

Confirmatory Factor Analysis with AMOS via SPSS

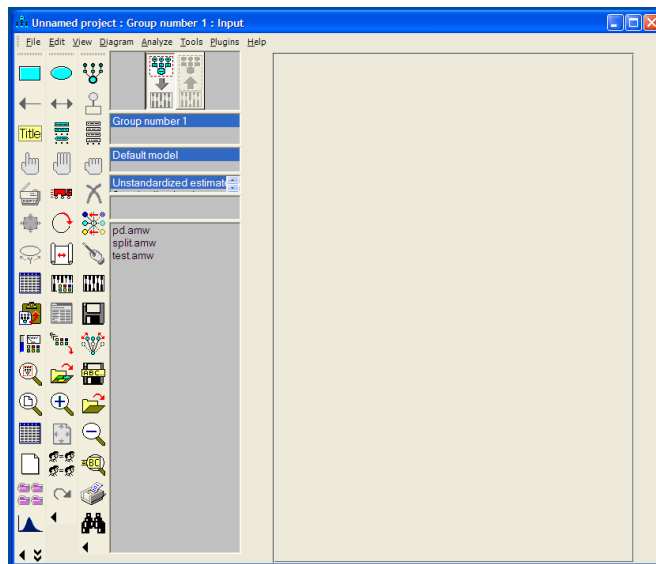
1. **Load data into SPSS**
2. **Click on AMOS on the Analyse pull-down menu**

Wait. It will take a few moments. SPSS will drop down to the bar and AMOS will take its place. AMOS is a separate program.

Instructions for Amos by drawing a diagram.

- Amos provides about eighty drawing and modelling operations.
- Amos provides four different ways to pick the operation you want to perform:
- Using the mouse to press a button in a toolbox (*this method will be our focus here*)
- Using the mouse or the keyboard to select an item from a pull-down menu
- Pressing a "hot key" on the keyboard (for some operations)
- Using the second mouse button to select an item from a pop-up menu (for some operations).

Amos drawing begins with a screen:



It contains drawing space and other default information [including a list of recent files accessed].

Amos has a memory and begins with the last drawing you did. You can start afresh from the pull down menu at the top under 'File' – or use the tools to start a new drawing.

The tools used in Amos 6 graphics are arranged on the left hand side of the screen [see the diagram above – previous versions used a floating 'toolbox']

Most buttons are toggle based - click on and click off. The function of each button appears in a bar as you move over it.

The *essential* buttons for creating a new model are:



To start a new drawing



To draw an unobserved variable as an ellipse

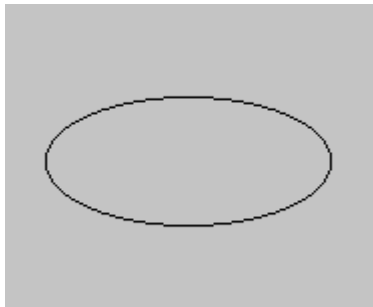


To draw a correlation as a curved double-headed arrow



To create a factor structure from an ellipse (representing the factor). For some unknown reason it is extremely difficult to get Amos to recognize a factor structure that you have created piece by piece with rectangles, arrows and ellipses. Amos much prefers factors drawn with this special button.

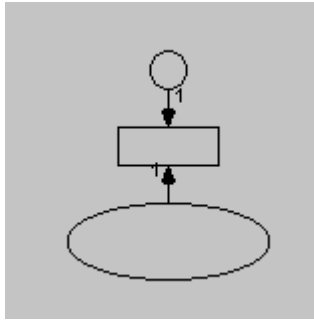
To use this you need to have drawn the central object first. For example draw an ellipse (not too large if you have many variables loading on a factor). Note you can use either the ellipse button above to draw the ellipse – or you can use this factor structure button



