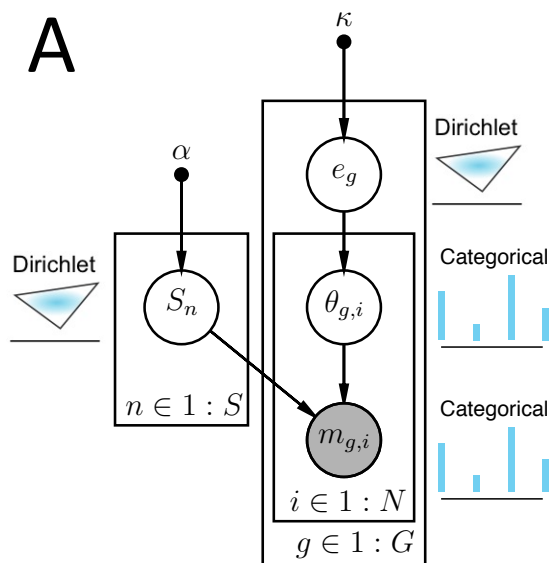


A



NMF Generative model

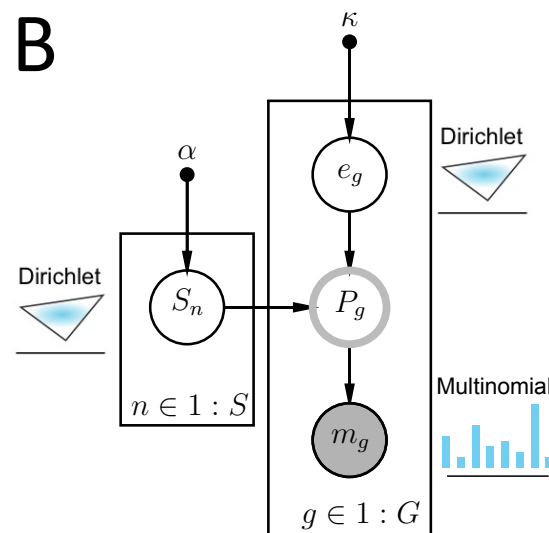
$$e_g \sim \text{Dir}(\kappa)$$

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

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

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

B



NMF Inferential model

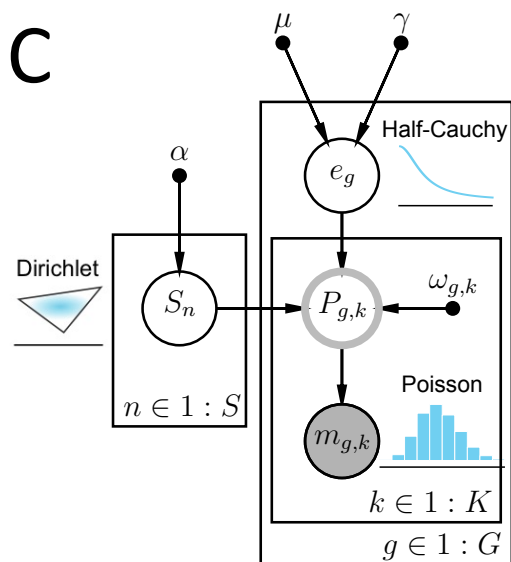
$$e_g \sim \text{Dir}(\kappa)$$

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

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

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

C



EMu model

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

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

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

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

Legend

• Fixed value

○ Random variable

● Conditioning observation

○ Deterministic value

→ Relationship

Poisson
Probability distribution

Plate – indicates repeated elements within the model