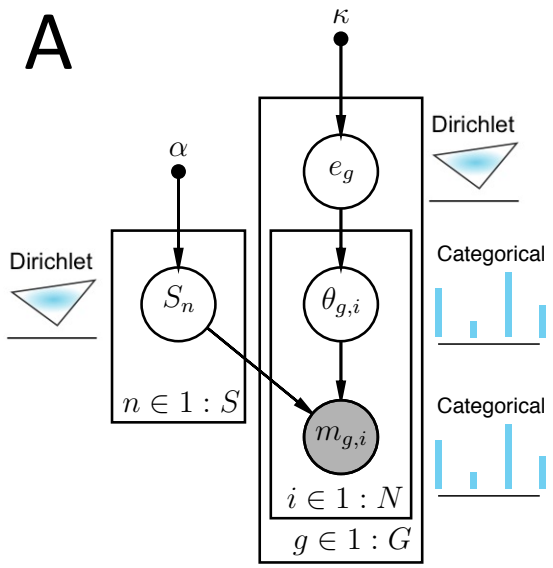
A




## NMF Generative model

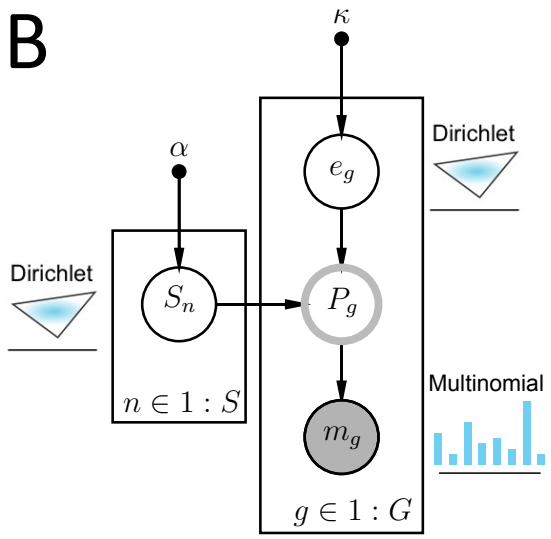
$$e_g \sim \mathrm{Dir}(\kappa)$$

$$S_n \sim \mathrm{Dir}(\alpha)$$

$$\theta_{g,i} \sim \mathrm{Cat}(e_g)$$

$$m_{g,i} \sim \mathrm{Cat}(S_n | \theta_{g,i} = n)$$

B




## NMF Inferential model

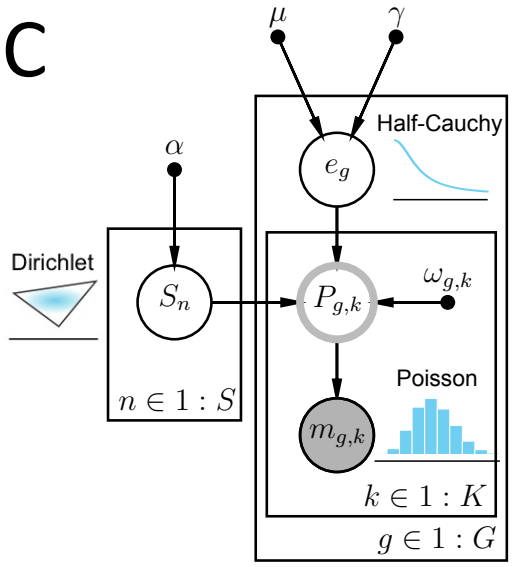
$$e_g \sim \mathrm{Dir}(\kappa)$$

$$S_n \sim \mathrm{Dir}(\alpha)$$

$$P_{g,k} = \sum_n e_{g,n} S_{n,k}$$

$$m_g \sim \mathrm{Mult}(P_g | E, S)$$

C




## EMu model

$$e_g \sim \mathrm{HalfCauchy}(\mu, \gamma)$$

$$S_n \sim \mathrm{Dir}(\alpha)$$

$$P_{g,k} = \omega_{g,k} \times \sum_n e_{g,n} S_{n,k}$$

$$m_{g,k} \sim \mathrm{Pois}(P_{g,k} | \omega, E, S)$$