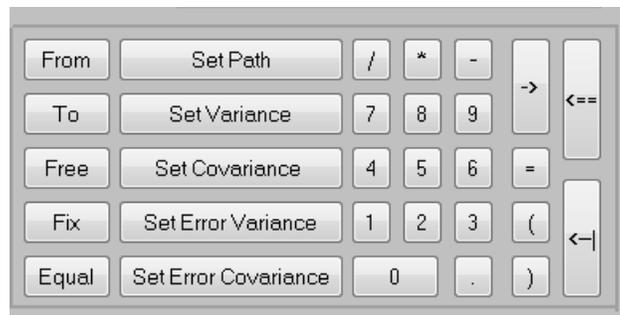


Using SIMPLIS project files

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1 Introduction

LISREL allows the user to create SIMPLIS syntax by making use of a dialog box keypad. This keypad, see illustration below, is operated by clicking (left mouse button) on the appropriate symbol. Note that the **<==** symbol represents the **backspace** key while the symbol **<-|** denotes the **enter** key. The path diagram produced by running the program can subsequently be modified to change the model specifications.



As an illustration, we consider path analysis for latent variables, which, in its most general form, is a structural equation system for a set of latent variables classified as dependent or independent. In the application described below, the system is recursive (see the SIMPLIS Syntax Guide.)

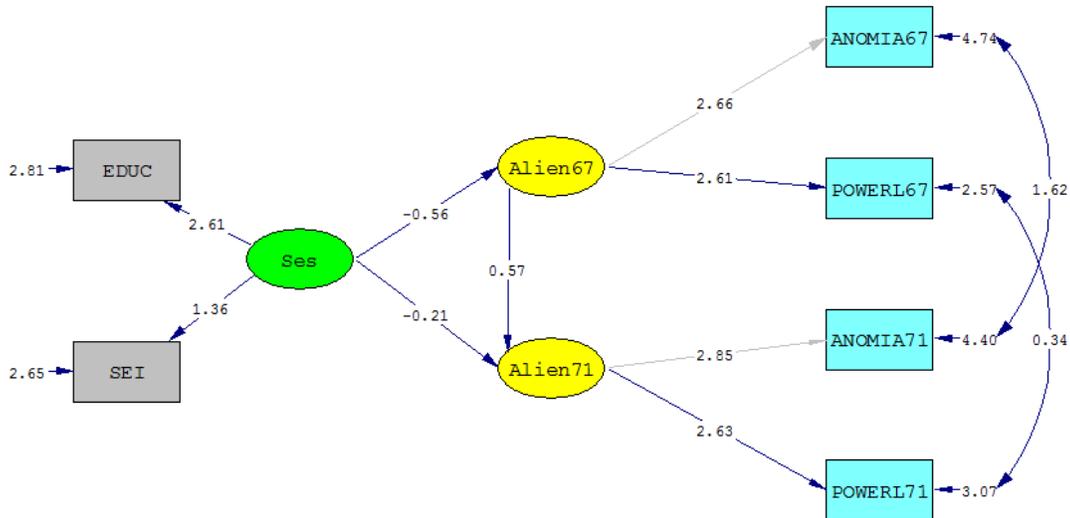
Recursive models are particularly useful for analyzing data from longitudinal studies in psychology, education and sociology. The characteristic feature of a longitudinal research design is that the same measurements are used on the same people at two or more occasions. Wheaton, et al. (1977) reported on a study concerned with the stability over time of attitudes such as alienation, and the relation to background variables such as education and occupation. Data on attitude scales were collected from 932 persons in two rural regions in Illinois at three points in time: 1966, 1967, and 1971. The variables used for the present example are the Anomia subscale and the Powerlessness subscale, taken to be indicators of Alienation. This example uses data from 1967 and 1971 only.

