of the scale scores from Lertap's Scores sheet to its Data sheet, used the 8-ball, and picked up the lot in SPSS.

An important Lertap / SPSS issue

An important matter to keep in mind when setting up column headers in Lertap's Data worksheet, and when using the Title=() specification on *sub cards, is to realise that these headers and titles will become "variable names" if you later use SPSS. There are some restrictions on how such names are formed.

SPSS variable names can contain up to eight characters, the first of which must be a letter. The names should not contain a space. They may contain the underscore character, and the "period" (full stop), but, if they do, these characters should not be at the end of the name.

SPSS variable names must not be the same as SPSS reserved keywords. These keywords include the set {ALL AND BY EQ GE GT LE LT NE NOT OR TO WITH}.

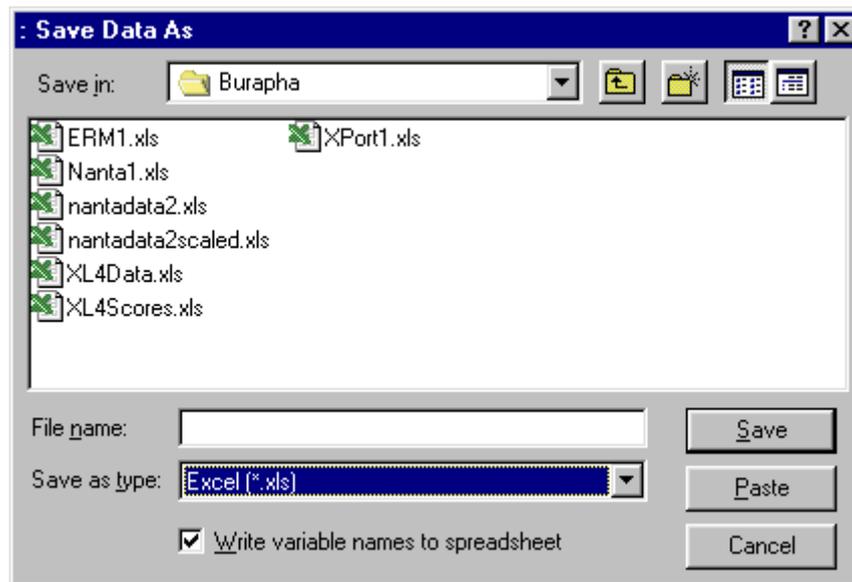
These naming rules make it unwise to use item headers such as 1, 2, 3, and Item 1, Item 2, Item 3, or Q 1, Q 2, Q 3. However, Item_1 would be okay, as would Q_1.

If you have no intention of using SPSS, Lertap's column headers and Title=() specifications can be just about anything you want. Making an effort to keep them at eight characters or less is a good idea (in fact, if the Title is longer than eight characters, Lertap uses just the first eight).

From SPSS to Excel to Lertap

If item response data have been entered into SPSS, it is possible to have SPSS' data editor save the contents of its "Data View" as an Excel file, or workbook.

To do this, in the SPSS data editor, use the File / Save As... option and complete the following dialog box:



Make sure that the "Save as type:" field is as above, and also make sure there's a tick in the "Write variable names to spreadsheet" box.

SPSS will produce a log of what it has done. After it has done this, close SPSS, go to Excel, and open the workbook you saved via the "File name:" box above (it's empty above, but you will, of course, supply a name).

There are then several steps to follow before the new workbook will be ready for use with Lertap. With the new workbook open in Excel,

1. Use Excel's Tools / Options... tabs, look at the General tab, and place a tick in the "R1C1 reference style" box. This will make sure that the new workbook uses digits instead of letters for its columns.
2. Rename the workbook's worksheet to Data.
3. Insert a new row at the top of the Data worksheet, and type a title or description of some sort in it. This row is required as Lertap wants its Data worksheet to have two header rows—the first can have a description of any sort, while the second must have headers for the columns.
4. Use Excel's Insert / Worksheet option to add a new worksheet to the workbook. Rename it as CCs.
5. Prepare appropriate control cards, or job definition statements, in the CCs sheet.

