Example: Difference of biases

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Summary

This is an example report showing an MCMC simulation for the difference in biases for Bernoulli trials.

Code for Bayes Analysis

```r
source("DBDA2E-utilities.R")
```

```
##
## *********************************************************************
## Kruschke, J. K. (2015). Doing Bayesian Data Analysis, Second Edition:
## A Tutorial with R, JAGS, and Stan. Academic Press / Elsevier.
## *********************************************************************
```

```
## Loading required package: coda
```

```
## Linked to JAGS 4.3.0
```

```
## Loaded modules: basemod,bugs
```

```r
source("Jags-Ydich-XnomSsubj-MbernBeta.R")
```

```
##
## *********************************************************************
## Kruschke, J. K. (2015). Doing Bayesian Data Analysis, Second Edition:
## A Tutorial with R, JAGS, and Stan. Academic Press / Elsevier.
## *********************************************************************
```

```r
### Read in the data
d <- read.csv("z6N8z2N7.csv")
y <- d$y
s <- as.numeric(d$s)
```

```r
### Bundle data into a list

Ntotal <- length(y)
Nsubj  <- length(unique(s))

dList <- list( y = y,
               s = s,
               Ntotal = Ntotal,
               Nsubj  = Nsubj )
```

Specify model (check against TEMPmodel.txt)

