

Generalized Linear Mixed Model Analysis

JMP PRO Use to build a linear model with both random and fixed effects along with the option of choosing a non-normal distribution for the response variable. A mixed model can also be analyzed in standard JMP, though fewer options are available.

Analysis of a Generalized Linear Mixed Model

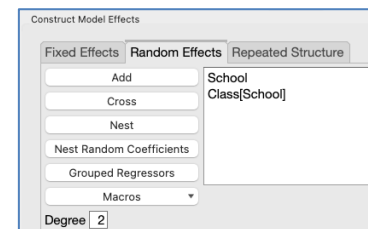
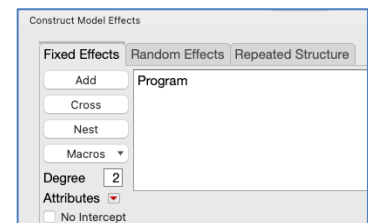
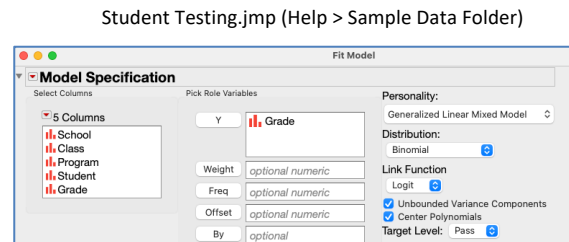
1. From an open JMP data table, select **Analyze > Fit Model**.
2. Select the **Generalized Linear Mixed Model** personality.
3. Add the response. Here we're using the binary outcome variable 'Grade' (Pass, Fail).
4. Choose a distribution for the response. Here we chose Binomial.
5. Add the fixed model effects under the **Fixed Effects Tab**. Here there is just one fixed factor – the categorical variable 'Program'.
6. Add the random model effects under the **Random Effects Tab**, Here we're specifying the two random factors 'School' and 'Class'. For these data, the 5 different classes are nested within the 10 different schools. To specify this, select 'Class' in the model effects window and select 'School' in the columns window, and click **Nest**.

Note: The Repeated Structure tab can be used if the response is repeated measurements on the same unit.

7. Click **Run**.

By default, JMP will display table of results including estimates of variance components for the random effects, parameter estimates for the fixed effects, and test statistics with corresponding p-values to help determine the importance of the model terms.

Additional options are available under the **top red triangle** such as displaying the Profiler, diagnostics plots, and saving model results to the data table.



Generalized Linear Mixed Model for Grade = Pass

Fit Statistics		Model Summary	
Number of rows	500	Response	Grade
Sum of Frequencies	500	Distribution	Binomial
Generalized Chi-Square	272.85331	Probability Model Link	Logit
Generalized Chi-Square / DF	0.5478982		

Random Effects Covariance Parameter Estimates					
Variance Component	Estimate	Std Error	95% Lower	95% Upper	Wald p-Value
School	1.8060322	1.5427052	-1.217614	4.8296789	0.2417
Class[School]	3.5936449	1.1550594	1.32977	5.8575197	0.0019*

Fixed Effects Parameter Estimates							
Term	Estimate	Std Error	DFDen	t Ratio	Prob> t	95% Lower	95% Upper
Intercept	1.8285321	0.6525447	13.7	2.80	0.0144*	0.4259915	3.2310727
Program[0-1]	-0.106385	0.6808782	38.8	-0.16	0.8766	-1.483859	1.2710891
-2 Residual Log Pseudo-Likelihood 2597.3959							

Fixed Effects Tests					
Source	Nparm	DFNum	DFDen	F Ratio	Prob>F
Program	1	1	38.8	0.024413	0.8766

Interpretation:

The fixed effect 'Program' is not significant (p-value = 0.8766). The random effect 'School' is not significant (p-value = 0.2417 and a confidence interval [-1.22 , 4.83] that contains 0). The random effect 'Class' is significant (p-value 0.0019). The estimated variance components for that effect is 3.59 with a corresponding 95% Confidence Interval of [1.33 , 5.86].

See the guide **Mixed Model Analysis (Standard Least Squares)** to see how to fit a mixed model in standard JMP. Visit **Fitting Linear Models > Mixed Models** and **Generalized Linear Mixed Models** in **JMP Help** to learn more.