6. Use Excel's File / Open... option to open the Lertap5.xls file. This will install Lertap's toolbar, and give access to the Run option, the one which leads to "Interpret CCs lines", and "Elmillion item analysis".

That's it, you should be ready to roll. If you someday have the chance to follow these steps, however, you may notice an annoying problem with the new workbook: all of its sheets will be set to work in a fixed-pitch font, usually Courier.

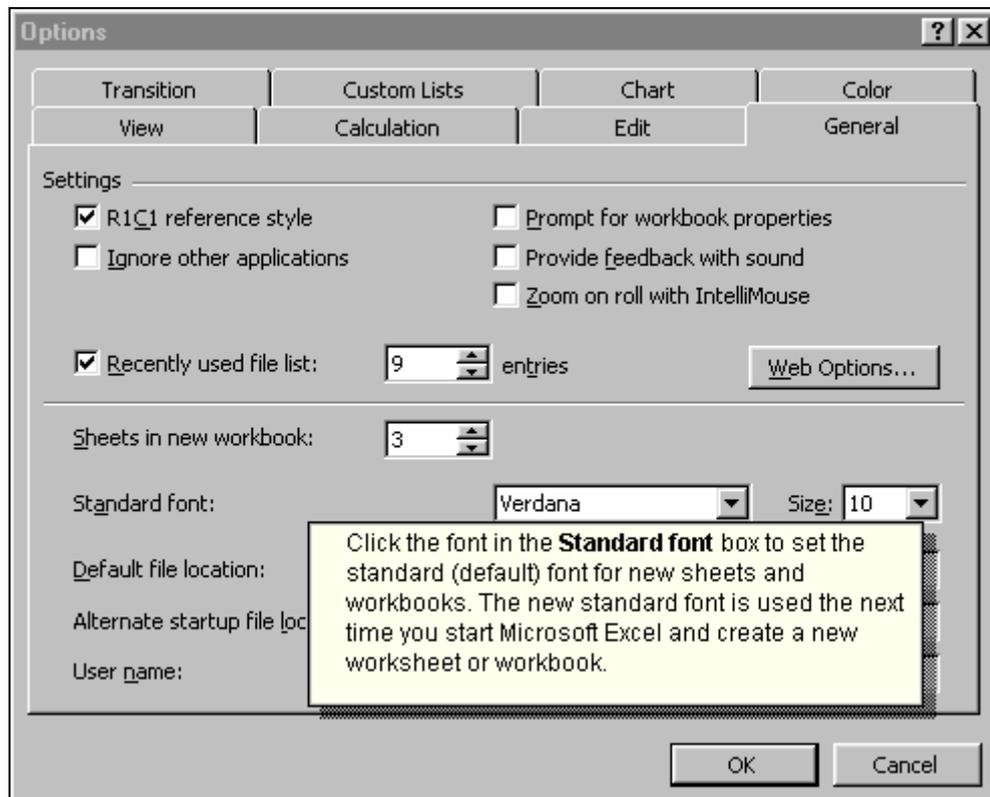
Lertap's reports don't really sparkle with Courier, they look better with the Verdana font, or with Arial. It's supposed to be feasible to set the default Excel worksheet font on one of the Options tabs, but doing so may not work as one might expect. When you run into font problems of this nature, the following little section may be useful.

More about Excel fonts and Lertap

The font used in any Excel worksheet may be changed quickly. Use the CTRL and A keys at the same time, and then select, say, Verdana from the Font box on Excel's Formatting toolbar (use View / Toolbars if the Formatting bar is not displayed).

Lertap is programmed to use the Verdana font, point size 10, in all but one of its worksheets. The exception is the CCs worksheet, where Courier New, a fixed-pitch font, is preferred (but not required).

Excel has a setting called the "Standard Font". It may be set using the General tab under Excel's Tools / Options, as seen below²:



² We were using Excel 2000 when we took this screen shot.

Setting the Standard Font does not seem to work as one might often hope. If a new workbook is opened when the Standard Font is set to, for example, Arial, changing the Standard Font from within the same workbook to, say, Verdana, will not “stick”. We can close the workbook, exit from Excel, start up again, reopen the workbook, find its Standard Font set to Verdana, but any new worksheets in that same workbook will inherit the original Standard Font, Arial.