The background variables are the respondent's education (years of schooling completed) and Duncan's Socio-economic Index (SEI). These are taken to be indicators of the respondent's socio-economic status (Ses). The sample covariance matrix of the six observed variables is given below:

	y1	y2	y3	y4	x1	x2
ANOMIA67	11.834					
POWERL67	6.947	9.364				
ANOMIA71	6.819	5.091	12.532			
POWERL71	4.783	5.028	7.495	9.986		
EDUC	-3.839	-3.889	-3.841	-3.625	9.610	
SEI*	-2.190	-1.883	-2.175	-1.878	3.552	4.503

*The variable SEI has been scaled down by a factor of 10.

The path diagram for this model is shown below:



Notes:

- The error terms of ANOMIA and POWERL are specified to be correlated over time.
- The four one-way arrows to the right of the diagram represent the measurement errors in ANOMIA67, POWERL67, ANOMIA71 and POWERL71 respectively.
- The two-way arrows on the right indicate that some of the measurement errors are correlated. The covariance between the two error terms for each variable can be interpreted as a specific error variance. For other models for the same data, see Jöreskog & Sörbom (1989, pp. 213-223).

To set up this model for SIMPLIS is straightforward as shown in the following syntax file:

```

Stability of Alienation
Observed Variables
ANOMIA67 POWERL67 ANOMIA71 POWERL71 EDUC SEI
Covariance matrix
11.834
6.947      9.364
6.819      5.091      12.532
4.783      5.028      7.495      9.986
-3.839     -3.889     -3.841     -3.625      9.610
-2.190     -1.883     -2.175     -1.878      3.552      4.503
Sample Size 932
Latent Variables Alien67 Alien71 Ses
Relationships
ANOMIA67 POWERL67 = Alien67
ANOMIA71 POWERL71 = Alien71
EDUC SEI = Ses

```

Alien67 = Ses
 Alien71 = Alien67 Ses
 Set Error Covariance of ANOMIA67 and ANOMIA71 Free
 Set Error Covariance of POWERL67 and POWERL71 Free
 Path Diagram
 End of Problem

Notes:

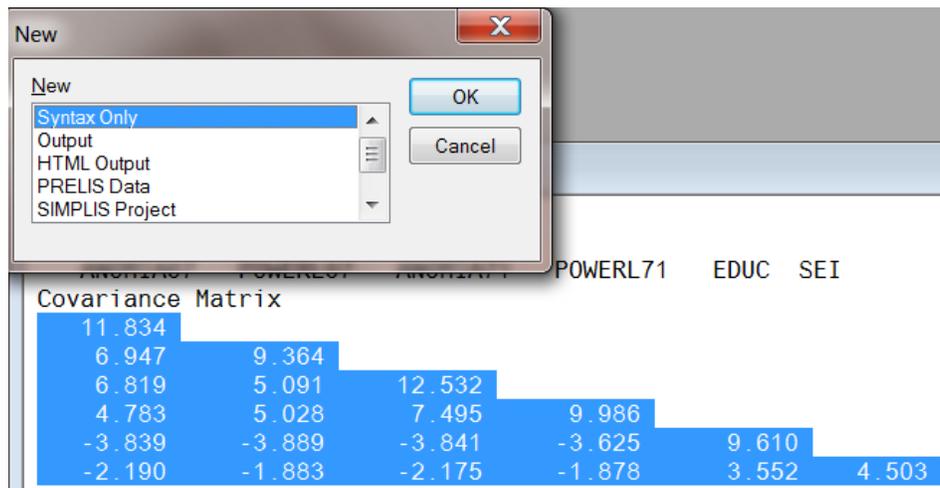
- The model is specified in terms of relationships. The first three lines under Relationships specify the relationships between the observed and the latent variables. For example, ANOMIA71 POWERL71 = Alien71 means that the observed variables ANOMIA71 and POWERL71 depend on the latent variable Alien71.
- The Line Alien71 = Alien67 Ses means that the latent variable Alien71 depends on the two latent variables Alien67 and Ses. This is one of the structural relationships.

2 Building the SIMPLIS Syntax

The files **ex6a.spl** and **ex6b.spl** in the **SIMPLIS examples** folder both contain the numeric values of the covariance matrix of the observed variables.

