Synchrony in relationship, example with MONRADO Data

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Contents

Preparation of the data

Fixed variables

```
FileExtension <- ".MTS.avi_res.csv"

# working directory
# where this report is
setwd("/Users/Ofix/Documents/Fac/internat/Recherche/projets/synchro/synchroData/Git/Monrado/Reports/")

# blue will refer to father
# red will refer to mother
# green to child
colOrderList <- c("blue","red", "green")

ParticipantsList <- c("father", "mother", "child")
```

```
## Create a csv files list with the directories
FullNameList <- list.files("../Data/CSV/raw", full.names=TRUE)
FullNameList

## Create a csv files list without the directories
filesList <- list.files("../Data/CSV/raw", full.names=FALSE)
filesList
```

Functions list

Import Data List

Function that import data from .csv files inside a CSV folder

Arguments:

List FullNameList with the full name of the .csv

```
importdata <-function(FullnameList){
    data <- c()
    for (i in FullnameList){
        dataAlone <- read.csv(i)
        mydata.nas <- apply(dataAlone[,c(2:5)], 1, function(x){all(is.na(x))})
        dataAlone <- dataAlone[!mydata.nas,]
        print(i)
```

```
        data <- rbind(data, dataAlone)
    }
    return (data)
}
```

MeanMotionByTime

Function that takes raw motion history data and computes the mean on a given interval. Intervals don't overlap, so the frequency of the data change (from 25 frames by seconde to 25 frames/interval by second).

Arguments:

- **subject** : Subject studied (patient, mother, father or therapist)
- **indexOfvideos** : List of videos studied (element eg 3 or list eg 1:3 or c(1,2,4))
- **interval** : number of frames in the studied interval
- **data** : data frame where there is data

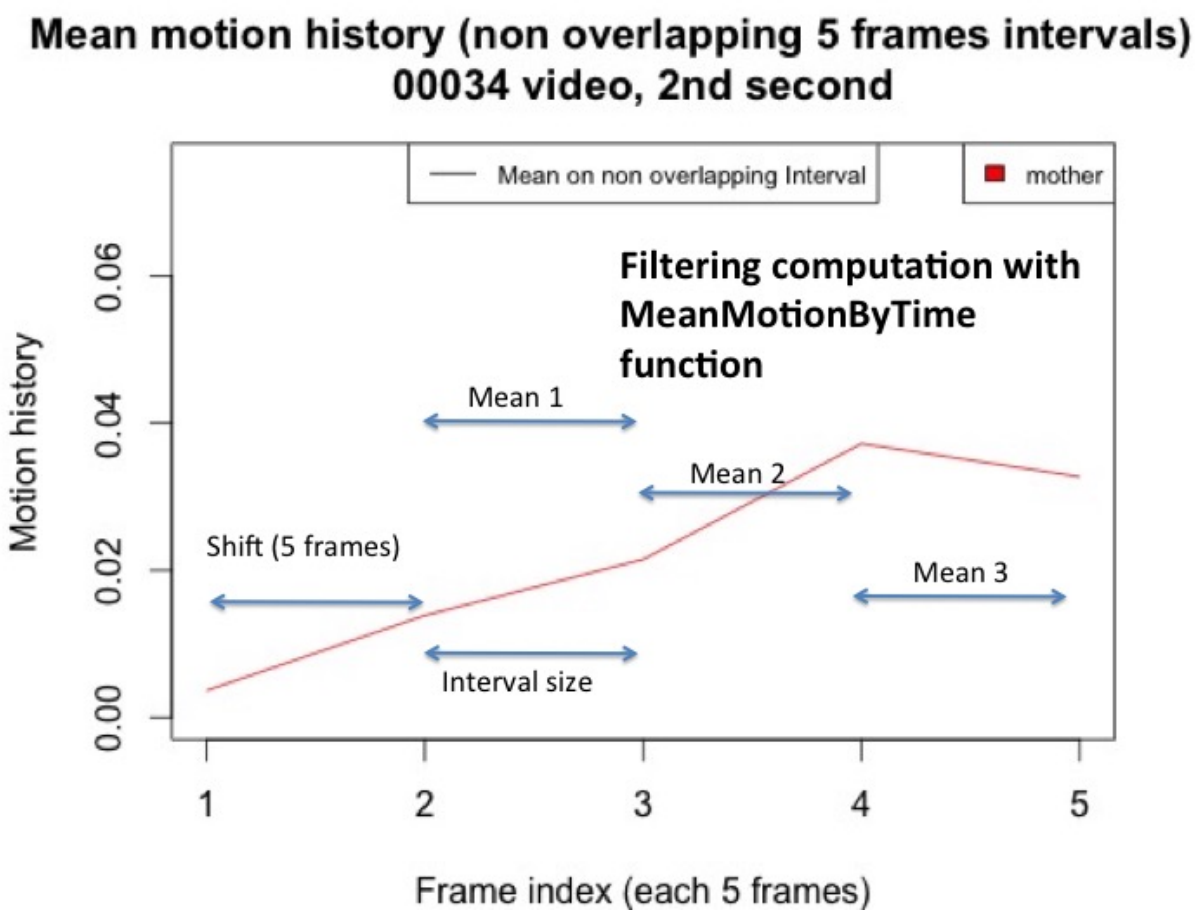


Figure 1:

```
MeanMotionByTime <- function(subject, indexOfvideos=1:NumberOfvideos, interval, data){
  x <- c()
  for (fam in families[indexOfvideos]){
```

```
        dataVector <- data[which(data$family==fam), subject]
        ## with ceiling : superior limit of the round
        IntervalNumbersVideo <- ceiling(length(dataVector)/interval)
        for (i in 1:IntervalNumbersVideo){
                borneinf<- 1+(i-1)*interval
                bornesup <-i*interval
                dataVectorInterval <- dataVector[borneinf:bornesup]
                mean <- mean(dataVectorInterval, na.rm=TRUE)
                x <- c(x, mean)}}
  return (x)}
```

Slidinginterval

Function that takes raw motion history data and computes the mean on a given interval. The interval overlap, so the frequency of the data don't change. It stays at 25 frames/s (fig.2.).

Arguments:

- **subject** : subject studied (patient, mother, father or therapist)
- **indexOfvideos** : list of videos studied (element eg. 3 or list eg 1:3 or c(1,2,4))
- **interval** : number of frames in the studied interval
- **data** : data frame where there is data

```
SlidingInterval <- function(subject, indexOfvideos=1:NumberOfvideos, interval, data)
  {x <- c()
  for (file in families[indexOfvideos]){
      dataVector <- data[which(data$family==file), subject]
      NBofAnalysedFrames <- length(dataVector)-interval+1
          for (i in 1:NBofAnalysedFrames){
              borneinf <- (i)
              bornesup <-(interval-1+i)
              dataVectorInterval <- dataVector[borneinf:bornesup]
              mean <- mean(dataVectorInterval, na.rm=TRUE)
              x <- c(x, mean)}}
  return (x)}
```

Before importing data

We prepared videos in AVI format (converted by Converting video script) and frames extracted by Frames extractor script and non relevant part of the images masked by Paintbrush in green.

With these videos and frames, we used the motionHistoryExtractor.cpp script in C++ which extracted motion history in CSV files for each video. This script use the opencv module. There is a filter in this script to avoid too much noise.

Data dictionnary of raw files

They are in the form videoname.MTS.avi_res.csv

- **frame** : index of the frame, with frame rate of 25/s
- **father** : motion history for father from 0 (no pixel change) to 1 (all pixels are changed)
- **mother** : idem for mother

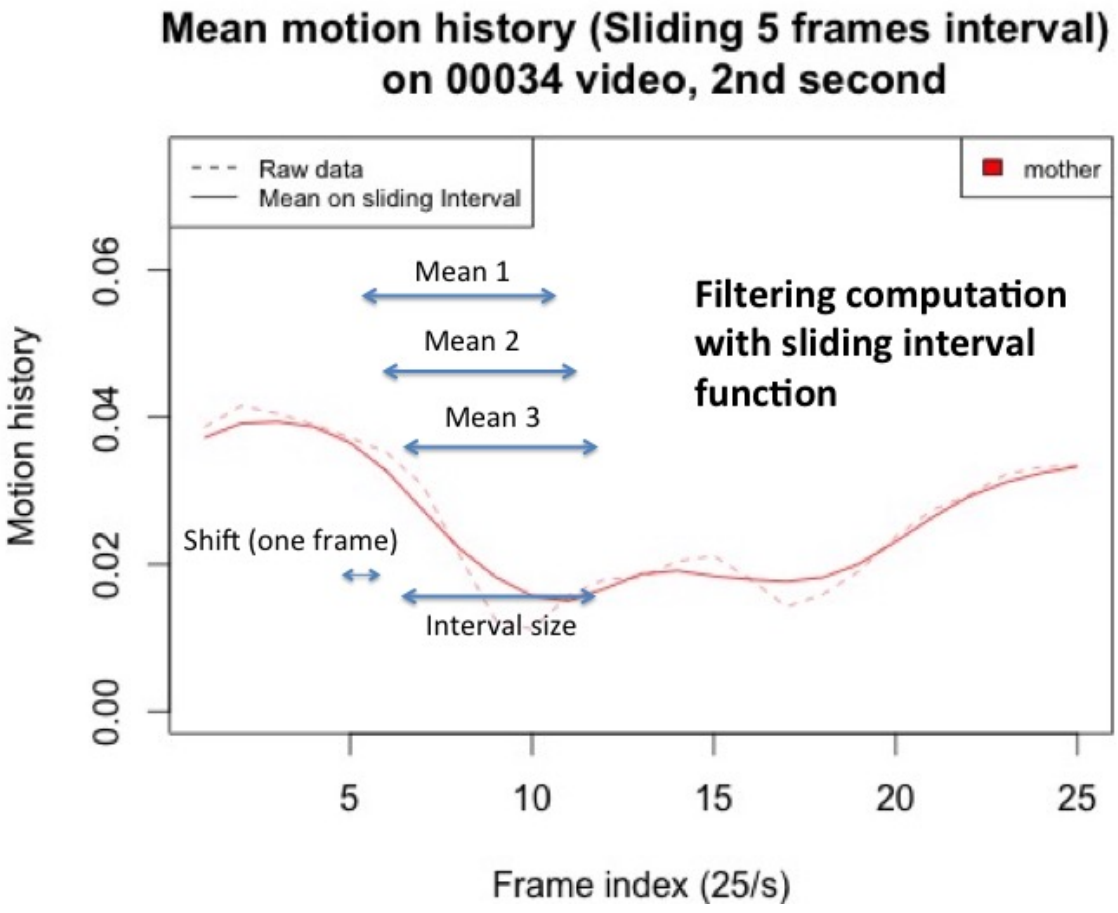

Mean motion history (Sliding 5 frames interval)
on 00034 video, 2nd second
Raw data
Mean on sliding Interval
mother
Mean 1
Mean 2
Mean 3
Filtering computation
with sliding interval
function
Shift (one frame)
Interval size
Motion history
0.00
0.02
0.04
0.06
5
10
15
20
25
Frame index (25/s)

Figure 2:

- **child** : idem for child
- **therapist** : idem for therapist (non relevant here but used in INCANT study)
- **file** : name of the file in the form : videoname.MTS.avi

Import data

```
data <- importdata(FullNameList)
```

Clean dataframe

Add new columns: compute minutes and log on data frame The timeMin is calculated with a frame rate of 25/sec.

```
# Detete No relevant subject here
data$therapist <- NULL

# compute time in minute
data$timeMin <- data$frame/(25*60)

## Create a list of files without the extention of the video
families <- c()
for (i in filesList){
    name <- sub(FileExtension, "", i)
    families <- c(families, name)
}
families
```

```
##  [1] "1606"    "BAJE059" "BALU062" "BEAL036" "BEAM031" "BRLO041" "COLO022"
##  [8] "DIPE004" "DOMA"    "DRNE"    "FOMA057" "GROP039" "HAJA052" "HUMA058"
## [15] "JAEM046" "JEEO040" "JOCE014" "LACL"    "MAEL048" "MAME20"  "MIPH043"
## [22] "MOSA065" "NAMA045" "NUMA027" "OGGA034" "PAMA029" "PELI020" "RAEM049"
## [29] "RAMA054" "SEEM035" "SHAN042" "SOGA061" "TIUG032" "VINO"
```

```
NumberOfvideos <- length(families)
NumberOfvideos
```

```
## [1] 34
```

```
# create a list with the simplified dname (whitout extension), make a data frame of it  and merge 2 dat
a <- data.frame(family = families, unique(data$file))
data <- merge(data, a, by.x="file", by.y="unique.data.file.")

# Compute log
data$fatherShifted <- data$father + min(data$father[which (data$father >0)])/2
data$logFather <- log(data$fatherShifted)

data$motherShifted <- data$mother + min(data$mother[which (data$mother >0)])/2
data$logMother <- log(data$motherShifted)

data$childShifted <- data$child + min(data$child[which (data$child >0)])/2
data$logChild <- log(data$childShifted)

# Add date TODO
data$file <- NULL
```

```
data <- data[,c("family", "frame", "timeMin", "child", "childShifted", "logChild", "father", "fatherShi
```

Data dictionnary of clean data data dataframe

- **family** : code of the family
- **frame** : index of the frame, with frame rate of 25/s
- **timeMin** : time in minute for each video ie frame/(25*60)
- **child** : motion history for child from 0 (no pixel change) to 1 (all pixels are changed)
- **childShifted** : motion history of child + mininimum of data$child[which(data$chid >0)])/2 to avoid 0 values which log can't be computed
- **logChild** : natural logarithm of childShifted
- **father** : motion history of father from 0 (no pixel change) to 1 (all pixels are changed)
- **fatherShifted** : motion history of father + mininimum of data$child[which(data$chid >0)])/2 to avoid 0 values which log can't be computed
- **logFather** : natural logarithm of childShifted
- **mother** : motion history of mother from 0 (no pixel change) to 1 (all pixels are changed)
- **motherShifted** : motion history of mother + mininimum of data$child[which(data$chid >0)])/2 to avoid 0 values which log can't be computed
- **logMother** : natural logarithm of motherShifted

Clean time annotations data frame (cutFrames)

Preparing cutFrames

The cutFrames data frame was done manually by looking manually all videos and definining:

- when the experimenter leaves the room and the interaction begin,

Between is the non conflictual discussion

- when the experimenter comes back to ask participants to have a conflictual discussion
- when the experimenter leaves and the conflictual discussion begins Between is the conflictual discussion
- when the experimenter comes back to shut down the camera
- Sex of the child
- Sex of the parent

```
# Import data
cutFrames <- read.csv2("../Data/CSV/Cutframes.csv")
str(cutFrames)
```

```
## 'data.frame':    34 obs. of  7 variables:
##  $ family    : Factor w/ 34 levels "1606","BAJE059",..: 1 2 3 4 5 6 7 8 9 10 ...
##  $ CutBefore : Factor w/ 11 levels "00:06","00:07",..: 6 4 3 5 3 7 5 11 7 5 ...
##  $ CutMiddle1: Factor w/ 26 levels "04:43","04:53",..: 21 15 16 16 4 10 17 18 20 17 ...
##  $ CutMiddle2: Factor w/ 31 levels "05:02","05:08",..: 27 20 25 14 2 20 17 26 19 21 ...
##  $ CutFinal  : Factor w/ 28 levels "11:40","14:43",..: 25 26 21 14 6 11 23 22 24 20 ...
##  $ ChildSex  : Factor w/ 2 levels "Female","Male": 1 1 2 1 1 1 1 1 1 2 ...
##  $ ParentSex : Factor w/ 2 levels "Female","Male": 2 2 1 1 1 1 1 1 1 1 ...
```

```
# Change the vector in character and cut the sting in two parts minutes and second for the 4 time label
cutFrames$CutBefore <- as.character(cutFrames$CutBefore)
cutFramesCB <- strsplit(cutFrames$CutBefore, split=":")

# Compute the time in minutes from time in minutes and seconds for each video for Cut Before
```

```
Cut <- c()
for (i in 1:nrow(cutFrames)){
  CutBeforeAlone <- (as.numeric(cutFramesCB[i][[1]][1]) + as.numeric(cutFramesCB[i][[1]][2])/60)
  Cut <- c(Cut, CutBeforeAlone)
  }
cutFrames$CutBeforeMin <- Cut

# Compute the time in minutes from time in minutes and seconds for each video for Cut CutMiddle1
Cut <- c()
cutFrames$CutMiddle1 <- as.character(cutFrames$CutMiddle1)
cutMiddleSplit <- strsplit(cutFrames$CutMiddle1, split=":")
for (i in 1:nrow(cutFrames)){
  CutAlone <- (as.numeric(cutMiddleSplit[i][[1]][1]) + as.numeric(cutMiddleSplit[i][[1]][2])/60)
  Cut <- c(Cut, CutAlone)
  }
cutFrames$CutMiddle1Min <- Cut

# Compute the time in minutes from time in minutes and seconds for each video for Cut CutMiddle2
Cut <- c()
cutFrames$CutMiddle2 <- as.character(cutFrames$CutMiddle2)
cutMiddleSplit <- strsplit(cutFrames$CutMiddle2, split=":")
for (i in 1:nrow(cutFrames)){
  CutAlone <- (as.numeric(cutMiddleSplit[i][[1]][1]) + as.numeric(cutMiddleSplit[i][[1]][2])/60)
  Cut <- c(Cut, CutAlone)
  }
cutFrames$CutMiddle2Min <- Cut

# Compute the time in minutes from time in minutes and seconds for each video for Cut CutFinal
Cut <- c()
cutFrames$CutFinal <- as.character(cutFrames$CutFinal)
cutSplit <- strsplit(cutFrames$CutFinal, split=":")
for (i in 1:nrow(cutFrames)){
  CutAlone <- (as.numeric(cutSplit[i][[1]][1]) + as.numeric(cutSplit[i][[1]][2])/60)
  Cut <- c(Cut, CutAlone)
  }
cutFrames$CutFinalMin <- Cut
Cut <- c()
```

Data dictionnary of cutFrames dataframe

- **family** : code of the family
- **CutBefore** : when the experimenter leave the room and the interaction begin character string in the form min:sec
- **CutMiddle1** : when the experimenter come back to explain that the participants are asked to have a conflictual discussion, character string in the form min:sec
- **CutMiddle2** : when the experimenter leave and the conflictual discussion begin Between is the conflictual discussion, character string in the form min:sec
- **CutFinal** : when the experimenter come back to shut down the camera, character string in the form min:sec
- **ChildSex** : Factor variable : Male of Female
- **ParentSex** : Factor variable : Male of Female
- **CutBeforeMin** : when the experimenter leave the room and the interaction begin numeric variable in minutes

- **CutMiddle1Min** : when the experimenter come back to explain that the participants are asked to have a conflictual discussion, numeric variable in minutes
- **CutMiddle2Min** : when the experimenter leave and the conflictual discussion begin Between is the conflictual discussion, numeric variable in minutes
- **CutFinalMin** : when the experimenter come back to shut down the camera, numeric variable in minutes

Psychometric database

Preparing psycho dataframe

This demographic and psychometric data were collected by the MONRADO team. The data file was cleaned following this flowchart (fig.3).

```
psycho <- read.csv2("/Users/Ofix/Documents/Fac/internat/Recherche/projets/synchro/synchroData/Monrado/Da

# replace 1 code by male and 2 by female
psycho$Sex[which(psycho$Sex == 1 )] <- "male"
psycho$Sex[which(psycho$Sex == 2 )] <- "female"

psycho$Birth_place <- as.character(psycho$Birth_place)
# Clean Besancon town name with a special character
psycho$Birth_place[which(psycho$Birth_place =="Besan\x8don")] <- "Besancon"

psycho$Num_identification <- NULL
psycho$Sex <- NULL
psycho$TASDF <- NULL
psycho$TASIF <- NULL
psycho$TASEOT<- NULL
psycho <- rename (psycho, c("Num._ident_videos" = "family"))
#View(psycho)
#str(psycho)
```

Data dictionnary of cutFrames dataframe

- **family** : code of the family
- **interview_date** : interview_date in a character format
- **Birthday** : Birthday of the child
- **Birth_place** : Birth place of the child
- **attachement_style** : attachement style in 7 factors
- **attachement_cluster** : attachement style in 5 factors, DUALS will be excluded
- **Insecurity_level** : level of insecurity not used
- **global score** : global score of attachment not used
- **TAS1** : score for 1st question of TAS Questionnaire : Toronto Alexithymia Score idem until TAS20 (Alexithymia questionnaire : difficulty to express emotions)
- **TAS_total** : total score of TAS
- **STAIYA1** : score for the 1st question of State-Trait Anxiety Inventory State score (at this specific moment), for the 1st question of State-Trait Anxiety Inventory State idem until 20
- **STAIYA_total** : total score of STAIYA Anxiety State score (at this specific moment)
- **STAIYB1** : score for the 1st question of State-Trait Anxiety Inventory Trait score (not at this specific moment), idem until 20
- **STAIYB_total** : total score of STAIYB Anxiety Trait score (not at this specific moment)

