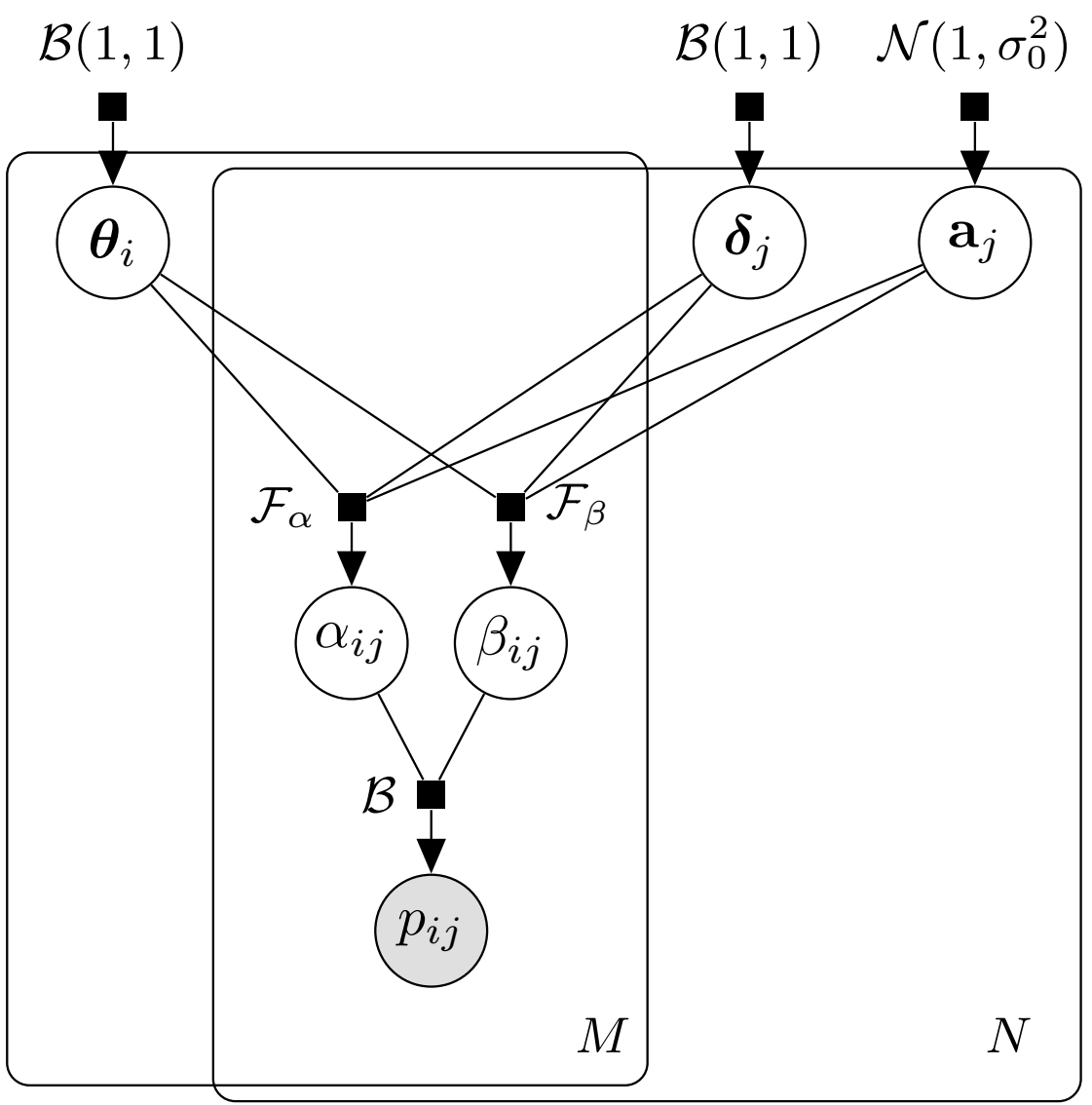

$$p_{ij} \sim \mathcal{B}(\alpha_{ij}, \beta_{ij})$$

$$\alpha_{ij} = \mathcal{F}_\alpha(\boldsymbol{\theta}_i, \boldsymbol{\delta}_j, \mathbf{a}_j) = \left(\frac{\boldsymbol{\theta}_i}{\boldsymbol{\delta}_j}\right)^{\mathbf{a}_j}$$

$$\beta_{ij} = \mathcal{F}_\beta(\boldsymbol{\theta}_i, \boldsymbol{\delta}_j, \mathbf{a}_j) = \left(\frac{1-\boldsymbol{\theta}_i}{1-\boldsymbol{\delta}_j}\right)^{\mathbf{a}_j}$$

Item Characteristic Curve
mapping ability to expected response:

$$E[p_{ij}|\boldsymbol{\delta}_j, a_j] = \frac{\alpha_{ij}}{\alpha_{ij}+\beta_{ij}} = \frac{1}{1+\left(\frac{\boldsymbol{\delta}_j}{1-\boldsymbol{\delta}_j}\right)^{\mathbf{a}_j} \Big/ \left(\frac{\boldsymbol{\theta}_i}{1-\boldsymbol{\theta}_i}\right)^{\mathbf{a}_j}}$$