# Version 3: 3 clusters

### Simulate data

```
I <- 50
K <- 3
S <- 10

# choose diffuse priors for gamma
a_gamma <- 2
b_gamma <- 100

set.seed(123)

a <- matrix(NA, nrow=K, ncol=S)
b <- matrix(NA, nrow=K, ncol=S)
for (s in 1:S) {
  a[, s] <- rgamma(K, a_gamma, rate = 1/b_gamma)
  b[, s] <- rgamma(K, a_gamma, rate = 1/b_gamma)
}

# reorder a,b matrices to match ordering of means (U) in S1
U <- a/(a+b)
V <- a+b
U.ordered <- U[order(U[,1]), ]
a.ordered <- a[order(U[,1]),]
b.ordered <- b[order(U[,1]),]
V.ordered <- V[order(U[,1]),]

pi <- as.vector(rdirichlet(1, rep(1, K)))
z <- sample(1:K, size = I, replace = T, prob = pi)

w <- matrix(NA, nrow=I, ncol=S)
for (s in 1:S) {
  w[, s] <- rbeta(I, a.ordered[,s][z], b.ordered[,s][z])
}

tcn <- matrix(2, nrow=I, ncol=S)
m <- matrix(rep(sample(1:2, size = I, replace = T), S), nrow=I, ncol=S)

calcTheta <- function(m, tcn, w) {
  (m * w) / (tcn * w + 2*(1-w))
}
theta <- calcTheta(m, tcn, w)

n <- replicate(S, rpois(I, 100))
y <- matrix(NA, nrow=I, ncol=S)
for (i in 1:I) {
  for (s in 1:S) {
    y[i, s] <- rbinom(1, n[i, s], theta[i,s])
  }
```

```
}
```

