



# KUANT Guides

Guide No.  
KUANT 001.2

## LISREL (8.80) Syntax Reference:

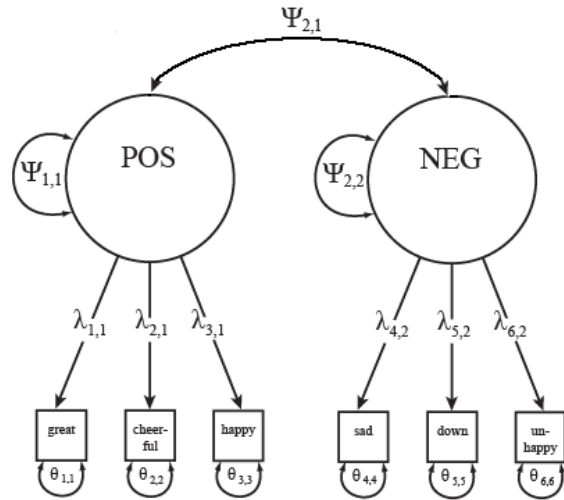
The basics of the data command, reading in data, model specification and output options using LISREL syntax.

*McConnell, E.K., Selig, J.P. & Geldhof, G.J. (2008)*

[www.quant.ku.edu](http://www.quant.ku.edu)

### Current Example

The example used to illustrate concepts in this guide will come from data regarding Positive and Negative Affect. Positive and Negative Affect are latent constructs, each with three manifest variables. 'Great', 'Cheerful' and 'Happy' load onto Positive Affect, while 'Sad', 'Down' and 'Unhappy' load onto Negative Affect. See right.



### TI: Title Line

The title line specifies a descriptive title for the analysis. The TI line is optional and is for organizational purposes. All lines in the syntax above the letters DA (data command) are read as the title.

**TI: Positive and Negative Affect in Seventh Graders**

### DA: Data Command

The data command specifies the structure of the data and type of matrix that will be analyzed. Below is an example of data with 154 observations, 6 input variables, and two groups. LISREL will use a covariance matrix (as opposed to correlation matrix, which is specified using KM) and maximum likelihood estimation.

**DA NO=154 NI=6 NG=2 MA=CM ME=ML**

sample size (N)

number of  
input variables

type of matrix to  
be analyzed;  
ex. covariance  
matrix

number of  
groups

method of estimation;  
ex. maximum likelihood

*Notes:* The number of groups will be equal to 1 unless it is a multiple group CFA. In this example, the two groups could be males and females. Maximum likelihood is the default estimation in LISREL, so it does not necessarily need to be explicitly specified.

## **RA/ME/SD/KM: Reading Data Into LISREL**

This section will be a very brief review of how to read in data. For a detailed discussion, please see the *Reading Data Into LISREL* Kuant guide.

### **1. Using PRELIS**

See the *Reading Data Into LISREL* Kuant guide for detailed instructions on using PRELIS.

### **2. Using Sufficient Statistics**

After obtaining the means, standard deviations and correlation matrix from a separate statistical package, place them directly into the LISREL syntax after the DA command.

<b>ME</b>	←	_____	means			
12.740	12.720	12.580	7.060	7.100	7.200	
<b>SD</b>	←	_____	standard deviations			
1.3218	1.1787	0.9916	0.7669	0.7889	0.8806	
<b>KM</b>	←	_____	correlation matrix			
1.000						
0.476	1.000					
0.491	0.578	1.000				
0.096	0.177	0.195	1.000			
0.241	0.184	-0.050	-0.246	1.000		
0.081	0.153	0.308	0.103	-0.176	1.000	

### **3a. Using a Text File**

In most cases, this will require an export of data from its original format into either an ASCII or tab delimited file with no variable names. Reference the raw data with an **RA** command.

**RA=posneg.txt**

### **3b. Using a Text File with Individual Specifications**

Obtain sufficient statistics and format them into a tab delimited file. Reference the data file in the syntax with the ME (means), SD (standard deviations), and KM (correlation matrix) commands.

**ME=posneg.dat**

**SD=posneg.dat**

**KM=posneg.dat**

## **LA: Labeling Observed Variables**

The label command specifies labels for the manifest (observed) variables. The number of labels must equal the number of input variables in NI statement. The six observed variables for the Positive and Negative Affect data are labeled below.

<b>LA</b>						
great	cheerful	happy	←	_____	for POS	
sad	down	unhappy	←	_____	for NEG	

Putting the labels on the two different lines is not necessary. The labels could have run from 'great' to 'unhappy' on one line, although separation by construct helps with organization.

## **SE: Select Command**

This optional command selects in any order any number from the input variables. It is an optional command, and only necessary if the order of input variables is different than desired.

