Univariate conjugate prior distributions for various one-parameter likelihoods from a sample of size n. Also given are the corresponding posterior parameters and the predictive distribution for a single new observation $\tilde{y}^{\dagger}$. See Appendix C and/or Bernardo and Smith (1994), pp. 427–435, for definitions of distributions.

Sampling distribution	**Conjugate prior**	**Posterior parameters**	**Predictive distribution**
$y\|\theta \sim \text{Binomial}(\theta, n)$ including Bernoulli $(n = 1)$	$\theta \sim \text{Beta}(a, b)$	$a_n = a + y$, $b_n = b + n - y$	$\text{Beta-Binomial}(a_n, b_n, n)$
$y\|\mu \sim \prod_{i=1}^{n} \text{Normal}(\mu, \sigma^2)$	$\mu \sim \text{Normal}(\gamma, \omega^2 = \frac{\sigma^2}{n_0})$	$\gamma_n = \frac{n_0\gamma + n\bar{y}}{n_0 + n}$, $\omega_n^2 = \frac{\sigma^2}{n_0 + n}$	$\text{Normal}(\gamma_n, \omega_n^2 + \sigma^2)^{\ddagger}$
$y\|\sigma^2 \sim \prod_{i=1}^{n} \text{Normal}(\mu, \sigma^2)$	$\sigma^{-2} \sim \text{Gamma}(a, b)$	$a_n = a + \frac{n}{2}$, $b_n = b + \frac{1}{2}\sum_i (y_i - \mu)^2$	$\text{Student-}t(\mu, \frac{b_n}{a_n}, 2a_n)^{\S}$
$y\|\theta \sim \prod_{i=1}^{n} \text{Poisson}(\theta)$	$\theta \sim \text{Gamma}(a, b)$	$a_n = a + n\bar{y}$, $b_n = b + n$	$\text{NegBin}(\frac{b_n}{b_n + 1}, a_n)$
$y\|\theta \sim \prod_{i=1}^{n} \text{Gamma}(\alpha, \theta)$ including Exponential $(\alpha = 1)$	$\theta \sim \text{Gamma}(a, b)$	$a_n = a + n\alpha$, $b_n = b + n\bar{y}$	$\text{Gamma-Gamma}(a_n, b_n, \alpha)$
$y\|\theta \sim \prod_{i=1}^{n} \text{Uniform}(0, \theta)$	$\theta \sim \text{Pareto}(a, b)$	$a_n = a + n$, $b_n = \max\{b, y\}$	$\begin{cases} \frac{a_n}{a_n+1}\text{Uniform}(0, b_n), & \tilde{y} \leq b_n \\ \frac{1}{a_n+1}\text{Pareto}(a_n, b_n), & \tilde{y} > b_n \end{cases}$
$y\|\theta \sim \text{NegBin}(\theta, r)$ including Geometric $(r = 1)$	$\theta \sim \text{Beta}(a, b)$	$a_n = a + r$, $b_n = b + y$	$\text{Negative-Binomial-Beta}(a_n, b_n, r_p)$