
Results of Parameter Estimates for informative priors and non-informative priors in the Empirical Example

The following Table B contains the results from the Bayesian method with informative and non-informative priors. For informative priors, $IGamma(0.1, 0.1)$ is used as the priors for residual variances, $N(0, 1)$ is used as the priors for the intercept and regression slopes, while the default prior distributions of Mplus8.3 are adopted for non-informative priors. The results indicate that the differences on parameter estimates between the two sets of priors are rather small, suggesting that priors only have minimal effect for the analysis of the PISA2018 sample in this example.

Table B. Parameter Estimates and Their Standard Deviations by the 2moME model for informative priors and non-informative priors

Parameter	Informative priors		Non-informative priors	
	Est.	Posterior SD	Est.	Posterior SD
Fixed Parameters				
Intercept of SCREAD ($\gamma_{d_{M0}}$)	-0.029	0.032	-0.029	0.032
Intercept of READ ($\gamma_{d_{Y0}}$)	0.504***	0.031	0.505***	0.031
EMOSUP \rightarrow SCREAD ($\gamma_{d_{M1}}$)	0.130***	0.036	0.130***	0.036
ESCS \rightarrow SCREAD (γ_{a_0})	0.082*	0.040	0.081*	0.040
ESCS \times EMOSUP \rightarrow SCREAD (γ_{a_1})	0.176***	0.045	0.176***	0.045
EMOSUP \rightarrow READ ($\gamma_{d_{Y1}}$)	0.031	0.035	0.031	0.036
TSREAD \rightarrow READ ($\gamma_{d_{Y2}}$)	0.041	0.034	0.041	0.034
ESCS \rightarrow READ (γ_{c_0})	0.079*	0.036	0.080*	0.036
SCREAD \rightarrow READ (γ_{b_0})	0.212***	0.041	0.212***	0.041
SCREAD \times TSREAD \rightarrow READ (γ_{b_1})	-0.129***	0.038	-0.130***	0.038

ESCS× EMOSUP → READ (γ_{c_1})	0.047	0.044	0.049	0.044
ESCS×TSREAD → READ (γ_{c_2})	-0.025	0.041	-0.023	0.040
Random Parameters				
Var(e_M)	0.648	0.048	0.648	0.048
Var(e_Y)	0.510	0.045	0.510	0.045
Var(u_{a_i})	0.175	0.051	0.180	0.053
Var(u_{b_i})	0.198	0.047	0.205	0.048
Var(u_{c_i})	0.086	0.036	0.080	0.036
DIC	3687.65		3690.69	

Note.* p<0.05; ** p<0.01; *** p<0.001