*When is this needed?* Questionnaires often have questions (observed variables) mixed up so the questions asking about the same construct are not right next to each other. Data are usually entered in the order they appear on the questionnaire. When giving data to LISREL, however, you want to put the observed variables that (you hope) load on to the same construct next to one another. This is done with the SE command when the data file is not set up this way initially.

Suppose the Positive and Negative Affect questionnaire rearranged the questions...

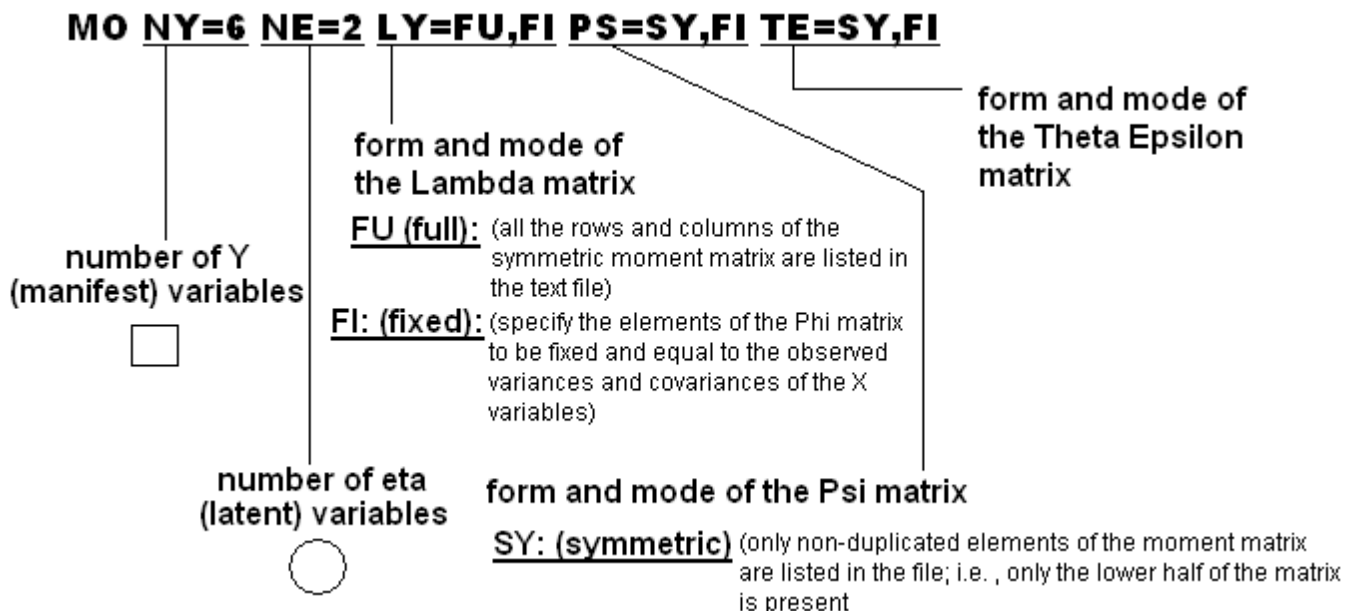
**LA** ← entered in order they appear in the data file  
down great happy cheerful unhappy sad

**SE** ← then rearranged to reflect latent variable order  
great cheerful happy  
sad down unhappy /

The Select Command always ends with a backslash.

## **MO: Model Command**

This command, the bulk of the syntax, specifies the model fitted to the data. The syntax will obviously depend on the structure and method of identification of your model (fixed latent variance, marker variable, effects coding, etc.). The example is for a model that is identified by standardizing the latent variance.



The code above is for only the first line of the model command. The code following this first line in the model command will contain a majority of your syntax, which is where individual model specifications are made. The following code continues to model Positive and Negative affect using latent standardization.

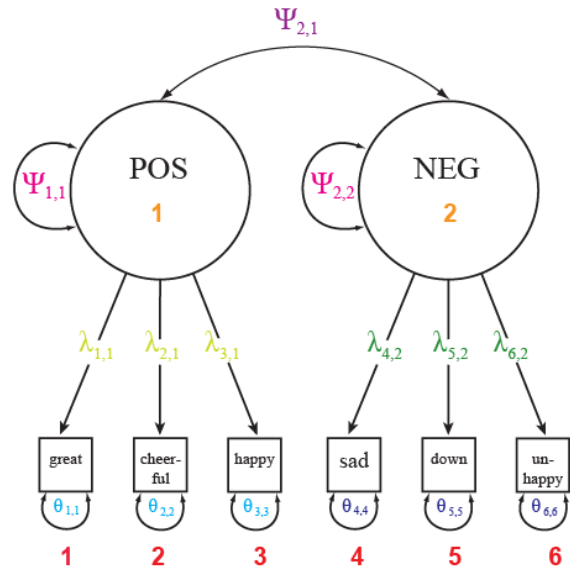
## MO command (cont.)

