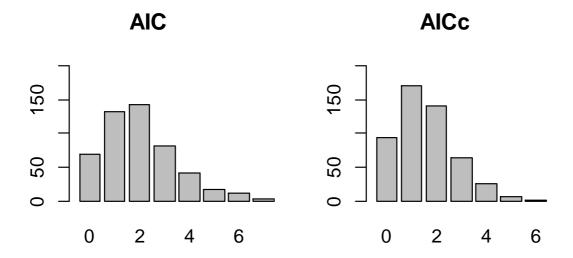
## #Model Selection Simulation (For Illustration)

Simulate data where the null model is true. Use 500 reps with n=50 observations per rep and 10 predictors. For each rep, find the model with the lowest AIC and lowest AICc and count the number of predictors (K).

```
library(MuMIn)
library(plyr)
options(na.action = "na.fail")
set.seed(9513)
Reps <- 500
N < -50
SimData <- data.frame(Rep = sort(rep(seq(1, Reps), N)),</pre>
                      Y = rnorm(Reps*N), X1 = rnorm(Reps*N),
                      X2 = rnorm(Reps*N), X3 = rnorm(Reps*N),
                      X4 = rnorm(Reps*N), X5 = rnorm(Reps*N),
                      X6 = rnorm(Reps*N), X7 = rnorm(Reps*N),
                      X8 = rnorm(Reps*N), X9 = rnorm(Reps*N),
                      X10 = rnorm(Reps*N))
str(SimData)
Results <- ddply(SimData, c("Rep"),
                 function(d) {
                   FullModel <- lm(Y \sim ., data = d)
                   Out1 <- dredge(FullModel, rank = "AIC")
                   Out2 <- dredge(FullModel, rank = "AICc")</pre>
                   data.frame(AIC.K = (Out1$df[1] - 2),
                               AICc.K = (Out2\$df[1] - 2))
                 }
)
str(Results)
table(Results$AIC.K)
table(Results$AICc.K)
par(mfrow = c(1,2))
barplot(table(Results$AIC.K), main = "AIC")
barplot(table(Results$AICc.K), main = "AICc")
sum(Results$AIC.K > 0)/nrow(Results)
sum(Results$AICc.K > 0)/nrow(Results)
> str(SimData)
'data.frame':
                   25000 obs. of 12 variables:
 $ Rep: int 1 1 1 1 1 1 1 1 1 ...
 $ Y : num -0.228 0.601 1.6 -0.469 1.661 ...
 $ X1 : num -1.08 1.82 -1.6 1.54 1.1 ...
 $ X2 : num 0.164 0.363 -1.043 0.734 1.905 ...
 $ X3 : num -0.542 -1.497 1.238 0.441 0.105 ...
 $ X4 : num 0.1612 0.642 -1.3871 0.0885 -0.5525 ...
```

MR3: Simulation 1

```
$ X5 : num
             -1.1777 1.5603 1.9826 0.5774 -0.0969 ...
             -0.798 -0.685 1.761 -0.89 0.468 ...
 $ X6 : num
 $ X7 : num
             -1.659 1.758 -0.721 -0.479 0.136 ...
 $ X8 : num
             -1.7635 -0.3171 0.0831 -0.0638 -0.2011 ...
             1.231 -0.793 -0.155 1.092 1.521 ...
 $ X9 : num
 $ X10: num 0.945 0.455 -1.157 -0.735 0.516 ...
> str(Results)
'data.frame':
                   500 obs. of
                                 3 variables:
                1 2 3 4 5 6 7 8 9 10 ...
 $ Rep
         : int
 $ AIC.K : num 1 4 3 6 0 3 1 3 1 3 ...
 $ AICc.K: num
               1 3 3 5 0 3 1 2 1 2 ...
> table(Results$AIC.K)
  0
      1
          2
              3
                  4
                          6
 70 133 143
             81
                 42
                     17
                          12
> table(Results$AICc.K)
              3
  0
      1
          2
                  4
                      5
                           6
                      6
 93 170 141
             64
                 25
                           1
> par(mfrow = c(1,2))
> barplot(table(Results$AIC.K), main = "AIC")
> barplot(table(Results$AICc.K), main = "AICc")
> sum(Results$AIC.K > 0)/nrow(Results)
[1] 0.86
> sum(Results$AICc.K > 0)/nrow(Results)
[1] 0.814
```



MR3: Simulation 2