## JAGS

```
jags.file <- file.path(models.dir, "v3_no_constraints.jags")

test.data <- list("I" = I, "S" = S, "K" = K,
                  "y" = y, "n" = n,
                  "m" = m, "tcn" = tcn)
jags.m <- jags.model(jags.file, test.data,
                     n.chains = 1,
                     inits = list(".RNG.name" = "base::Wichmann-Hill",
                                  ".RNG.seed" = 123))
```

```
## Compiling model graph
##    Resolving undeclared variables
##    Allocating nodes
## Graph information:
##    Observed stochastic nodes: 500
##    Unobserved stochastic nodes: 611
##    Total graph size: 8521
##
## Initializing model
```

```
params <- c("z", "w", "U", "V")
samps <- coda.samples(jags.m, params, n.iter=10000, thin=7)
s <- summary(samps)
effectiveSize(samps)
```

```
##    U[1,1]    U[2,1]    U[3,1]    U[1,2]    U[2,2]    U[3,2]    U[1,3]
## 1278.4927 1428.0000 1206.9313 1338.1505 1428.0000 1428.0000 1083.8180
##    U[2,3]    U[3,3]    U[1,4]    U[2,4]    U[3,4]    U[1,5]    U[2,5]
## 1428.0000 1428.0000 1274.9923 1428.0000 1428.0000 1428.0000 1428.0000
##    U[3,5]    U[1,6]    U[2,6]    U[3,6]    U[1,7]    U[2,7]    U[3,7]
## 1428.0000 1177.3583 1428.0000 1428.0000 1428.0000 1352.1725 1281.1776
##    U[1,8]    U[2,8]    U[3,8]    U[1,9]    U[2,9]    U[3,9]   U[1,10]
## 1281.1604 1428.0000 1428.0000 1382.7244 1206.8022 1428.0000 1182.3113
##   U[2,10]   U[3,10]    V[1,1]    V[2,1]    V[3,1]    V[1,2]    V[2,2]
## 1256.0824 1428.0000  991.2431 1299.9255 1594.3768  965.1004 1428.0000
##    V[3,2]    V[1,3]    V[2,3]    V[3,3]    V[1,4]    V[2,4]    V[3,4]
## 1648.8854 1239.4848 1428.0000 1210.9534 1016.1106 1428.0000 1428.0000
##    V[1,5]    V[2,5]    V[3,5]    V[1,6]    V[2,6]    V[3,6]    V[1,7]
## 1231.0081 1428.0000 1428.0000 1060.2253 1453.1251 1428.0000 1169.5972
##    V[2,7]    V[3,7]    V[1,8]    V[2,8]    V[3,8]    V[1,9]    V[2,9]
## 1887.6474 1428.0000  877.8424 1428.0000 1079.4837 1185.6818 1428.0000
##    V[3,9]   V[1,10]   V[2,10]   V[3,10]    w[1,1]    w[2,1]    w[3,1]
## 1322.0664 1153.1783 1203.2380 1428.0000 1284.5934 1467.8574 1428.0000
##    w[4,1]    w[5,1]    w[6,1]    w[7,1]    w[8,1]    w[9,1]   w[10,1]
## 1239.4218 1547.9910 1428.0000 1053.1719 1271.7245 1543.0936 1428.0000
##   w[11,1]   w[12,1]   w[13,1]   w[14,1]   w[15,1]   w[16,1]   w[17,1]
## 1314.1204 1559.6798 1428.0000 1428.0000  869.7631 1428.0000 1428.0000
##   w[18,1]   w[19,1]   w[20,1]   w[21,1]   w[22,1]   w[23,1]   w[24,1]
## 1428.0000 1109.9757 1428.0000 1428.0000 1428.0000 1428.0000 1425.6398
```

```
##   w[25,1]   w[26,1]   w[27,1]   w[28,1]   w[29,1]   w[30,1]   w[31,1]
## 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[32,1]   w[33,1]   w[34,1]   w[35,1]   w[36,1]   w[37,1]   w[38,1]
## 1415.5250 1428.0000 1428.0000 1428.0000 1428.0000 1577.6594 1428.0000
##   w[39,1]   w[40,1]   w[41,1]   w[42,1]   w[43,1]   w[44,1]   w[45,1]
## 1318.9527 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1250.9093
##   w[46,1]   w[47,1]   w[48,1]   w[49,1]   w[50,1]    w[1,2]    w[2,2]
## 1428.0000 1428.0000 1768.5711 1428.0000 1428.0000 1428.0000 1428.0000
##    w[3,2]    w[4,2]    w[5,2]    w[6,2]    w[7,2]    w[8,2]    w[9,2]
## 1303.6276 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[10,2]   w[11,2]   w[12,2]   w[13,2]   w[14,2]   w[15,2]   w[16,2]
## 1428.0000 1428.0000 1428.0000 1576.9077 1217.1756 2002.0869 1428.0000
##   w[17,2]   w[18,2]   w[19,2]   w[20,2]   w[21,2]   w[22,2]   w[23,2]
## 1428.0000 1277.7010 1213.0020 1428.0000 1547.2557 1428.0000 1569.7335
##   w[24,2]   w[25,2]   w[26,2]   w[27,2]   w[28,2]   w[29,2]   w[30,2]
## 1428.0000 1428.0000 1711.1128 1428.0000 1428.0000 1428.0000 1428.0000
##   w[31,2]   w[32,2]   w[33,2]   w[34,2]   w[35,2]   w[36,2]   w[37,2]
## 1428.0000 1428.0000 1428.0000 1428.0000 1225.2340 1428.0000 1428.0000
##   w[38,2]   w[39,2]   w[40,2]   w[41,2]   w[42,2]   w[43,2]   w[44,2]
## 1428.0000 1428.0000 1164.7352 1428.0000 1428.0000 1428.0000 1428.0000
##   w[45,2]   w[46,2]   w[47,2]   w[48,2]   w[49,2]   w[50,2]    w[1,3]
## 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##    w[2,3]    w[3,3]    w[4,3]    w[5,3]    w[6,3]    w[7,3]    w[8,3]
## 1540.1571 1261.5598 1428.0000 1281.2456 1428.0000 1428.0000 1428.0000
##    w[9,3]   w[10,3]   w[11,3]   w[12,3]   w[13,3]   w[14,3]   w[15,3]
## 1318.0840 1428.0000 1428.0000 1515.1875 1551.8057 1428.0000 1428.0000
##   w[16,3]   w[17,3]   w[18,3]   w[19,3]   w[20,3]   w[21,3]   w[22,3]
## 1428.0000 1428.0000 1428.0000 1310.5278 1800.7650 1428.0000 1428.0000
##   w[23,3]   w[24,3]   w[25,3]   w[26,3]   w[27,3]   w[28,3]   w[29,3]
## 1582.3054 1428.0000 1555.6416 1428.0000 1428.0000 1202.7430 1097.0265
##   w[30,3]   w[31,3]   w[32,3]   w[33,3]   w[34,3]   w[35,3]   w[36,3]
## 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1563.8124
##   w[37,3]   w[38,3]   w[39,3]   w[40,3]   w[41,3]   w[42,3]   w[43,3]
## 1428.0000 1428.0000 1352.0911 1428.0000 1256.4407 1428.0000 1428.0000
##   w[44,3]   w[45,3]   w[46,3]   w[47,3]   w[48,3]   w[49,3]   w[50,3]
## 1428.0000 1428.0000 1428.0000 1301.9569 1442.9849 1428.0000 1428.0000
##    w[1,4]    w[2,4]    w[3,4]    w[4,4]    w[5,4]    w[6,4]    w[7,4]
## 1428.0000 1428.0000 1279.4163 1428.0000 1088.5842 1428.0000 1365.9846
##    w[8,4]    w[9,4]   w[10,4]   w[11,4]   w[12,4]   w[13,4]   w[14,4]
## 1428.0000 1428.0000 1428.0000 1458.9764 1428.0000 1302.0586 1260.4097
##   w[15,4]   w[16,4]   w[17,4]   w[18,4]   w[19,4]   w[20,4]   w[21,4]
## 1428.0000 1558.1878 1428.0000 1193.7295 1428.0000 1557.6993 1428.0000
##   w[22,4]   w[23,4]   w[24,4]   w[25,4]   w[26,4]   w[27,4]   w[28,4]
## 1428.0000 1421.7524 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[29,4]   w[30,4]   w[31,4]   w[32,4]   w[33,4]   w[34,4]   w[35,4]
## 1850.4989 1306.6560 1261.6416 1316.9925 1648.7872 1428.0000 1428.0000
##   w[36,4]   w[37,4]   w[38,4]   w[39,4]   w[40,4]   w[41,4]   w[42,4]
## 1428.0000 1428.0000 1801.6551 1701.5560 1428.0000 1428.0000 1428.0000
##   w[43,4]   w[44,4]   w[45,4]   w[46,4]   w[47,4]   w[48,4]   w[49,4]
## 1428.0000 1467.6467 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[50,4]    w[1,5]    w[2,5]    w[3,5]    w[4,5]    w[5,5]    w[6,5]
## 1978.9156 1428.0000 1711.6415 1428.0000 1428.0000 1304.5932 1428.0000
##    w[7,5]    w[8,5]    w[9,5]   w[10,5]   w[11,5]   w[12,5]   w[13,5]
## 1428.0000 1730.6153 1254.8354 1428.0000 1428.0000 1322.6537 1428.0000
```

```
##   w[14,5]   w[15,5]   w[16,5]   w[17,5]   w[18,5]   w[19,5]   w[20,5]
## 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[21,5]   w[22,5]   w[23,5]   w[24,5]   w[25,5]   w[26,5]   w[27,5]
## 1230.6679 1423.2157 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[28,5]   w[29,5]   w[30,5]   w[31,5]   w[32,5]   w[33,5]   w[34,5]
## 1112.9070 1867.2675 1584.5138 1428.0000 1428.0000 1406.9611 1358.8946
##   w[35,5]   w[36,5]   w[37,5]   w[38,5]   w[39,5]   w[40,5]   w[41,5]
## 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1355.2246 1608.2796
##   w[42,5]   w[43,5]   w[44,5]   w[45,5]   w[46,5]   w[47,5]   w[48,5]
## 1428.0000 1428.0000 1428.0000 1428.0000 1620.0328 1198.2904 1428.0000
##   w[49,5]   w[50,5]    w[1,6]    w[2,6]    w[3,6]    w[4,6]    w[5,6]
## 1428.0000 1428.0000 1440.7496 1428.0000 1428.0000 1428.0000 1124.3259
##    w[6,6]    w[7,6]    w[8,6]    w[9,6]   w[10,6]   w[11,6]   w[12,6]
## 1428.0000 1428.0000 1678.8002 1289.5325 1621.9286 1428.0000 1428.0000
##   w[13,6]   w[14,6]   w[15,6]   w[16,6]   w[17,6]   w[18,6]   w[19,6]
## 1428.0000 1556.6180 1276.3694 1648.8367 1428.0000 1556.3651 1428.0000
##   w[20,6]   w[21,6]   w[22,6]   w[23,6]   w[24,6]   w[25,6]   w[26,6]
## 1428.0000 1428.0000 1428.0000 1316.1754 1428.0000 1146.0048 1428.0000
##   w[27,6]   w[28,6]   w[29,6]   w[30,6]   w[31,6]   w[32,6]   w[33,6]
## 1339.0093 1428.0000 1428.0000 1428.0000 1236.1001 1428.0000 1428.0000
##   w[34,6]   w[35,6]   w[36,6]   w[37,6]   w[38,6]   w[39,6]   w[40,6]
## 1311.2959 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[41,6]   w[42,6]   w[43,6]   w[44,6]   w[45,6]   w[46,6]   w[47,6]
## 1301.4521 1428.0000 1428.0000 1428.0000 1193.2759 1428.0000 1428.0000
##   w[48,6]   w[49,6]   w[50,6]    w[1,7]    w[2,7]    w[3,7]    w[4,7]
## 1428.0000 1428.0000 1428.0000 1532.7343 1428.0000 1312.8800 1428.0000
##    w[5,7]    w[6,7]    w[7,7]    w[8,7]    w[9,7]   w[10,7]   w[11,7]
## 1428.0000 1428.0000 1428.0000 1428.0000 1596.6387 1630.9213 1428.0000
##   w[12,7]   w[13,7]   w[14,7]   w[15,7]   w[16,7]   w[17,7]   w[18,7]
## 1428.0000 1682.6144 1428.0000 1428.0000 1428.0000 1428.0000  950.7382
##   w[19,7]   w[20,7]   w[21,7]   w[22,7]   w[23,7]   w[24,7]   w[25,7]
## 1302.6774 1617.8424 1276.5178 1428.0000 1428.0000 1594.5371 1483.0206
##   w[26,7]   w[27,7]   w[28,7]   w[29,7]   w[30,7]   w[31,7]   w[32,7]
## 1428.0000 1428.0000 1428.0000 1428.0000  916.1826 1091.1512 1500.7351
##   w[33,7]   w[34,7]   w[35,7]   w[36,7]   w[37,7]   w[38,7]   w[39,7]
## 1428.0000 1428.0000 2051.7638 1428.0000 1428.0000 1428.0000 1575.8774
##   w[40,7]   w[41,7]   w[42,7]   w[43,7]   w[44,7]   w[45,7]   w[46,7]
## 1500.1579 1260.3009 1003.0426 1428.0000 1428.0000 1428.0000 1428.0000
##   w[47,7]   w[48,7]   w[49,7]   w[50,7]    w[1,8]    w[2,8]    w[3,8]
## 1668.9487 1428.0000 1428.0000 1428.0000 1428.0000 1226.9940 1542.3362
##    w[4,8]    w[5,8]    w[6,8]    w[7,8]    w[8,8]    w[9,8]   w[10,8]
## 1428.0000 1428.0000 1312.1898 1428.0000 1625.4032 1428.0000 1428.0000
##   w[11,8]   w[12,8]   w[13,8]   w[14,8]   w[15,8]   w[16,8]   w[17,8]
## 1589.5481 1191.8631 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[18,8]   w[19,8]   w[20,8]   w[21,8]   w[22,8]   w[23,8]   w[24,8]
## 1428.0000 1625.6323 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[25,8]   w[26,8]   w[27,8]   w[28,8]   w[29,8]   w[30,8]   w[31,8]
## 1278.1379 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[32,8]   w[33,8]   w[34,8]   w[35,8]   w[36,8]   w[37,8]   w[38,8]
## 1428.0000 1428.0000 1428.0000 1428.0000 1222.3981 1428.0000 1449.1657
##   w[39,8]   w[40,8]   w[41,8]   w[42,8]   w[43,8]   w[44,8]   w[45,8]
## 1621.5384 1428.0000 1548.4784 1428.0000 1428.0000 1301.4706 1428.0000
##   w[46,8]   w[47,8]   w[48,8]   w[49,8]   w[50,8]    w[1,9]    w[2,9]
## 1313.1329 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
```