From the **File** menu, select **Open** and locate **ex6a.spl**. Use the mouse cursor (left button down) to mark the covariances as shown below. Use the **Edit** menu and click **Copy** or, alternatively, press the **Ctrl - C** keys on the keyboard.

From **File, New** select **Syntax Only** and click **OK**. Use the **Edit, Paste** function to copy the contents of the clipboard to the syntax window or, alternatively, use the **Ctrl - V** keys on the keyboard. Use the **File, Save As** option to save the covariances to the file **wheaton.cov**.



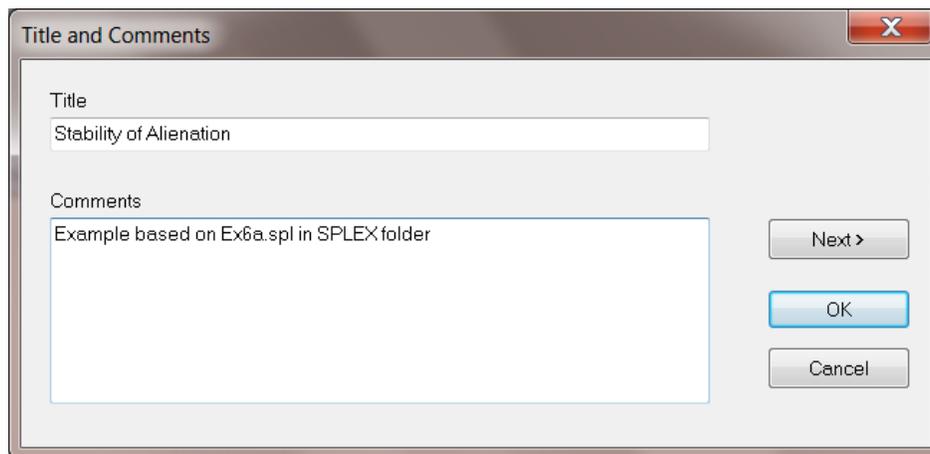
Select the **New** option from the **File** menu and select **SIMPLIS Project** in the **New** dialog box. Click **OK** to open the **Save As** dialog box.

Select a filename and a folder in which the SIMPLIS project should be saved. For the present example the filename selected is **SIMPLIS6.spj**. When done, click **Save** to go to the SIMPLIS project (SPJ) window.



Before generating syntax, you may optionally select **SIMPLIS Outputs** from the **Output** menu. Customize this dialog box according to your preferences; for example, change the **Number of Decimals in the Output** option to 4. When done, click **OK**.

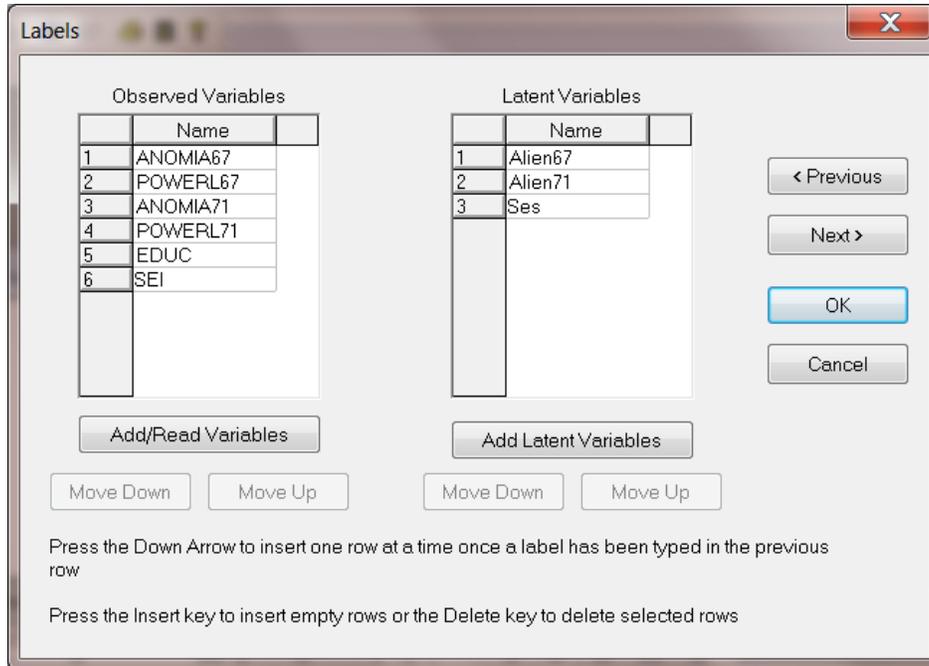
The following step is to provide information regarding **Title and Comments**, **Groups**, **Variables**, and **Data**. Select the **Titles and Comments** option from the **Setup** menu. The first item on the **Title and Comments** dialog box is the title for the problem. After typing in the title and (optionally) the comments, click on **Next** to go on with the setup.