**MO NY=6 NE=2 LY=FU,FI PS=SY,FI TE=SY,FI**  
**FR PS (2,1)** ————— freeing Psi 2,1 (relationship  
 between two latent variables)  
**FR LY(1,1) LY(2,1) LY(3,1)** }  
**FR LY(4,2) LY(5,2) LY(6,2)** } freeing Lambda-Y's  
**FR TE(1,1) TE(2,2) TE(3,3)** }  
**FR TE(4,4) TE(5,5) TE(6,6)** } freeing Theta Epsilons  
**VA 1.0 PS(1,1) PS(2,2)** ————— sets the scale by setting  
 Psi's = to 1.0

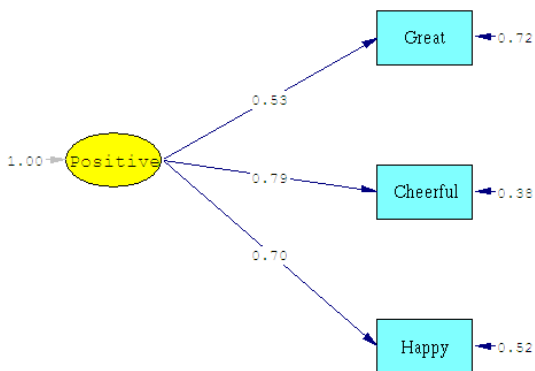
Before writing model syntax, it is sometimes helpful to draw out the model and label individual parameters. The Positive and Negative Affect example is drawn out and labeled below.

\* If this handout has been printed in black and white, please reprint in color for this information.

**MO NY=6 NE=2 LY=FU,FI PS=SY,FI TE=SY,FI**  
**FR PS (2,1)**  
**FR LY(1,1) LY(2,1) LY(3,1)**  
**FR LY(4,2) LY(5,2) LY(6,2)**  
**FR TE(1,1) TE(2,2) TE(3,3)**  
**FR TE(4,4) TE(5,5) TE(6,6)**  
**VA 1.0 PS(1,1) PS(2,2)**



## PD: Path Diagram Option



Putting 'PD' in the syntax after the model commands prints a path diagram of your model in LISREL. This is an optional command.

## **LE: Labeling Latent Constructs**

It is a good practice to label your latent variables as this eases interpretation of your results. This should be done at the end of your syntax, immediately prior to your OU statement. For a Y-side model, simply type "LE" (Label Etas) followed by a list of the latent variable names. The following example labels two latent constructs, positive and negative affect.

```
LE POS NEG
```

## **OU: Output Command**

The output command is used to request output and manipulate the way results are viewed. This command also has the capability to specify the number of iterations and change options on scale setting, among other things. A typical output line may read as below. This output command turns the admissibility check off and set the number of decimal places in the output to three.

```
OU AD=off ND=3
```

### Some common output options:

- **AD=off** OR some **#** : specifies the iteration number at which the admissibility of the solution will be checked and the iterations will stop if the check fails
- **IT=#** : specifies the maximum number of iterations LISREL can go through before failing to converge
- **ND=#** : specifies the number of decimals to be shown in the output
- **BE/LY/PS/TE/TY=<filename>**: requests that the Beta / Lambda-Y / Psi / Theta Epsilon / or Theta-Y matrix be output to a specific text file
- **RS**: prints the residuals, standardized residuals, QQ-plot, and fitted covariance matrix in the output file
- **MI**: prints the model modification indices in the output file
- **EF**: prints the estimated total and indirect effects in the output file
- **SC**: prints the completely standardized solution
- **WP**: specifies a column width of 132 when viewing the output
- **SO**: suppresses the automated checking of the scale setting for each latent variable

## **Complete Example Syntax**

After the output command, the LISREL syntax is complete. Using the syntax from the Positive and Negative Affect example, the entire file would read as follows:

```
TI Positive and Negative Affect in 7th Graders
DA NO=154 NI=6 MA=CM ME=ML
RA posneg.txt
LA
    down great happy cheerful unhappy sad
SE
    great cheerful happy
    sad down unhappy/
MO NY=6 NE=2 LY=FU,FI PS=SY,FI TE=SY,FI
FR PS(2,1)
FR LY(1,1) LY(2,1) LY(3,1)
FR LY(4,2) LY(5,2) LY(6,2)
FR TE(1,1) TE(2,2) TE(3,3)
FR TE(4,4) TE(5,5) TE(6,6)
VA 1.0 PS(1,1) PS(2,2)
PD
OU AD=off ND=3
```