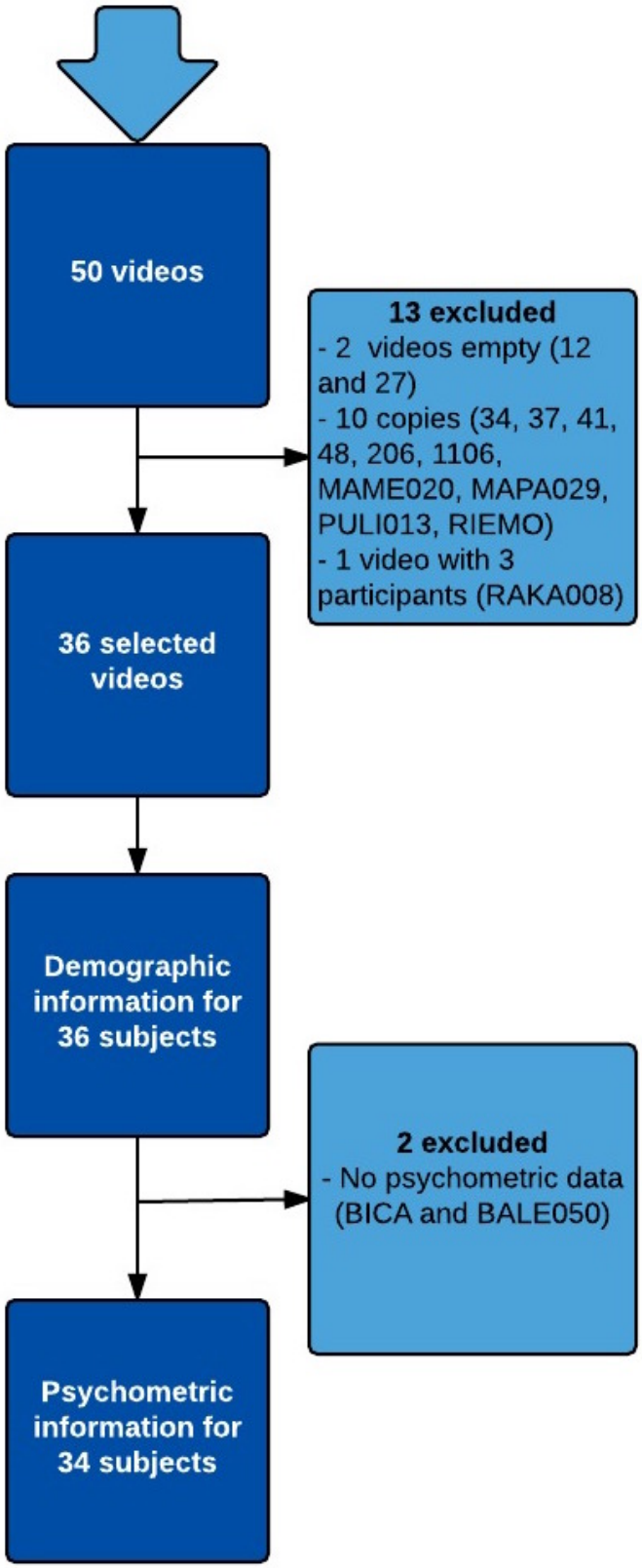

50 videos
13 excluded
- 2 videos empty (12 and 27)
- 10 copies (34, 37, 41, 48, 206, 1106, MAME020, MAPA029, PULI013, RIEMO)
- 1 video with 3 participants (RAKA008)
36 selected videos
Demographic information for 36 subjects
2 excluded
- No psychometric data (BICA and BALE050)
Psychometric information for 34 subjects

Figure 3:

- **BDI1** : score for the 1st question of the BDI (Beck Depression Inventory questionnaire) (Depression questionnaire) idem until BDI13
- **BDI_total** : total score of BDI (Beck Depression Inventory questionnaire)

Merge the data and the annotation data frames

```
# merge the two data frames
data <- merge(data, cutFrames, by.x="family", by.y="family")
data <- merge(data, psycho, by.x="family", by.y="family")

# reorder by family, then by frame order
data <- data[order(data$family, data$frame),]

# Create a column corresponding to the phase of the video for each time limit
data$LabelVideo <- rep(NA, nrow(data))
data[which(data$timeMin <= data$CutBeforeMin),]$LabelVideo <- "Cut"

data[which(data$timeMin > data$CutBeforeMin & data$timeMin < data$CutMiddle1Min),]$LabelVideo <- "No Co

data[which(data$timeMin >= data$CutMiddle1Min & data$timeMin <= data$CutMiddle2Min),]$LabelVideo <- "Cu

data[which(data$timeMin > data$CutMiddle2Min & data$timeMin < data$CutFinalMin),]$LabelVideo <- "Conflic

data[which(data$timeMin >= data$CutFinalMin),]$LabelVideo <- "Cut"

#View(data)
```

- **LabelVideo** : description of the phase of the video : cut, No-Conflict, Cut, or Conflict

Presentation of the data

```
str(data)
```

```
## 'data.frame':    802970 obs. of  107 variables:
##  $ family             : Factor w/ 34 levels "1606","BAJE059",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ frame              : int  1 2 3 4 5 6 7 8 9 10 ...
##  $ timeMin            : num  0.000667 0.001333 0.002 0.002667 0.003333 ...
##  $ child              : num  0.005132 0.006495 0.000241 0.000829 0.000149 ...
##  $ childShifted       : num  0.005132 0.006495 0.000241 0.00083 0.00015 ...
##  $ logChild           : num  -5.27 -5.04 -8.33 -7.09 -8.81 ...
##  $ father             : num  0.002321 0.005813 0.000678 0.001026 0.00058 ...
##  $ fatherShifted      : num  0.002322 0.005814 0.000679 0.001027 0.00058 ...
##  $ logFather          : num  -6.07 -5.15 -7.3 -6.88 -7.45 ...
##  $ mother             : num  NA NA NA NA NA NA NA NA NA NA ...
##  $ motherShifted      : num  NA NA NA NA NA NA NA NA NA NA ...
##  $ logMother          : num  NA NA NA NA NA NA NA NA NA NA ...
##  $ CutBefore          : chr  "00:11" "00:11" "00:11" "00:11" ...
##  $ CutMiddle1         : chr  "05:30" "05:30" "05:30" "05:30" ...
##  $ CutMiddle2         : chr  "06:16" "06:16" "06:16" "06:16" ...
##  $ CutFinal           : chr  "16:27" "16:27" "16:27" "16:27" ...
##  $ ChildSex           : Factor w/ 2 levels "Female","Male": 1 1 1 1 1 1 1 1 1 1 ...
```

```
##  $ ParentSex          : Factor w/ 2 levels "Female","Male": 2 2 2 2 2 2 2 2 2 2 ...
##  $ CutBeforeMin       : num  0.183 0.183 0.183 0.183 0.183 ...
##  $ CutMiddle1Min      : num  5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 5.5 ...
##  $ CutMiddle2Min      : num  6.27 6.27 6.27 6.27 6.27 ...
##  $ CutFinalMin        : num  16.4 16.4 16.4 16.4 16.4 ...
##  $ interview_date     : Factor w/ 30 levels "02/12/14","03/12/14",..: 27 27 27 27 27 27 27 27 27 27
##  $ Birthday           : Factor w/ 33 levels "01/09/99","01/11/99",..: 28 28 28 28 28 28 28 28 28 28
##  $ Birth_place        : chr  "Clermont-Ferrand" "Clermont-Ferrand" "Clermont-Ferrand" "Clermont-Ferra
##  $ attachement_style  : Factor w/ 7 levels "Angry Dismissive Fearful",..: 4 4 4 4 4 4 4 4 4 4 ...
##  $ attachement_cluster: Factor w/ 5 levels "DU","DUAL","FE",..: 3 3 3 3 3 3 3 3 3 3 ...
##  $ insecurite_level   : Factor w/ 9 levels "","Clearly","Markedly",..: 3 3 3 3 3 3 3 3 3 3 ...
##  $ global_score       : Factor w/ 14 levels "","10 Midly Fearful",..: 6 6 6 6 6 6 6 6 6 6 ...
##  $ TAS1               : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ TAS2               : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ TAS3               : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ TAS4               : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ TAS5               : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ TAS6               : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ TAS7               : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ TAS8               : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ TAS9               : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ TAS10              : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ TAS11              : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ TAS12              : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ TAS13              : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ TAS14              : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ TAS15              : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ TAS16              : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ TAS17              : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ TAS18              : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ TAS19              : int  5 5 5 5 5 5 5 5 5 5 ...
##  $ TAS20              : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ TAS_total          : int  56 56 56 56 56 56 56 56 56 56 ...
##  $ STAIYA1            : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ STAIYA2            : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ STAIYA3            : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA4            : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA5            : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYA6            : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA7            : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA8            : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYA9            : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ STAIYA10           : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ STAIYA11           : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYA12           : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA13           : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA14           : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA15           : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYA16           : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA17           : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ STAIYA18           : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYA19           : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYA20           : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ STAIYA_total       : int  39 39 39 39 39 39 39 39 39 39 ...
```

```
##  $ STAIYB1            : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ STAIYB2            : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYB3            : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB4            : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB5            : int  2 2 2 2 2 2 2 2 2 2 ...
##  $ STAIYB6            : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB7            : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB8            : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYB9            : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB10           : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYB11           : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB12           : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYB13           : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB14           : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB15           : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB16           : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYB17           : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB18           : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB19           : int  4 4 4 4 4 4 4 4 4 4 ...
##  $ STAIYB20           : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ STAIYB_total       : int  70 70 70 70 70 70 70 70 70 70 ...
##  $ BDI1               : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ BDI2               : int  3 3 3 3 3 3 3 3 3 3 ...
##  $ BDI3               : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ BDI4               : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ BDI5               : int  0 0 0 0 0 0 0 0 0 0 ...
##  $ BDI6               : int  1 1 1 1 1 1 1 1 1 1 ...
##  $ BDI7               : int  1 1 1 1 1 1 1 1 1 1 ...
##   [list output truncated]
```

```
summary(data)
```

```
##      family           frame          timeMin             child
##  MOSA065: 26975   Min.   :    1   Min.   : 0.000667   Min.   :0.0000000
##  HUMA058: 25631   1st Qu.: 5905   1st Qu.: 3.936667   1st Qu.:0.0006849
##  BAJE059: 25295   Median :11809   Median : 7.872667   Median :0.0034616
##  1606   : 24947   Mean   :11838   Mean   : 7.891817   Mean   :0.0094846
##  DOMA   : 24863   3rd Qu.:17713   3rd Qu.:11.808667   3rd Qu.:0.0117680
##  COLO022: 24443   Max.   :26975   Max.   :17.983333   Max.   :0.9270200
##  (Other):650816
##   childShifted          logChild             father       fatherShifted
##  Min.   :0.0000004   Min.   :-14.66620   Min.   :0.0      Min.   :0.0
##  1st Qu.:0.0006853   1st Qu.: -7.28564   1st Qu.:0.0      1st Qu.:0.0
##  Median :0.0034621   Median : -5.66589   Median :0.0      Median :0.0
##  Mean   :0.0094850   Mean   : -6.14384   Mean   :0.0      Mean   :0.0
##  3rd Qu.:0.0117684   3rd Qu.: -4.44233   3rd Qu.:0.0      3rd Qu.:0.0
##  Max.   :0.9270204   Max.   : -0.07578   Max.   :0.1      Max.   :0.1
##                                          NA's   :655136   NA's   :655136
##    logFather          mother       motherShifted      logMother
##  Min.   :-14.6    Min.   :0.00     Min.   :0.00     Min.   :-14.78
##  1st Qu.: -9.3    1st Qu.:0.00     1st Qu.:0.00     1st Qu.: -8.28
##  Median : -7.1    Median :0.00     Median :0.00     Median : -6.37
##  Mean   : -7.5    Mean   :0.01     Mean   :0.01     Mean   : -6.96
##  3rd Qu.: -5.3    3rd Qu.:0.01     3rd Qu.:0.01     3rd Qu.: -5.07
##  Max.   : -2.0    Max.   :0.96     Max.   :0.96     Max.   : -0.04
```

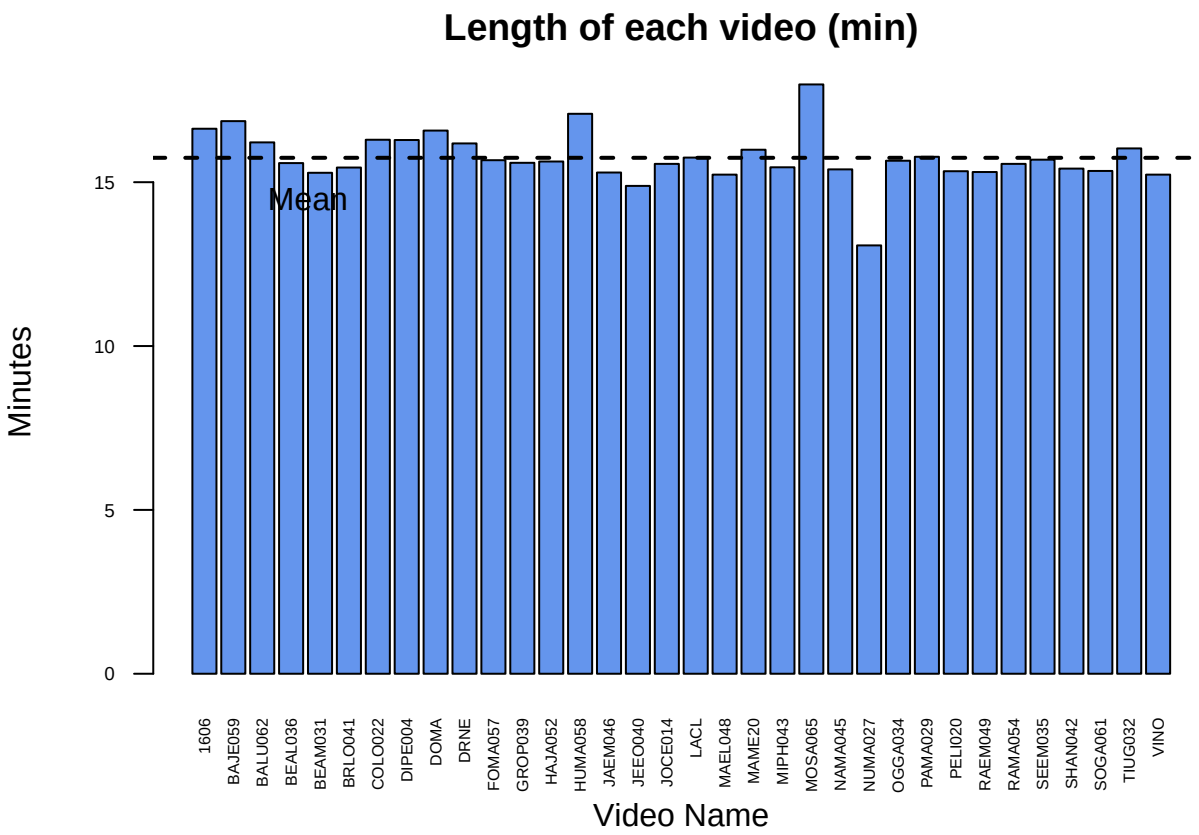
```
##  NA's   :655136   NA's   :147834   NA's   :147834   NA's   :147834
##   CutBefore          CutMiddle1         CutMiddle2
##  Length:802970      Length:802970      Length:802970
##  Class :character   Class :character   Class :character
##  Mode  :character   Mode  :character   Mode  :character
##
##
##
##
##    CutFinal           ChildSex       ParentSex       CutBeforeMin
##  Length:802970      Female:659648   Female:655136   Min.   :0.1000
##  Class :character   Male  :143322   Male  :147834   1st Qu.:0.1333
##  Mode  :character                                   Median :0.1667
##                                                     Mean   :0.1878
##                                                     3rd Qu.:0.1833
##                                                     Max.   :0.4500
##
##  CutMiddle1Min   CutMiddle2Min    CutFinalMin     interview_date
##  Min.   :4.717   Min.   :5.033   Min.   :11.67   26/03/15: 47962
##  1st Qu.:5.033   1st Qu.:5.433   1st Qu.:15.22   13/05/15: 47122
##  Median :5.217   Median :5.800   Median :15.47   04/12/14: 46558
##  Mean   :5.281   Mean   :5.830   Mean   :15.59   18/12/14: 45814
##  3rd Qu.:5.383   3rd Qu.:6.033   3rd Qu.:16.08   21/04/15: 26975
##  Max.   :7.083   Max.   :7.833   Max.   :17.80   16/04/15: 25631
##                                                  (Other) :562908
##      Birthday      Birth_place
##  06/09/99: 51418   Length:802970
##  13/12/96: 25631   Class :character
##  01/12/99: 25295   Mode  :character
##  27/05/99: 24947
##  28/11/98: 24863
##  18/06/97: 24431
##  (Other) :626385
##                           attachement_style  attachement_cluster
##  Angry Dismissive Fearful          : 23447   DU       : 22847
##  Dual Style Mildly Enmeshed-Fearful: 22847   DUAL     : 46618
##  Enmeshed                          :145266   FE       :313175
##  Fearful                           :167909   Secure   :350025
##  Secure                            :350025   Withdrawn: 70305
##  Withdrawn                         : 70305
##  Withdrawn Fearful (Dual)          : 23171
##    insecurite_level               global_score         TAS1
##  Clearly   :327022   13 Clearly secure  :256273   Min.   :1.000
##  Mildly    :121063                      :139230   1st Qu.:3.000
##  Markedly  : 95768   9 Mildly Enmeshed  : 73077   Median :4.000
##  Moderatly : 92324   3 Markedly Fearful : 72597   Mean   :3.317
##  Moderately: 47110   4 Moderatly Fearful: 47110   3rd Qu.:4.000
##            : 47050   9 Midly Enmshec    : 25295   Max.   :5.000
##  (Other)   : 72633   (Other)            :189388
##       TAS2            TAS3            TAS4            TAS5
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :2.000
##  1st Qu.:3.000   1st Qu.:1.000   1st Qu.:2.000   1st Qu.:4.000
##  Median :4.000   Median :1.000   Median :2.000   Median :4.000
##  Mean   :3.419   Mean   :1.831   Mean   :2.567   Mean   :4.059
```

```
##  3rd Qu.:4.000   3rd Qu.:3.000   3rd Qu.:4.000   3rd Qu.:5.000
##  Max.   :5.000   Max.   :5.000   Max.   :5.000   Max.   :5.000
##
##       TAS6            TAS7            TAS8            TAS9
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:2.000   1st Qu.:1.000   1st Qu.:2.000   1st Qu.:2.000
##  Median :3.000   Median :2.000   Median :2.000   Median :3.000
##  Mean   :2.803   Mean   :2.224   Mean   :2.321   Mean   :3.237
##  3rd Qu.:4.000   3rd Qu.:3.000   3rd Qu.:3.000   3rd Qu.:4.000
##  Max.   :5.000   Max.   :5.000   Max.   :5.000   Max.   :5.000
##  NA's   :23447   NA's   :22967                   NA's   :23507
##      TAS10           TAS11           TAS12           TAS13
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:4.000   1st Qu.:2.000   1st Qu.:2.000   1st Qu.:1.000
##  Median :4.000   Median :4.000   Median :3.000   Median :3.000
##  Mean   :3.961   Mean   :3.401   Mean   :2.829   Mean   :2.591
##  3rd Qu.:5.000   3rd Qu.:4.000   3rd Qu.:4.000   3rd Qu.:3.000
##  Max.   :5.000   Max.   :5.000   Max.   :5.000   Max.   :5.000
##
##      TAS14           TAS15           TAS16           TAS17
##  Min.   :1.00   Min.   :1.00   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.00   1st Qu.:2.00   1st Qu.:1.000   1st Qu.:1.000
##  Median :3.00   Median :3.00   Median :3.000   Median :2.000
##  Mean   :2.68   Mean   :2.87   Mean   :2.562   Mean   :2.442
##  3rd Qu.:4.00   3rd Qu.:4.00   3rd Qu.:3.000   3rd Qu.:4.000
##  Max.   :5.00   Max.   :5.00   Max.   :5.000   Max.   :5.000
##
##      TAS18           TAS19           TAS20         TAS_total
##  Min.   :1.000   Min.   :2.000   Min.   :1.000   Min.   :31.0
##  1st Qu.:3.000   1st Qu.:4.000   1st Qu.:1.000   1st Qu.:47.0
##  Median :4.000   Median :4.000   Median :2.000   Median :51.0
##  Mean   :4.049   Mean   :4.094   Mean   :2.365   Mean   :51.3
##  3rd Qu.:5.000   3rd Qu.:5.000   3rd Qu.:3.000   3rd Qu.:57.0
##  Max.   :5.000   Max.   :5.000   Max.   :5.000   Max.   :70.0
##
##     STAIYA1         STAIYA2         STAIYA3         STAIYA4
##  Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.00   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000
##  Median :2.00   Median :2.000   Median :1.000   Median :2.000
##  Mean   :2.06   Mean   :1.909   Mean   :1.287   Mean   :1.747
##  3rd Qu.:3.00   3rd Qu.:2.000   3rd Qu.:1.000   3rd Qu.:2.000
##  Max.   :4.00   Max.   :4.000   Max.   :3.000   Max.   :4.000
##
##     STAIYA5         STAIYA6         STAIYA7         STAIYA8
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:2.000   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:2.000
##  Median :2.000   Median :1.000   Median :1.000   Median :2.000
##  Mean   :2.412   Mean   :1.584   Mean   :1.289   Mean   :2.469
##  3rd Qu.:3.000   3rd Qu.:2.000   3rd Qu.:2.000   3rd Qu.:3.000
##  Max.   :4.000   Max.   :4.000   Max.   :3.000   Max.   :4.000
##
##     STAIYA9         STAIYA10        STAIYA11        STAIYA12
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000
```

```
##  Median :2.000   Median :2.000   Median :1.000   Median :1.000
##  Mean   :1.764   Mean   :1.701   Mean   :1.498   Mean   :1.554
##  3rd Qu.:2.000   3rd Qu.:2.000   3rd Qu.:2.000   3rd Qu.:2.000
##  Max.   :3.000   Max.   :3.000   Max.   :4.000   Max.   :3.000
##
##     STAIYA13        STAIYA14        STAIYA15        STAIYA16
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000   1st Qu.:1.000
##  Median :1.000   Median :2.000   Median :2.000   Median :1.000
##  Mean   :1.403   Mean   :1.879   Mean   :1.824   Mean   :1.703
##  3rd Qu.:2.000   3rd Qu.:2.000   3rd Qu.:2.000   3rd Qu.:2.000
##  Max.   :3.000   Max.   :4.000   Max.   :4.000   Max.   :4.000
##
##     STAIYA17        STAIYA18        STAIYA19        STAIYA20
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:1.000   1st Qu.:2.000   1st Qu.:1.000
##  Median :2.000   Median :1.000   Median :2.000   Median :1.000
##  Mean   :1.967   Mean   :1.728   Mean   :2.178   Mean   :1.498
##  3rd Qu.:3.000   3rd Qu.:2.000   3rd Qu.:3.000   3rd Qu.:2.000
##  Max.   :4.000   Max.   :4.000   Max.   :3.000   Max.   :3.000
##
##   STAIYA_total      STAIYB1       STAIYB2         STAIYB3
##  Min.   :25.00   Min.   :1.0   Min.   :1.000   Min.   :2.00
##  1st Qu.:30.00   1st Qu.:1.0   1st Qu.:2.000   1st Qu.:2.00
##  Median :34.00   Median :2.0   Median :2.000   Median :3.00
##  Mean   :35.46   Mean   :1.7   Mean   :1.942   Mean   :2.65
##  3rd Qu.:39.00   3rd Qu.:2.0   3rd Qu.:2.000   3rd Qu.:3.00
##  Max.   :56.00   Max.   :3.0   Max.   :3.000   Max.   :4.00
##
##     STAIYB4         STAIYB5         STAIYB6         STAIYB7
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:1.000   1st Qu.:2.000   1st Qu.:2.000
##  Median :2.000   Median :2.000   Median :3.000   Median :2.000
##  Mean   :2.056   Mean   :1.914   Mean   :2.621   Mean   :2.302
##  3rd Qu.:3.000   3rd Qu.:2.000   3rd Qu.:3.000   3rd Qu.:3.000
##  Max.   :4.000   Max.   :4.000   Max.   :4.000   Max.   :4.000
##  NA's   :22331                                   NA's   :22967
##     STAIYB8         STAIYB9         STAIYB10        STAIYB11
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:1.000   1st Qu.:2.000   1st Qu.:1.000   1st Qu.:2.000
##  Median :2.000   Median :2.000   Median :1.000   Median :2.000
##  Mean   :1.711   Mean   :2.319   Mean   :1.497   Mean   :2.293
##  3rd Qu.:2.000   3rd Qu.:3.000   3rd Qu.:2.000   3rd Qu.:3.000
##  Max.   :3.000   Max.   :4.000   Max.   :3.000   Max.   :4.000
##
##     STAIYB12        STAIYB13        STAIYB14        STAIYB15
##  Min.   :1.000   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:2.000   1st Qu.:1.000   1st Qu.:2.000   1st Qu.:1.000
##  Median :3.000   Median :2.000   Median :3.000   Median :2.000
##  Mean   :2.593   Mean   :1.864   Mean   :2.752   Mean   :1.917
##  3rd Qu.:4.000   3rd Qu.:2.000   3rd Qu.:3.000   3rd Qu.:2.000
##  Max.   :4.000   Max.   :4.000   Max.   :4.000   Max.   :4.000
##
##     STAIYB16        STAIYB17        STAIYB18        STAIYB19
```