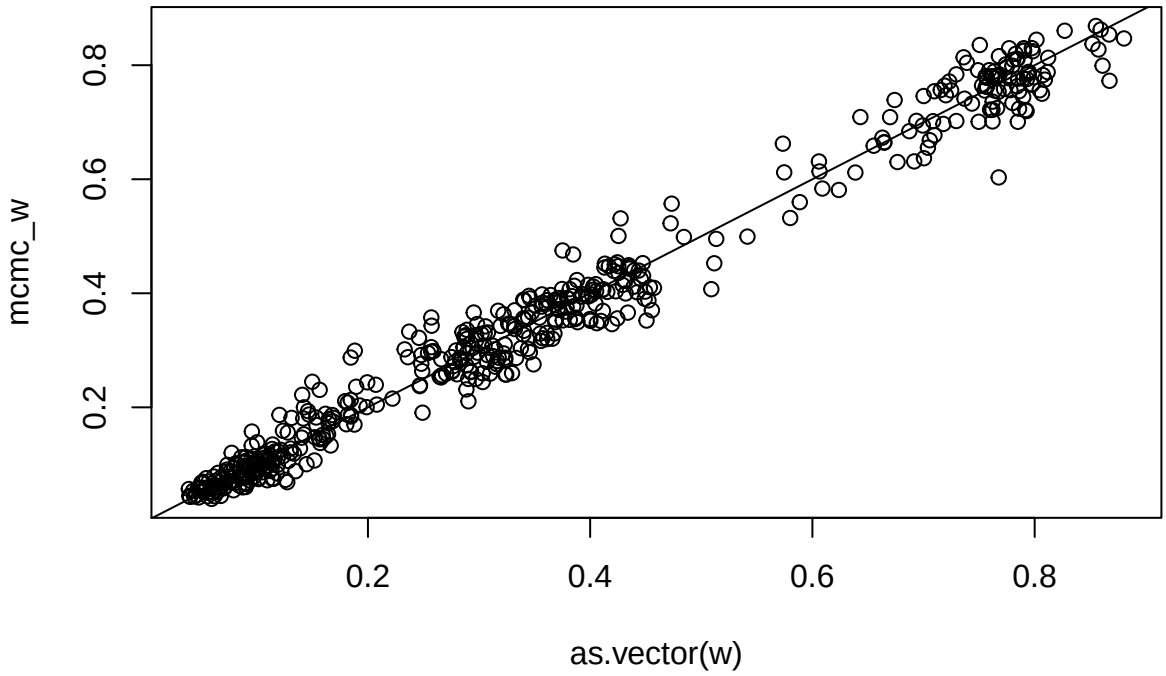
```
##    w[3,9]    w[4,9]    w[5,9]    w[6,9]    w[7,9]    w[8,9]    w[9,9]
## 1270.2285 1428.0000 1428.0000 1600.4214 1428.0000 1428.0000 1428.0000
##   w[10,9]   w[11,9]   w[12,9]   w[13,9]   w[14,9]   w[15,9]   w[16,9]
## 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1481.7222 1428.0000
##   w[17,9]   w[18,9]   w[19,9]   w[20,9]   w[21,9]   w[22,9]   w[23,9]
## 1307.2435 1428.0000 1272.1968 1428.0000 1428.0000 1297.3471 1428.0000
##   w[24,9]   w[25,9]   w[26,9]   w[27,9]   w[28,9]   w[29,9]   w[30,9]
## 1428.0000 1151.9331 1494.9455 1213.4135 1428.0000 1428.0000 1428.0000
##   w[31,9]   w[32,9]   w[33,9]   w[34,9]   w[35,9]   w[36,9]   w[37,9]
## 1428.0000 1693.1571 1430.7943 1428.0000 1428.0000 1428.0000 1428.0000
##   w[38,9]   w[39,9]   w[40,9]   w[41,9]   w[42,9]   w[43,9]   w[44,9]
## 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1609.3729
##   w[45,9]   w[46,9]   w[47,9]   w[48,9]   w[49,9]   w[50,9]   w[1,10]
## 1428.0000 1428.0000 1294.8638 1428.0000 1428.0000 1557.8032 1428.0000
##   w[2,10]   w[3,10]   w[4,10]   w[5,10]   w[6,10]   w[7,10]   w[8,10]
## 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000 1428.0000
##   w[9,10]  w[10,10]  w[11,10]  w[12,10]  w[13,10]  w[14,10]  w[15,10]
## 1428.0000 1428.0000 1323.4522 1321.4860 1428.0000 1181.3637 1428.0000
##  w[16,10]  w[17,10]  w[18,10]  w[19,10]  w[20,10]  w[21,10]  w[22,10]
## 1248.0020 1428.0000 1428.0000 1428.0000 1428.0000 1321.0466 1428.0000
##  w[23,10]  w[24,10]  w[25,10]  w[26,10]  w[27,10]  w[28,10]  w[29,10]
## 1428.0000 1566.2834 1428.0000 1428.0000 1428.0000 1146.8076 1428.0000
##  w[30,10]  w[31,10]  w[32,10]  w[33,10]  w[34,10]  w[35,10]  w[36,10]
## 1428.0000 1428.0000 1489.5036 1428.0000 1428.0000 1314.9771 1291.1218
##  w[37,10]  w[38,10]  w[39,10]  w[40,10]  w[41,10]  w[42,10]  w[43,10]
## 1428.0000 1428.0000 1428.0000 1273.7693 1428.0000 1428.0000 1428.0000
##  w[44,10]  w[45,10]  w[46,10]  w[47,10]  w[48,10]  w[49,10]  w[50,10]
## 1428.0000 1193.8735 1292.1684 1428.0000 1428.0000 1428.0000 1428.0000
##      z[1]      z[2]      z[3]      z[4]      z[5]      z[6]      z[7]
##    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
##      z[8]      z[9]     z[10]     z[11]     z[12]     z[13]     z[14]
##    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
##     z[15]     z[16]     z[17]     z[18]     z[19]     z[20]     z[21]
##    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
##     z[22]     z[23]     z[24]     z[25]     z[26]     z[27]     z[28]
##    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
##     z[29]     z[30]     z[31]     z[32]     z[33]     z[34]     z[35]
##    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
##     z[36]     z[37]     z[38]     z[39]     z[40]     z[41]     z[42]
##    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
##     z[43]     z[44]     z[45]     z[46]     z[47]     z[48]     z[49]
##    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000    0.0000
##     z[50]
##    0.0000
```

```
pdf(file.path(trace.dir, paste0(runName, "_trace.pdf")))
plot(samps)
dev.off()
```

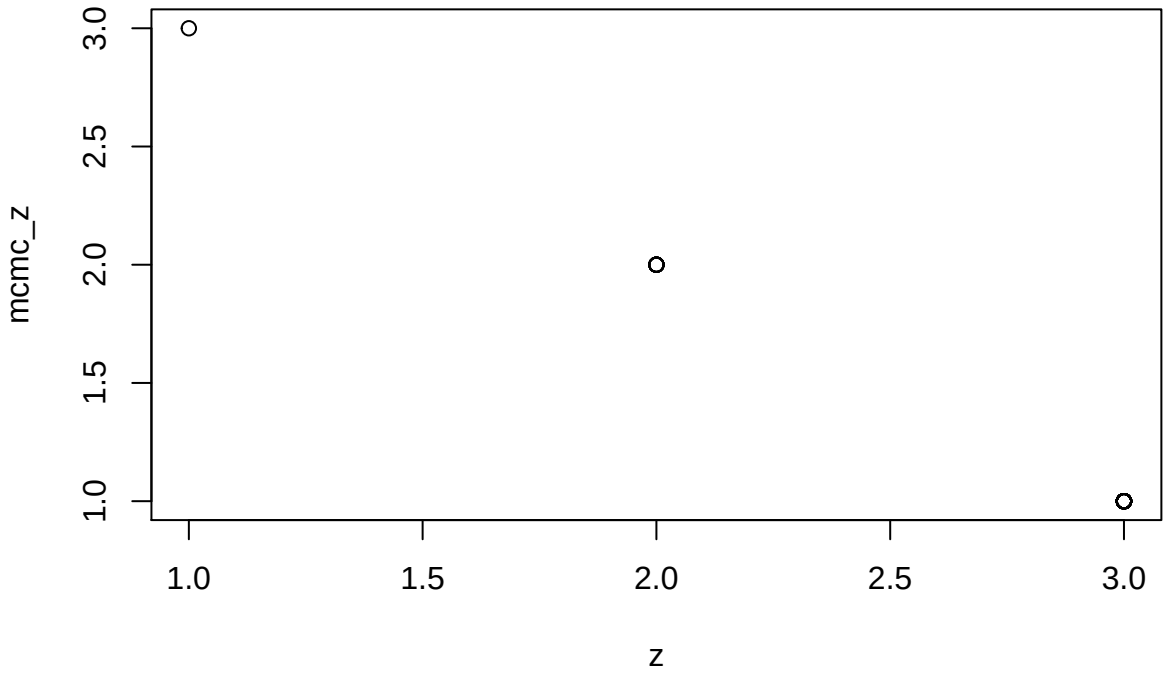
```
## pdf
##   2
```

```
mcmc_vals <- s$statistics
mcmc_w <- mcmc_vals[substr(rownames(mcmc_vals), 1, 1) == "w", "Mean"]
plot(as.vector(w), mcmc_w, type = "p")
```

```
abline(a=0, b=1)
```