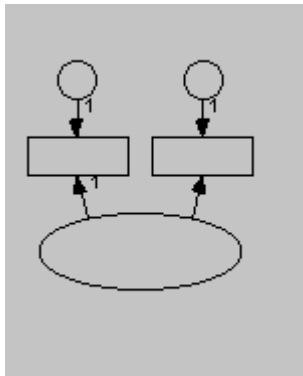
Then if you used the ellipse button to draw the ellipse click on



Then click on the ellipse...and

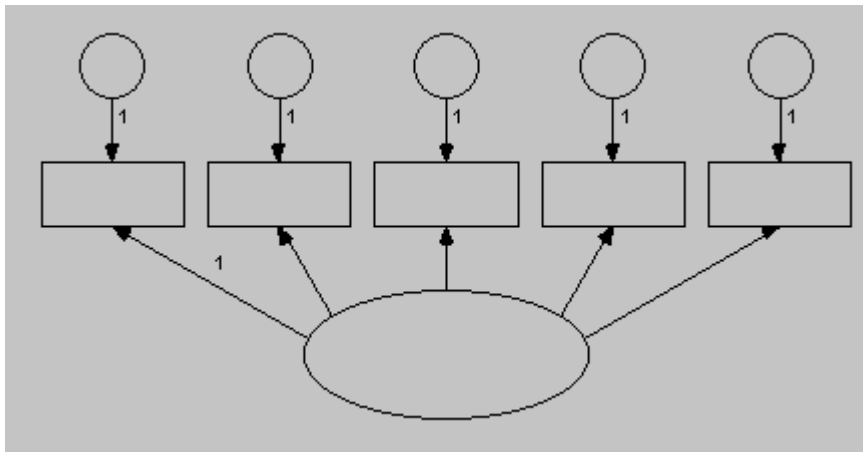


results. Click again on the ellipse adds another.

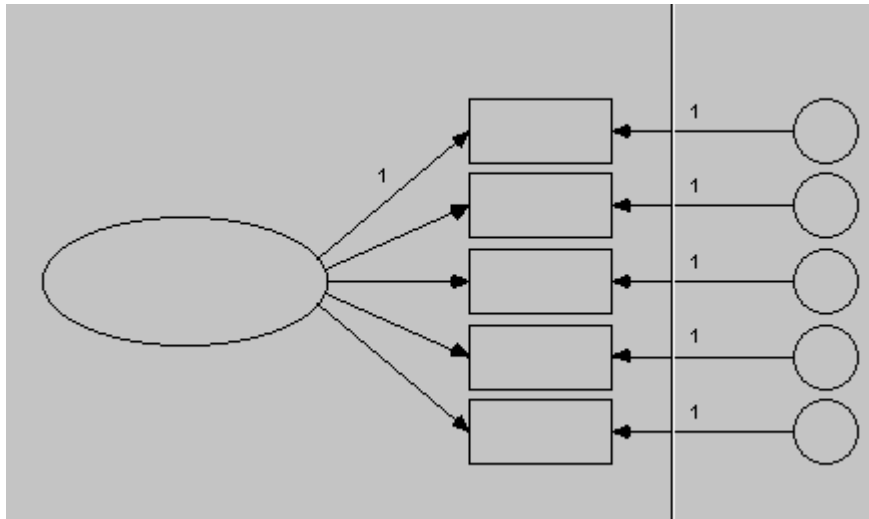


And so on.

To rotate the factor diagram (in order to load more variables on the factor or make it easier to link factors)



to



Click on

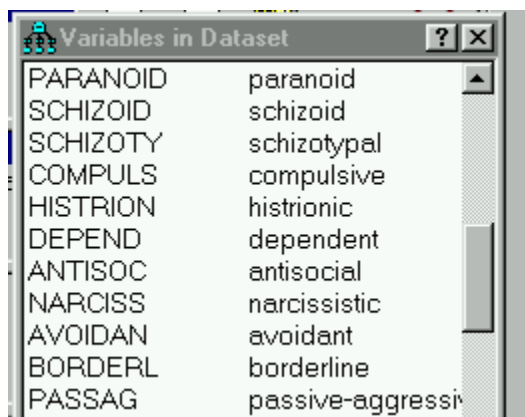


Then click on the ellipse. Each click rotates it 90 degrees clockwise.

