

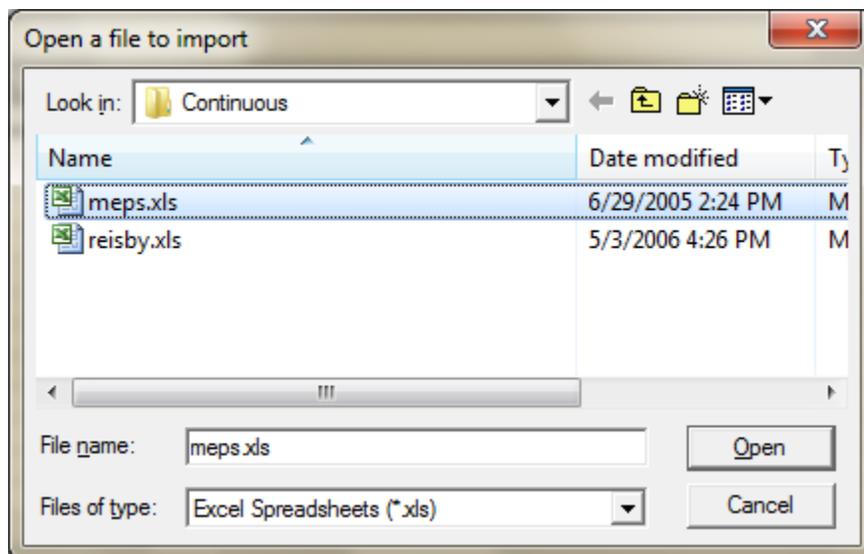
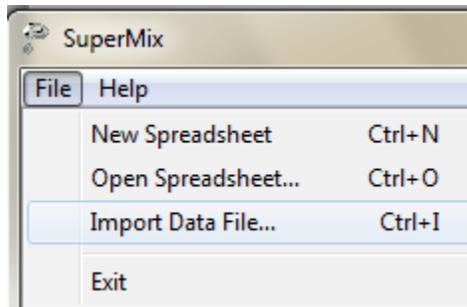
# SuperMix2 features not available in HLM 7

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## Spreadsheet display of .ss3 files

SuperMix can import all data file types available in the STAT/TRANSFER package. This is accomplished by using the **File, Import Data File...** option as shown in the images below.



The imported data file has extension **.ss3** and is displayed in the form of a spreadsheet as shown in the image below.