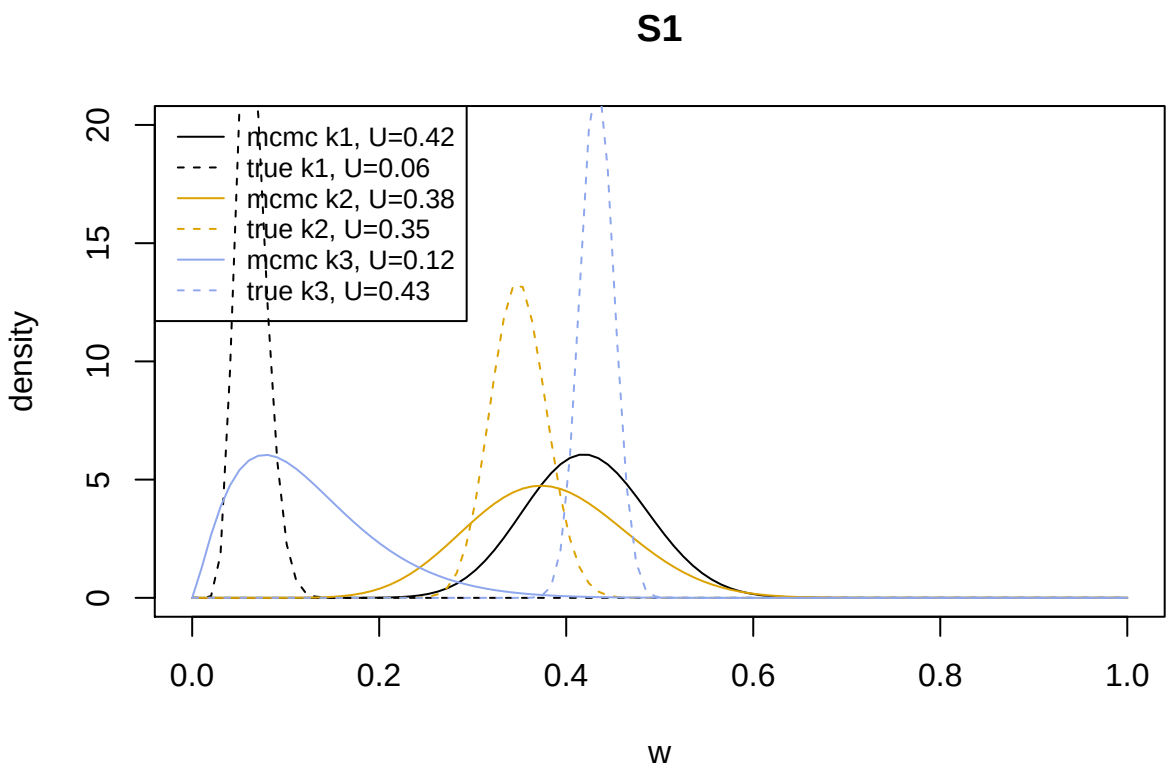


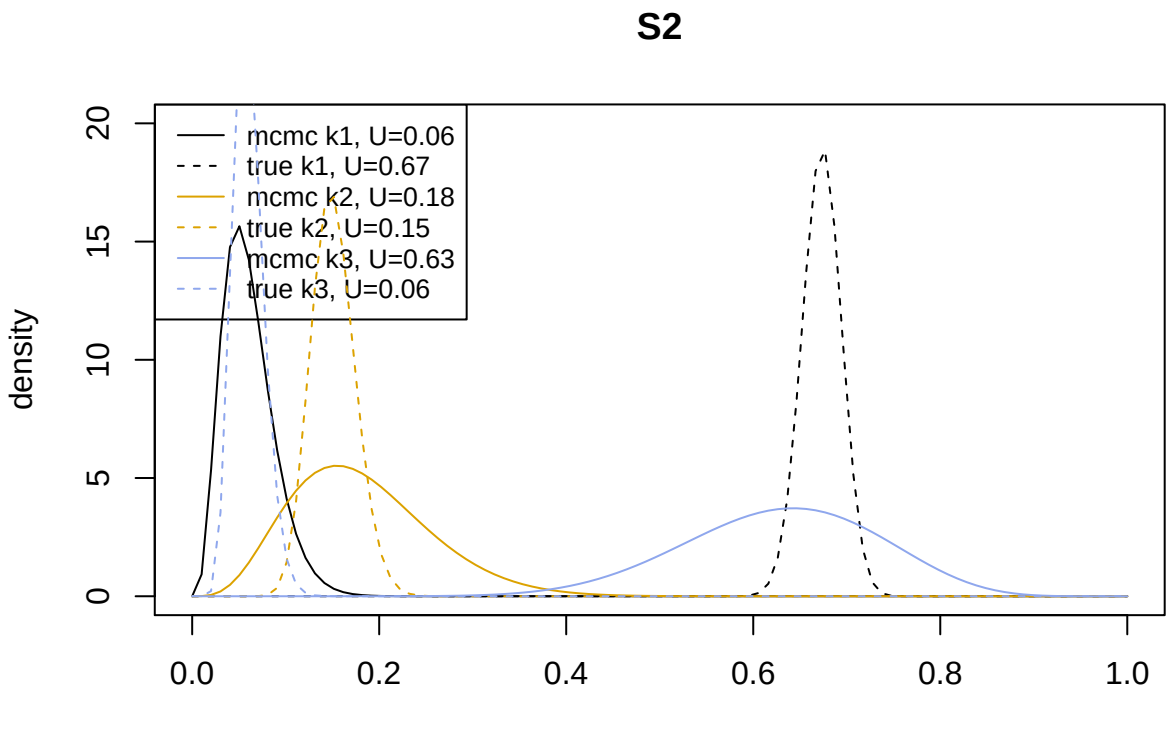

```
mcmc_z <- as.vector(mcmc_vals[substr(rownames(mcmc_vals), 1, 1) == "z", "Mean"])
#mcmc_z <- round(mcmc_z, 0)
plot(z, mcmc_z, type = "p")
```