Labelling the rectangles (observed variables in your SPSS file)



You use the button to bring up a list of the variables in your SPSS file.

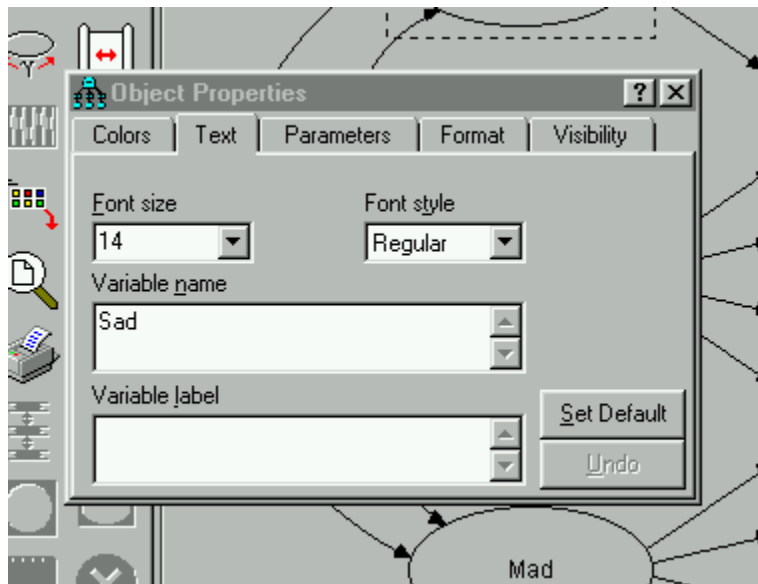


you then drag the required variables into the appropriate rectangles in your diagram.

Remember every rectangle must have a name from your SPSS file and no ellipse (or circle) must have a name from your SPSS file

Labelling ellipses and circles

The ellipses are your factors, the circles are your unique variances. right clicking on any ellipse or box pops up a menu – choose ‘Object properties’ to get the following box



At minimum, you need to enter a variable name. All ellipses and circles must be named or AMOS won't run. This must not be a variable name in your spss file. You can also add a label if you like.

To edit your diagram:



Clicking on this then clicking on an object or arrow will delete it.



Click on this to select an object (shape or line) by clicking on it. You can select a group by moving from one to another and clicking. Or you can



Click on this to select all objects in the drawing (This is handy for duplicating factors)



Click on this to de-select all selected objects



Click on this to move a selected object or group of objects



Click on this then click, drag and drop an object to duplicate it in the new position.

In each of these cases the pointer will highlight the object or arrow by changing its colour to red (the default colour).



Click on this to undo the mistake you just made.

There are also a number of buttons to rearrange your diagram



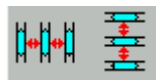
Re-draws the diagram on the screen



Fits the diagram to the page



Re-positions on the page



Horizontally or vertically re-spaces selected objects



Symmetrizes the indicators

Another useful action is to insert the fit statistics onto the drawing.

Do this by



clicking on the title button which brings up a box

Figure Caption

☐ Center align
☒ Left align
☐ Right align
☐ Center on page

Font size: 20

☐ Bold
☐ Italic

OK Cancel

Press Ctrl-Enter when finished

Caption

Chisquare = \cmmin
df = \df
p = \p
RMSEA = \rmsea

The text that is preceded by a backslash '\ ' is a keyword recognized by AMOS. Most of the keywords are self explanatory [cmin for chisquare is a little cryptic]

