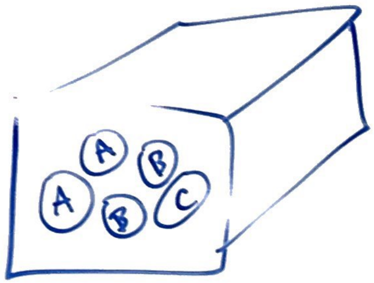


A fair $\theta = 0.5$

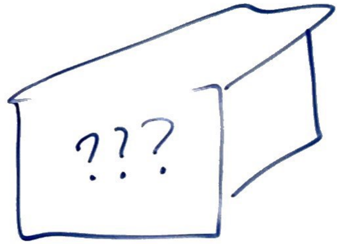
B θ 0.6

C $\theta = 0.9$

support

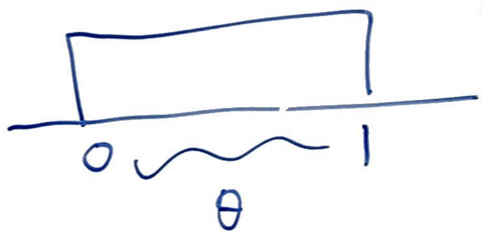
	0.5	0.6	0.9
$P(\theta)$	2/5	2/5	1/5

Prior PMF

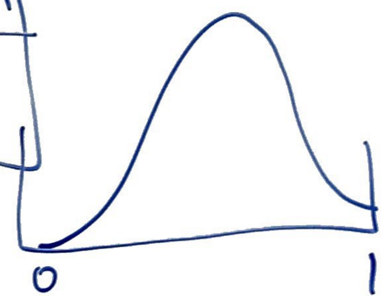


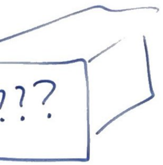
Uniform Prior

	0.1	0.2	...	0.9
$P(\theta)$				



Beta Prior PDF

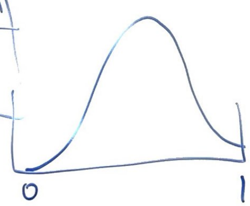


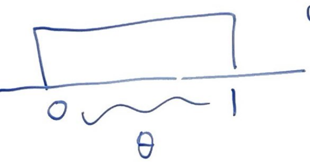


Uniform Prior

0.1	0.2	...	0.9

Beta
Prior PDF





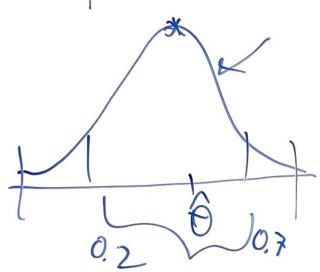
$\mathcal{L}(\theta)$

	0.5	0.6	0.9
$\mathcal{L}(\theta)$	0.5	0.6	0.9
	$0.5/2$	$0.6/2$	$0.9/2$

$\Sigma 2$

$$\text{posterior} = \frac{\text{prior} \times \text{likelihood}}{\text{Bayes Denom}}$$

← Bayes Numerator



$\boxed{\theta = \text{binomial proportion ?}}$

Prior ~ Beta(a, b) ~ θ

$\underbrace{a, b}$ hyper parameters

Binomial

$\mathcal{L}(\theta) = \theta^{y}(1-\theta)^{n-y}$ ← # of "success"

$\theta^{\boxed{y+1}-1}(1-\theta)^{\boxed{50-y+1}-1}$

$$Beta(\alpha,\beta) = \frac{\theta^{\boxed{\alpha}-1}(1-\theta)^{\boxed{\beta}-1}}{B(\alpha,\beta)}$$

Beta - Binomial

prior × likelihood ∝

$$\frac{1}{B(k+a, 50-k+b)}\theta^{\boxed{k+a}-1}(1-\theta)^{\boxed{n-k+b}-1}$$

? ?

Beta(k+ a , n - k+b)

$\mathcal{L}(\theta) \sim Beta(y+1, 50+1-y)$

Beta

posterior $\theta|y$

Conjugate prior

functional form of a Beta

Beta "kernel"