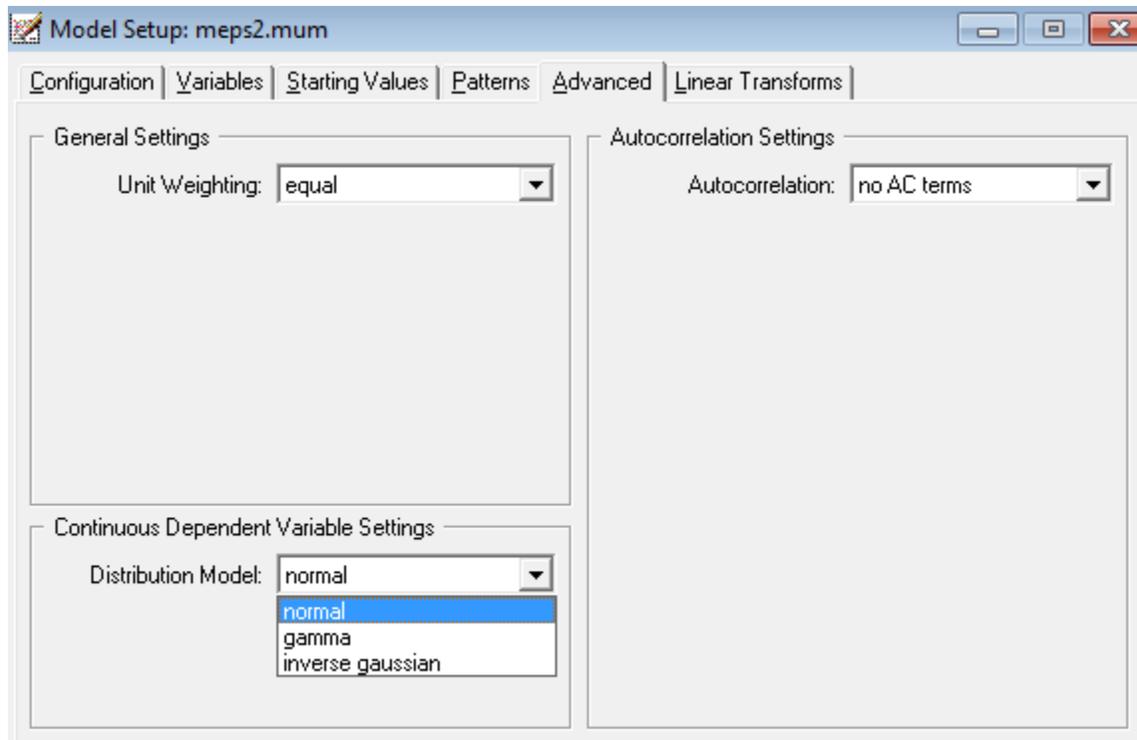
	(A)_VARST	(B)_VARPS	(C)_PERWT	(D)_TOTEX	(E)_RACE	(F)_SEX	(G)_INSCOV	(H)_RPOVC	(I)
1	1	1	4495.33	4.20	0	1	1	0	
2	1	1	7689.24	4.98	0	0	1	0	
3	1	2	11069.78	5.18	0	1	0	1	
4	1	2	9288.98	8.11	0	0	0	1	
5	1	2	12651.61	10.09	1	0	0	0	
6	1	2	6156.33	6.64	1	1	0	0	
7	1	2	31359.46	8.29	0	0	0	1	
8	1	2	29082.10	7.85	0	1	0	1	
9	1	2	14474.96	8.47	0	1	1	0	
10	1	2	14842.25	4.74	0	1	0	1	

Variable names of up to 16 characters in length are permitted while the HLM 7 maximum variable name length is 12 characters.

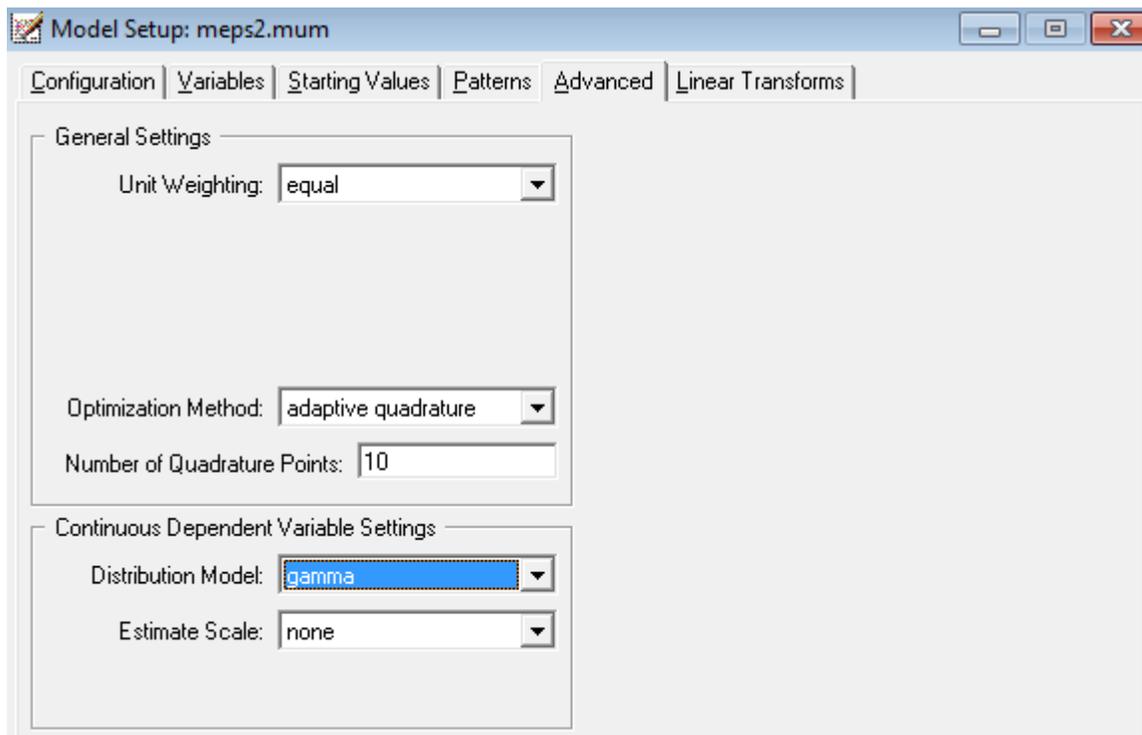
The SuperMix spreadsheet can be manipulated in various ways. Rows and columns can be changed directly, and simple computations or more complex built-in functions can be used. Some of these manipulations are discussed and illustrated in the SuperMix Primer.