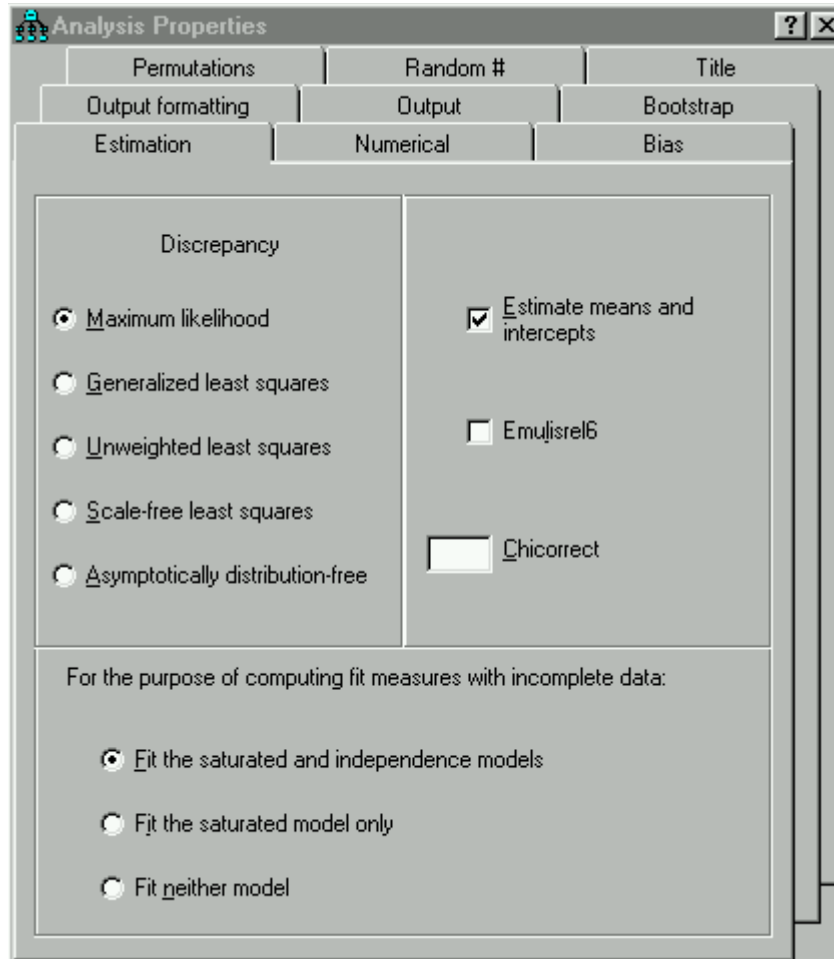
Another useful index of fit, the comparative fit index or CFI is represented by \cfi

You can also use this to insert a title onto the diagram. The title can be selected and moved around like any other object.Choosing your analysis



To choose options for you analysis, click on

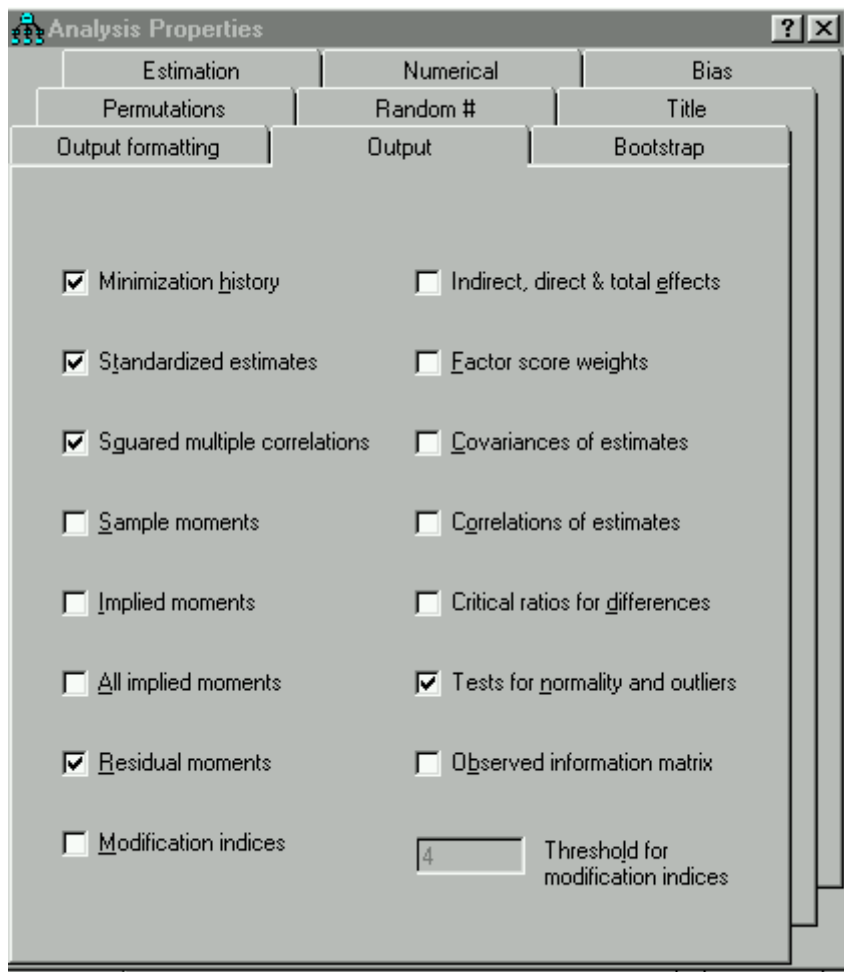
To bring up the ‘Analysis properties’ options