model { for (i in 1:Ntotal) { y[i] ~ dbern(theta[s[i]]) } for (s in 1:Nsubj) { theta[s] ~ dbeta(2,2) } }
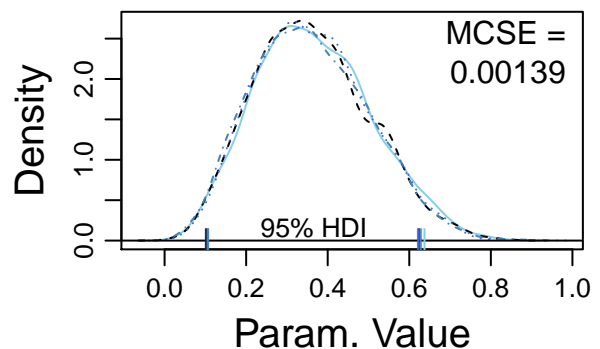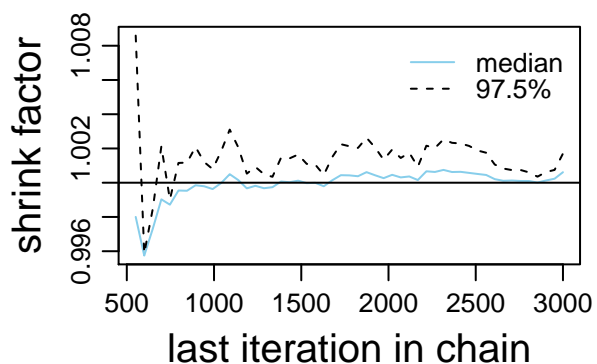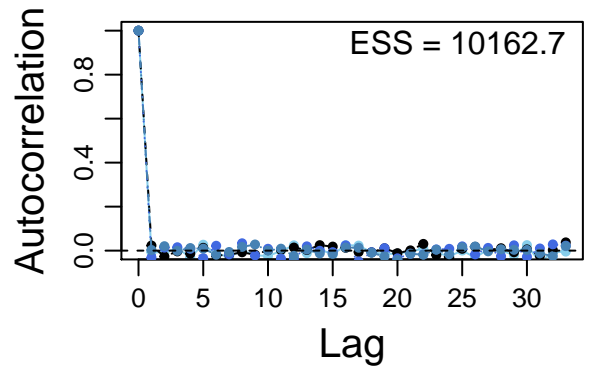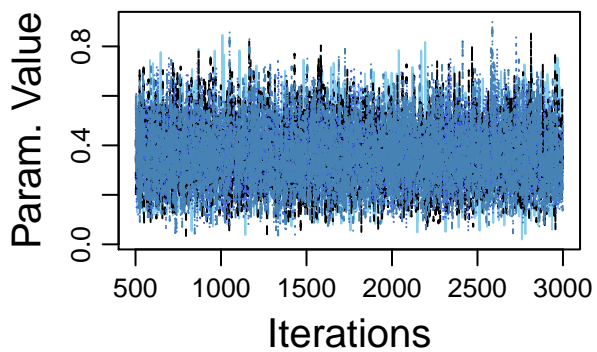
```
### High-level script for JAGS

mcmcCoda = genMCMC(data=d, numSavedSteps=10000)
```

```
## Compiling model graph
##    Resolving undeclared variables
##    Allocating nodes
## Graph information:
##    Observed stochastic nodes: 15
##    Unobserved stochastic nodes: 2
##    Total graph size: 35
##
## Initializing model
##
## Burning in the MCMC chain...
## Sampling final MCMC chain...
```

```
diagMCMC(mcmcCoda, parName="theta[2]")
smryMCMC(mcmcCoda, compVal=NULL, compValDiff=0.0)
```



```
##                    Mean    Median     Mode     ESS HDImass
```

```
## theta[1]              0.6674226 0.6773664 0.7044958  9647.1    0.95
## theta[2]              0.3622349 0.3527293 0.3302016 10000.0    0.95
## theta[1]-theta[2]     0.3051877 0.3132239 0.3535127 10000.0    0.95
##                          HDIlow   HDIhigh CompVal PcntGtCompVal ROPElow
## theta[1]               0.41206513 0.902506      NA            NA      NA
## theta[2]               0.10196671 0.629327      NA            NA      NA
## theta[1]-theta[2]     -0.08268338 0.660683       0         93.47      NA
##                          ROPEhigh PcntLtROPE PcntInROPE PcntGtROPE
## theta[1]                       NA         NA         NA         NA
## theta[2]                       NA         NA         NA         NA
## theta[1]-theta[2]              NA         NA         NA         NA


##                            Mean    Median      Mode     ESS HDImass
## theta[1]              0.6674226 0.6773664 0.7044958  9647.1    0.95
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##                          ROPEhigh PcntLtROPE PcntInROPE PcntGtROPE
## theta[1]                       NA         NA         NA         NA
## theta[2]                       NA         NA         NA         NA
## theta[1]-theta[2]              NA         NA         NA         NA
```

```r
plotMCMC(mcmcCoda, data=d, compVal=NULL, compValDiff=0.0, saveName="TEMP.jpg", saveType="jpg")
```

```r
### Test of proportions
table(d)
```

```
##     s
## y   Reginald Tony
##   0        2    5
##   1        6    2
```

```r
prop.test(x = c(6,2), n = c(8,7), correct=TRUE)
```

```
## Warning in prop.test(x = c(6, 2), n = c(8, 7), correct = TRUE): Chi-squared
## approximation may be incorrect
```

```
##
##  2-sample test for equality of proportions with continuity
##  correction
##
## data:  c(6, 2) out of c(8, 7)
## X-squared = 1.637, df = 1, p-value = 0.2007
## alternative hypothesis: two.sided
## 95 percent confidence interval:
##  -0.1191204  1.0000000
## sample estimates:
##    prop 1    prop 2
## 0.7500000 0.2857143
```
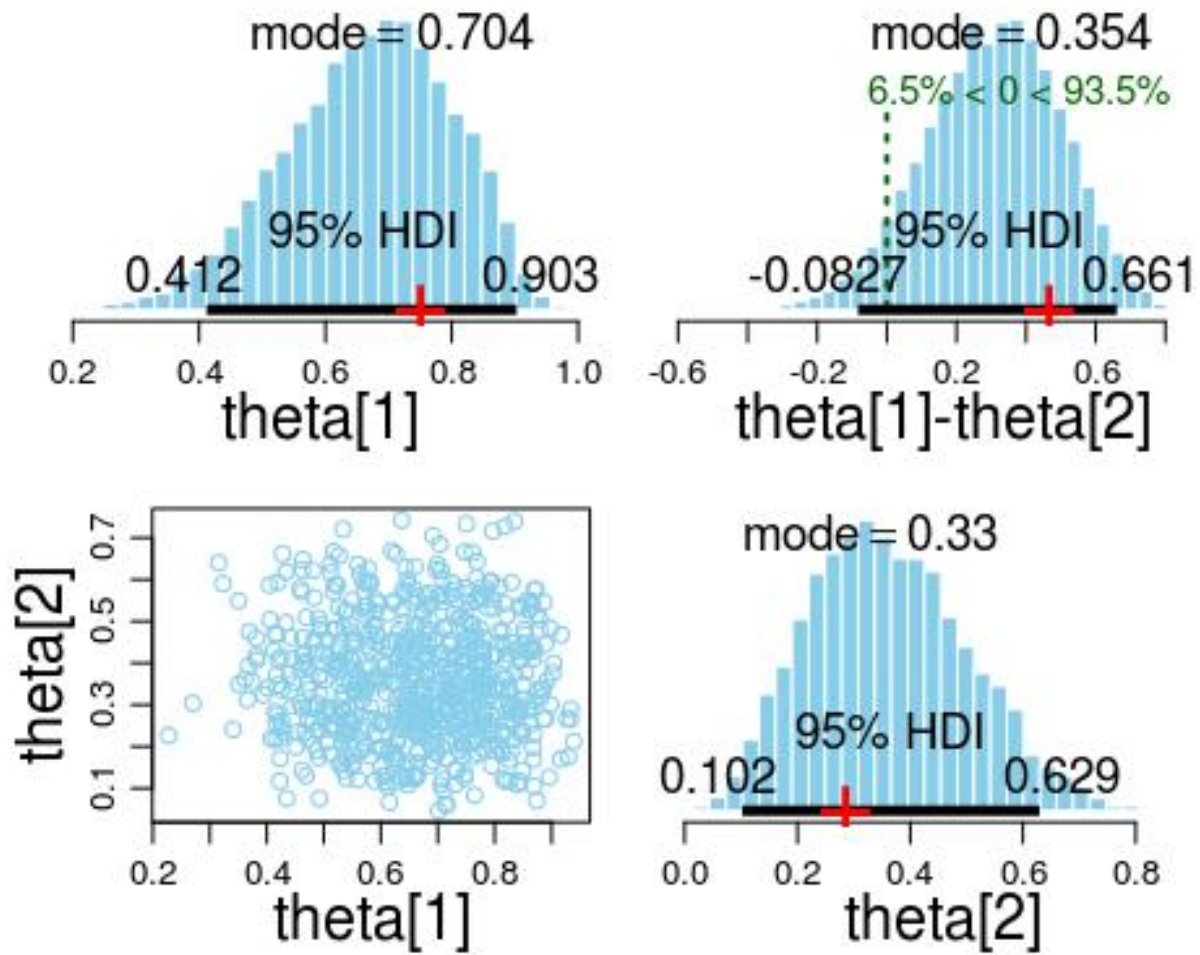
Figure 1: Posterior plot