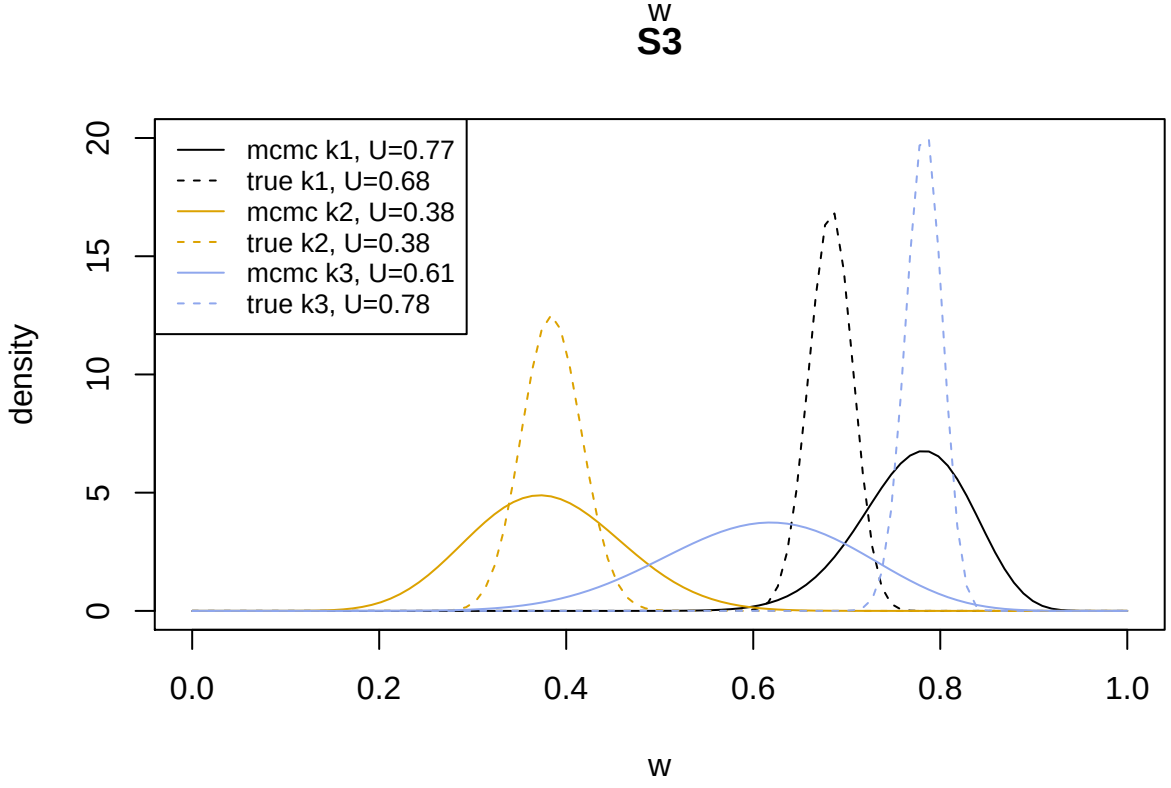


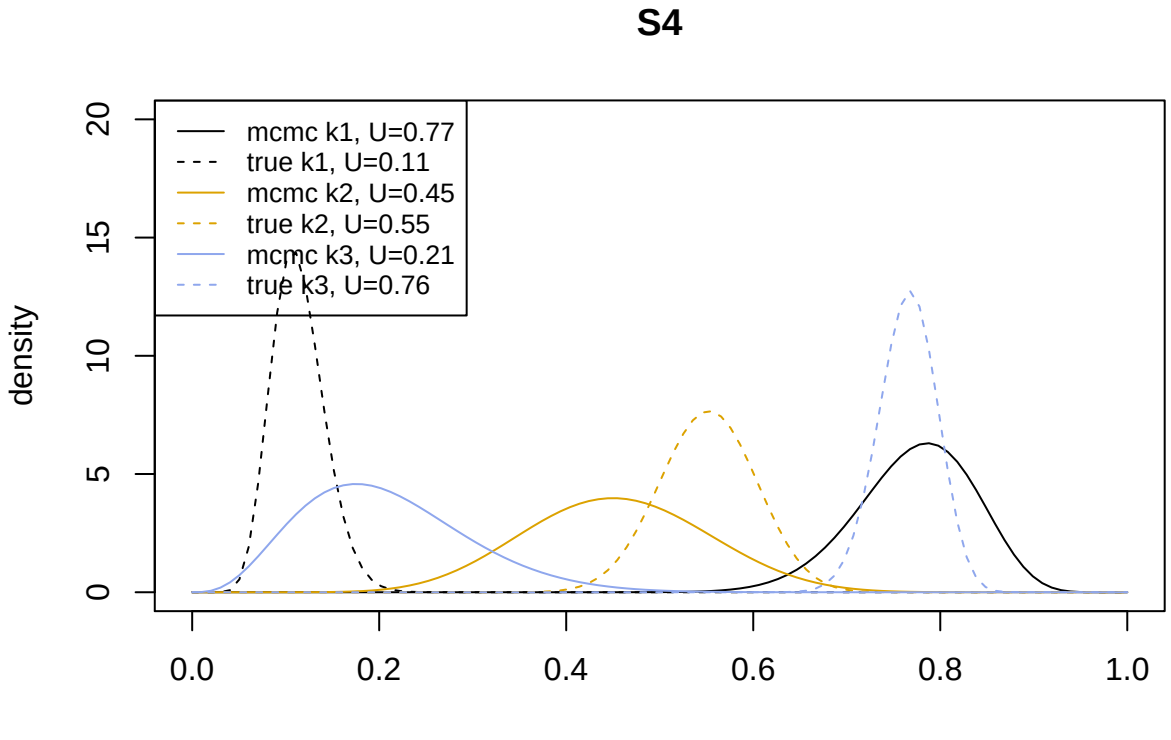

```
mcmc_U <- mcmc_vals[substr(rownames(mcmc_vals), 1, 1) == "U", "Mean"]
mcmc_U <- matrix(mcmc_U, nrow=K)
mcmc_V <- mcmc_vals[substr(rownames(mcmc_vals), 1, 1) == "V", "Mean"]
mcmc_V <- matrix(mcmc_V, nrow=K)
```

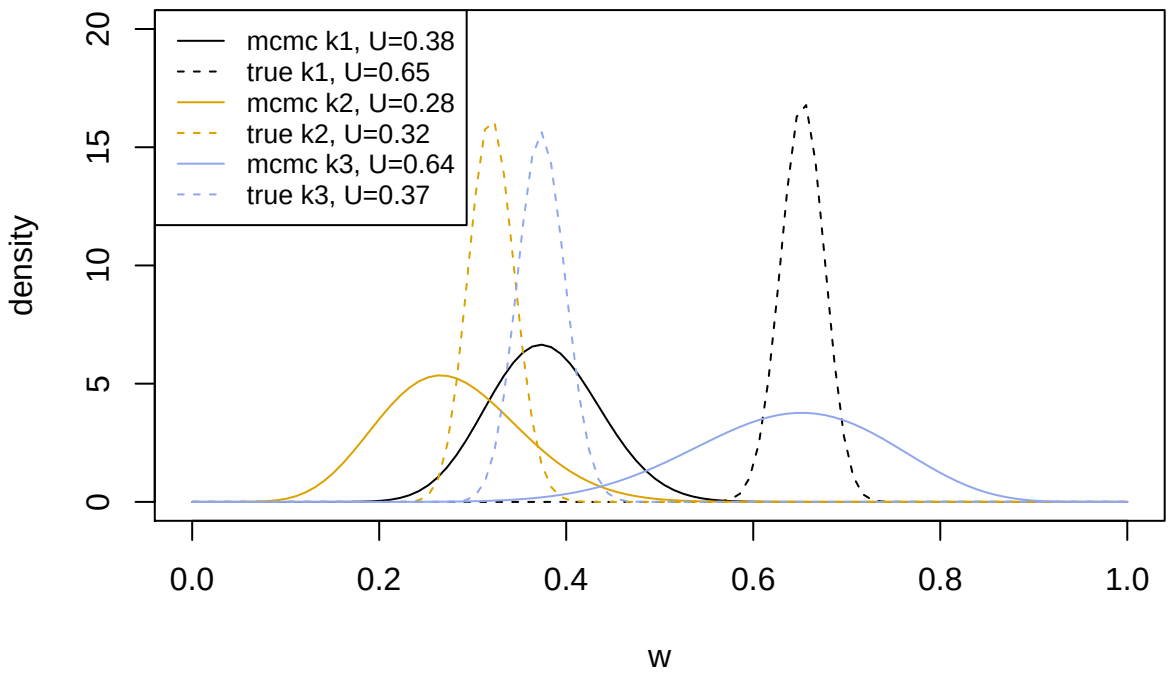
```r
p <- seq(0, 1, length = 100)
colors <- c("#000000", "#DCA200", "#8FA7ED", "#9D847A", "#A47901")
for (s in 1:S) {
  for (k in 1:K) {
    if (k == 1) {
      # plot mcmc mean U,V
      plot(p, dbeta(p, mcmc_U[k,s] * mcmc_V[k,s], (1-mcmc_U[k,s])*mcmc_V[k,s]),
           main = paste0("S", s),
           ylab = "density", xlab = "w", type = "l", col = colors[k],
           ylim = c(0, 20))
      # plot truth
      lines(p, dbeta(p, a.ordered[k,s], b.ordered[k,s]), type = "l", col = colors[k], lty=2)
      # add legend
      allU <- round(as.vector(rbind(mcmc_U[,s], U.ordered[,s])), digits = 2)
      legend(x = "topleft",
             legend = paste0(c("mcmc k", "true k"), rep(1:K, each=2), ", U=", allU),
             col = colors[rep(1:K, each=2)],
             lty = rep(1:2, K),
             cex=0.8)
    } else {
      # plot mcmc mean U,V
      lines(p, dbeta(p, mcmc_U[k,s] * mcmc_V[k,s], (1-mcmc_U[k,s])*mcmc_V[k,s]),
            type = "l", col = colors[k])
      # plot truth
      lines(p, dbeta(p, a.ordered[k,s], b.ordered[k,s]), type = "l", col = colors[k], lty=2)
    }
  }
}
```