### Continuous Outcome Variables: Additional Distributions

For non-negative continuous data, SuperMix offers the user the additional choice to specify as underlying distribution either as the Gamma distribution or Inverse Gaussian distribution as illustrated in the following image.



The choice of these non-normal distributions entails the use of quadrature procedures as illustrated in the dialog below where the gamma distribution is selected.

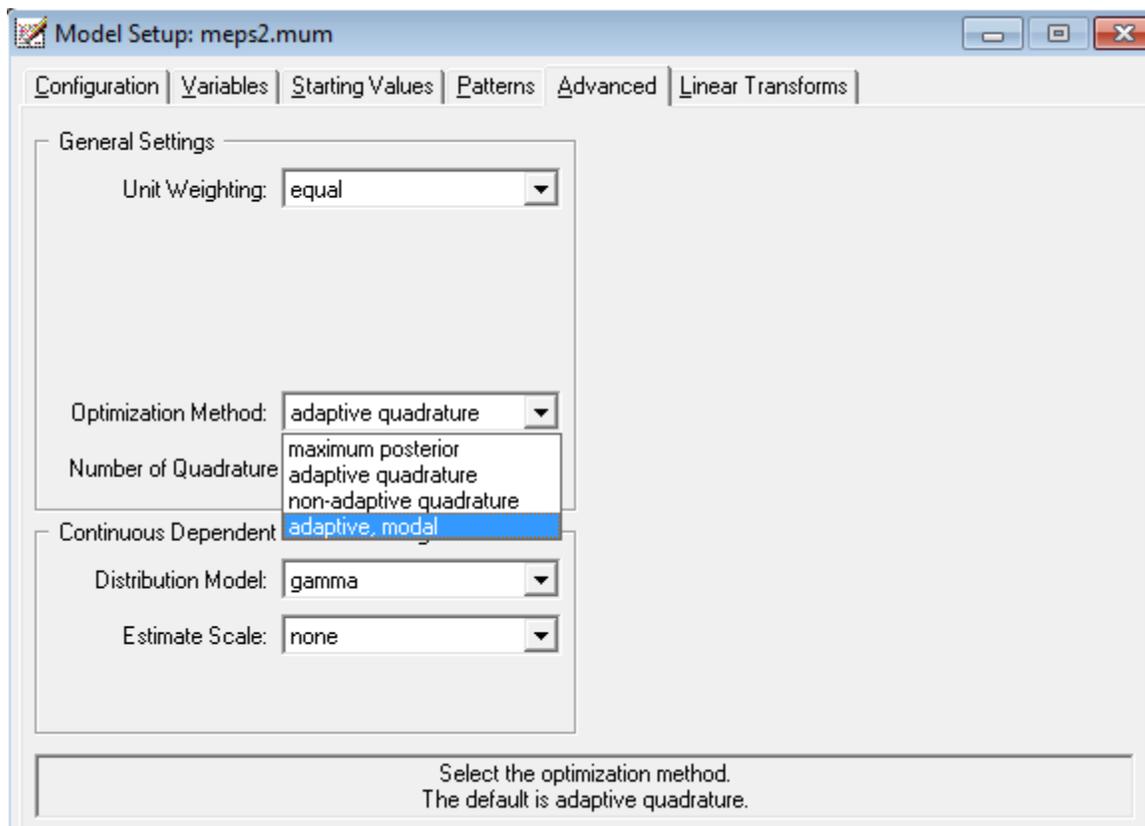


## Additional Estimation Methods

There are four estimation methods available. The Maximum Posterior method is an approximate model fitting procedure that does not use numerical quadrature and is useful when there are a large number of random effects. The four estimation methods are as follows.