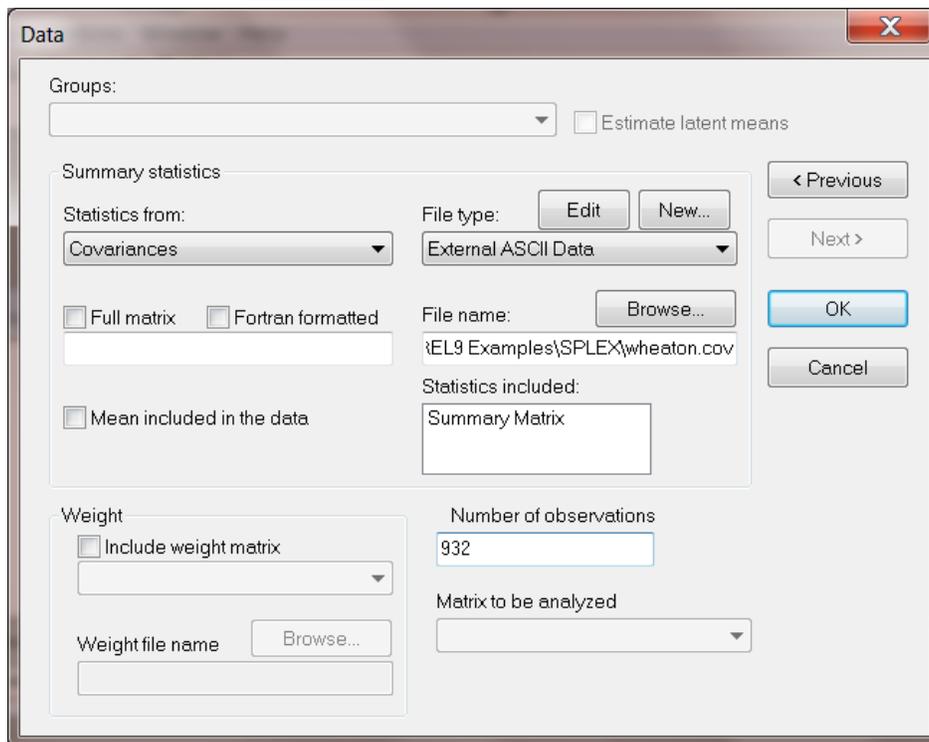
Since the present example is based on the one group only, nothing is entered in the space allowed for **Group Labels**, and **Next** is clicked to go to the **Labels** dialog box.

The default number of variables shown on the **Labels** dialog box is 3, these being CONST, VAR 1 and VAR 2. Click in the CONST textbox and change the name to ANOMIA67. Enter the label POWERL67 in the VAR 1 textbox and ANOMIA71 in the VAR 2 textbox. Move the mouse cursor into the ANOMIA71 textbox and use the down arrow to create a fourth textbox. Type in POWERL71 and repeat the procedure for EDUC and SEI.

In a similar manner, use the down arrow key to create text boxes in the **Latent Variables** column and enter the names Alien67, Alien71 and Ses. Note that a label name, which may include blanks, may not exceed 8 characters.



On the **Data** dialog box select **Covariances** from the **Statistics from:** drop-down list box. Type 932 in the **Number of Observations** string field. For **File type**, select **External ASCII data** and use the **Browse** button to select **wheaton.cov**.