If you have missing data you must click on the ‘Estimate means and intercepts’ button otherwise you would usually leave this section alone

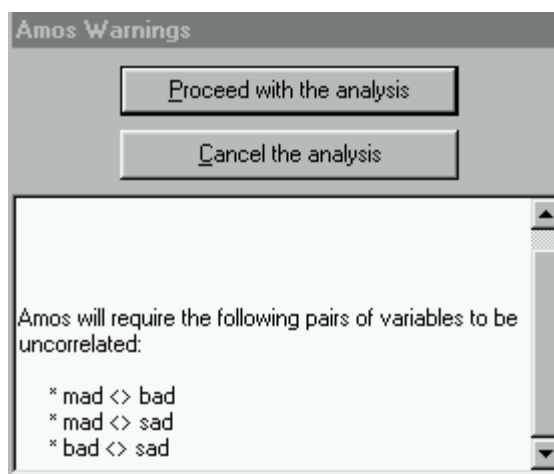
Options for printing and so forth are found on the ‘Output’ tab

- Normally you would choose standardized estimates. AMOS works with a covariance matrix so the factor loadings are regression parameters and the correlations covariances. Standardized estimates restores the familiar look.
- Squared multiple correlations give us our communality estimates
- Residual moments gives us the residuals in the covariance and correlation matrix. This can be helpful if we want to fiddle with our model.
- Tests for normality and outliers. Can be helpful, but by the time you’ve got this far you have to cross your fingers.

