Bayesfactor\_analysis

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Version: Rtudio: 2023.12.0 Build 369 R:4.4.0 lme4:1.1-35.1 BayesFactor:0.9.12-4.6

library(lme4)

## Loading required package: Matrix

library(BayesFactor)

## Loading required package: coda

## \*\*\*\*\*\*\*\*\*\*\*\*  
## Welcome to BayesFactor 0.9.12-4.6. If you have questions, please contact Richard Morey (richarddmorey@gmail.com).  
##   
## Type BFManual() to open the manual.  
## \*\*\*\*\*\*\*\*\*\*\*\*

rm(list=ls()) # clear objects from the workspace  
datafile <- read.csv("datafile.csv", sep = ",", dec = ".") # open the datafile  
colnames(datafile) #retrieve the column names of the datafile

## [1] "Participant" "Item"   
## [3] "Age" "Predictability"   
## [5] "Preview" "Age\_Predictability"   
## [7] "Age\_Preview" "Predictability\_Preview"   
## [9] "Condition" "TRT"   
## [11] "IA\_SKIP" "FFD"   
## [13] "SFD" "GD"   
## [15] "RO" "RI"   
## [17] "sentence.reading.time" "average.fixation.duration"   
## [19] "number.of.fixations" "number.of.regressions"   
## [21] "average.forwary.saccade.length"

nrow(datafile) #the number of observations of the datafile

## [1] 6811

iterations <- 100000  
rscaleFixed <- 0.5 # scaling factor for g-priors for fixed effects - this is the same as the default (cauchy)  
whichRandom <- c("Participant", "Item") # specify random effects  
datafile$Item = as.factor(datafile$Item)  
datafile$Participant = as.factor(datafile$Participant)  
datafile$Age = factor(datafile$Age, levels = c("Y","O"))  
datafile$Predictability = factor(datafile$Predictability, levels = c("H","L"))  
datafile$Preview = factor(datafile$Preview, levels = c("I","T","S"))

# BAYES FACTOR ANALYSIS FOR INTERACTION BETWEEN AGE:PREVIEW(T,S):PREDICTABILITY

## FFD:age:preview (T, S):predictability

datafile$depvar = log(datafile[,"FFD"])  
data <- subset(datafile, datafile$depvar!= "NA")  
data <- subset(data, data$Preview!="I")   
nrow(data)

## [1] 3248

bf0<-lmBF (depvar~Age+Preview+Predictability+Age:Preview   
 +Age:Predictability+Preview:Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
bf1<-lmBF(depvar ~Age\*Preview\*Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
print(bf0/bf1)

## Bayes factor analysis  
## --------------  
## [1] Age + Preview + Predictability + Age:Preview + Age:Predictability + Preview:Predictability + Participant + Item : 9.86786 ±6.56%  
##   
## Against denominator:  
## depvar ~ Age \* Preview \* Predictability + Participant + Item   
## ---  
## Bayes factor type: BFlinearModel, JZS

## SFD:age:preview (T, S):predictability

datafile$depvar = log(datafile[,"SFD"])  
data <- subset(datafile, datafile$depvar!= "NA")  
data <- subset(data, data$Preview!="I")   
nrow(data)

## [1] 2694

bf0<-lmBF (depvar~Age+Preview+Predictability+Age:Preview   
 +Age:Predictability + Preview:Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
bf1<-lmBF(depvar~Age\*Preview\*Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
print(bf0/bf1)

## Bayes factor analysis  
## --------------  
## [1] Age + Preview + Predictability + Age:Preview + Age:Predictability + Preview:Predictability + Participant + Item : 9.842192 ±3.87%  
##   
## Against denominator:  
## depvar ~ Age \* Preview \* Predictability + Participant + Item   
## ---  
## Bayes factor type: BFlinearModel, JZS

## GD:age:preview (T, S):predictability

datafile$depvar = log(datafile[,"GD"])  
data <- subset(datafile, datafile$depvar!= "NA")  
data <- subset(data, data$Preview!="I")   
nrow(data)

## [1] 3248

bf0<-lmBF (depvar~Age+Preview+Predictability+Age:Preview   
 +Age:Predictability + Preview:Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
bf1<-lmBF(depvar~Age\*Preview\*Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
print(bf0/bf1)

## Bayes factor analysis  
## --------------  
## [1] Age + Preview + Predictability + Age:Preview + Age:Predictability + Preview:Predictability + Participant + Item : 11.78087 ±11.73%  
##   
## Against denominator:  
## depvar ~ Age \* Preview \* Predictability + Participant + Item   
## ---  
## Bayes factor type: BFlinearModel, JZS

# BAYES FACTOR ANALYSIS FOR INTERACTION BETWEEN AGE:PREVIEW(I,T):PREDICTABILITY

## FFD:age:preview(I,T):predictability

datafile$depvar = log(datafile[,"FFD"])  
data <- subset(datafile, datafile$depvar!= "NA")  
data <- subset(data, data$Preview!="S")   
nrow(data)

## [1] 3107

bf0<-lmBF (depvar~Age+Preview+Predictability+Age:Preview   
 +Age:Predictability + Preview:Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
bf1<-lmBF(depvar~Age\*Preview\*Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
print(bf0/bf1)

## Bayes factor analysis  
## --------------  
## [1] Age + Preview + Predictability + Age:Preview + Age:Predictability + Preview:Predictability + Participant + Item : 11.71774 ±11.45%  
##   
## Against denominator:  
## depvar ~ Age \* Preview \* Predictability + Participant + Item   
## ---  
## Bayes factor type: BFlinearModel, JZS

## SFD:age:preview(I,T):predictability

datafile$depvar = log(datafile[,"SFD"])  
data <- subset(datafile, datafile$depvar!= "NA")  
data <- subset(data, data$Preview!="S")   
nrow(data)

## [1] 2754

bf0<-lmBF (depvar~Age+Preview+Predictability+Age:Preview   
 +Age:Predictability + Preview:Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
bf1<-lmBF(depvar~Age\*Preview\*Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
print(bf0/bf1)

## Bayes factor analysis  
## --------------  
## [1] Age + Preview + Predictability + Age:Preview + Age:Predictability + Preview:Predictability + Participant + Item : 10.37149 ±16.19%  
##   
## Against denominator:  
## depvar ~ Age \* Preview \* Predictability + Participant + Item   
## ---  
## Bayes factor type: BFlinearModel, JZS

## GD:age:preview(I,T):predictability

datafile$depvar = log(datafile[,"GD"])  
data <- subset(datafile, datafile$depvar!= "NA")  
data <- subset(data, data$Preview!="S")   
nrow(data)

## [1] 3107

bf0<-lmBF (depvar~Age+Preview+Predictability+Age:Preview   
 +Age:Predictability + Preview:Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
bf1<-lmBF(depvar~Age\*Preview\*Predictability+Participant+Item,   
 whichRandom = whichRandom, rscaleFixed = rscaleFixed,   
 iterations = iterations,data)  
print(bf0/bf1)

## Bayes factor analysis  
## --------------  
## [1] Age + Preview + Predictability + Age:Preview + Age:Predictability + Preview:Predictability + Participant + Item : 11.94482 ±6.65%  
##   
## Against denominator:  
## depvar ~ Age \* Preview \* Predictability + Participant + Item   
## ---  
## Bayes factor type: BFlinearModel, JZS