- Maximum Posterior
- Adaptive Quadrature
- Non-Adaptive Quadrature
- Adaptive Modal

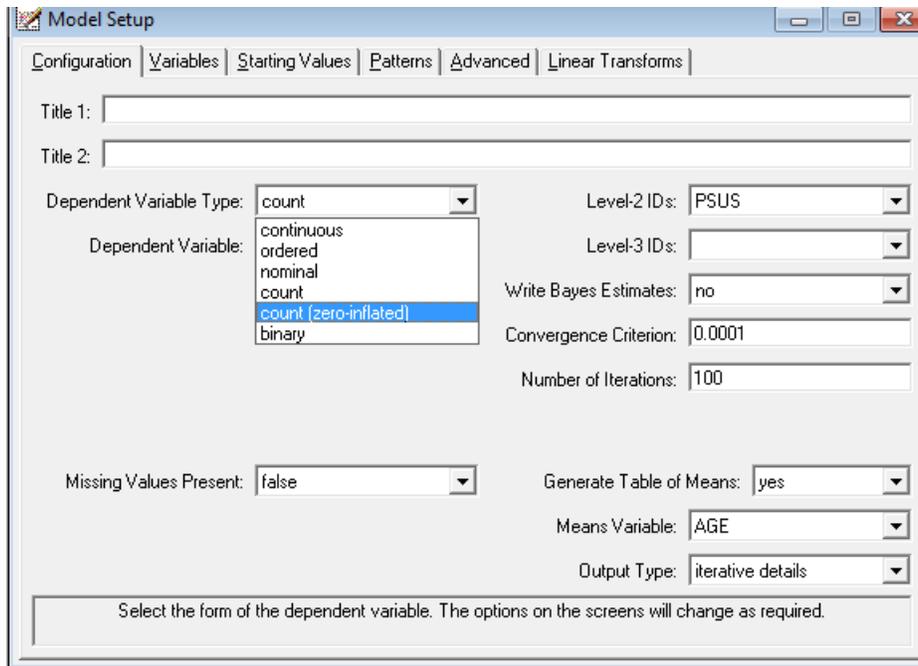
These methods are discussed in the SuperMix Manual and are shown in the dialog below.



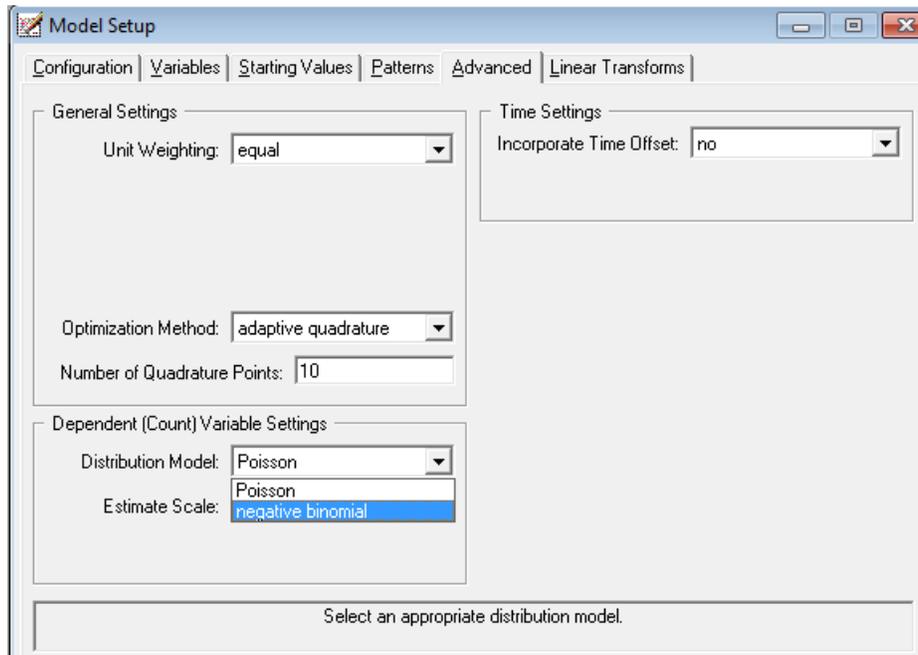
## Count variables including zero-inflated models