3 Completing the SIMPLIS Syntax

Select **Build SIMPLIS Syntax** from the **Setup** menu to create the basic SIMPLIS syntax. The **Build SIMPLIS Syntax** option on the **Setup** menu provides the user with a skeleton of SIMPLIS commands. There are a few commands that must be included to complete the SIMPLIS syntax. The first of these commands is:

```
ANOMIA67 POWERL67=Alien67
```

To add a line in the syntax window, move the mouse cursor to the end of the keyword Relationships and click once. Now move the cursor to the Enter key (<--|) on the keypad and click to insert a blank line below the Relationships line.

To enter the line

```
ANOMIA67 POWERL67 = Alien67
```

proceed as follows:

- Click on the observed variable ANOMIA67 (First variable under the heading **Observed**) and with the mouse button held down drag the variable name to the syntax window.
- Repeat by dragging the variable name POWERL67 next to ANOMIA67. To continue, click on the "=" key and then drag the latent variable name Alien67 (first variable under the heading **Latent**).

To complete, move the mouse cursor to the end of the line

```
ANOMIA67 POWERL67 = Alien67
```

and click. Then click on the **enter** key and repeat the steps outlined above to insert the lines:

```
ANOMIA71 POWERL71 = Alien71
```

```
EDUC SEI = Ses
```

```
Alien67 = Ses
```

```
Alien71 = Alien67 Ses
```

Finally, enter the commands:

```
Set Error Covariance of ANOMIA67 ANOMIA71 free
```

```
and
```

```
Set Error Covariance of POWERL67 POWERL71 free
```

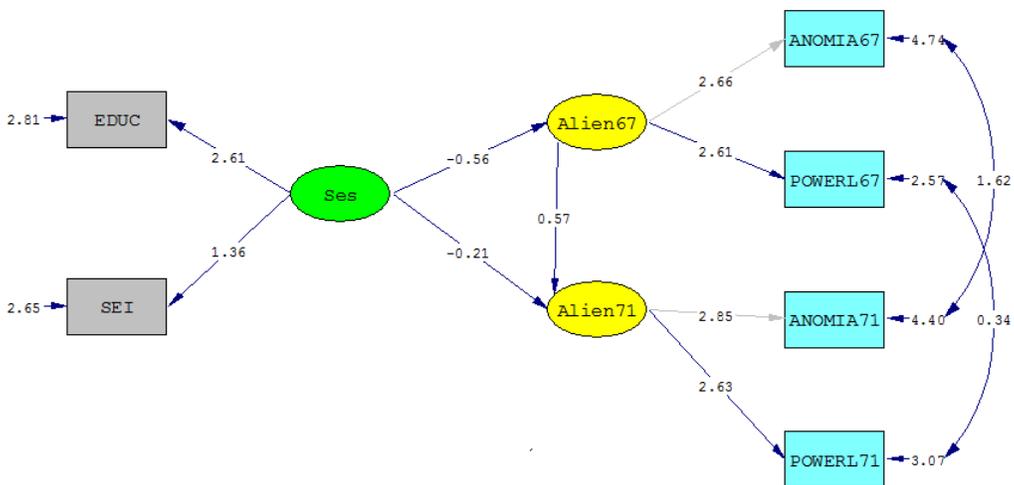
by using the keypad and by dragging the variable names to the appropriate positions. The completed syntax should correspond to the lines shown in the SPJ window below:

```

EX6A.SPJ
Latent Variables  Alien67 Alien71 Ses
Relationships
ANOMIA67 = Alien67
POWERL67 = Alien67
ANOMIA71 = Alien71
POWERL71 = Alien71
EDUC SEI = Ses
Alien67 = Ses
Alien71 = Alien67 Ses
Set the Error Covariance of ANOMIA67 and ANOMIA71 Free
Set the Error Covariance of POWERL67 and POWERL71| Free
Path Diagram
End of Problem

```

To run SIMPLIS, click the **Run LISREL** icon button on the main menu bar. A path diagram as shown below is produced, as well as the usual output file.



Chi-Square=4.72, df=4, P-value=0.31731, RMSEA=0.014