

# Modeling change: A gentle introduction to cross-lagged and latent growth curve approach: course materials

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## Lavaan notation

- **=~** we use this sign to specify latent variables, i.e. to indicate which items measure which latent variable

LAT\_VAR =~ item1+ item2+ item3

- **~** this sign is the regression operator. We use it to specify the regression formula, i.e. to indicate which variables predict a certain outcome

OUTCOME ~ predictor1+ predictor2+ predictor3

- **~~** we use it to specify variances and covariances

variable1 ~~ variable1 means variance of variable 1

variable1 ~~ variable2 means covariance between variables 1 and 2

- **+** when several variables are in a relationship with other variable, we specify this using the + sign. We can use it with specifying latent variables and predictors for the outcome, but also to specify that certain variable covaries with several other variables.

variable1 ~~ variable2+ variable3+ variable4 specifies that variable1 covaries with variables 2, 3 and 4

- **:=** a symbol for user-defined parameters, e.g. if we want to calculate indirect effect, in the model syntax we need to include indirect := a\*b where a and b are labels assigned to the regression parameters of the predictor -> mediator and mediator -> outcome effects.
- **#** symbol is for commenting in lavaan and R syntax. E.g., if we want to mark that the following part of our code described measurement model, we will write #measurement model.