In addition to the Poisson distribution, SuperMix offers the end user the choice of selecting the negative binomial distribution as an alternative option. Additionally, the end user can select the zero-inflated Poisson distribution or the negative binomial distribution as underlying distribution.

The dialog below shows the various dependent variable types that are available.



Regardless of the choice between the count or the count (zero-inflated) option as shown in the dialog above, both the Poisson or negative-binomial distributions are available.

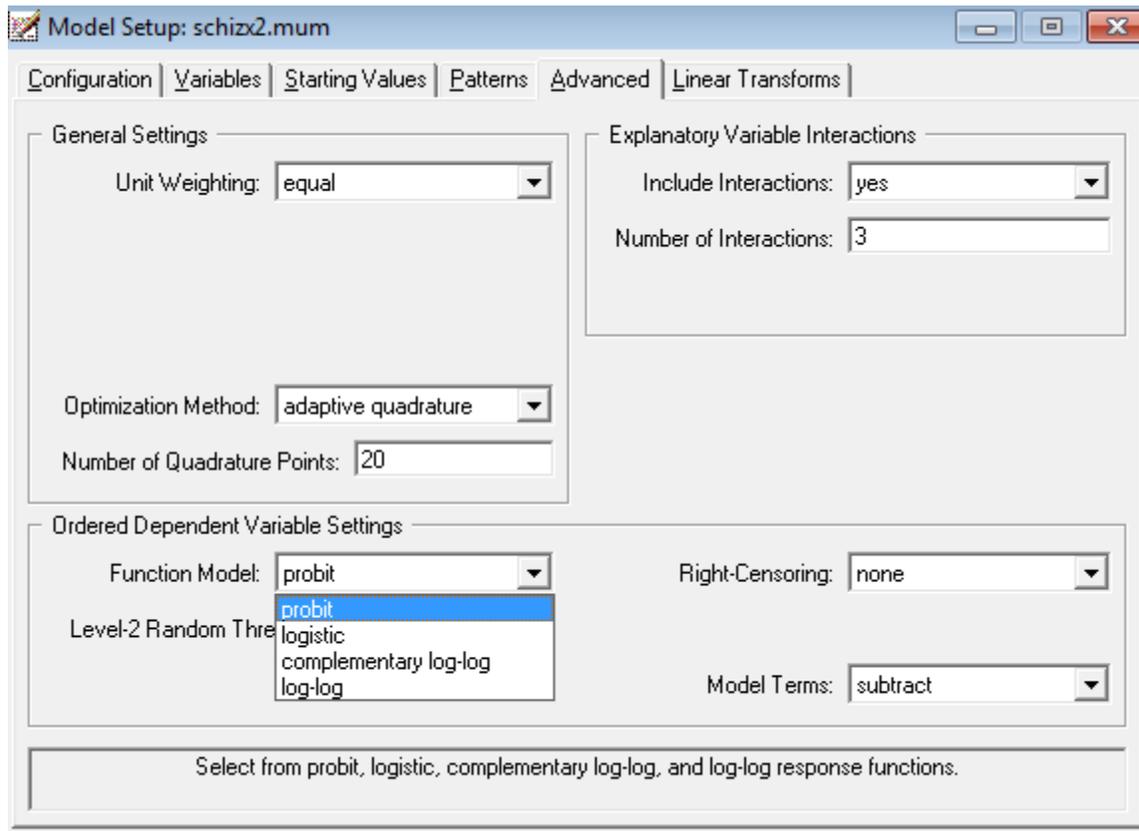


## Four link functions

SuperMix offers users the opportunity to select 4 different link functions while HLM 7 only uses the logistic link function). These 4 available link functions are as follows.