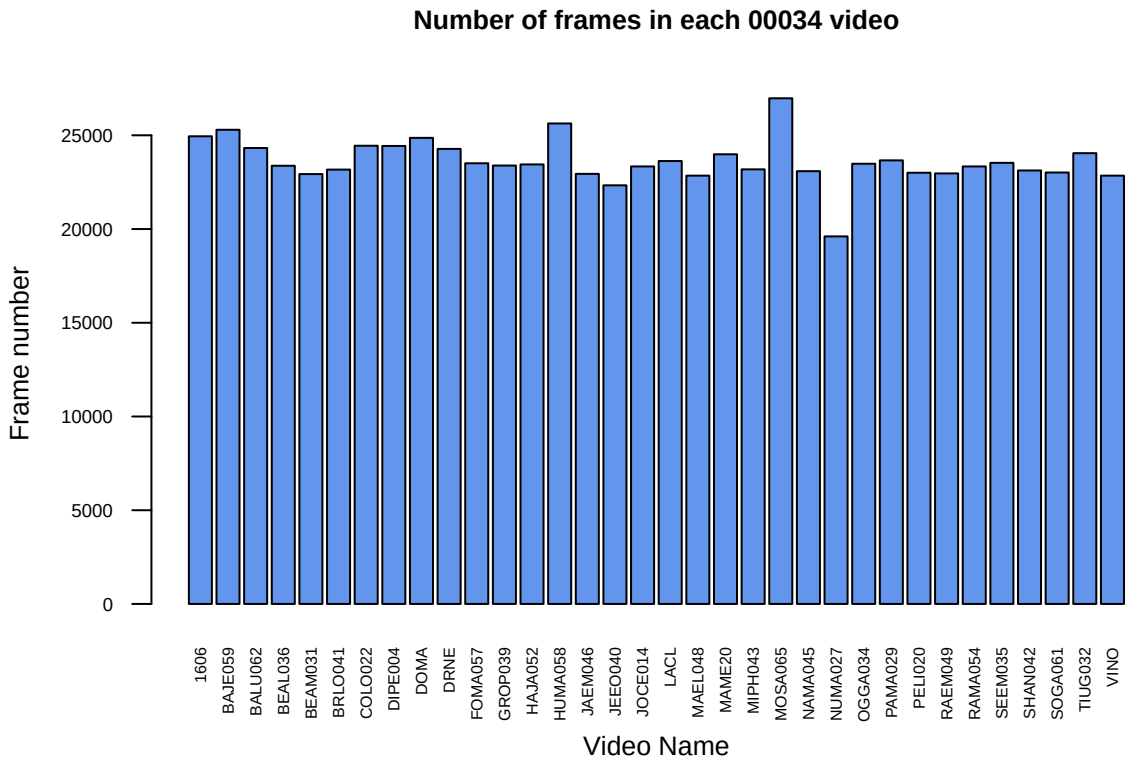
```
##  Min.   :1.00   Min.   :1.000   Min.   :1.000   Min.   :1.000
##  1st Qu.:2.00   1st Qu.:2.000   1st Qu.:1.000   1st Qu.:2.000
##  Median :2.00   Median :2.000   Median :1.000   Median :2.000
##  Mean   :2.23   Mean   :2.101   Mean   :1.879   Mean   :2.183
##  3rd Qu.:3.00   3rd Qu.:2.000   3rd Qu.:3.000   3rd Qu.:2.000
##  Max.   :4.00   Max.   :4.000   Max.   :4.000   Max.   :4.000
##
##     STAIYB20      STAIYB_total        BDI1            BDI2
##  Min.   :1.000   Min.   :26.00   Min.   :0.000   Min.   :0.0000
##  1st Qu.:2.000   1st Qu.:35.00   1st Qu.:0.000   1st Qu.:0.0000
##  Median :2.000   Median :43.00   Median :0.000   Median :0.0000
##  Mean   :2.323   Mean   :42.72   Mean   :0.349   Mean   :0.5063
##  3rd Qu.:3.000   3rd Qu.:47.00   3rd Qu.:1.000   3rd Qu.:1.0000
##  Max.   :4.000   Max.   :70.00   Max.   :2.000   Max.   :3.0000
##
##       BDI3            BDI4            BDI5            BDI6
##  Min.   :0.0000   Min.   :0.0000   Min.   :0.0000   Min.   :0.0000
##  1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000
##  Median :0.0000   Median :0.0000   Median :0.0000   Median :0.0000
##  Mean   :0.2349   Mean   :0.2043   Mean   :0.6359   Mean   :0.4427
##  3rd Qu.:0.0000   3rd Qu.:0.0000   3rd Qu.:1.0000   3rd Qu.:1.0000
##  Max.   :1.0000   Max.   :1.0000   Max.   :3.0000   Max.   :1.0000
##
##       BDI7            BDI8            BDI9            BDI10
##  Min.   :0.000   Min.   :0.0000   Min.   :0.0000   Min.   :0.0000
##  1st Qu.:0.000   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000
##  Median :0.000   Median :0.0000   Median :1.0000   Median :0.0000
##  Mean   :0.118   Mean   :0.1426   Mean   :0.8647   Mean   :0.4389
##  3rd Qu.:0.000   3rd Qu.:0.0000   3rd Qu.:1.0000   3rd Qu.:1.0000
##  Max.   :1.000   Max.   :1.0000   Max.   :2.0000   Max.   :3.0000
##
##      BDI11            BDI12            BDI13          BDI_total
##  Min.   :0.0000   Min.   :0.0000   Min.   :0.0000   Min.   : 0.000
##  1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.:0.0000   1st Qu.: 3.000
##  Median :1.0000   Median :1.0000   Median :0.0000   Median : 5.000
##  Mean   :0.7998   Mean   :0.8224   Mean   :0.3697   Mean   : 5.929
##  3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.:1.0000   3rd Qu.: 7.000
##  Max.   :3.0000   Max.   :2.0000   Max.   :2.0000   Max.   :17.000
##
##   LabelVideo
##  Length:802970
##  Class :character
##  Mode  :character
##
##
##
##
```

Length of the videos in minutes



We can see that the video are very comparable. THere is a shorter video in which the dyad doesn't really understand the request. The mother stand up at the end and go to see the experimenter.

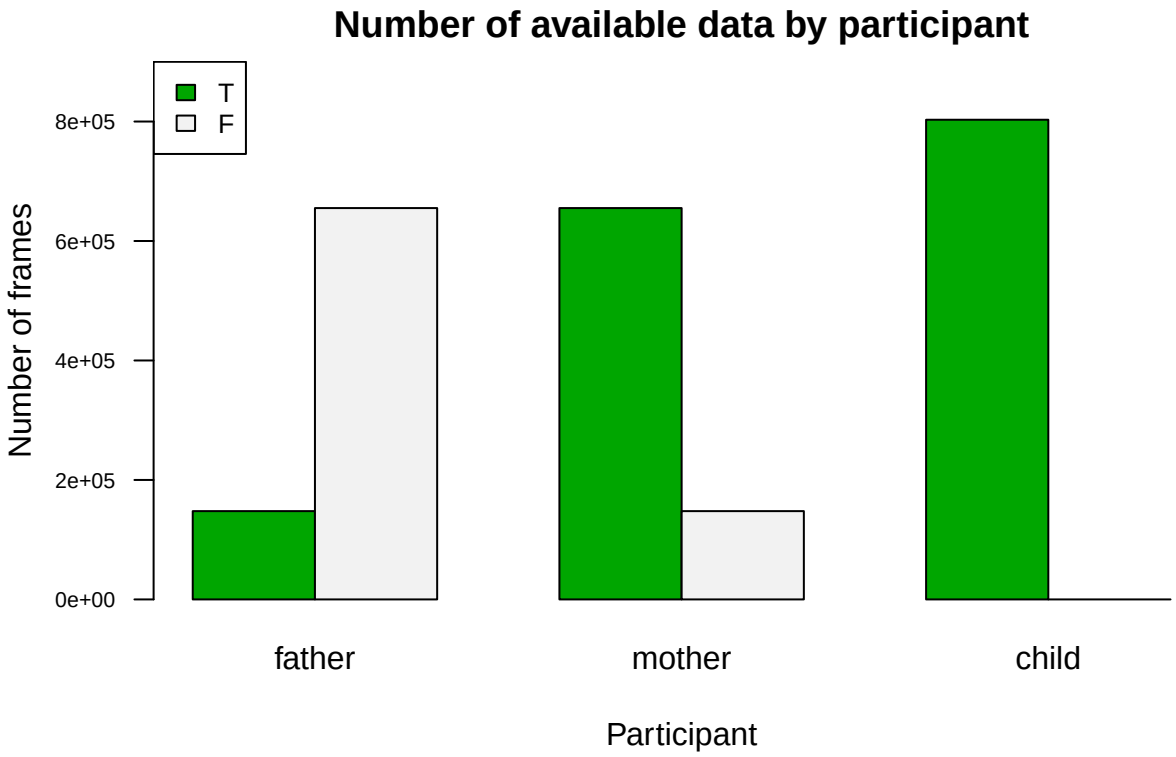
Length of the videos in number of frames



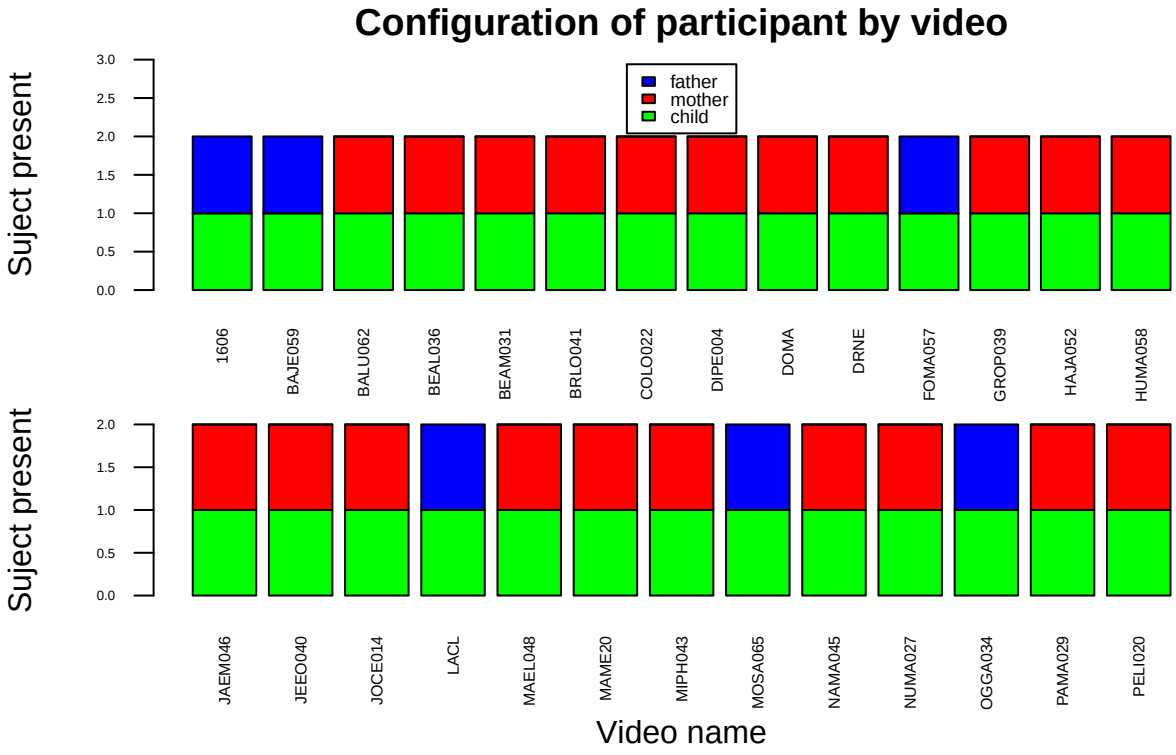
Configurations of the videos

Number of Available (True) and Not Available (False) data for each participant

```
##         [,1]   [,2]   [,3]
## FALSE 147834 655136 802970
## TRUE  655136 147834      0
```



- All the participants involved are filmed.
- All the children are filmed and we have all the data for each.
- More often there is the mother with him/her but sometimes, it is the father

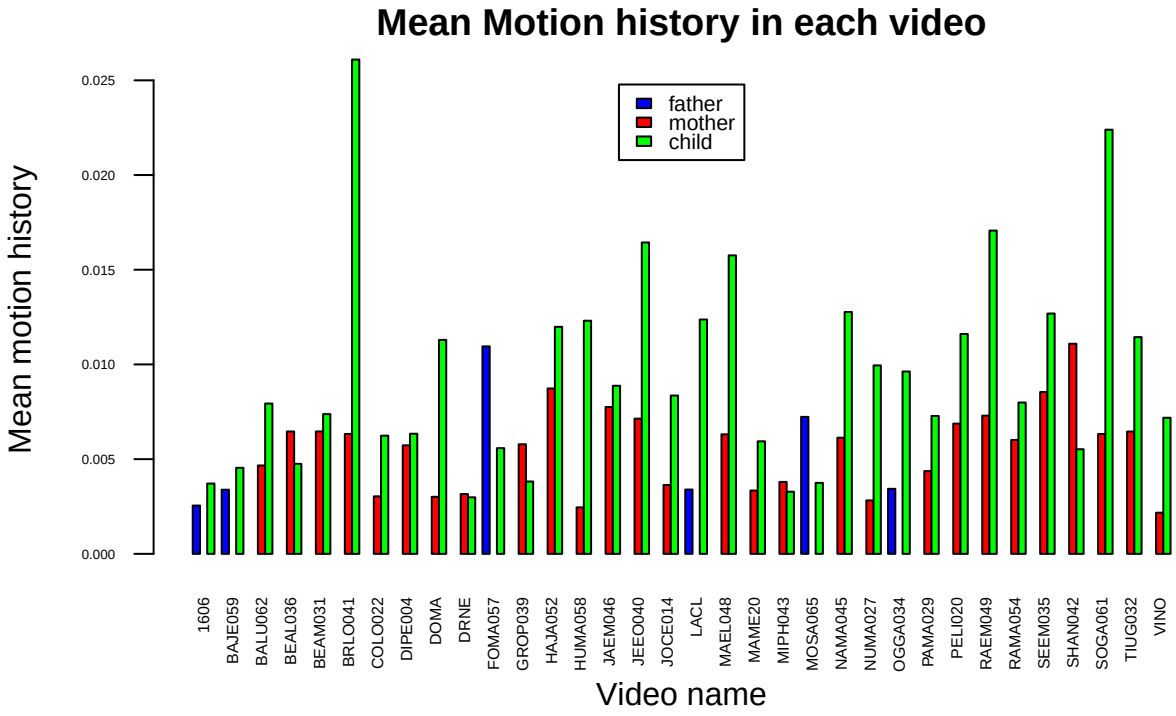


We can see that configurations of subjects are very similar (with always 2 subjects, we excluded RAKA008 with 3 subjects). More often the child is with his mother. Consequently, it makes the comparaisons of the

videos easier than in the INCANT study.

Global Motion history

Mean Motion history by video by participant



Global motion history by situation : “conflict” vs “no conflict”

```
MeanMotionNoConflict <- c(
  mean(data[which(data$LabelVideo=="No Conflict"),]$father, na.rm=TRUE),
  mean(data[which(data$LabelVideo=="No Conflict"),]$mother, na.rm=TRUE),
  mean(data[which(data$LabelVideo=="No Conflict"),]$child, na.rm=TRUE))

MeanMotionConflict <- c(
  mean(data[which(data$LabelVideo=="Conflict"),]$father, na.rm=TRUE),
  mean(data[which(data$LabelVideo=="Conflict"),]$mother, na.rm=TRUE),
  mean(data[which(data$LabelVideo=="Conflict"),]$child, na.rm=TRUE))

MeanMotion<- data.frame(MeanMotionNoConflict, MeanMotionConflict, names=c("father", "mother", "child"))
MeanMotion
```

```
##   MeanMotionNoConflict MeanMotionConflict  names
## 1          0.004555560        0.005024248 father
## 2          0.005280418        0.005301225 mother
## 3          0.009970003        0.008760330  child
```

```
par(mar=c(5,4,4,1))
barplot (as.matrix(MeanMotion[,1:2]), beside=TRUE, ylab= "Mean Motion history", col=colOrderList, names
```

```
        without and with conflict")
par(mar=c(1,0.5,0.5,1))
legend("top", inset=.05, ParticipantsList,
       fill=colOrderList, cex=0.7)
```

[](SyncPsychoMonrado_files/figure-latex/raw Global motion history by situation : “conflict” vs “no conflict”-1.pdf)

We can see that it seems to be a decrease of movement in conflict amond child but not much change among parents.

Log of Global motion history by situation : “conflict” vs “no conflict”

```
MeanMotionNoConflict <- c(
  mean(data[which(data$LabelVideo=="No Conflict"),]$logFather, na.rm=TRUE),
  mean(data[which(data$LabelVideo=="No Conflict"),]$logMother, na.rm=TRUE),
  mean(data[which(data$LabelVideo=="No Conflict"),]$logChild, na.rm=TRUE))

MeanMotionConflict <- c(
  mean(data[which(data$LabelVideo=="Conflict"),]$logFather, na.rm=TRUE),
  mean(data[which(data$LabelVideo=="Conflict"),]$logMother, na.rm=TRUE),
  mean(data[which(data$LabelVideo=="Conflict"),]$logChild, na.rm=TRUE))

MeanMotionlog <- data.frame(MeanMotionNoConflict, MeanMotionConflict, names=c("father", "mother", "chil
MeanMotion
```

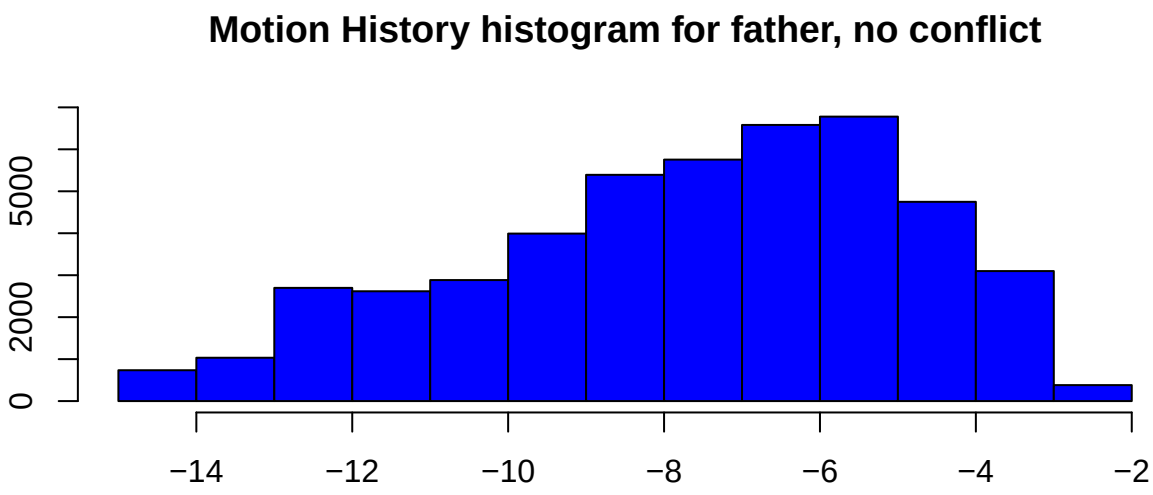
```
##   MeanMotionNoConflict MeanMotionConflict  names
## 1          0.004555560        0.005024248 father
## 2          0.005280418        0.005301225 mother
## 3          0.009970003        0.008760330  child
```

```
par(mar=c(5,4,4,1))
barplot (as.matrix(MeanMotionlog[,1:2]), beside=TRUE, ylab= "Log of Mean Motion history", col=colOrderLi
        without and with conflict")
legend("topleft", inset=.02, ParticipantsList,
       fill=colOrderList, cex=0.6)
```

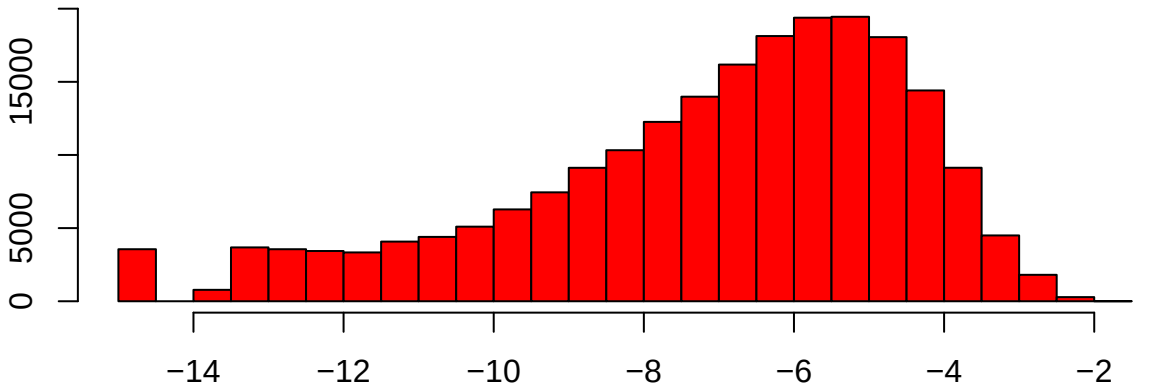
[](SyncPsychoMonrado_files/figure-latex/raw log Global motion history by situation : “conflict” vs “no conflict”-1.pdf)

With a log distribution of motion history, we can’t see any more this difference.

