Statistical Rethinking 2023

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Lecture 1

<To be reviewed with lecture contents>

Lecture 2

<To be reviewed with lecture contents>

A new model is born when we write:

$$W \sim Binomial(N, p)$$

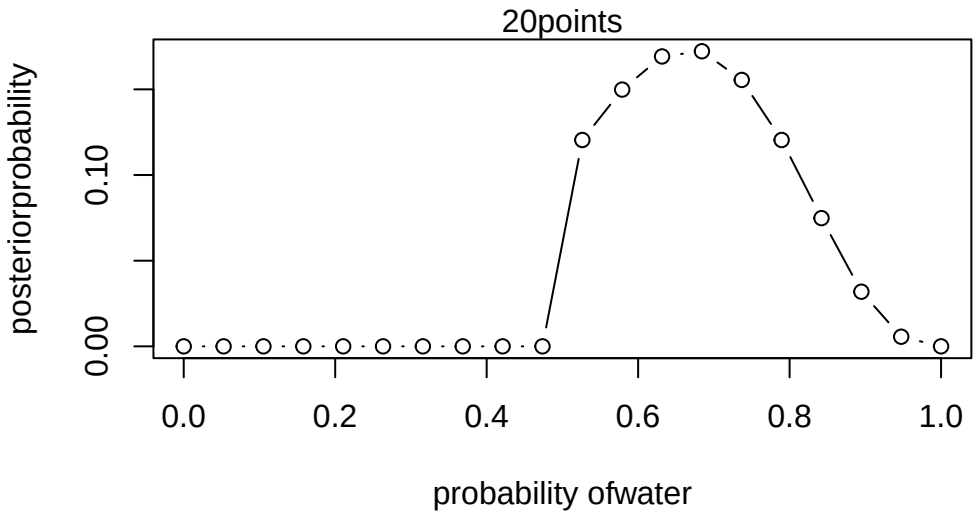
with

$$p \sim Unif(0, 1)$$

Simulation of Bayesian Experiment

```
# definegrid
p_grid <-seq(from=0,to=1,length.out=20)

# defineprior
#prior <-rep(1,20)
prior <-ifelse(p_grid<0.5,0,1)

# computelikelihoodateachvalueingrid
likelihood <-dbinom(6,size=9,prob=p_grid)

# computeproductoflikelihoodandprior
unstd.posterior <-likelihood*prior

# standardizetheposterior,soitsumsto1
posterior <-unstd.posterior/sum(unstd.posterior)
```

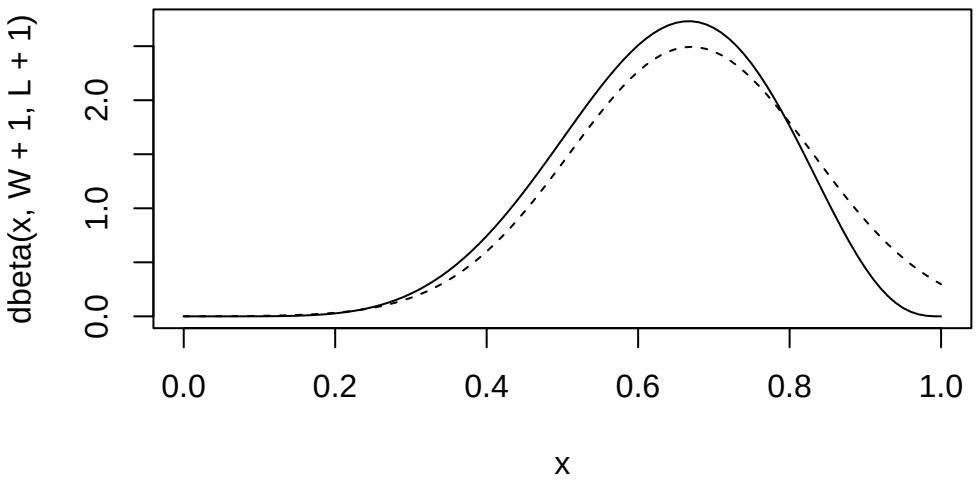
```
plot( p_grid,posterior,type="b",
xlab="probability ofwater",ylab="posteriorprobability")
mtext( "20points")
```



Homework 1

Suppose the globe tossing data had turned into a 4-water and 11-land. Construct the posterior distribution.

```
# 2.7 analyticalcalculation
W <-6
L <-3
curve( dbeta(x,W+1,L+1),from=0,to=1)

# quadraticapproximation
curve( dnorm(x,0.67,0.16),lty=2,add=TRUE)
```


dbeta(x, W + 1, L + 1)
0.0
1.0
2.0
0.0
0.2
0.4
0.6
0.8
1.0
x