- Probit
- Logistic
- Complementary log-log
- Log-log

The selection of one of these 4 link functions is illustrated in the dialog below.



## Threshold Interactions

The dialog above also demonstrates that SuperMix allows for threshold-interactions.

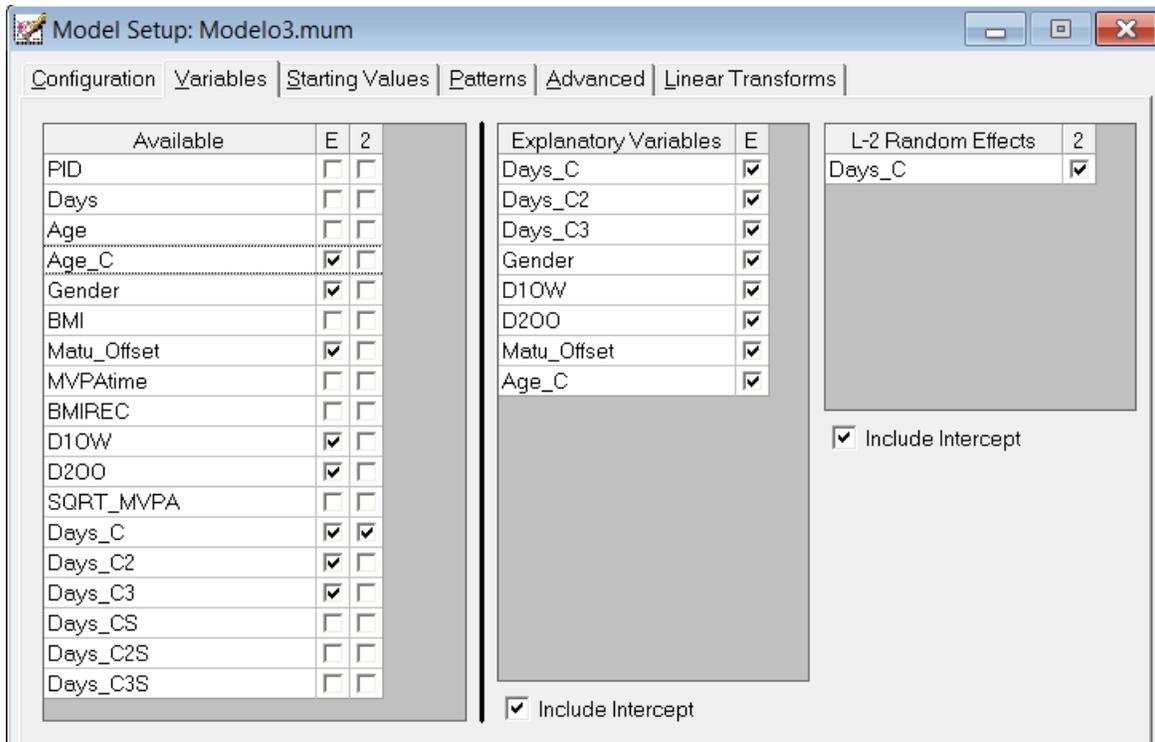
## Survival Analysis

SuperMix can also be used to perform survival analysis. Illustrative examples are available in the SuperMix Primer and in the SuperMix Manual.