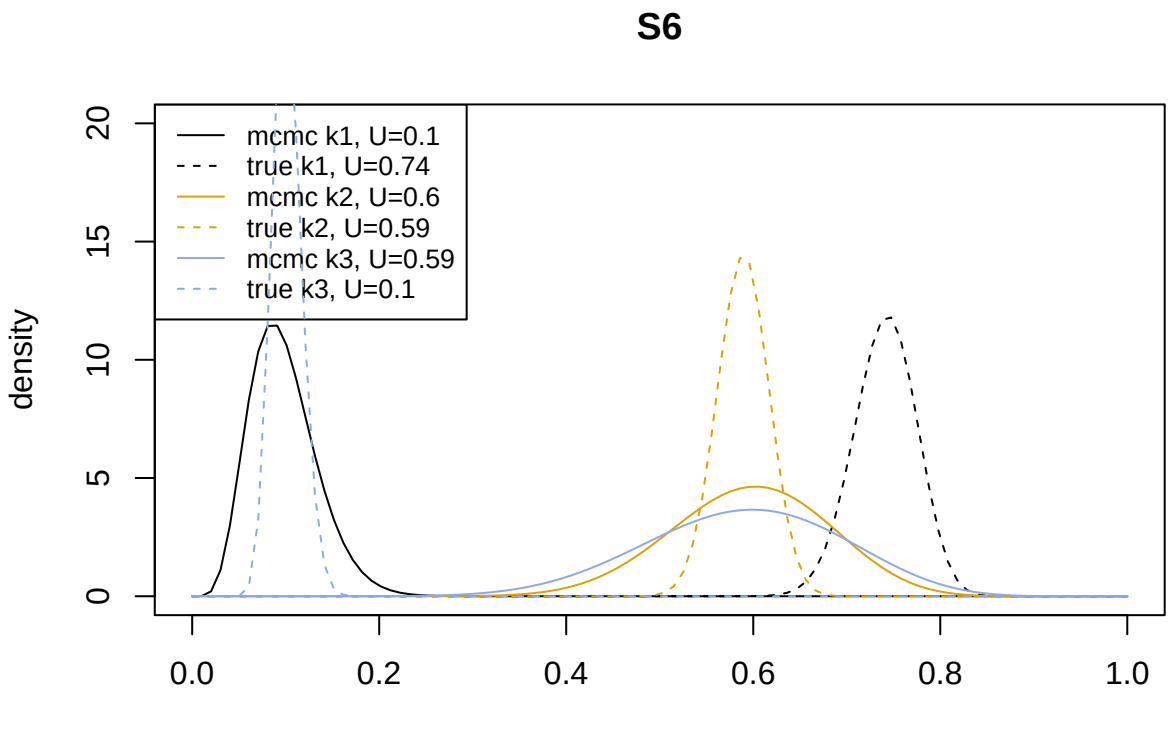


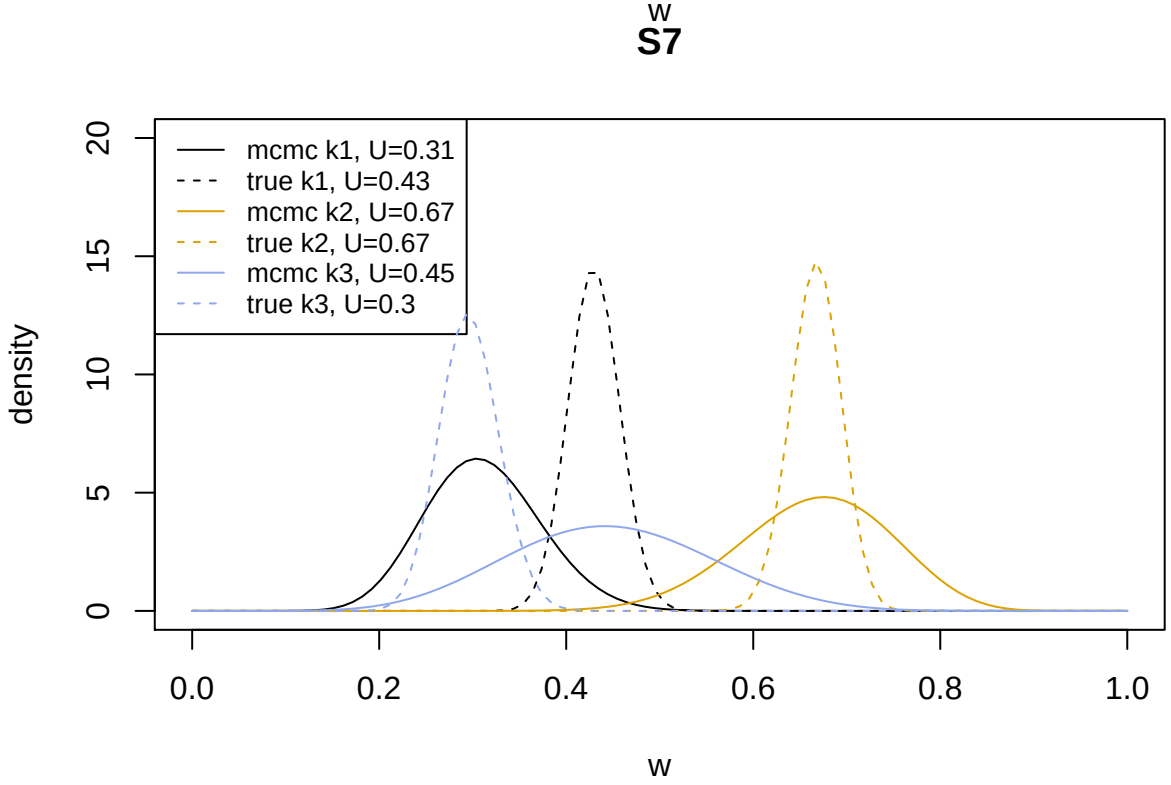

S2
mcmc k1, U=0.06
true k1, U=0.67
mcmc k2, U=0.18
true k2, U=0.15
mcmc k3, U=0.63
true k3, U=0.06
density
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
w

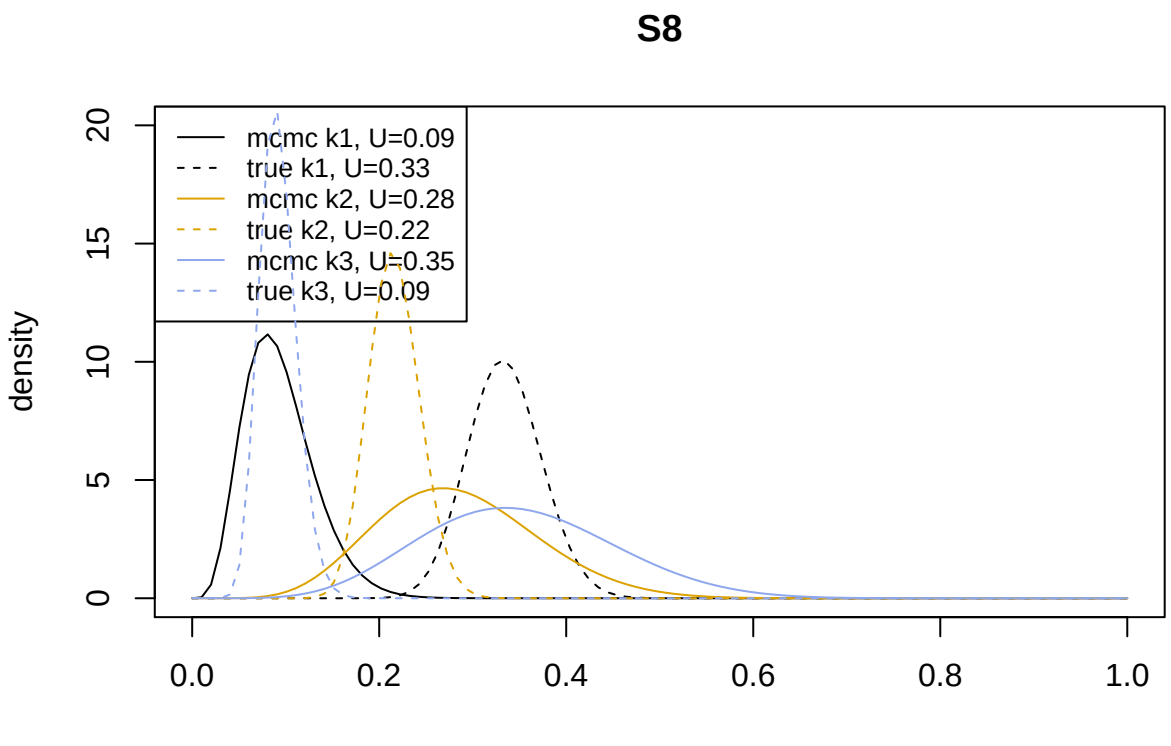

S3
mcmc k1, U=0.77
true k1, U=0.68
mcmc k2, U=0.38
true k2, U=0.38
mcmc k3, U=0.61
true k3, U=0.78
density
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
w