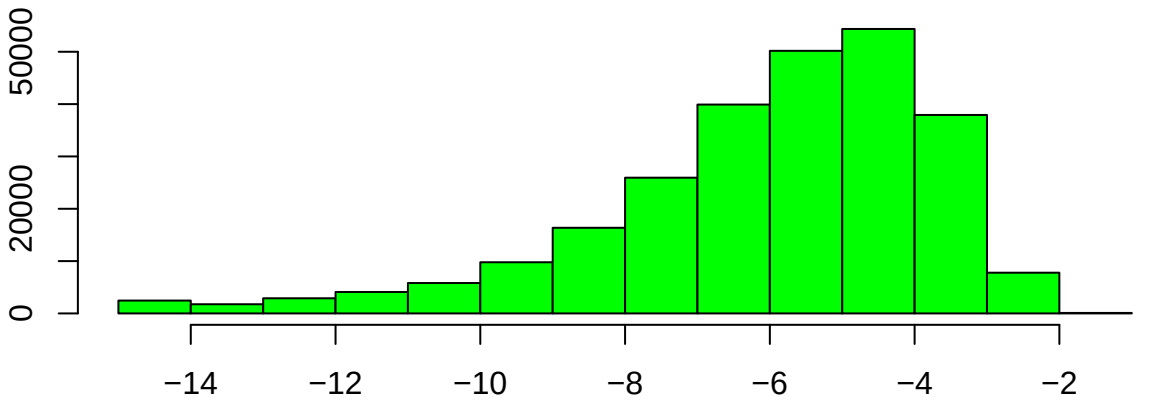
```
par(mar=c(3,3,4,1))
hist(data[which(data$LabelVideo=="No Conflict"),]$logFather, col="blue", main= "Motion History histogra
```



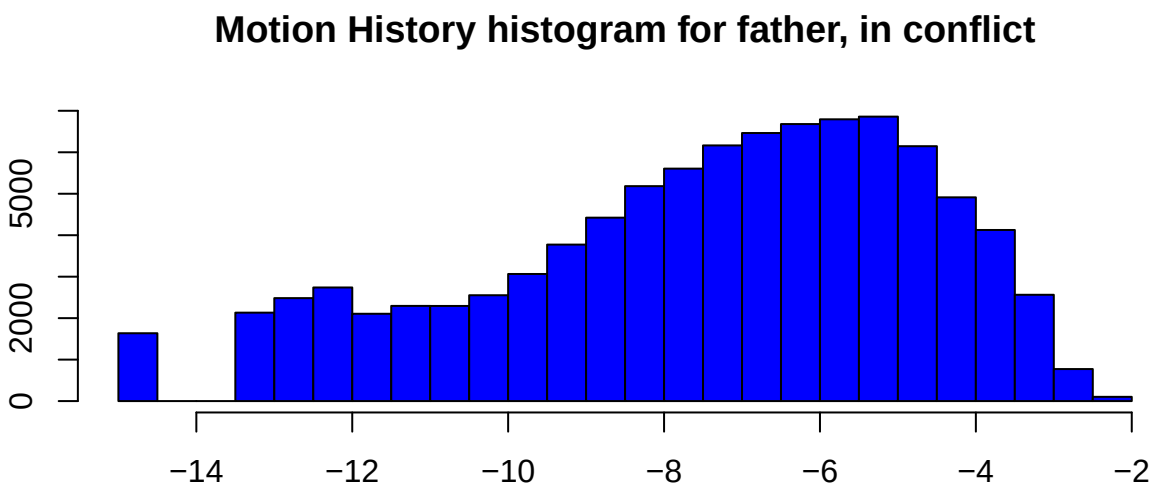

```
hist(data[which(data$LabelVideo=="No Conflict"),]$logMother, col="red", main= "Motion History histogram
```



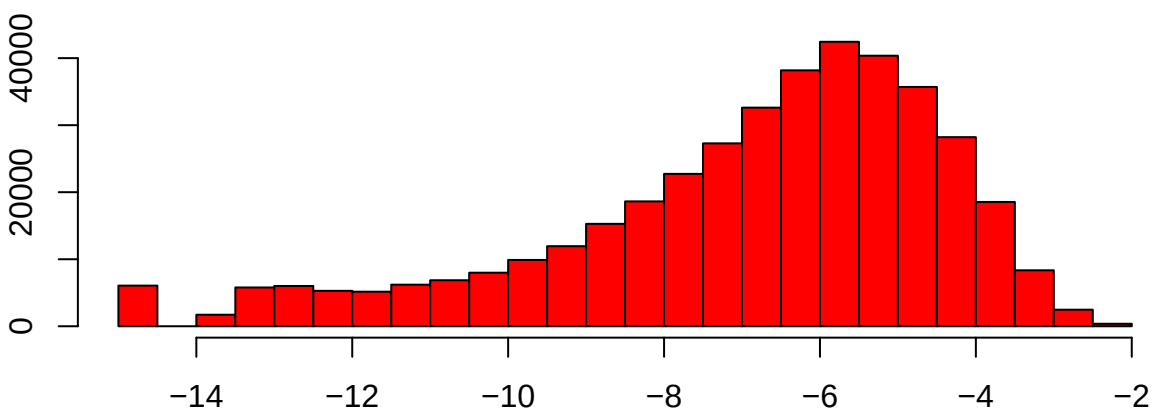

```
hist(data[which(data$LabelVideo=="No Conflict"),]$logChild, col="green", main= "Motion History histogra
```



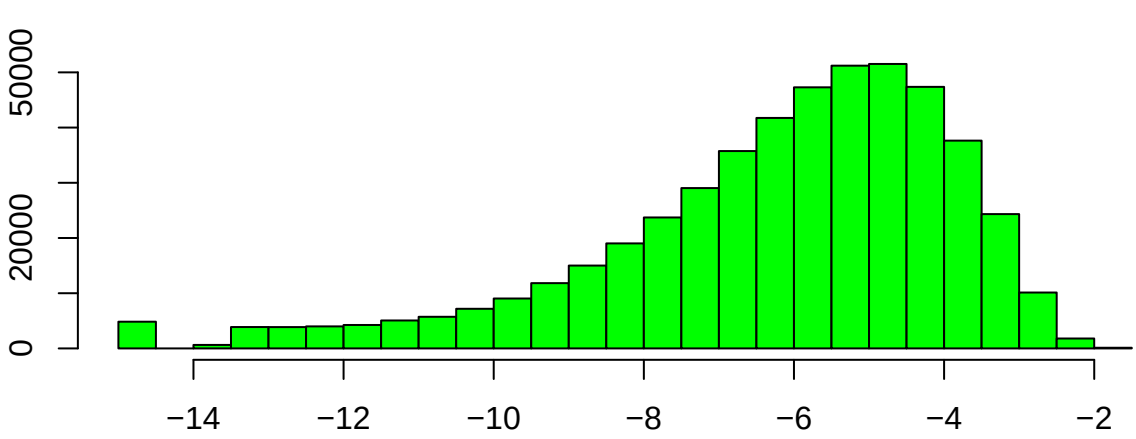

```
hist(data[which(data$LabelVideo=="Conflict"),]$logFather, col="blue", main= "Motion History histogram f
```




```
hist(data[which(data$LabelVideo=="Conflict"),]$logMother, col="red", main= "Motion History histogram fo
```




```
hist(data[which(data$LabelVideo=="Conflict"),]$logChild, col="green", main= "Motion History histogram f
```

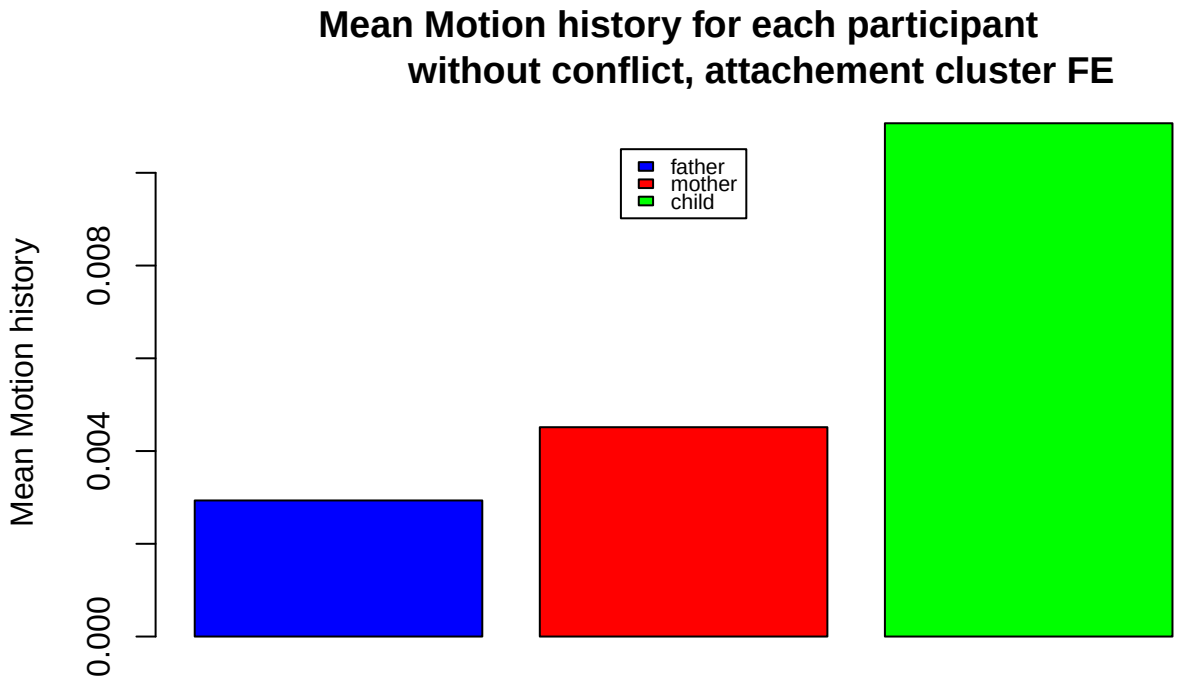


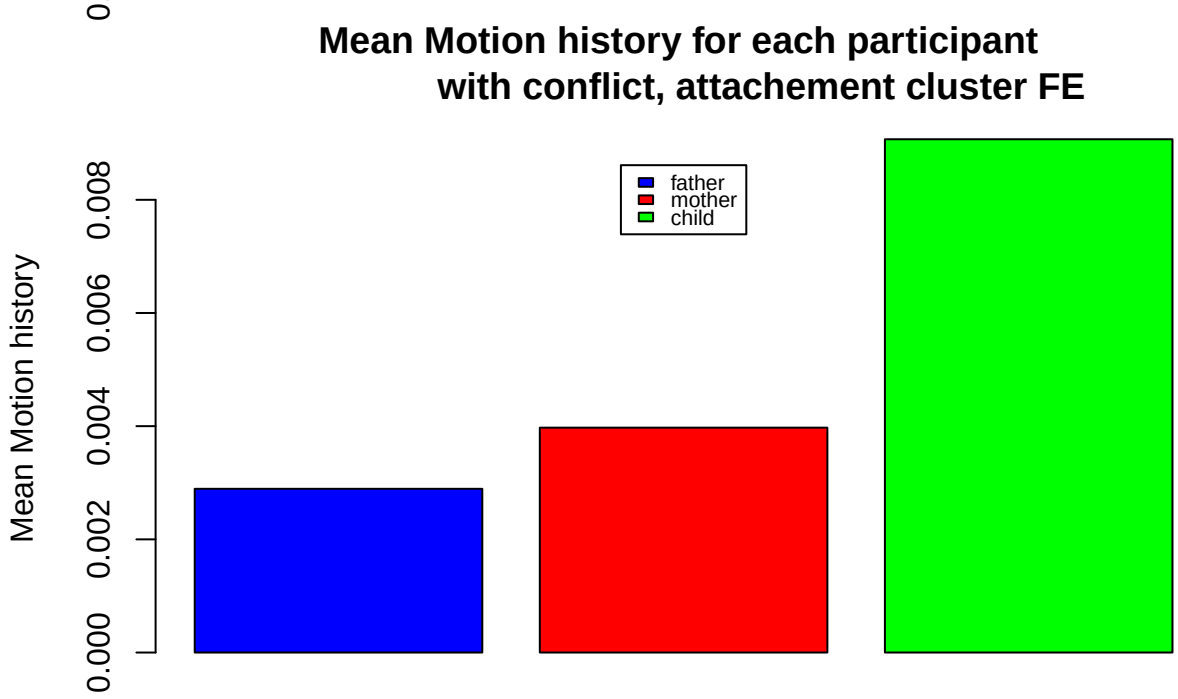

```
table(psycho$attachement_cluster)
```

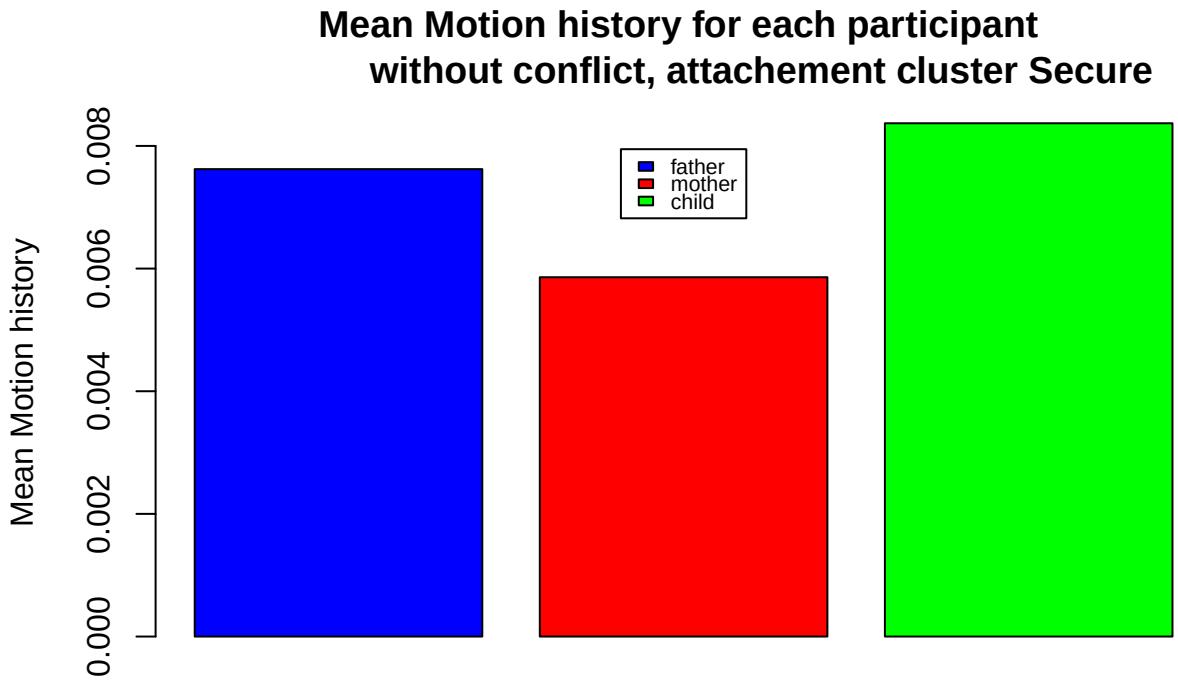
```
##
##        DU      DUAL        FE    Secure Withdrawn
##         1         2        13        15         3
```

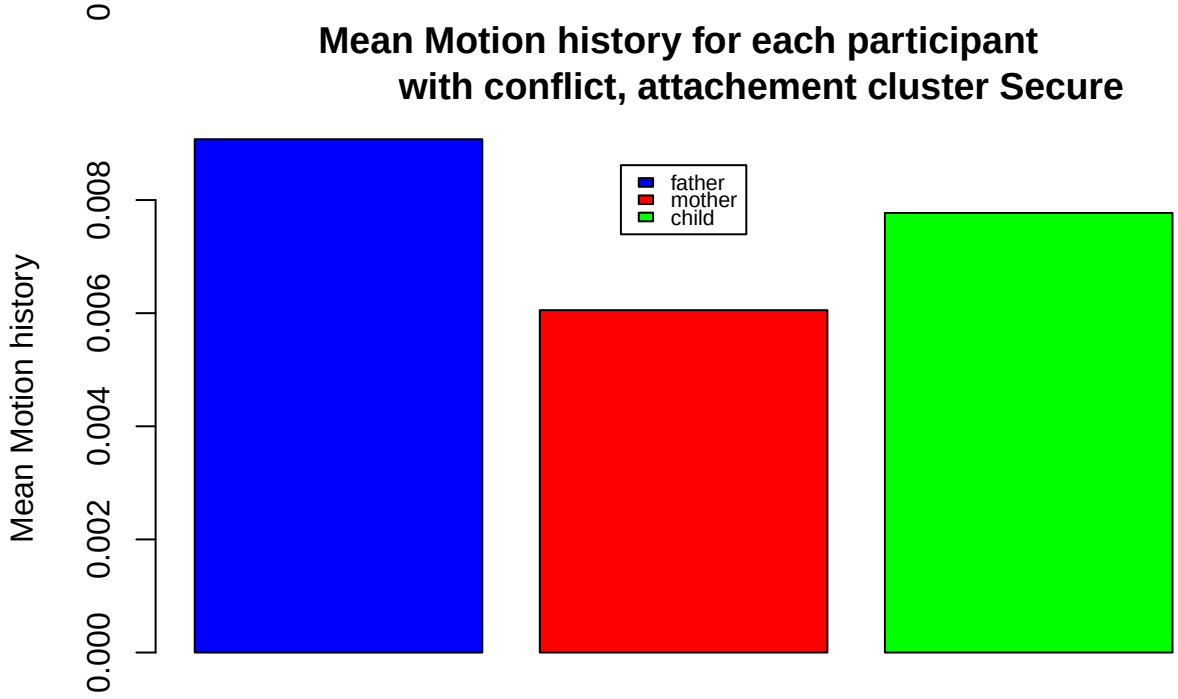
If we exclude dual attachement styles which are more complicated, heterogenous and not very numerous : BRLO041 (Withdrawn Fearful), HAJA052 (Angry Dismissive Fearful). We got 4 attachement styles that we can compare.

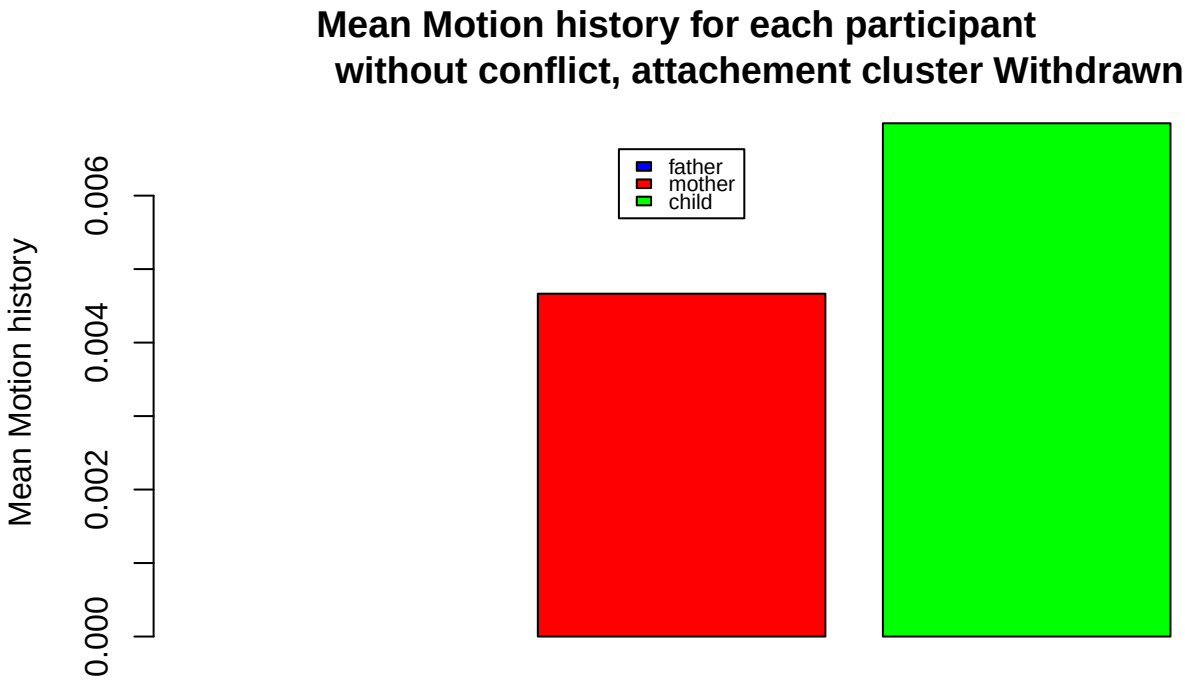
```
attachementStyles <- c("FE", "Secure", "Withdrawn", "DU")
for (i in attachementStyles){
      MeanMotionNoConflict <- c(
           mean(data[which(data$LabelVideo=="No Conflict" & data$attachement_cluster==i),]$father, na.r
           mean(data[which(data$LabelVideo=="No Conflict" & data$attachement_cluster==i),]$mother, na.r
           mean(data[which(data$LabelVideo=="No Conflict" & data$attachement_cluster==i),]$child, na.rm

      MeanMotionConflict <- c(
           mean(data[which(data$LabelVideo=="Conflict"& data$attachement_cluster==i),]$father , na.rm=T
           mean(data[which(data$LabelVideo=="Conflict"& data$attachement_cluster==i),]$mother , na.rm=T
           mean(data[which(data$LabelVideo=="Conflict" & data$attachement_cluster==i),]$child, na.rm=TRU

      #print(i)
      #print (MeanMotionNoConflict)
      #print (MeanMotionConflict)

      par(mar=c(5,4,4,1))
      barplot (MeanMotionNoConflict, beside=FALSE, ylab = "Mean Motion history", col=colOrderList, main=
               without conflict, attachement cluster", i))
      par(mar=c(1,0.5,0.5,1))
      legend("top", inset=.05, ParticipantsList,
             fill=colOrderList, cex=0.7)

      par(mar=c(5,4,4,1))
      barplot (MeanMotionConflict, beside=TRUE, ylab = "Mean Motion history", col=colOrderList, main=pas
               with conflict, attachement cluster", i))
      par(mar=c(1,0.5,0.5,1))
      legend("top", inset=.05, ParticipantsList,
             fill=colOrderList, cex=0.7)
}
```