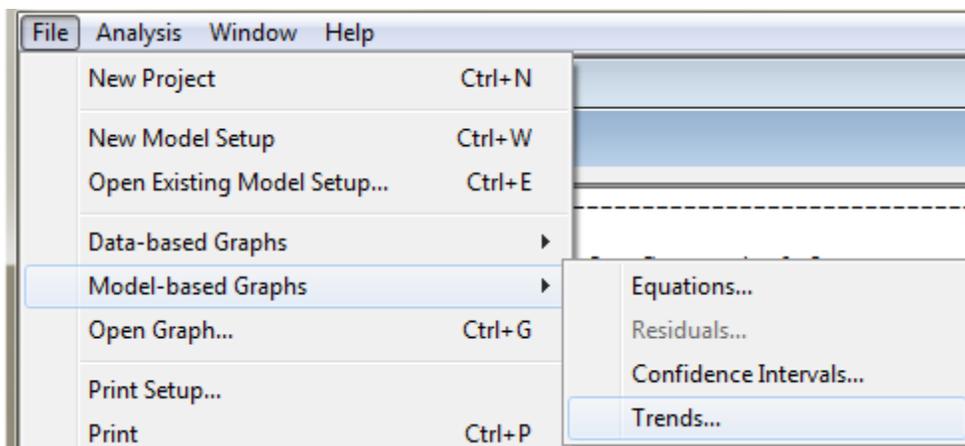
## Trend Graphs

Often researchers' main focus is on the analysis of longitudinal data and in many cases the trend over time can be adequately presented by additionally including  $\text{time}^2$  and  $\text{time}^3$  predictors in the model. On completion of the analysis, the end user can select the Trends... option for Model-based Graphs.

In the illustration below, the variables Days\_C, Days\_C2 and Days\_C3 represent time,  $\text{time}^2$  and  $\text{time}^3$ .



On completion of the analysis, the end user can select the **Trends...** option for **Model-based Graphs**.



