

Beta - Binomial Conjugation

$$\begin{aligned} \text{posterior} \quad \text{likelihood} \quad \text{prior} \\ P(\mu | a, b, m, N-m) &\propto P(m, N-m | \mu) P(\mu | a, b) \\ &\propto p^m (1-p)^{N-m} p^{a-1} (1-p)^{b-1} \\ &= p^{m+a-1} (1-p)^{N-m+b-1} \end{aligned}$$