

# Multilevel Models, Equations, Syntax & English

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model	equation	Stata	English
Intercept Only	$y = \beta_0 + e_{ij}$	mixed y	We estimated the mean of [outcome]
Intercept Independent Variable(s)	$y = \beta_0 + \beta_1 x + e_{ij}$ $y = \beta_0 + \beta_1 x + \beta_2 z + e_{ij}$	mixed y x mixed y x z	We estimated the relationship of [independent variable(s)] with [outcome]
Intercept Random variation of the intercept	$y = \beta_0 + e_{ij} + u_{0j}$	mixed y    groupid:	We estimated the mean of [outcome]. We allowed the intercept of the model to vary by [groupid].
Unconditional intraclass correlation coefficient (ICC)	$\frac{var(u_{0j})}{var(u_{0j}) + var(e_{ij})}$	mixed y    groupid: estat icc	XX% of the variation in [outcome] was explained by clustering of participants in [groupid]
Intercept Independent variable(s) Random variation of the intercept	$y = \beta_0 + \beta_1 x + e_{ij} + u_{0j}$ $y = \beta_0 + \beta_1 x + \beta_2 z + e_{ij} + u_{0j}$	mixed y x    groupid: mixed y x z    groupid:	We estimated the relationship of [independent variable(s)] with [outcome]. We allowed the intercept of the model to vary by group.

model	equation	Stata	English
Intercept Independent variable Random intercept Random slope	$y = \beta_0 + \beta_1 x + e_{ij} + u_{0j} + u_{1j}x$	mixed y x    groupid: x	We estimated the relationship of [independent variable] with [outcome]. We allowed the intercept of the model to vary by group. We also allowed the relationship of [independent variable] with [outcome] to vary by group.
We can estimate multilevel models with more than 1 random slope.	$y = \beta_0 + \beta_1 x + \beta_2 z + e_{ij} + u_{0j} + u_{1j}x + u_{2j}z$	mixed y x z    /// groupid: x z	