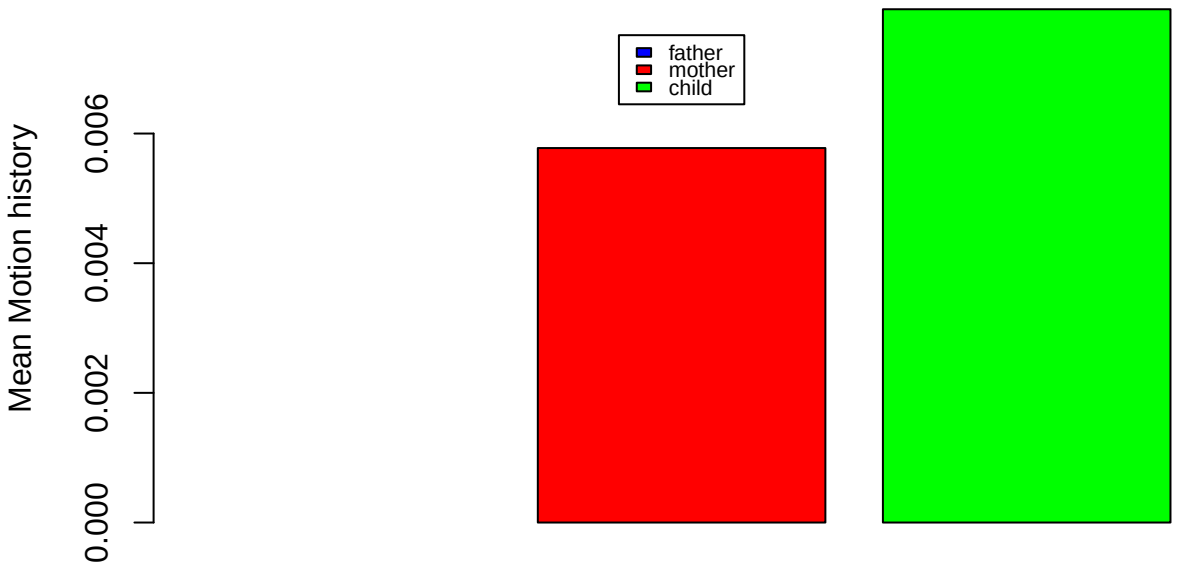

Mean Motion history for each participant
without conflict, attachement cluster FE
Mean Motion history
0.000
0.004
0.008
father
mother
child

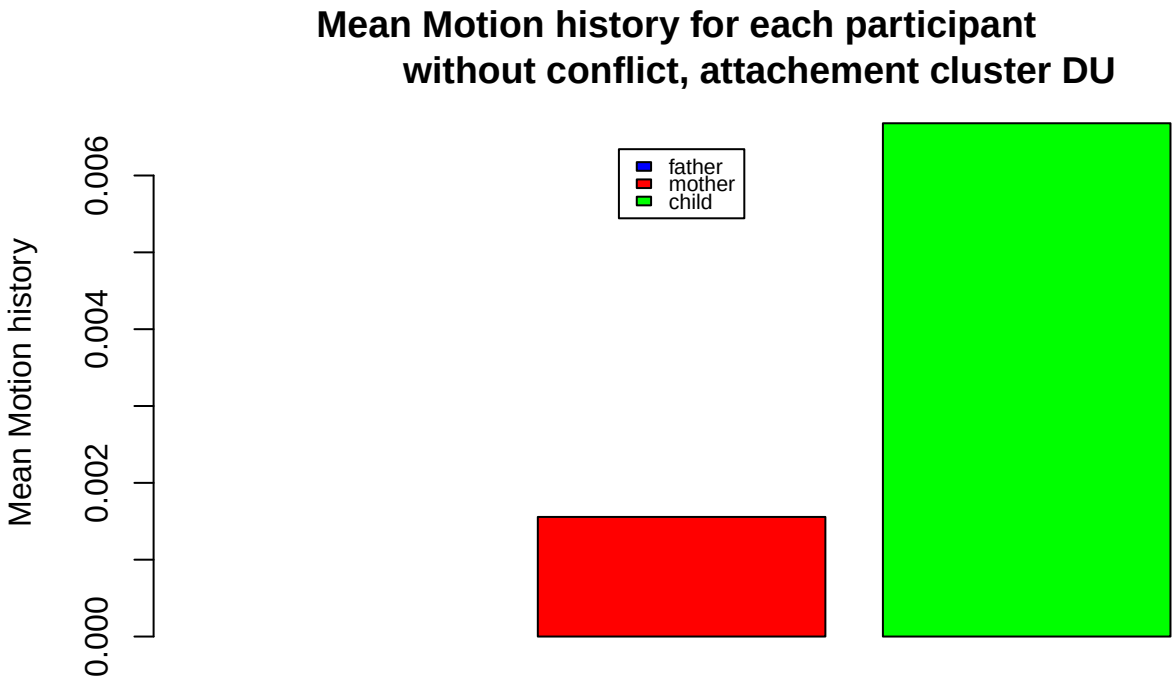

Mean Motion history for each participant
with conflict, attachement cluster FE
Mean Motion history
0.000
0.002
0.004
0.006
0.008
father
mother
child

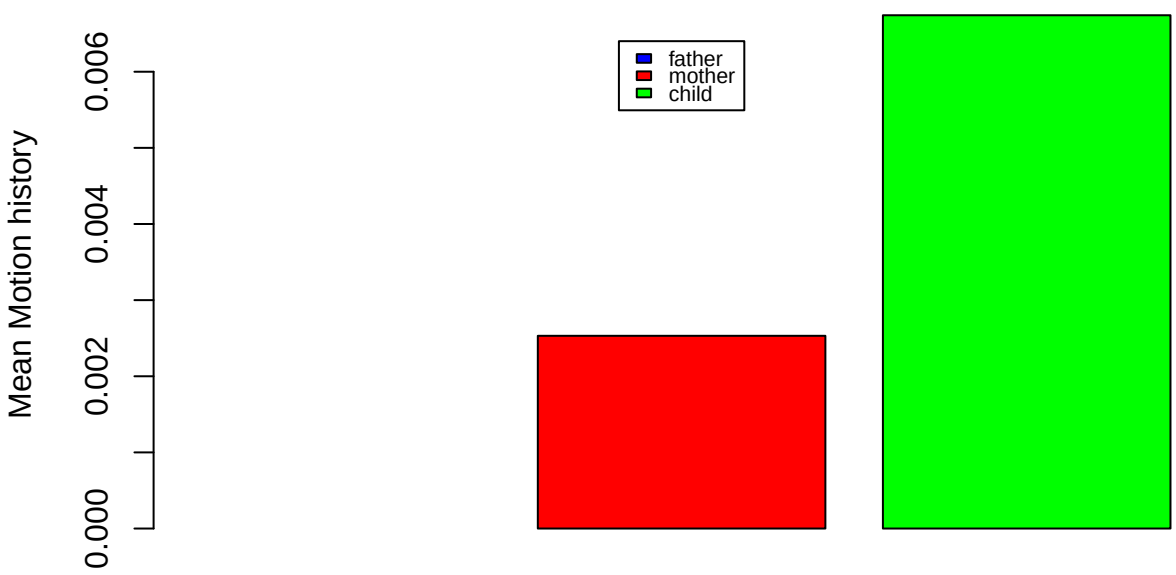

Mean Motion history for each participant
without conflict, attachement cluster Secure
Mean Motion history
0.000
0.002
0.004
0.006
0.008
father
mother
child


Mean Motion history for each participant
with conflict, attachement cluster Secure
Mean Motion history
0.000
0.002
0.004
0.006
0.008
father
mother
child

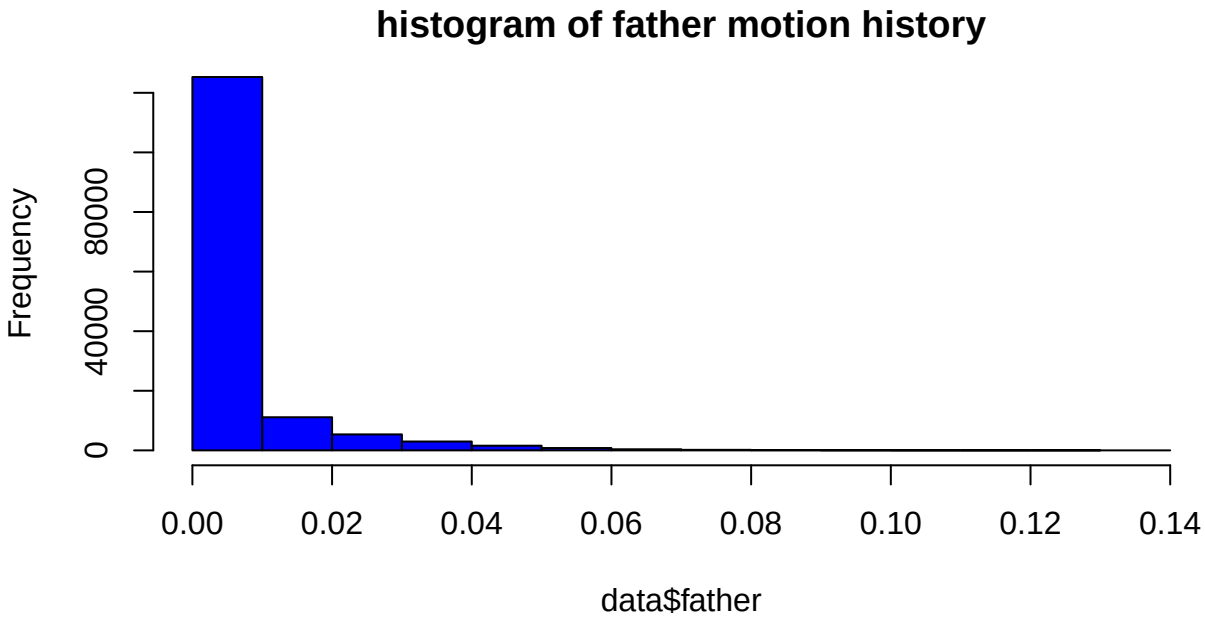

Mean Motion history for each participant
without conflict, attachement cluster Withdrawn
Mean Motion history
0.000
0.002
0.004
0.006
father
mother
child

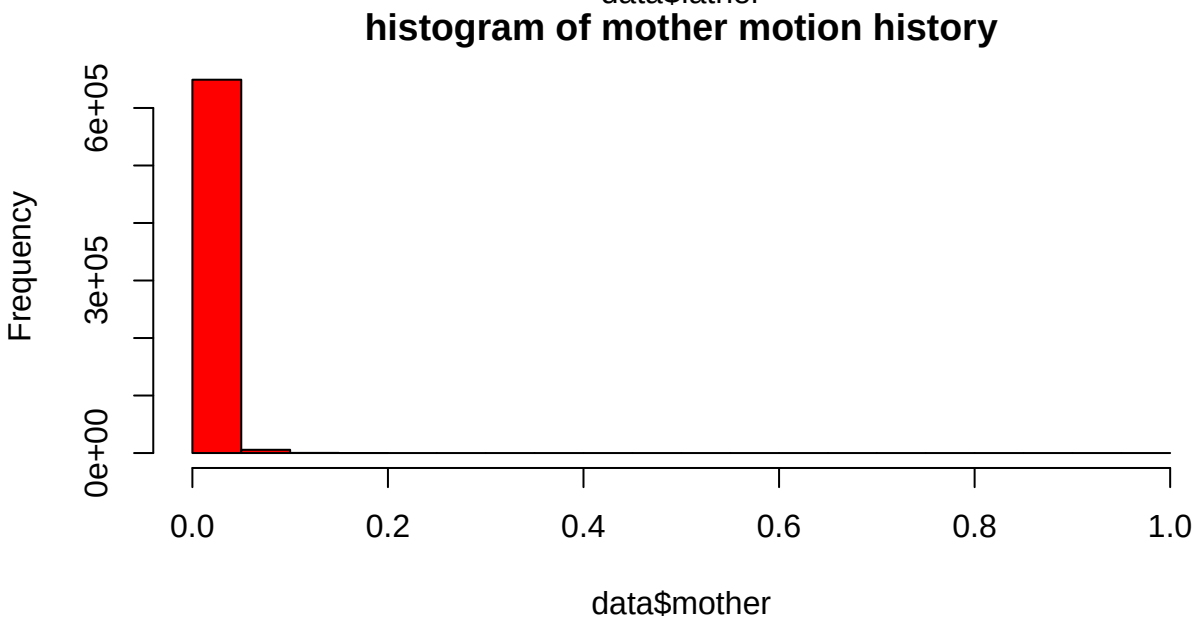

Mean Motion history for each participant
with conflict, attachement cluster Withdrawn
Mean Motion history
0.000
0.002
0.004
0.006
father
mother
child

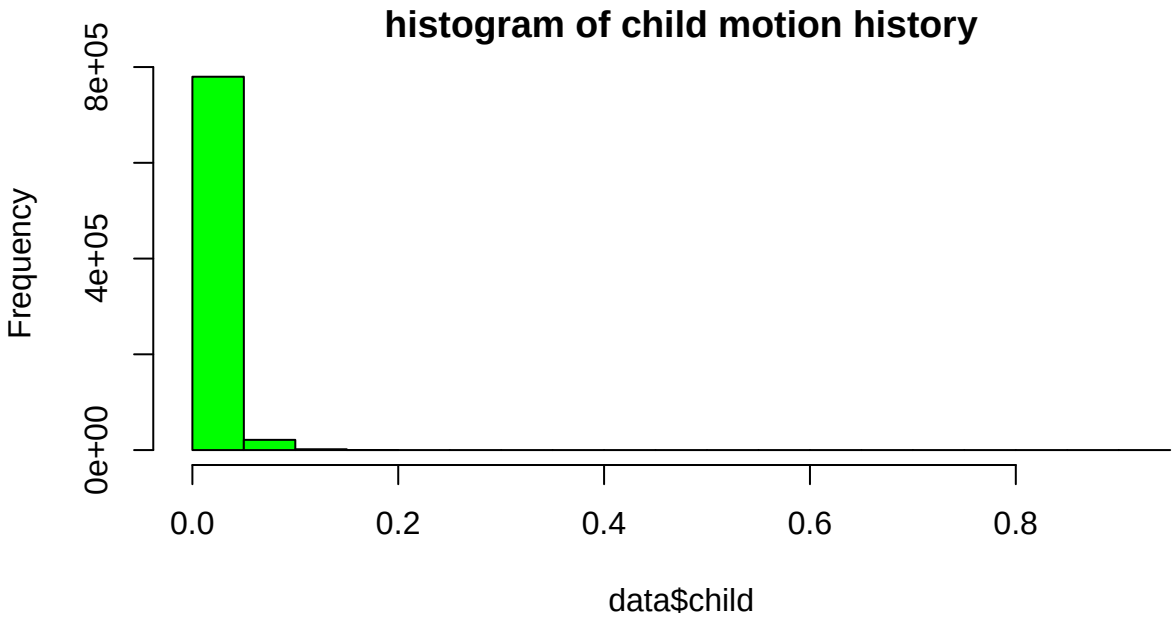

Mean Motion history for each participant
without conflict, attachement cluster DU
Mean Motion history
0.000
0.002
0.004
0.006
father
mother
child


Mean Motion history for each participant
with conflict, attachement cluster DU
Mean Motion history
0.000
0.002
0.004
0.006
father
mother
child

Motion history histogram by frame (raw data), all videos



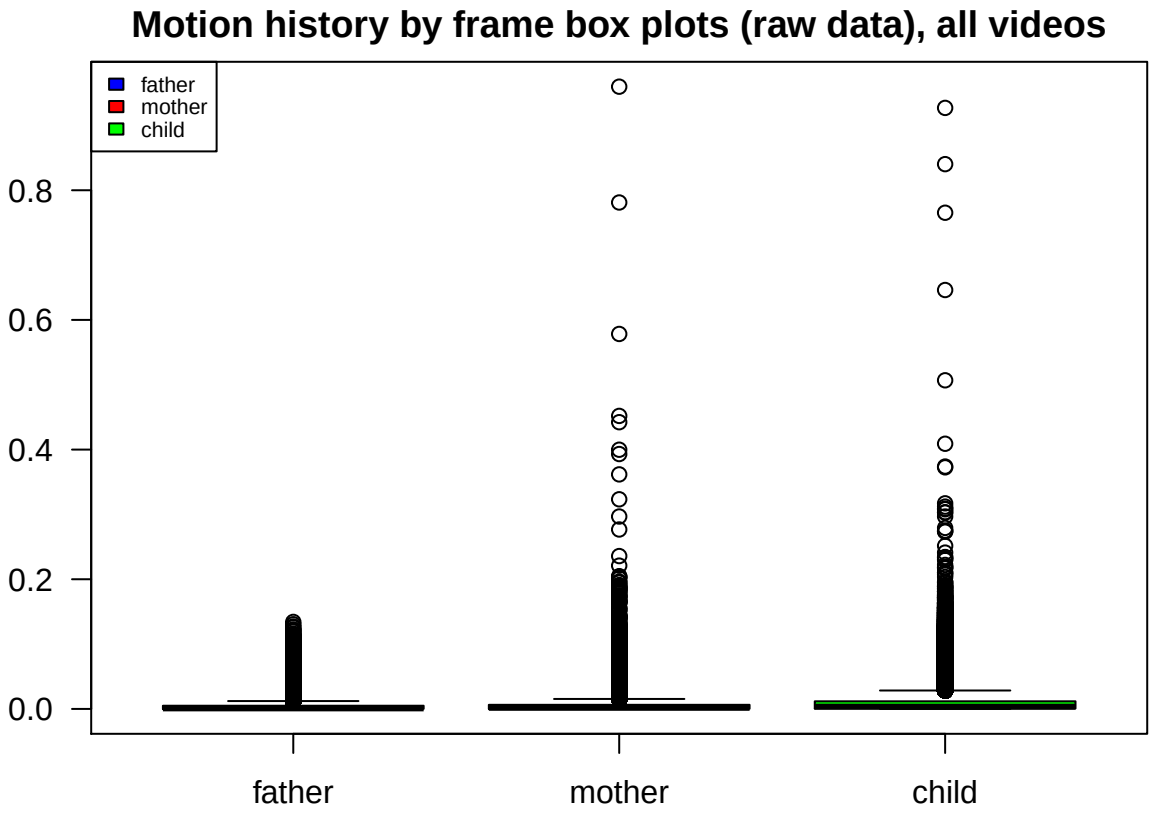




The motion history is not normalized at all. Most of motions are very small but some of them are much big (long tail). This is very usual with this algorithm extraction motion history.

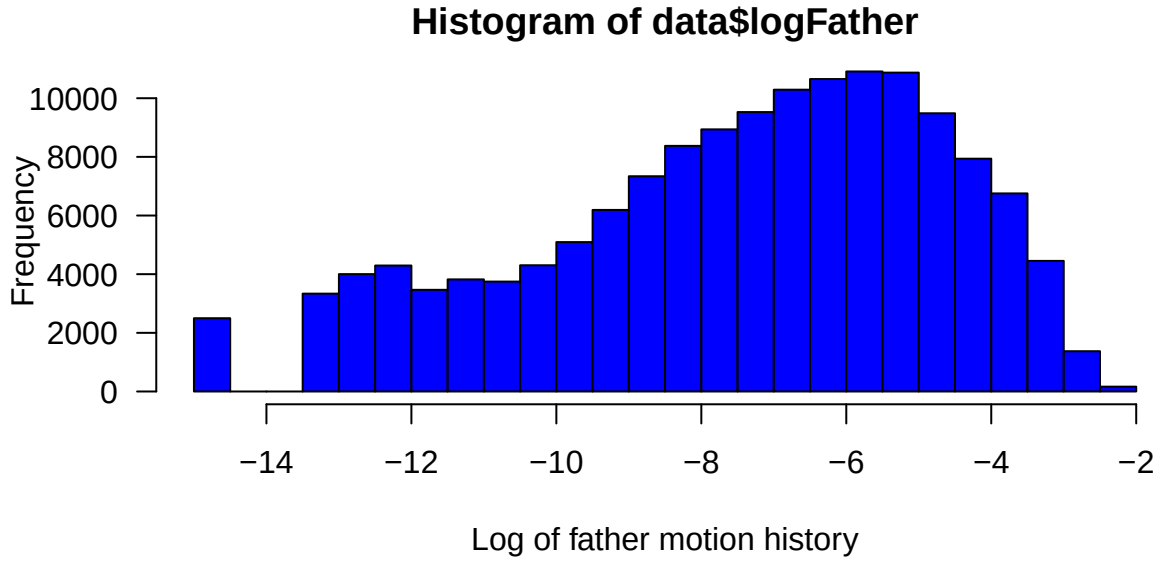
The subjects data are very similar.

```
par(mar=c(3,3,2,2))
boxplot(data$father, data$mother, data$child,
        col=colOrderList,
        names=ParticipantsList,
        main= "Motion history by frame box plots (raw data), all videos", las=1)
par(mar=c(1,0.5,0.5,1))
legend("topleft", ParticipantsList, fill=colOrderList, cex=0.7)
```

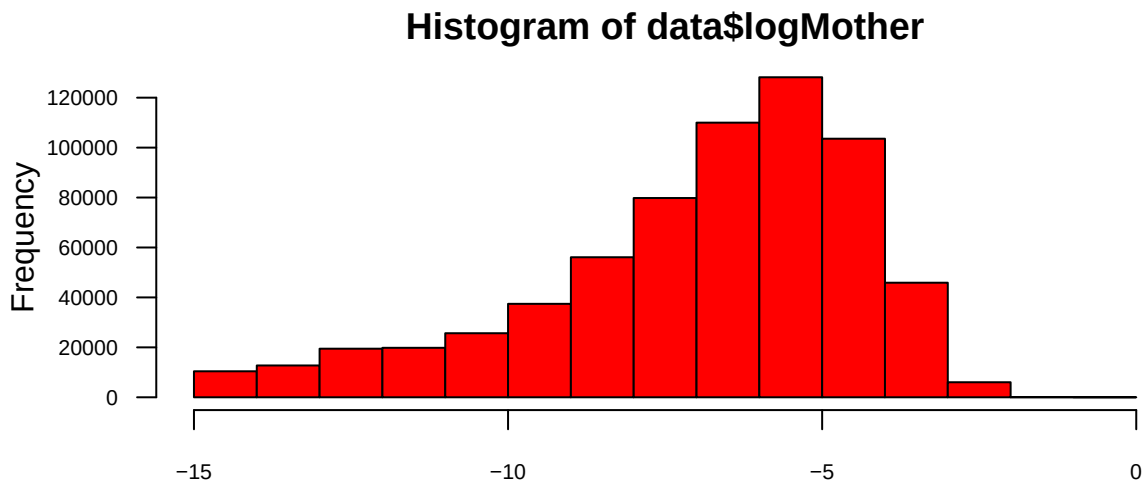


The subjects data distribution are very similar.