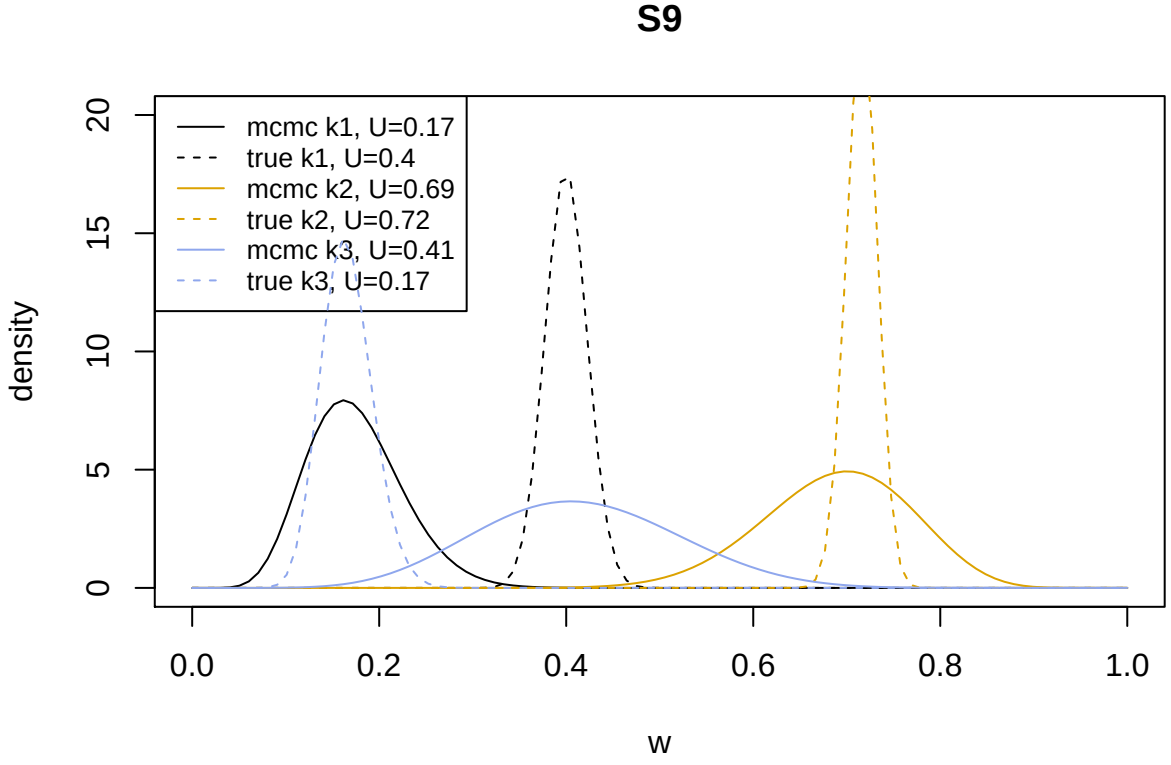

S4
mcmc k1, U=0.77
true k1, U=0.11
mcmc k2, U=0.45
true k2, U=0.55
mcmc k3, U=0.21
true k3, U=0.76
density
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
w


S5
mcmc k1, U=0.38
true k1, U=0.65
mcmc k2, U=0.28
true k2, U=0.32
mcmc k3, U=0.64
true k3, U=0.37
density
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
w

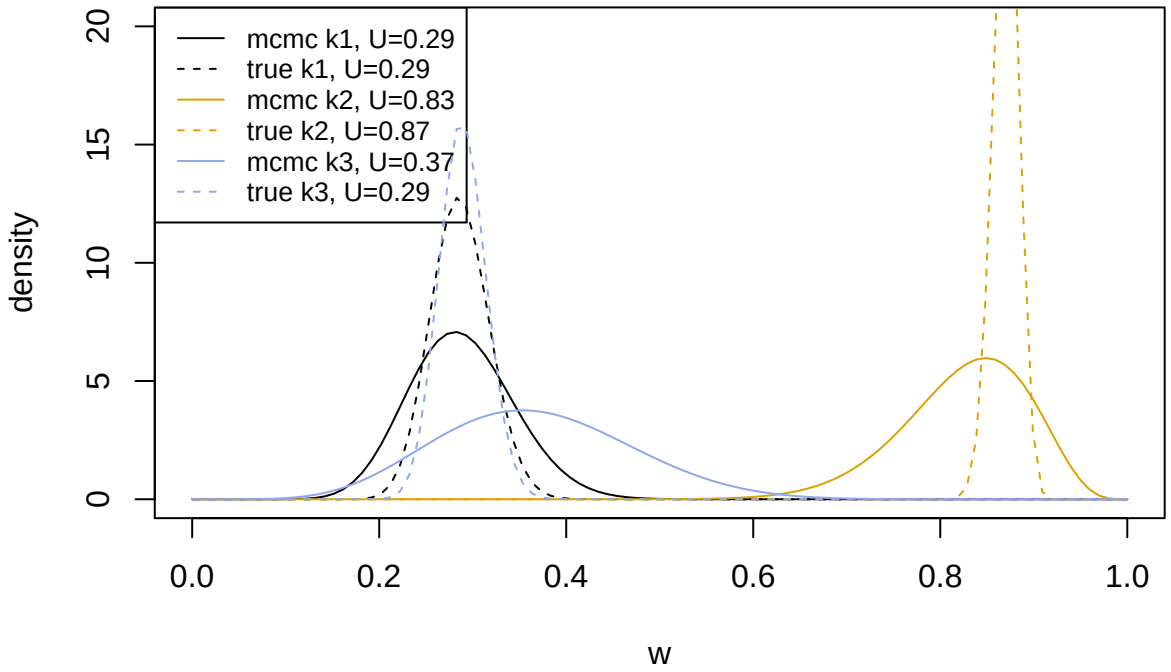

S6
mcmc k1, U=0.1
true k1, U=0.74
mcmc k2, U=0.6
true k2, U=0.59
mcmc k3, U=0.59
true k3, U=0.1
density
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
w


S7
mcmc k1, U=0.31
true k1, U=0.43
mcmc k2, U=0.67
true k2, U=0.67
mcmc k3, U=0.45
true k3, U=0.3
density
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
w


S8
mcmc k1, U=0.09
true k1, U=0.33
mcmc k2, U=0.28
true k2, U=0.22
mcmc k3, U=0.35
true k3, U=0.09
density
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
w


S9
mcmc k1, U=0.17
true k1, U=0.4
mcmc k2, U=0.69
true k2, U=0.72
mcmc k3, U=0.41
true k3, U=0.17
density
0
5
10
15
20
0.0
0.2
0.4
0.6
0.8
1.0
w