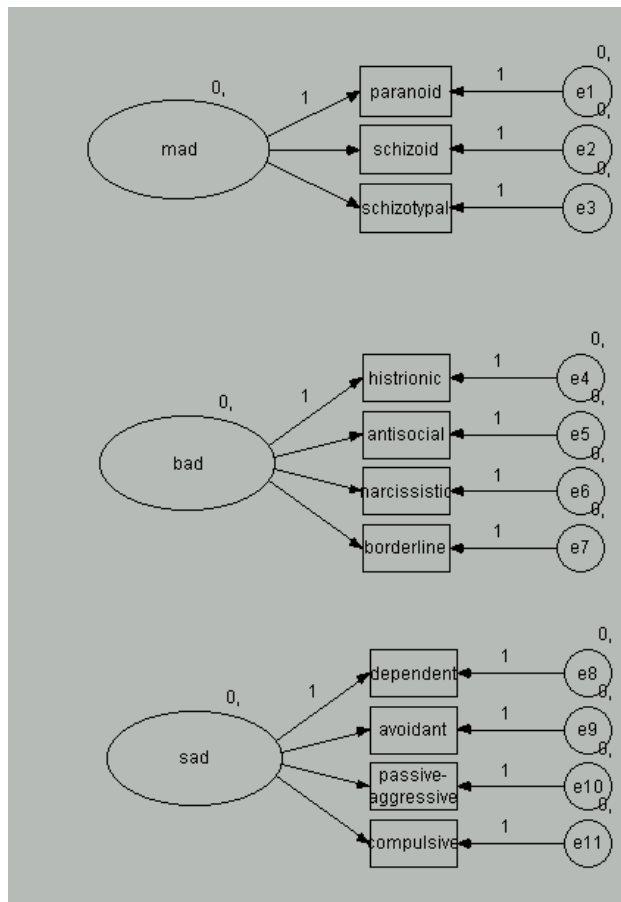


Run your analysis by clicking on 

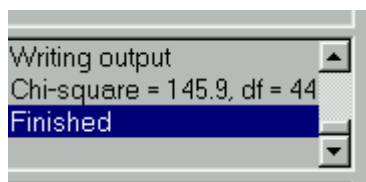
If you have specified an uncorrelated model (see next page) you will receive a warning which you can ignore by clicking the 'Proceed..' button



If this is a new file a save file window will pop up (after all you don't want to lose your masterpiece)

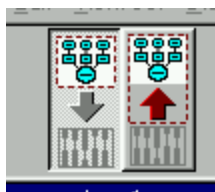


As it runs you should see activity in a box on the left hand in the middle. When it stops and looks like

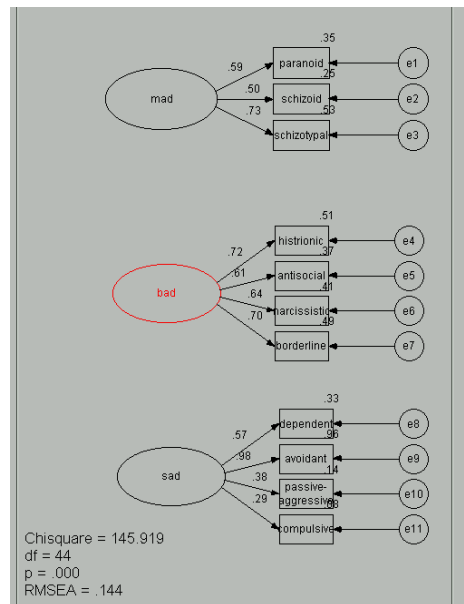
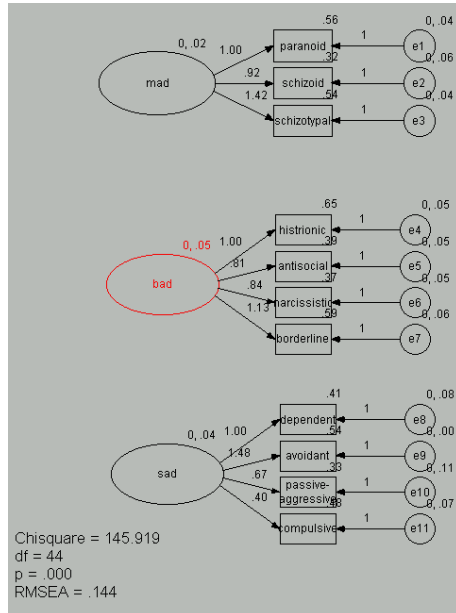
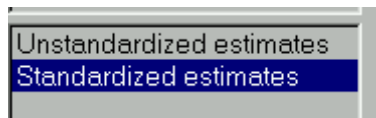


the moment of truth has arrived.

You can examine the output on the diagram by clicking the right hand of these buttons.



The coefficients on the diagram will be Unstandardized [looks like regression weights] or standardized [looks like factor loadings], depending on which button on the right you have clicked



There is also printed output



A simple text file can be accessed through the button

This file is automatically saved with the name you specified when you saved your drawing. The drawing will appear with the extension .AmosTNP in the directory [eg pd.AmosTNP] while this file will have the extension .amo [eg pd.amo]