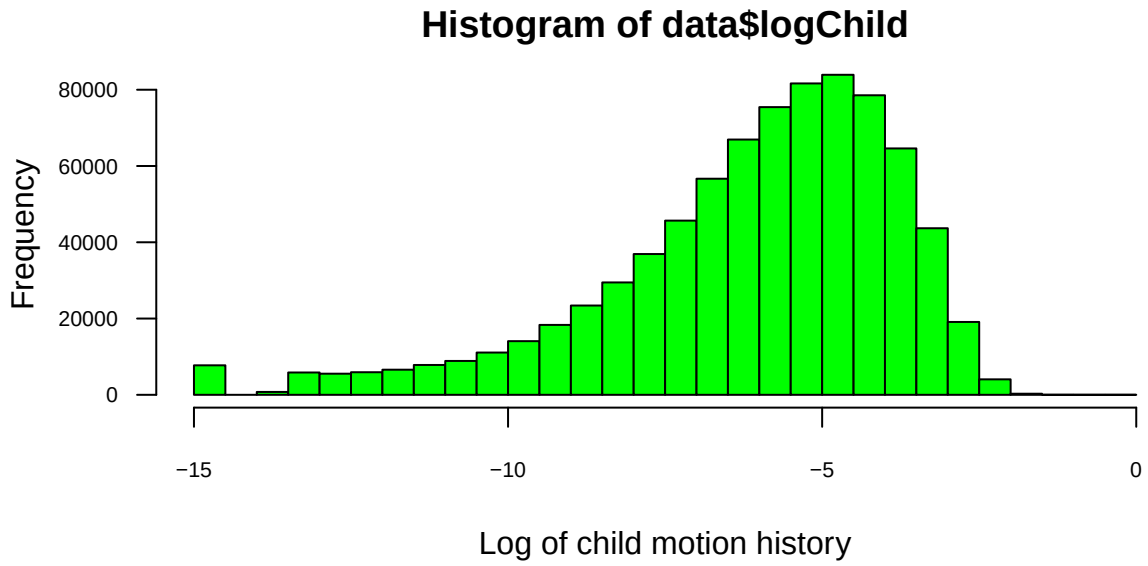
```
par(mar=c(4,4,2,2))
hist(data$logFather, col="blue", las=1, xlab="Log of father motion history")
```




```
hist(data$logMother, col="red", las=1, xlab="Log of mother motion history", cex.axis=0.7)
```



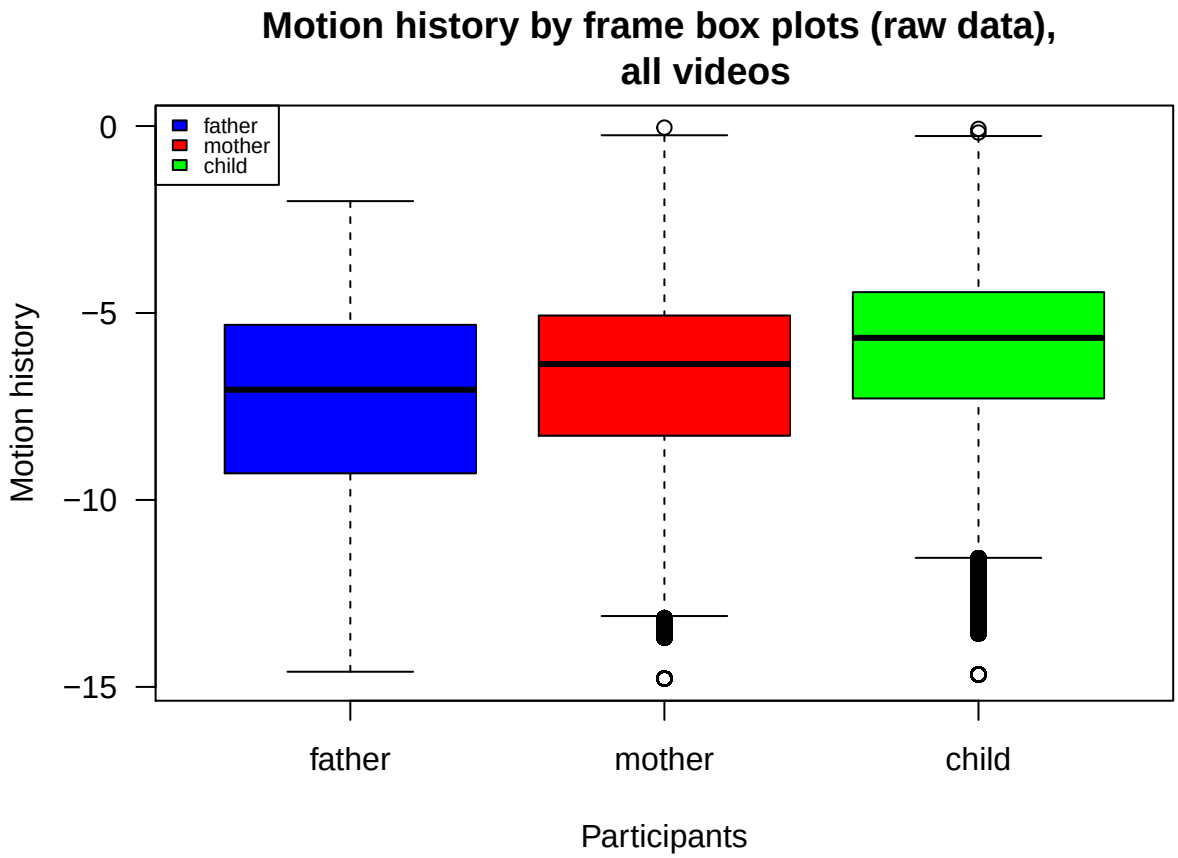

```
hist(data$logChild, col="green", las=1, xlab="Log of child motion history", cex.axis=0.7)
```



When doing the log, we almost normalized the distribution. We couldn't do the log on 0. The result would gave -Inf. We shifted all the distribution to the right by adding the half of the minimum after 0 of the distribution.

$\text{data}childShifted < -data\text{child} + \min(\text{data}child[which(data\text{child} > 0)])/2$

```
par(mar=c(4,4,3,2))
boxplot(data$logFather, data$logMother, data$logChild,
        col=colOrderList,
        names=ParticipantsList,
        main= "Motion history by frame box plots (raw data),
        all videos", las=1, xlab="Participants", ylab="Motion history")
par(mar=c(1,0.5,0.5,1))
legend("topleft", ParticipantsList, fill=colOrderList, cex=0.7)
```



Sliding interval

```
## REMINDER:
# SlidingInterval <- function(subject, indexOfvideos=1:NumberOfvideos, interval, data) with :
# subject : subject studied (patient, mother, father or therapist)
# indexOfvideos : list of videos studied (element eg. 3 or list eg 1:3 or c(1,2,4))
# interval : number of frames in the studied interval
# data : data frame where there is data
# repalce by 5 after
slidedFather <- SlidingInterval("father", 1 , 5, data)
slidedChild <- SlidingInterval("child", 1 , 5, data)

summary(slidedFather)
```

```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
## 2.600e-07 1.551e-05 1.333e-04 2.550e-03 8.358e-04 9.641e-02
```

```
summary(slidedChild)
```

```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
## 5.500e-07 2.057e-04 1.127e-03 3.713e-03 3.886e-03 7.121e-02
```

Non overlapping interval

```
fatherFive <- MeanMotionByTime("father", indexOfvideos=1, interval=5, data)
childFive <- MeanMotionByTime("child", indexOfvideos=1, interval=5, data)

summary(childFive)
```

```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
## 1.110e-06 2.049e-04 1.118e-03 3.713e-03 3.900e-03 7.121e-02
```

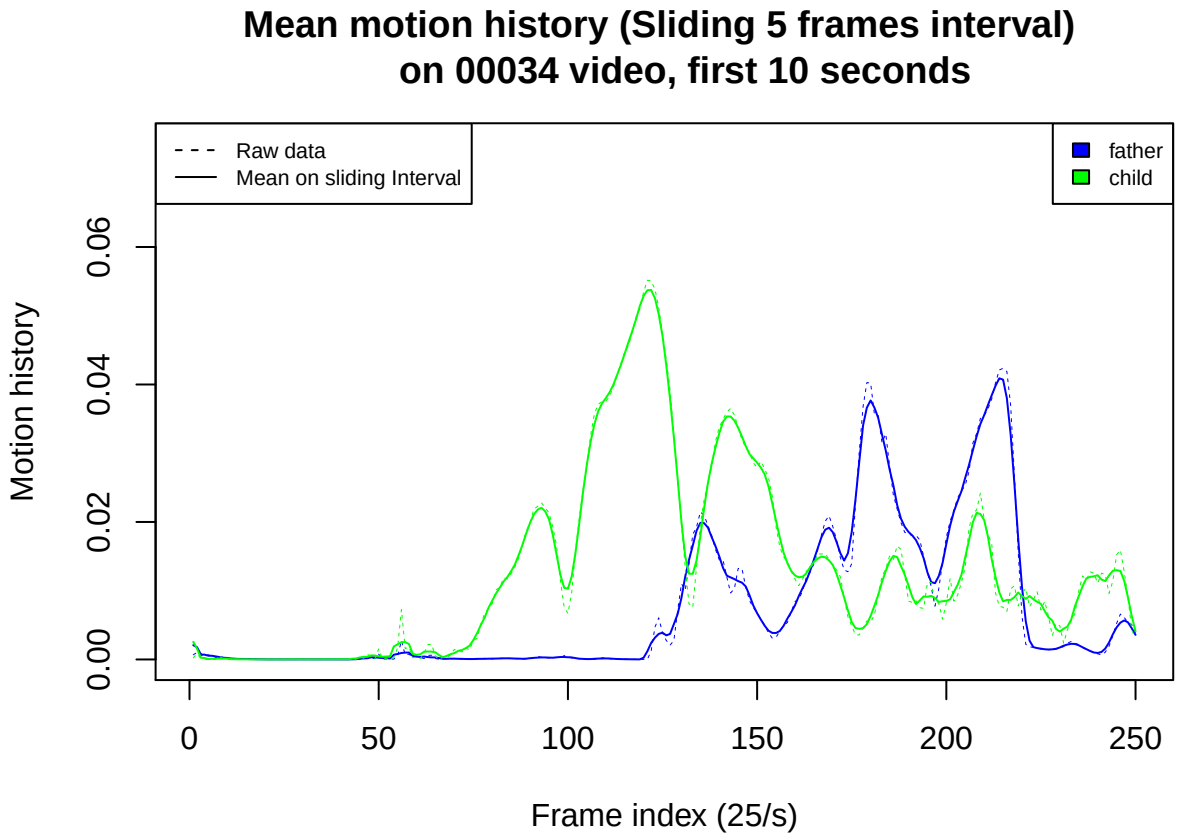
```
summary(fatherFive)
```

```
##      Min.   1st Qu.    Median      Mean   3rd Qu.      Max.
## 2.600e-07 1.551e-05 1.330e-04 2.550e-03 8.329e-04 9.137e-02
```

Focus on the motion history of the first 10 seconds of the first video 00034

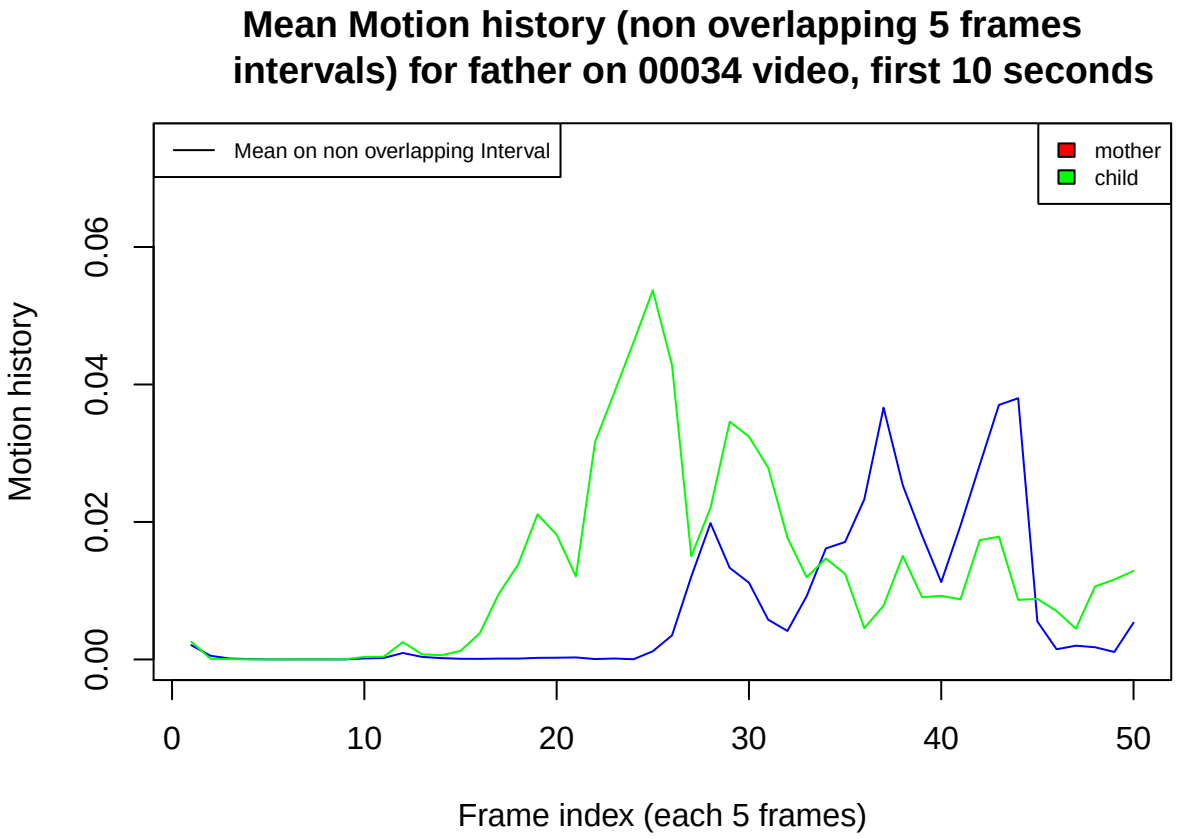
Sliding interval function on a 5 frames interval

```
par(mar=c(4,4,4,2))
plot(1:250, data$father[3:252], main="Mean motion history (Sliding 5 frames interval)
     on 00034 video, first 10 seconds ", xlab="Frame index (25/s)",
     ylab="Motion history",
     col="blue", type="l", lty=2, lwd=0.5, ylim=c(0, 0.075))
lines(slidedFather[1:250],  col="blue", lty=1)
lines(slidedChild[1:250],  col="green", lty=1)
lines(data$child[3:252],  col="green", lty=2, lwd=0.5)
legend("topleft", c("Raw data", "Mean on sliding Interval"), lty=c(2, 1), cex=0.7)
legend("topright", ParticipantsList[c(1,3)], fill=colOrderList[c(1,3)], cex=0.7)
```



Non overlapping interval function on a 5 frames interval

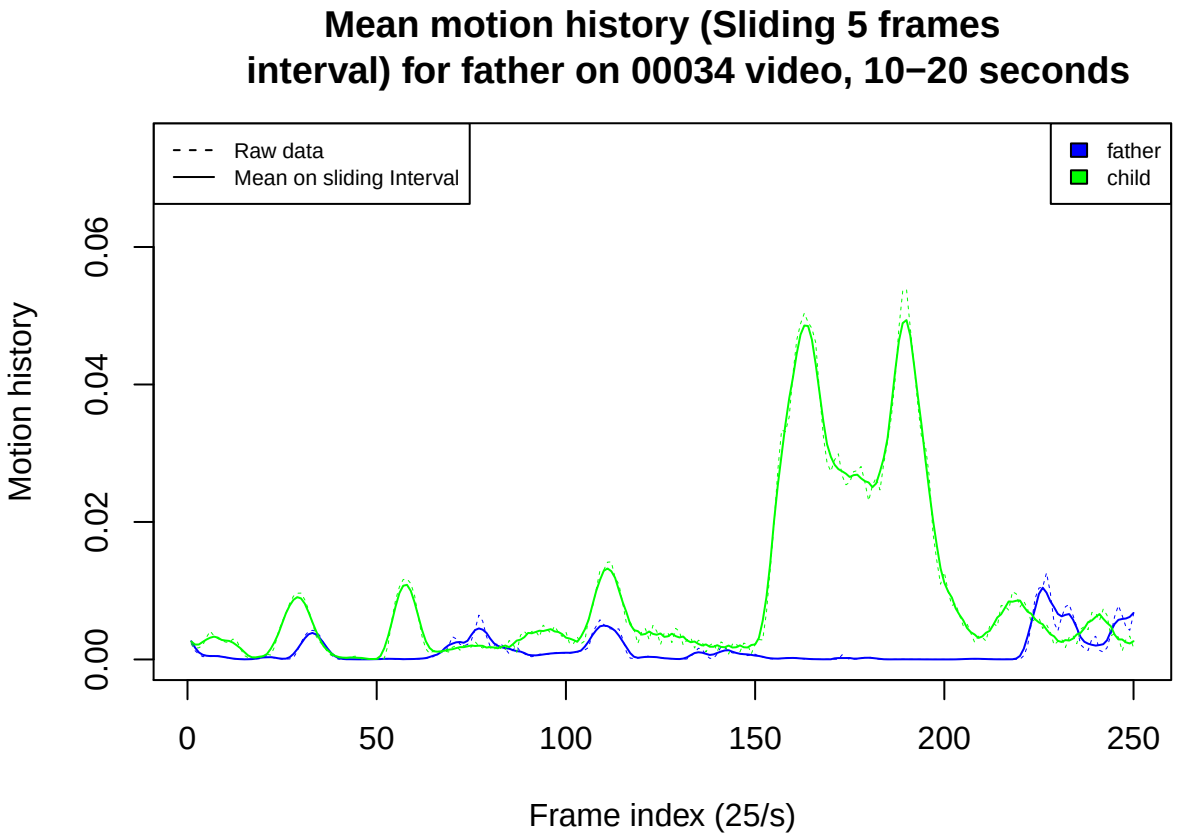
```
par(mar=c(4,4,4,2))
plot (1:50, fatherFive[1:50], type="l", col="blue",
main="Mean Motion history (non overlapping 5 frames
      intervals) for father on 00034 video, first 10 seconds",
ylab="Motion history", xlab="Frame index (each 5 frames)", ylim=c(0, 0.075))
lines(childFive[1:50], col="green", lty=1)
legend("topleft", "Mean on non overlapping Interval" , lty=1, cex=0.7)
legend("topright", ParticipantsList[c(2,3)], fill=colOrderList[2:3], cex=0.7)
```



Motion history of the father during 10-20 seconds of the first video 00034

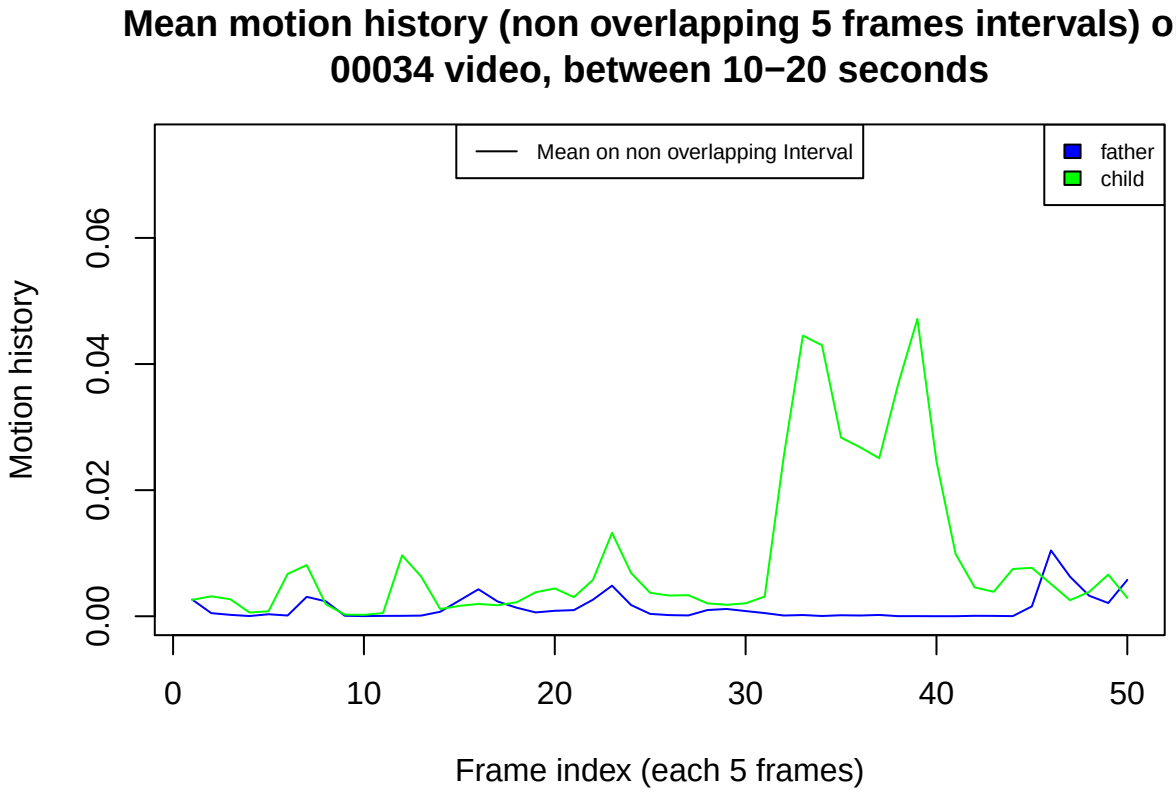
Non overlapping interval function on a 5 frames interval

```
par(mar=c(4,4,4,2))
plot(1:250, data$father[253:502], main="Mean motion history (Sliding 5 frames
     interval) for father on 00034 video, 10-20 seconds", xlab="Frame index (25/s)",
     ylab="Motion history", col="blue", type="l", lty=2, lwd=0.5, ylim=c(0, 0.075))
lines(slidedFather[251:500],  col="blue", lty=1)
lines(data$child[253:502],  col="green", lty=2, lwd=0.5)
lines(slidedChild[251:500],  col="green", lty=1)
legend("topleft", c("Raw data", "Mean on sliding Interval") , lty=c(2, 1), cex=0.7)
legend("topright", ParticipantsList[c(1,3)], fill=colOrderList[c(1,3)], cex=0.7)
```



