

# R Notebook

## install packages, read data, summarize

```
library(BayesFactor)
```

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

```
## Loading required package: Matrix
```

```
## Warning: package 'Matrix' was built under R version 3.5.2
```

```
## *****
```

```
## Welcome to BayesFactor 0.9.12-4.2. If you have questions, please contact Richard Morey (richarddmorey)
```

```
##
```

```
## Type BFManual() to open the manual.
```

```
## *****
```

```
retirement<-read.csv(file="retirement.csv")
```

```
attach(retirement)
```

```
summary(retirement)
```

```
##      occupation      gender      mental
## Min.   :1.000   Min.   :1.000   Min.   :1.000
## 1st Qu.:2.000   1st Qu.:1.000   1st Qu.:3.000
## Median :3.000   Median :2.000   Median :4.000
## Mean   :3.146   Mean   :1.612   Mean   :3.794
## 3rd Qu.:4.000   3rd Qu.:2.000   3rd Qu.:4.000
## Max.   :6.000   Max.   :2.000   Max.   :5.000
```

## ANOVA - first create factors

```
retirement$gender=factor(retirement$gender)
```

```
levels(retirement$gender)= c("Female", "Male")
```

```
retirement$occupation=factor(retirement$occupation)
```

```
levels(retirement$occupation)=c("Prof", "Manag", "nonmanual", "Skilled", "Semi-Skilled", "Unskilled")
```

```
summary(aov(mental ~ gender*occupation, data=retirement))
```

```
##              Df Sum Sq Mean Sq F value    Pr(>F)
## gender          1    0.2    0.206    0.256    0.613
## occupation      5   45.9    9.187   11.396 7.44e-11 ***
## gender:occupation  5    6.0    1.202    1.491    0.189
## Residuals     1898 1530.0    0.806
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

There is an occupation main effect

Bayesian analysis - all models, top down and bottom up

```
bfa = anovaBF(mental ~ gender*occupation, data=retirement,whichModels = 'all')
bfa

## Bayes factor analysis
## -----
## [1] occupation          : 54417793      ±0.01%
## [2] gender              : 0.05966566    ±0%
## [3] occupation:gender   : 0.009737589    ±0.1%
## [4] occupation + gender : 4692121      ±1.15%
## [5] occupation + occupation:gender : 1634325      ±1.41%
## [6] gender + occupation:gender : 0.0006564834 ±1.39%
## [7] occupation + gender + occupation:gender : 115266      ±1.42%
##
## Against denominator:
##   Intercept only
## ---
## Bayes factor type: BFlinearModel, JZS

bft = anovaBF(mental ~ gender*occupation, data=retirement,whichModels = 'top')
bft

## Bayes factor top-down analysis
## -----
## When effect is omitted from occupation + gender + occupation:gender , BF is...
## [1] Omit gender:occupation : 42.34564      ±1.56%
## [2] Omit gender           : 14.73542      ±1.76%
## [3] Omit occupation       : 5.88735e-09 ±1.88%
##
## Against denominator:
##   mental ~ occupation + gender + occupation:gender
## ---
## Bayes factor type: BFlinearModel, JZS

bfb = anovaBF(mental ~ gender*occupation, data=retirement,whichModels = 'bottom')
bfb

## Bayes factor analysis
## -----
## [1] occupation          : 54417793      ±0.01%
## [2] gender              : 0.05966566    ±0%
## [3] occupation:gender   : 0.009737589    ±0.1%
##
## Against denominator:
##   Intercept only
## ---
## Bayes factor type: BFlinearModel, JZS
```

all models - anything that occupation main effect has large bf  
top down - omit occupation and the model has very little power  
bottom up - add occupation and the BF goes way up