

### Mixed-effects Location Scale modeling:

A mixed-effects location scale (MELS) model is an extended multilevel model that includes a random subject intercept and a random subject scale effect. A random subject intercept reflects a subject's mean (or location), and a random subject scale reflects a subject's variability (or scale), respectively.

### [Model Configuration]

- 1 Data import**
  - Import data
  - Create title (optional)
  - Set up missing value
- 2 Select stage 1 outcome**

Select **Continuous**, **Dichotomous**, or **Ordinal** for Stage 1 outcome. Choose between **Probit** or **Logistic** model if your Stage 1 outcome is dichotomous/ordinal.
- 3 Specify random location**

Select **"Intercept only"** and the model includes a random subject intercept.
- 4 Select random scale**

Select **"Yes"** if the model includes random subject scale (allowing subjects to have individual within-subject variance effects)

By selecting **"Intercept only"** in random location effects and **"Yes"** in random scale estimate, the stage 1 model will become a **MELS** model.

**Dataset**

- ① CSV file path:
- Title (optional):
- ① Does your data contain missing values?  Yes  No
- What is your missing data coded as?

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**Stage 1 Model**

- ① Stage 1 outcome:  Continuous  Dichotomous  Ordinal
- ① Specify random location effects:  Intercept only  Intercept and slope(s)
- ① Include estimates of random scale:  Yes  No
- ① Include Stage 2 model:  Yes  No

- 5 Select stage 2 model**

Select **"Yes"** when you have a stage 2 model. Select **"No"** when you just need a stage 1 model.

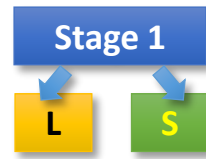
In this example, it is **"stage 1 only"**. Please select **"No"**. If you need a stage 2 model, please check [\[Data Import\]](#) cheatsheet.
- 6 Click Continue to enter Stage 1 Configuration**

Click **"Continue"** to proceed to additional model specifications.

**Or click Reset (optional)**  
Click **"Reset"** to clear the specifications and start over.

**Or Save model (optional)**  
Click it to keep all the model configuration above and save it as a .MW file.

\* Please see more details in User's Guide Chapter 2.



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### [Stage 1 Configuration]

- 7 Select ID**  
ID is the key variable to define the two levels of your data.
- 8 Select Stage 1 Outcome**
- 9 Select Stage 1 Regressors**

MixWILD-2.0-Beta11

Model Configuration | **Stage 1 Configuration** | Stage 1 Results | View Model | View Data | Help

Selected Model Configuration  
Stage 1 model: Intercept Only  
State 1 outcome: Continuous

ID Variable: ID  
Stage 1 Outcome: POS\_AFFECT

Configure Stage 1 Regressors ...  
Options ...

Specify the relationship between the mean and WS variance.  
 No Association  
 Linear Association  
 Quadratic Association

	Mean	BS Variance	WS Variance
<b>Level-1</b>			
WEEKEND	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Disaggregate?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
NEG_AFFECT	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Disaggregate?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Level-2</b>			
Age	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Save Model | Clear Stage 1 | Run Stage 1

Add Stage 1 Regressors

Level-1 (Time Varying)  
**9a Select level 1 variables**

Level-2 (Time Invariant)  
**9b Select level 2 variables**

- 10 Stage 1 Options (optional)**  
Please check the details in the [Stage 1 Options] cheatsheet.

- 11 Specify the relationship**  
Specify the association between mean and within-subject (WS) variance of the outcome variable aka the association of the random intercept and random scale effects.

\* Please see more details in User's Guide Chapter 2.

- 12 Specify Mean Model**  
Select the regressors in [Mean Model] to predict the mean value of the outcome variable.  
In the example, the regressors are as follows:

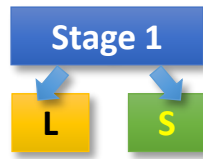
- Weekend
- Negative affect (BS)
- Negative affect (WS)
- Age

**\* Disaggregate**  
Select "Disaggregate" for each of the time-varying variable(s) for which decomposition of the within-subject and between-subject effects in predicting stage 1 outcome is desired. Negative affect is disaggregated in the Mean model in this example.

- 13 Specify BS Model**  
Select the regressors to predict the between-subject variance of the outcome variable.  
- Weekend  
- Negative affect

- 14 Specify WS Model**  
Select the regressors to predict the within-subject variance of the outcome variable.  
- Weekend  
- Negative affect

- 15 Run Stage 1 model**



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### [Stage 1 Analysis Results]

#### Overview (Example 1 in Users' Guide Chapter 2)

In this analysis, the outcome variable is positive affect (PA), and the Level-1 regressor, negative affect (NA), has been decomposed in terms of its between-subject (BS) version (the subject mean of this variable across all occasions, with suffix `_BS`) and the within-subject (WS) version (the subject's occasion specific deviation of the variable relative to the subject mean, with suffix `_WS`). In addition, we control for the covariates such as weekend (Level 1) and baseline age (Level 2) in the Mean, BS and WS Variance submodels.

#### Mean (Beta) Model

This analysis shows that a person's PA is significantly related to the age ( $\beta = -0.178$ ), and the time-varying variable weekend has a positive association with PA ( $\beta = 1.184$ ). In addition, a person's positive mood is significantly and inversely related to one's WS effect of NA ( $\beta = -0.052$ ), which means a subject has lower PA if the subject has a higher daily NA deviated from one's own mean of NA.

#### BS (Alpha) Model

The intercept estimate shows subject's mean of PA is different from person to person ( $\alpha = 3.507$ ). subjects' PA means are more varied with increased levels of NA ( $\alpha = 0.016$ ).

#### WS (Tau) Model

The within-subject variance in PA varies from day to day within a subject ( $\tau = 4.491$ ). The within-subject variance in PA does increase somewhat for subjects on the weekend days ( $\tau = 0.147$ ), though this is not significant at the .05 level.

#### Random Scale

A significant random scale standard deviation (Std Dev) suggests that subjects differ from each other in their degree of WS variance in PA ( $scale\ sd = 0.346$ ).

#### Association between Mean and WS Variance

WS variance and mean are marginally and negatively related ( $estimate = -0.118$ ) indicating that subjects with higher PA intercepts exhibit more consistency in their mood reports.

Variable	Estimate	AsymStdError	z-value	p-value
<b>BETA (regression coefficients)</b>				
intercept	45.47985	5.45639	8.33516	0.00000
WEEKEND	1.18496	0.59370	1.99590	0.04594
Age	-0.17835	0.05127	-3.47904	0.00050
NEG_AFFECT_BS	-0.03896	0.19071	-0.20431	0.83811
NEG_AFFECT_WS	-0.05260	0.02344	-2.24413	0.02482
<b>ALPHA (BS variance parameters: log-linear model)</b>				
intercept	3.50678	0.26525	13.73867	0.00000
WEEKEND	0.08828	0.16250	0.54328	0.58694
NEG_AFFECT	0.01646	0.00547	3.00758	0.00263
<b>TAU (WS variance parameters: log-linear model)</b>				
intercept	4.49095	0.11522	38.97701	0.00000
WEEKEND	0.14735	0.08879	1.65962	0.09699
NEG_AFFECT	0.00349	0.00313	1.11346	0.26551
<b>Random scale standard deviation</b>				
Std Dev	0.34636	0.06252	5.53970	0.00000
<b>Random location (mean) effect on WS variance</b>				
Loc Eff	-0.11818	0.06222	-1.89946	0.05750

\* Please see more details in User's Guide Chapter 2 {Example 1}.

Save Results As ...