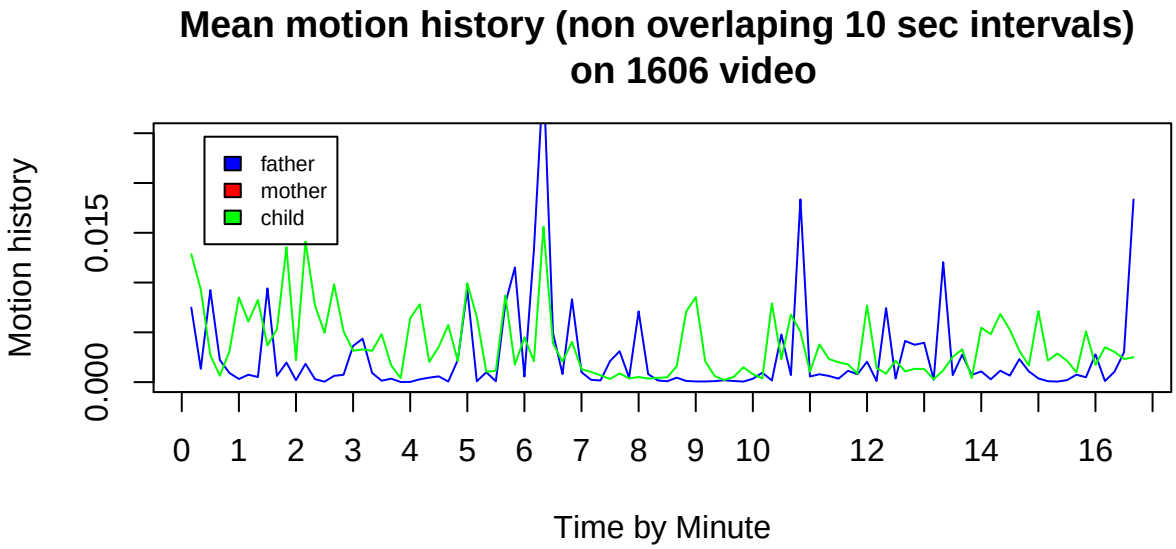
Non overlapping interval function on a 5 frames interval

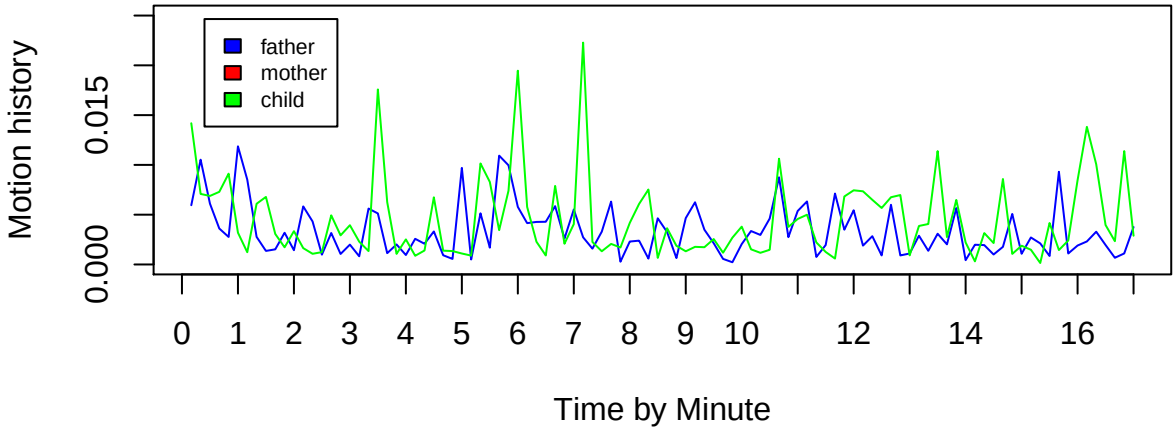
```
plot (1:50, fatherFive[51:100], type="l", col="blue",
main="Mean motion history (non overlapping 5 frames intervals) on
00034 video, between 10-20 seconds",
ylab="Motion history", xlab="Frame index (each 5 frames)", ylim=c(0, 0.075))
lines(childFive[51:100], col="green", lty=1)
legend("top", "Mean on non overlapping Interval" , lty=1, cex=0.7)
legend("topright", ParticipantsList[c(1,3)], fill=colOrderList[c(1,3)], cex=0.7)
```

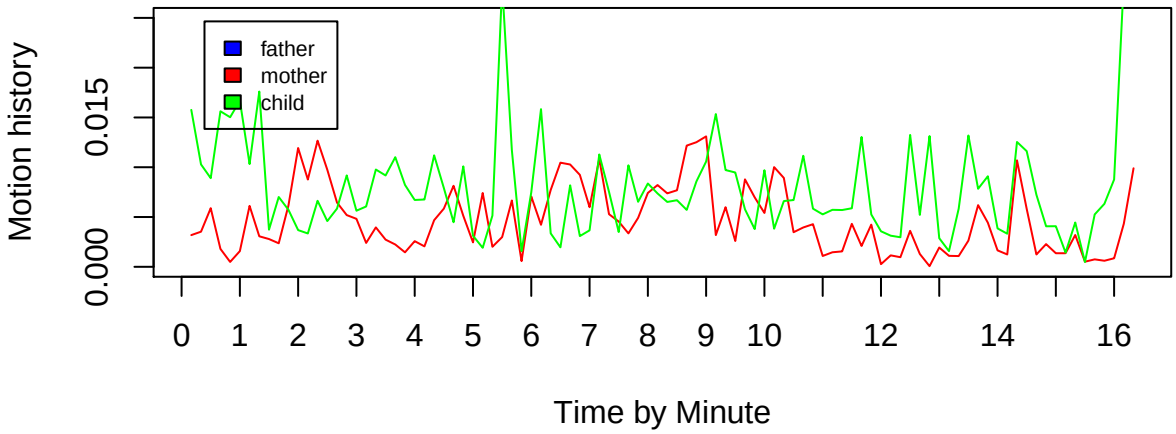


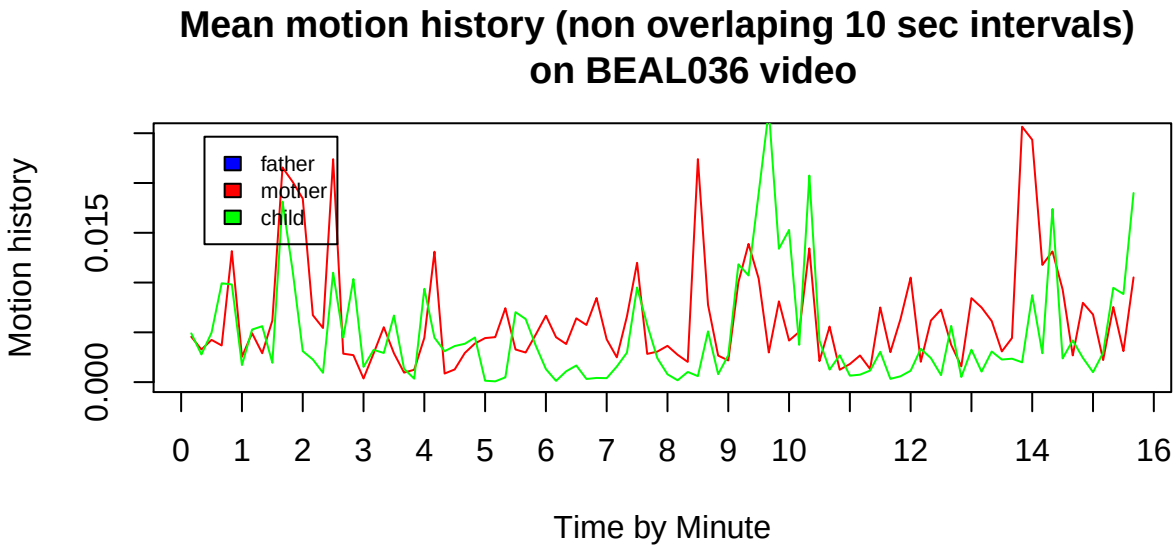
Mean motion history by 10 sec plots

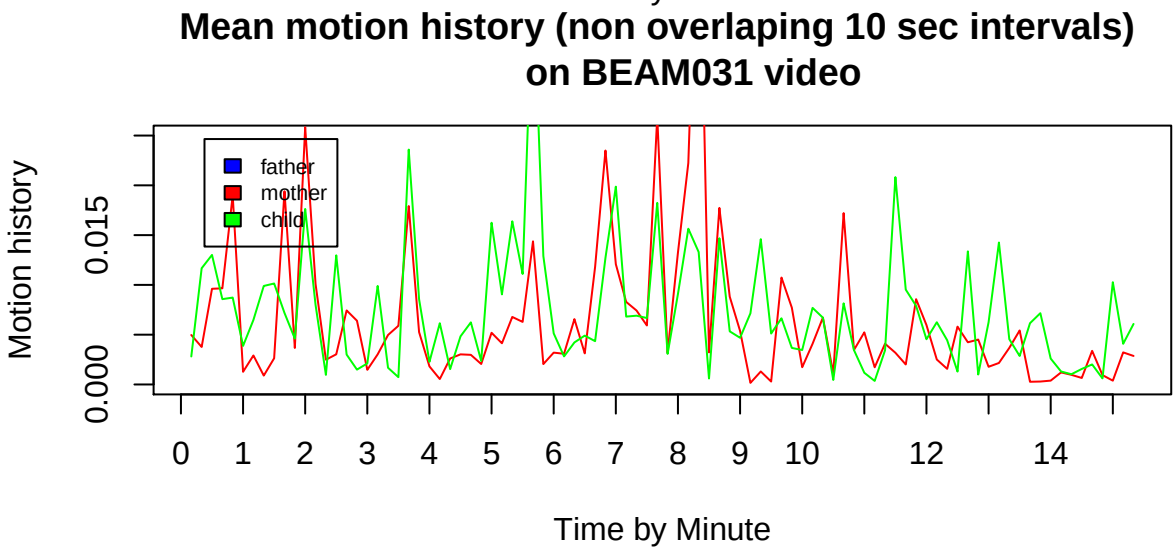
```
for (i in 1:NumberOfvideos){
  fatherMinute<- MeanMotionByTime("father", indexOfvideos=i, interval=250, data)

  motherMinute<- MeanMotionByTime("mother", indexOfvideos=i, interval=250, data)

  childMinute<- MeanMotionByTime("child", indexOfvideos=i, interval=250, data)

  par(mar=c(4,4,4,2))
      plot ((1:length(fatherMinute)/6), fatherMinute, type="l", col="blue",
      main=paste("Mean motion history (non overlaping 10 sec intervals)
      on ", families[i], " video" , sep=""),
      ylab="Motion history", xlab="Time by Minute", ylim=c(0, 25E-03),
      xaxp=c(0, (round(length(fatherMinute)/6)), round((length(fatherMinute)/6))))
      lines((1:length(fatherMinute)/6), motherMinute, col="red")
      lines((1:length(fatherMinute)/6), childMinute, col="green")
      legend("topleft", inset=.05, ParticipantsList[1:3],
             fill=colOrderList[1:3], cex=0.7)}
```

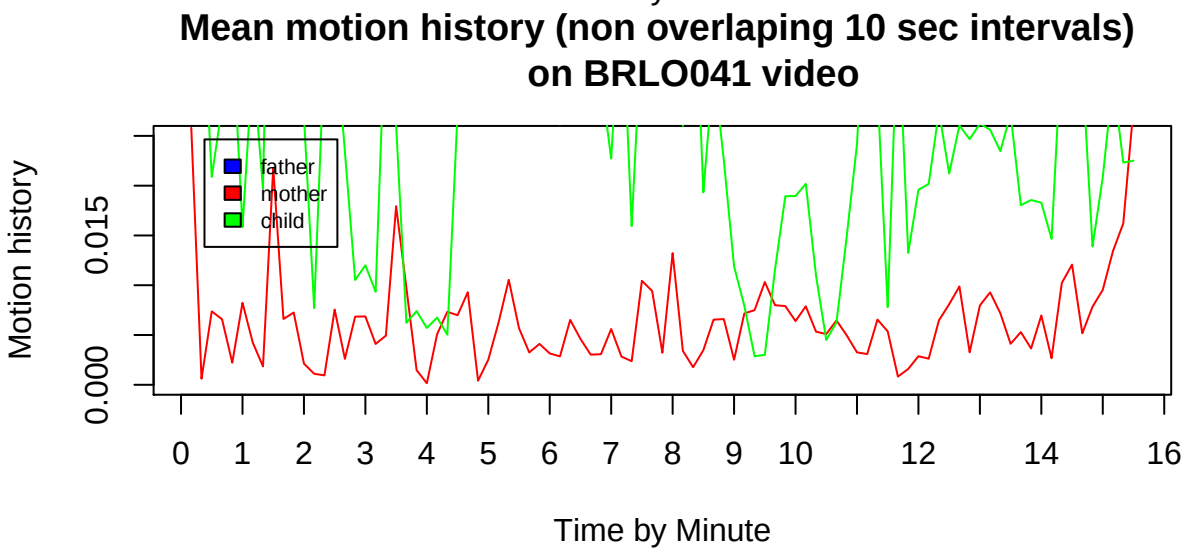

Mean motion history (non overlaping 10 sec intervals)
on 1606 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

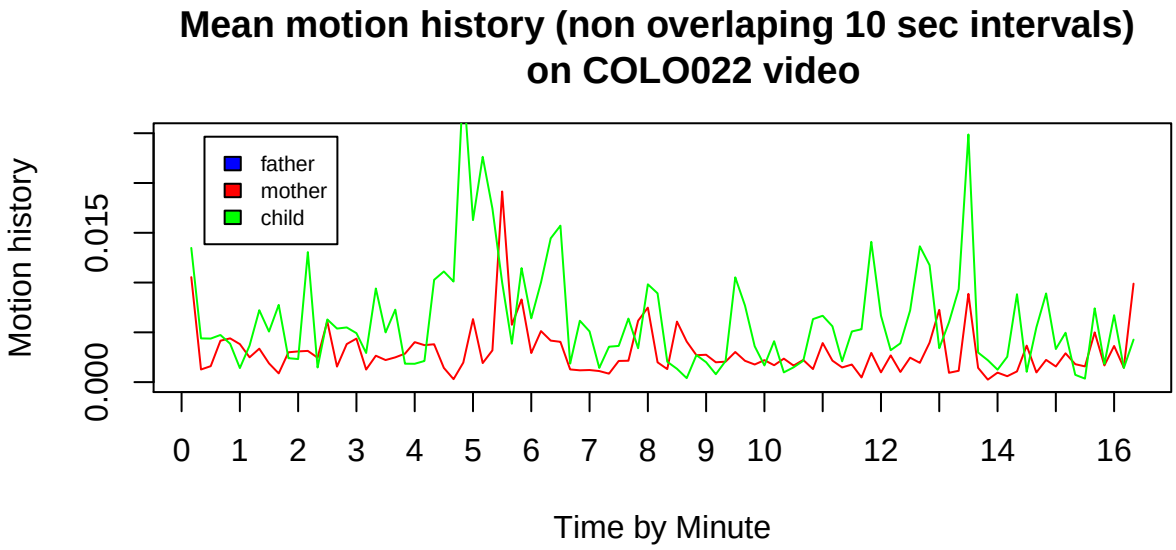

Mean motion history (non overlaping 10 sec intervals)
on BAJE059 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

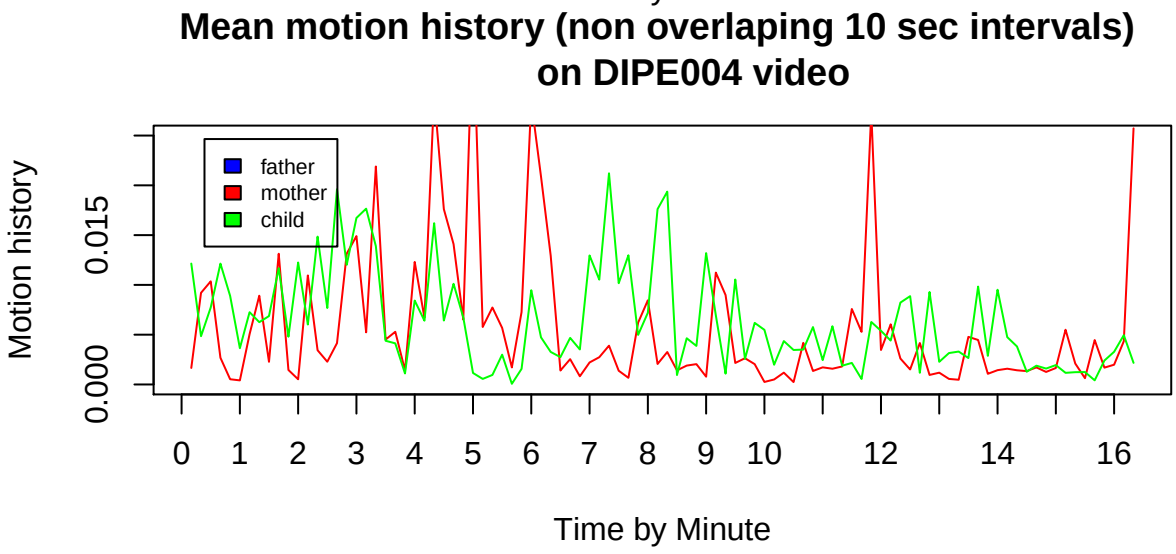

Mean motion history (non overlaping 10 sec intervals)
on BALU062 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

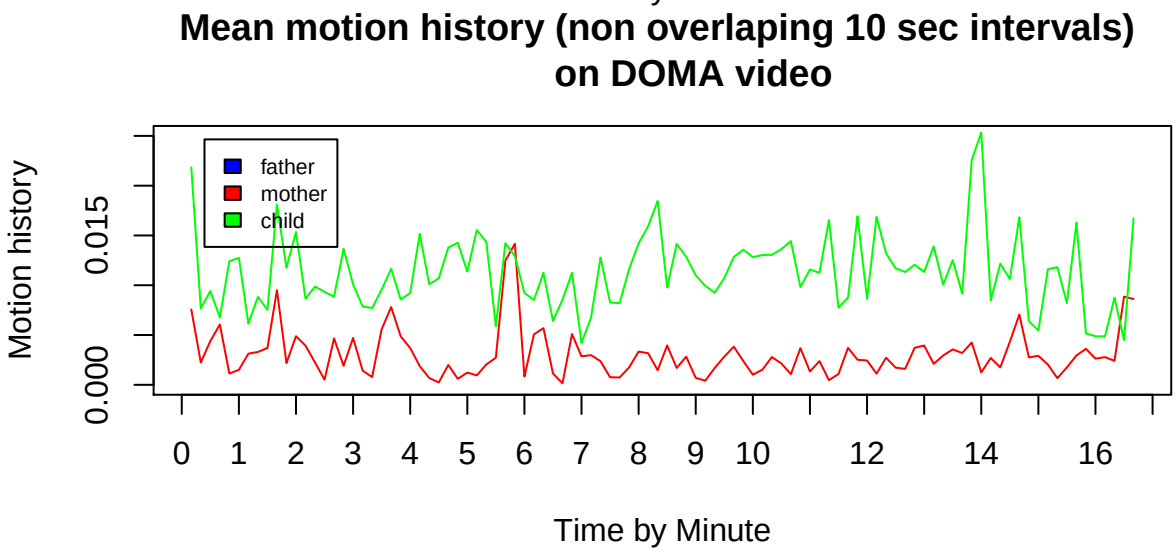

Mean motion history (non overlaping 10 sec intervals)
on BEAL036 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

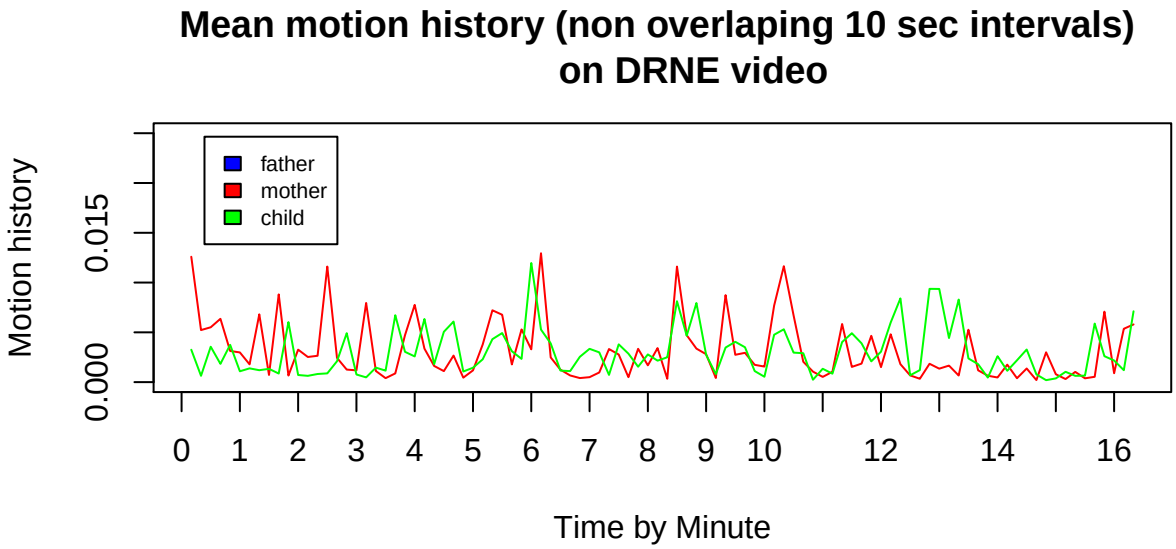

Mean motion history (non overlaping 10 sec intervals)
on BEAM031 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14
Time by Minute