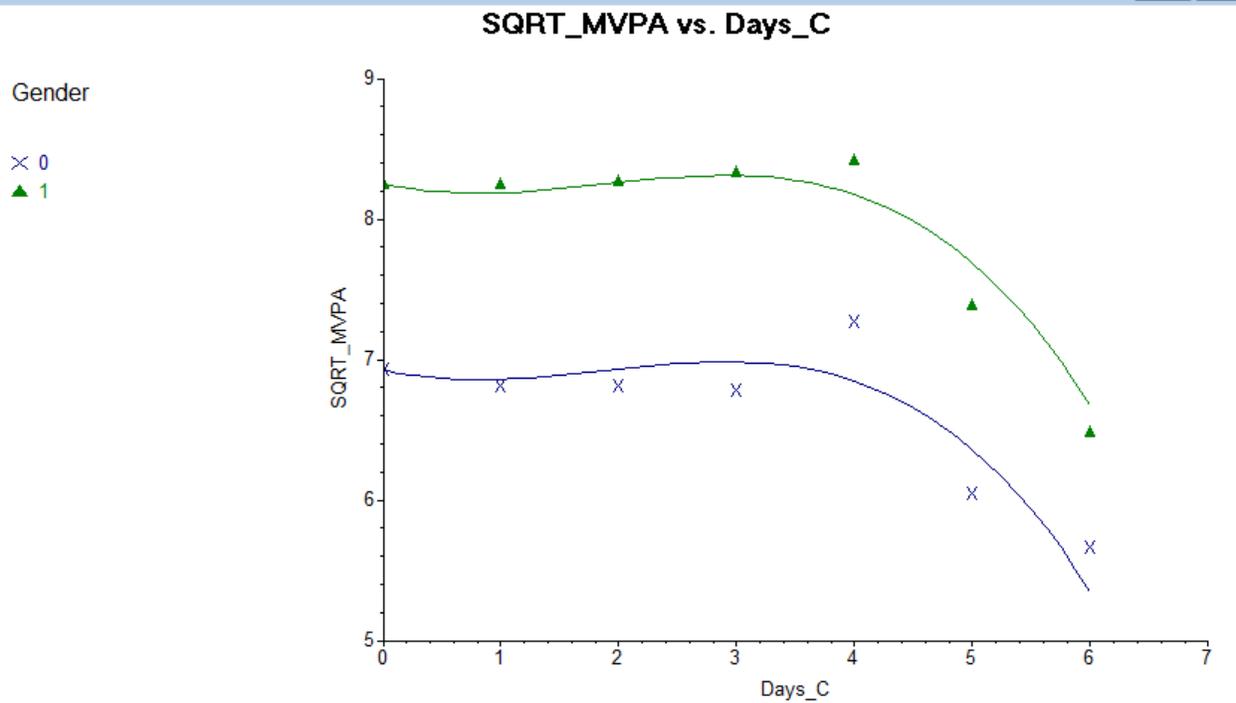
### Plot Trends for Time Variable

List of Variables

Name	Time Order	Mark	Interaction
intercept		<input type="checkbox"/>	
Days_C	Time	<input type="checkbox"/>	
Days_C2	Time^2	<input type="checkbox"/>	
Days_C3	Time^3	<input type="checkbox"/>	
Gender		<input checked="" type="checkbox"/>	
D10W		<input type="checkbox"/>	
D200		<input type="checkbox"/>	
Matu_Offset		<input type="checkbox"/>	
Age_C		<input type="checkbox"/>	
PID		<input type="checkbox"/>	

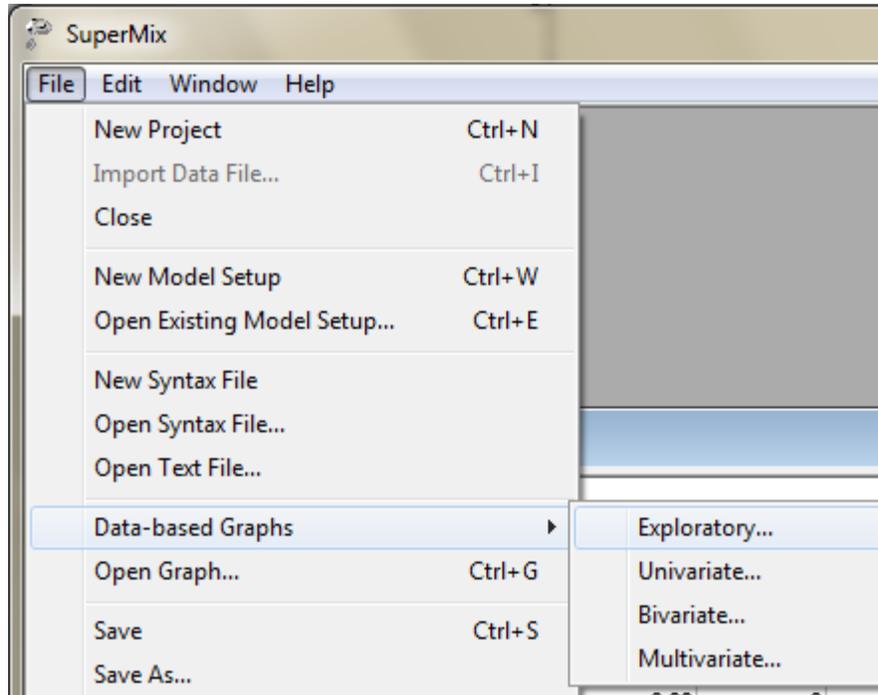
Remaining predictors fixed at 0  
 Remaining predictors fixed at their means

Note: Only one variable may be selected for marking and exactly one must be selected as the time.



## Data-based Graphics

SuperMix offers the user a wide choice of data-based graphical displays as shown in the dialog below. The choices become available when an SS3 spreadsheet is the active window. The graphics are discussed and illustrated in the SuperMix Primer and the SuperMix Manual.



## Imposition of fixed and equality constraints and specification of fixed effects and random effects covariance patterns

SuperMix allows end users to impose fixed and equality constraints on both fixed effects and the elements of the random effects covariance matrices. In addition, one can specify covariance patterns such as Toeplitz, Diagonal, Intra-class correlations, Moving Average of order 1 or user-specified. This feature is discussed in detail in Section 9.7.5 of the SuperMix Manual.

## **Documentation and other additional features**

SuperMix includes the following three user guides that are available via the Help Menu of the application.

- SuperMix Primer
- SuperMix Manual
- Additional Topics (population averages and eight articles written by Donald Hedeker)

The SuperMix Manual was written for the more advanced end user and contains the statistical theory and topics such as how to specify covariance patterns and how to fix parameters or constrain them to be equal.

SuperMix uses quadrature to obtain population average estimates of the fixed effects and results may therefore differ from those yielded by HLM 7.