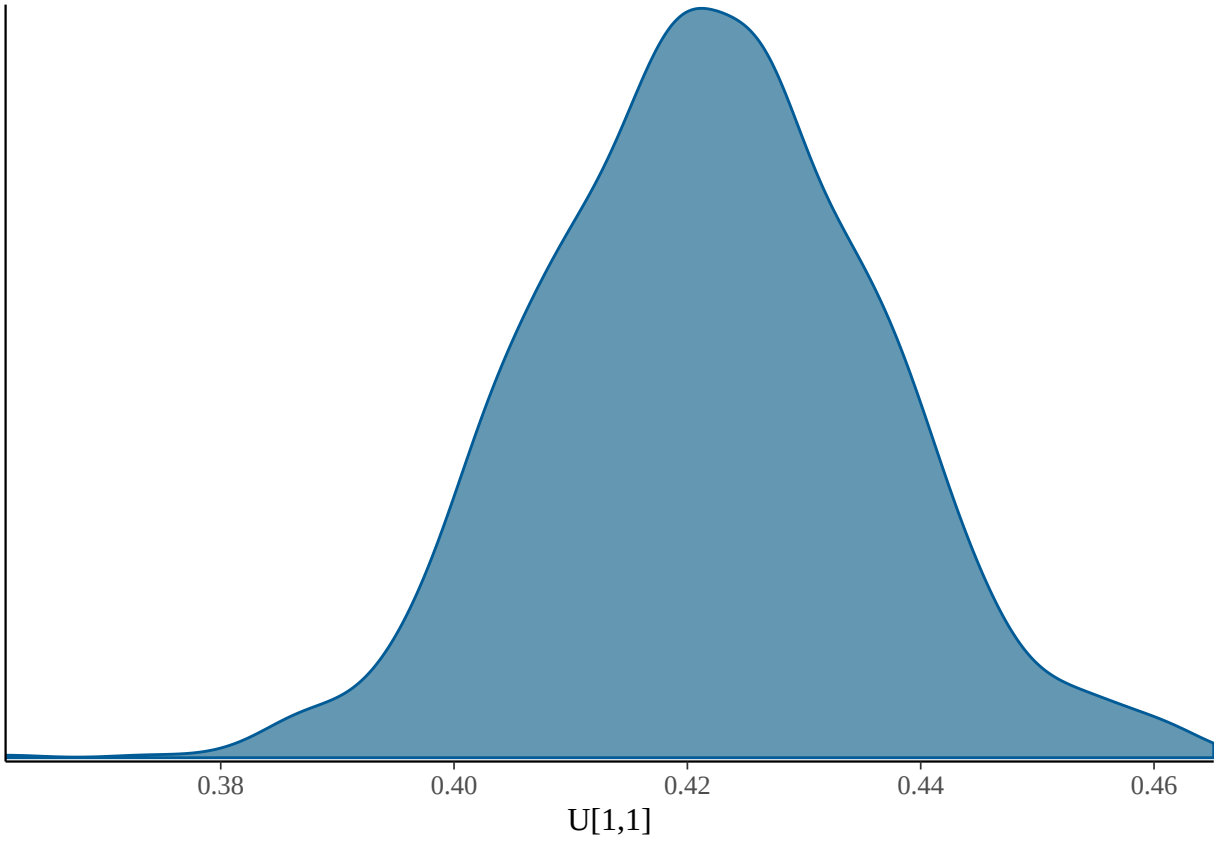
## S10



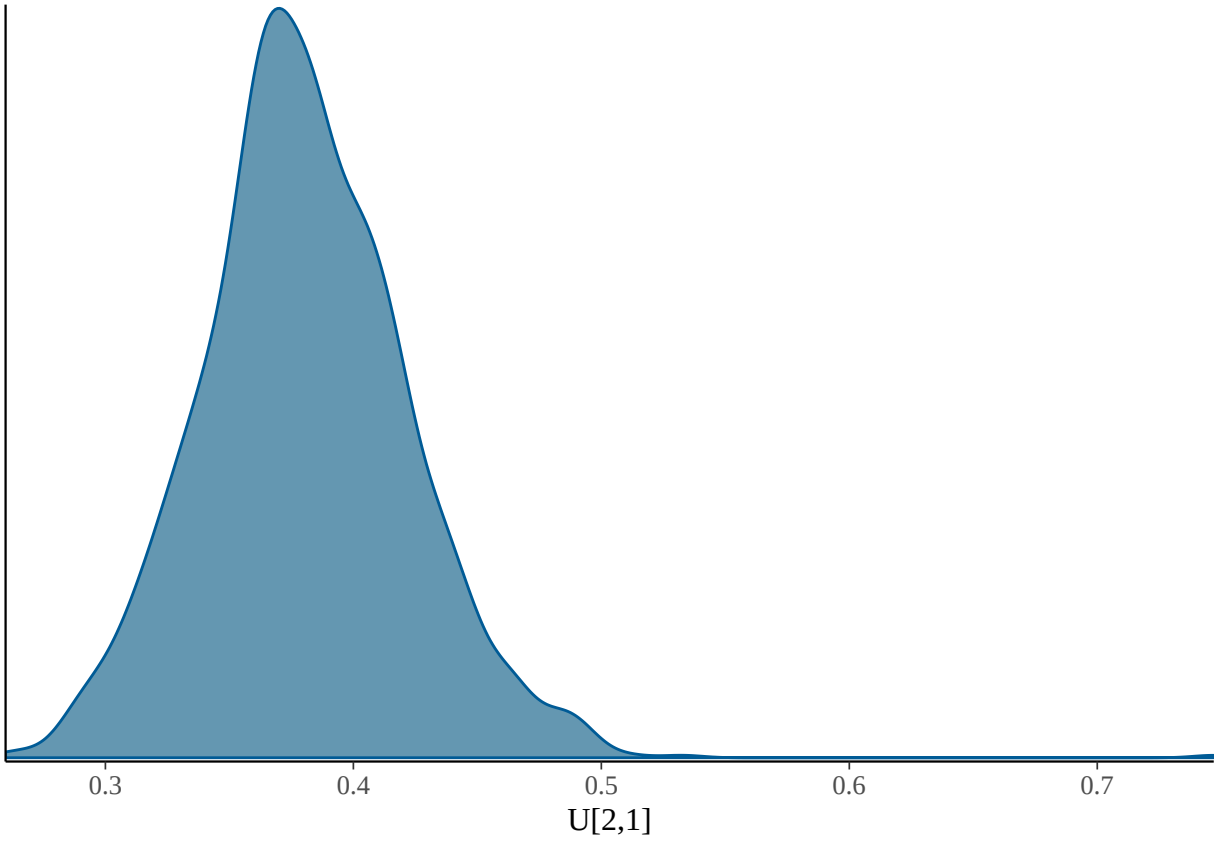

```
# https://cran.r-project.org/web/packages/bayesplot/vignettes/plotting-mcmc-draws.html
posterior <- as.array(samps)

U.ordered[,1]
```

```
## [1] 0.0638265 0.3492084 0.4330499
```

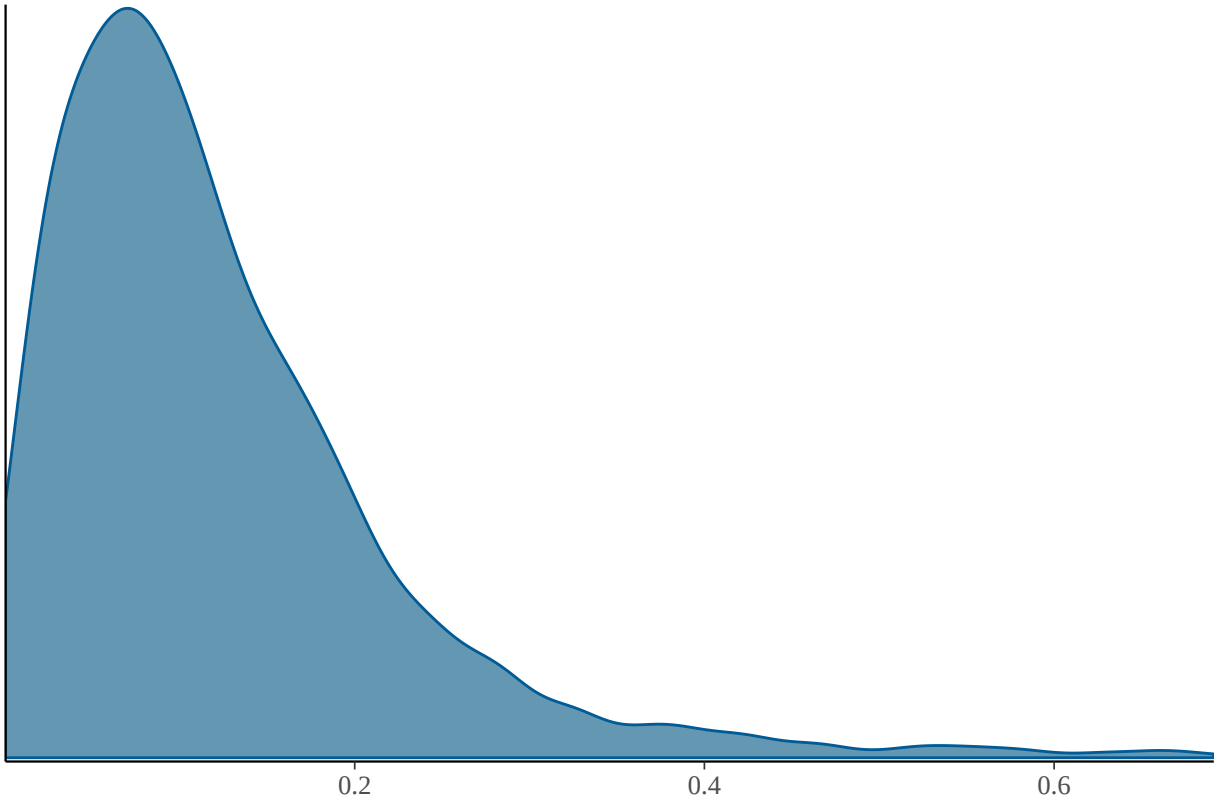
```
mcmc_dens(posterior, pars = "U[1,1]")
```




```
mcmc_dens(posterior, pars = "U[2,1]")
```




```
mcmc_dens(posterior, pars = "U[3,1]")
```




U[3,1]