Reading the fine print provided by Excel’s Help system will reveal that the Standard Font only applies to new workbooks. Workbooks which existed before the Standard Font was changed are not affected—in other words, the default font for existing workbooks is fixed at whatever the Standard Font was when the workbooks were first created.

How to work around this? Let’s assume you have set up a workbook outside of Lertap, that is, used Excel without Lertap’s toolbar showing. Say you’ve set up a Data worksheet following Lertap’s requirements (first two rows used for headers, as described in Chapter 3). Say this worksheet’s font is, perhaps, Times New Roman. If you start up Lertap at this point, and access its Run options, the reports which Lertap creates, such as Stats1f and Stats1b, will (more likely than not) use Times New Roman. They may not look as good as they would with Lertap’s preferred font, which is Verdana.

How to get the reports in Verdana? You could try reformatting each report using the CTRL and A keys at the same time, as mentioned above. However, things may still be less than optimal—the contents of some cells may not show in their entirety; you may have to turn on “Row & column headers”³, and then resize the columns.

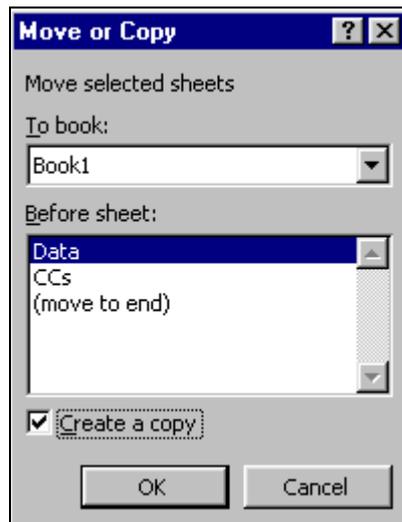
How to circumvent font problems such as these? Begin by using Lertap’s New option to “Make a new blank Lertap5 workbook”. Take note of the name of the new workbook which Excel creates—it’ll usually be something like Book1.xls.

Next, go to the workbook which contains the Data worksheet set up outside of Lertap. Make a copy of this worksheet, and move the copy to the new Lertap workbook (Book1.xls, or whatever it’s called).

How to make a copy of a worksheet and have it moved to another workbook? Excel’s Edit options include one to “Move or Copy Sheet”⁴. Taking this option will result in a dialog box like this one:

³ Use the View Tab on Excel’s Tools / Options for this.

⁴ Right-clicking on the worksheet’s tab is a useful shortcut.



Above, we placed a tick in the "Create a copy" box, and chose Book1 from the drop-down list of open workbooks which appeared when we clicked on the little arrow on the right-hand side of the "To book". Once the OK button is clicked, Excel will copy the worksheet to Book1. At this point you'd want to delete the Data sheet from Book1, and rename the worksheet you've just copied so that its name is Data.

Next, place appropriate control "cards" in Book1's CCs sheet. You should then find that the report worksheets which Lertap creates when its Run options are used are well formatted, and employ the Verdana font.

Importing other data formats

Excel can import data from a variety of other systems. We asked Excel's Help system to list them, and here's what it said:

Microsoft Office provides drivers that you can use to retrieve data from the following data sources:

- Microsoft SQL Server OLAP Services (OLAP provider)
- Microsoft Access 2000
- dBASE
- Microsoft FoxPro
- Oracle
- Paradox
- SQL Server
- Text file databases

Notes:

You can retrieve data from a Microsoft Exchange or Lotus 1-2-3 data source by using DAO in Microsoft Visual Basic.

You can use ODBC drivers or data source drivers from other manufacturers to get information from other types of databases that are not listed here, including other types of OLAP databases. For information about other drivers that might be available from Microsoft, see the xreadme.txt file. For information about installing an ODBC driver or data source driver that is not listed here or in the xreadme.txt file, check the documentation for the database, or contact your database vendor.

Importing data from a text file is directly supported from Excel's Data / Get External Data / Import Text File... option. You'd use this option to import "csv" files (comma-separated values files), or text files where the tab character has been used to separate fields.

Excel's Data / Get External Data / Import Text File... option provides good support for importing data from text files which have fixed-width fields.