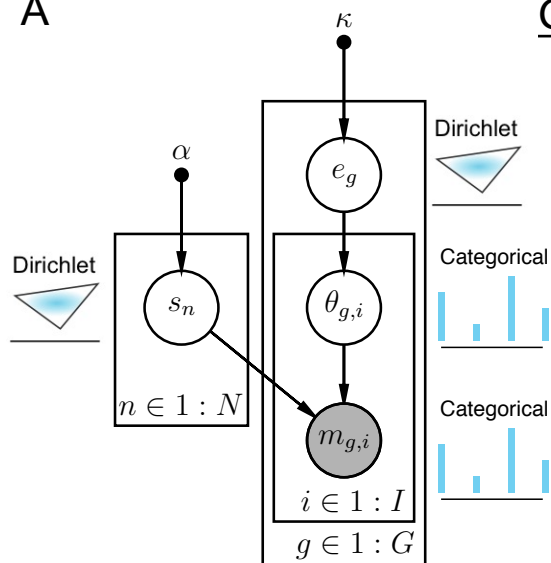
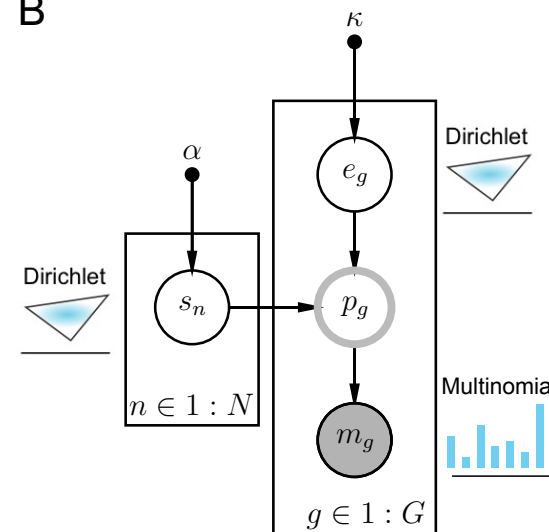


A Generative mutational model



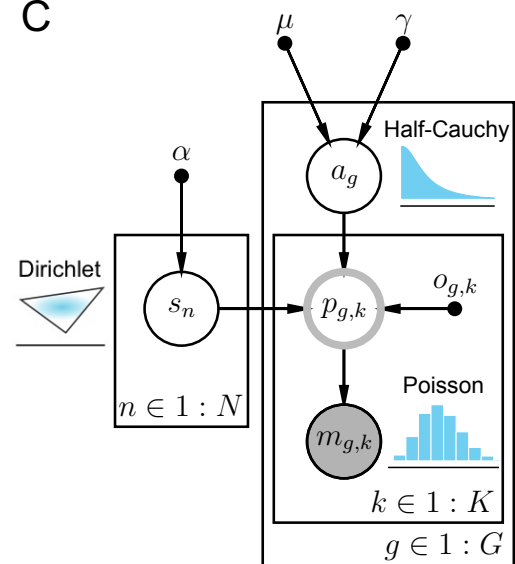
$$\begin{aligned}
 e_g &\sim \text{Dirichlet}(\kappa) \\
 s_n &\sim \text{Dirichlet}(\alpha) \\
 \theta_{g,i} &\sim \text{Categorical}(e_g) \\
 m_{g,i} &\sim \text{Categorical}(s_n | \theta_{g,i} = n)
 \end{aligned}$$

B NMF model



$$\begin{aligned}
 e_g &\sim \text{Dirichlet}(\kappa) \\
 s_n &\sim \text{Dirichlet}(\alpha) \\
 p_{g,k} &= \sum_n e_{g,n} s_{n,k} \\
 m_g &\sim \text{Multinomial}(p_g)
 \end{aligned}$$

C EMu model



$$\begin{aligned}
 a_g &\sim \text{Half-Cauchy}(\mu, \gamma) \\
 s_n &\sim \text{Dirichlet}(\alpha) \\
 p_{g,k} &= o_{g,k} \times \sum_n a_{g,n} s_{n,k} \\
 m_{g,k} &\sim \text{Poisson}(p_{g,k})
 \end{aligned}$$