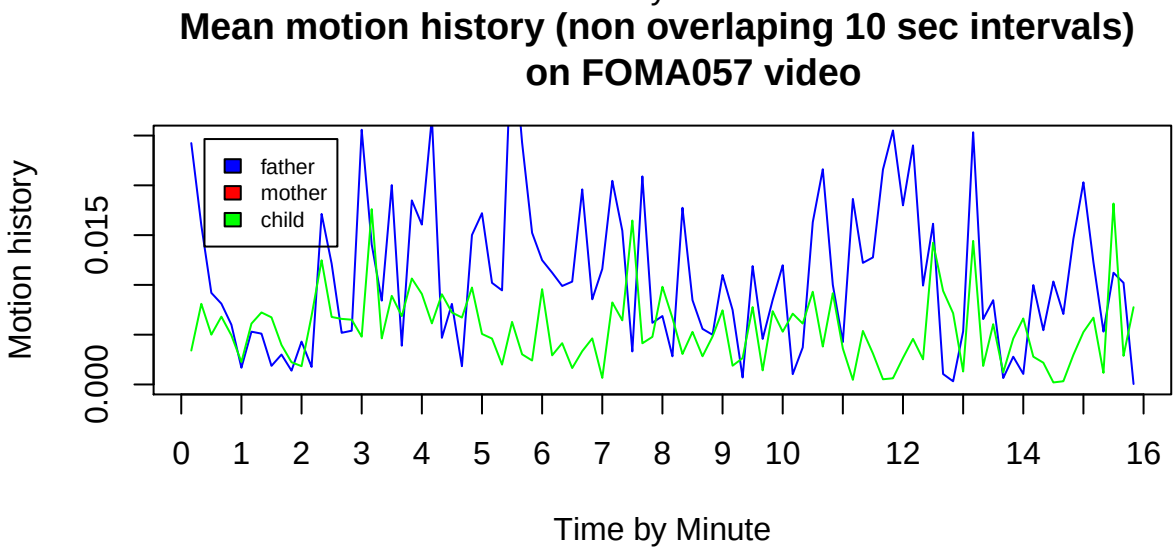

Mean motion history (non overlaping 10 sec intervals)
on BRLO041 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

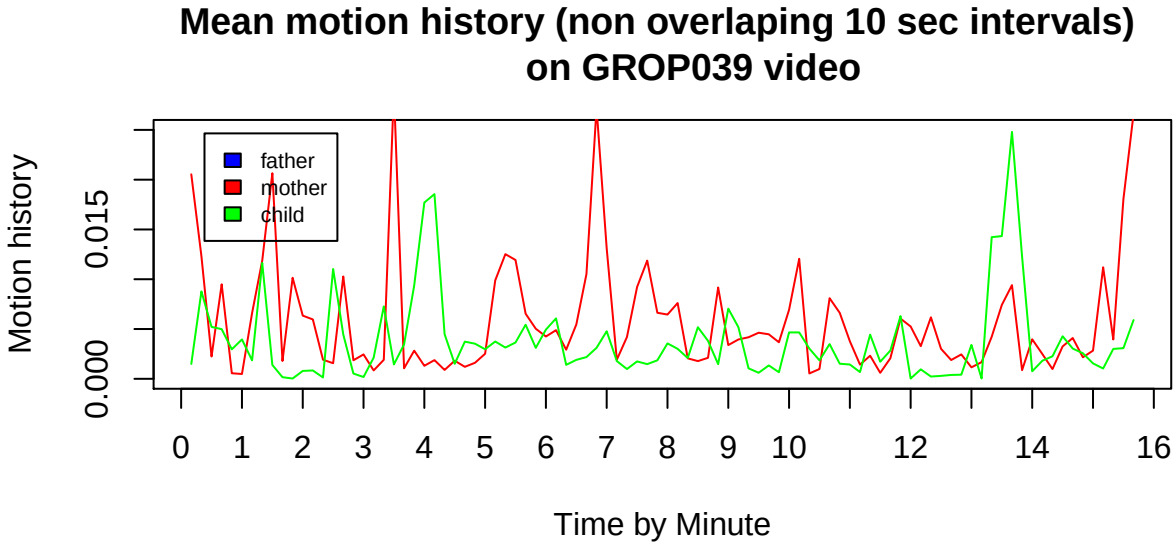

Mean motion history (non overlaping 10 sec intervals)
on COLO022 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

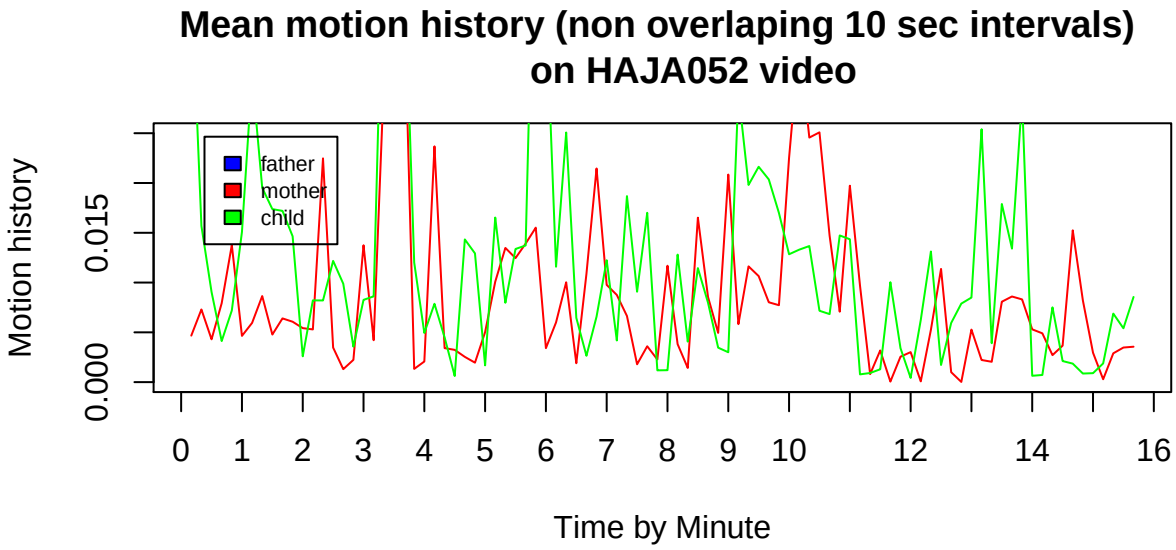

Mean motion history (non overlaping 10 sec intervals)
on DIPE004 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

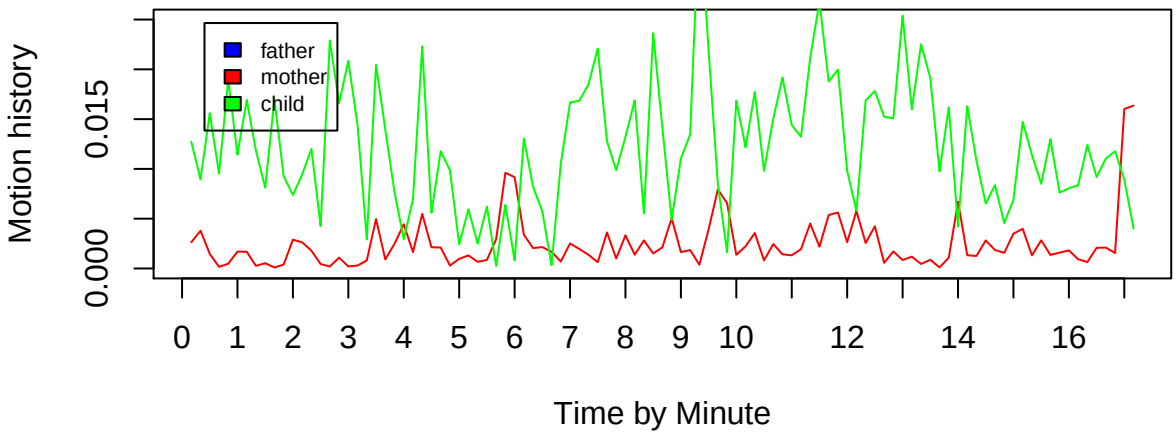

Mean motion history (non overlaping 10 sec intervals)
on DOMA video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

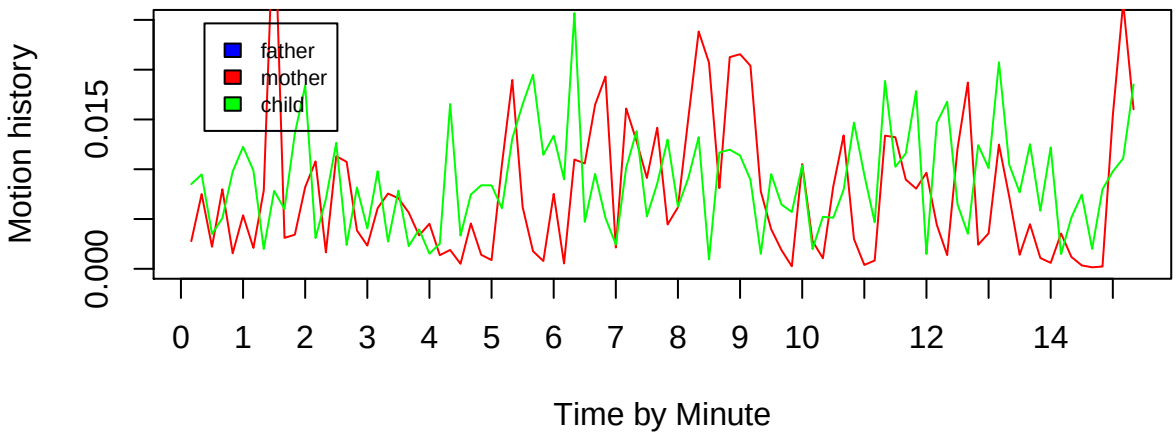

Mean motion history (non overlaping 10 sec intervals)
on DRNE video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

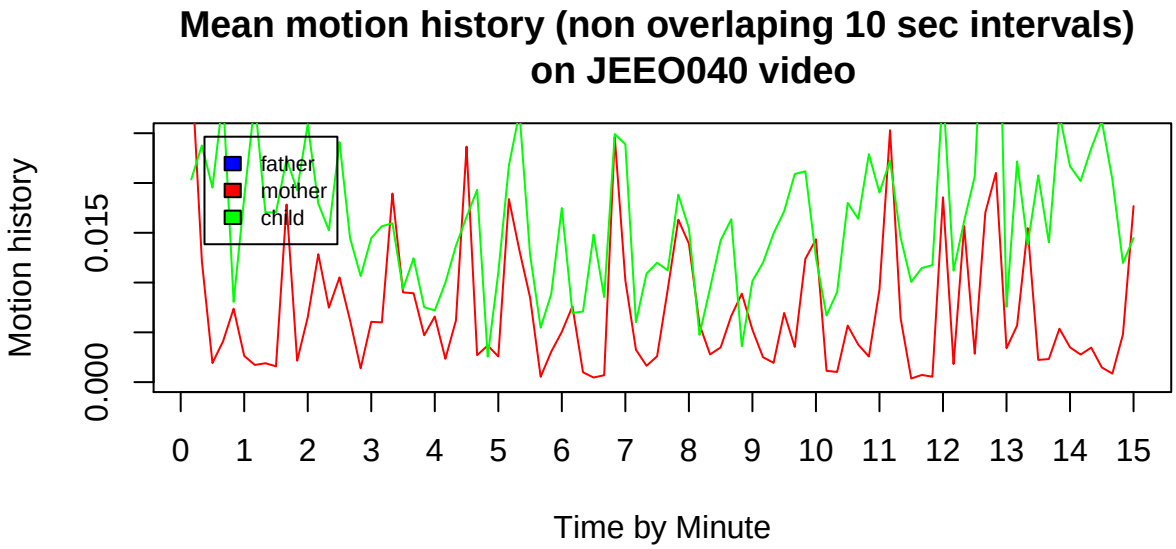

Mean motion history (non overlaping 10 sec intervals)
on FOMA057 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

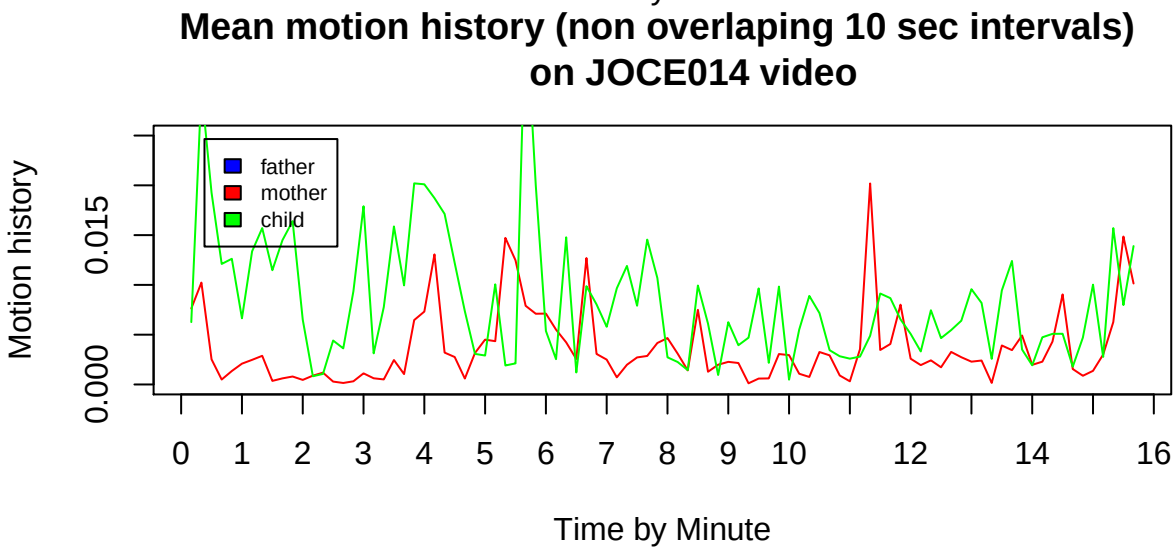

Mean motion history (non overlaping 10 sec intervals)
on GROP039 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

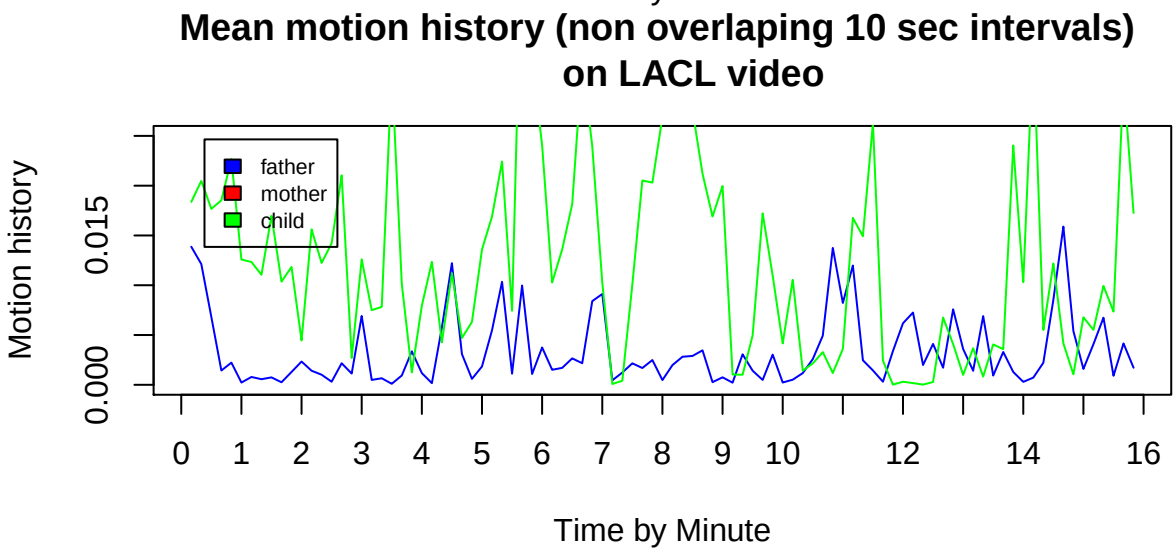

Mean motion history (non overlaping 10 sec intervals)
on HAJA052 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

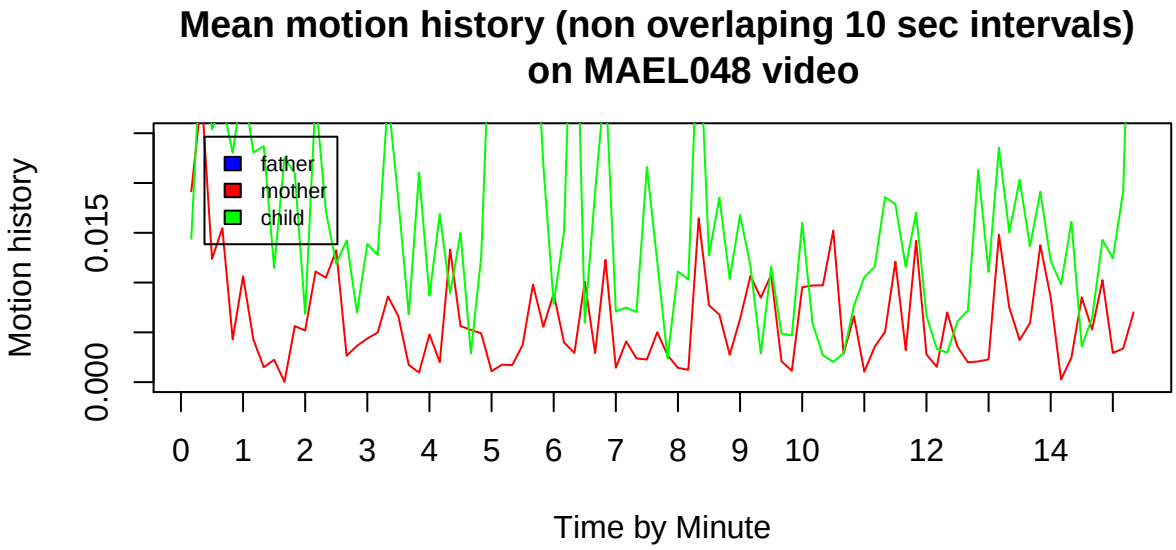

Mean motion history (non overlaping 10 sec intervals)
on HUMA058 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

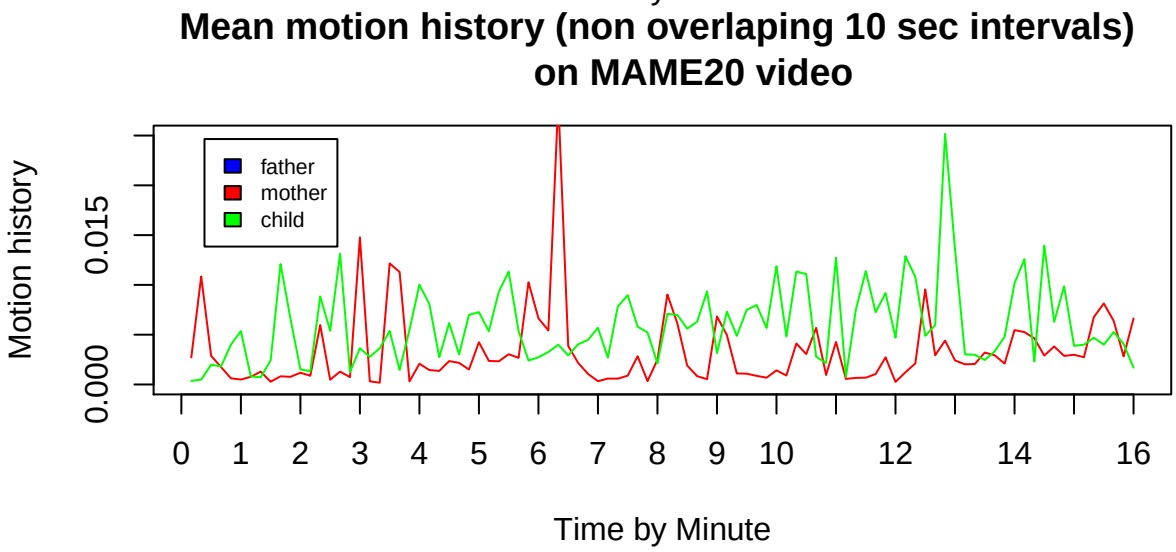

Mean motion history (non overlaping 10 sec intervals)
on JAEM046 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14
Time by Minute

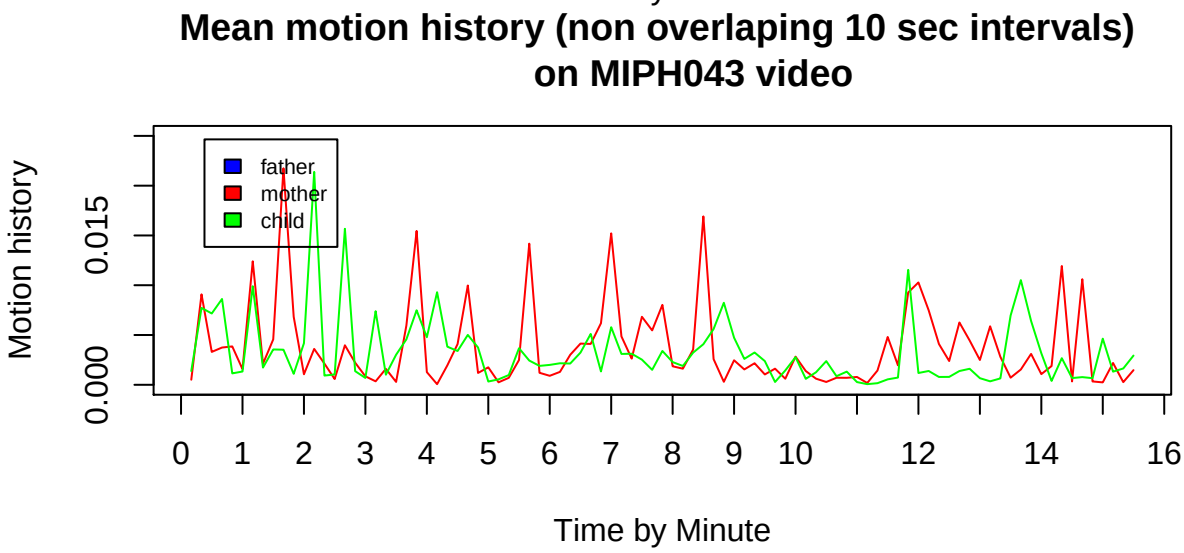

Mean motion history (non overlaping 10 sec intervals)
on JEEO040 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time by Minute

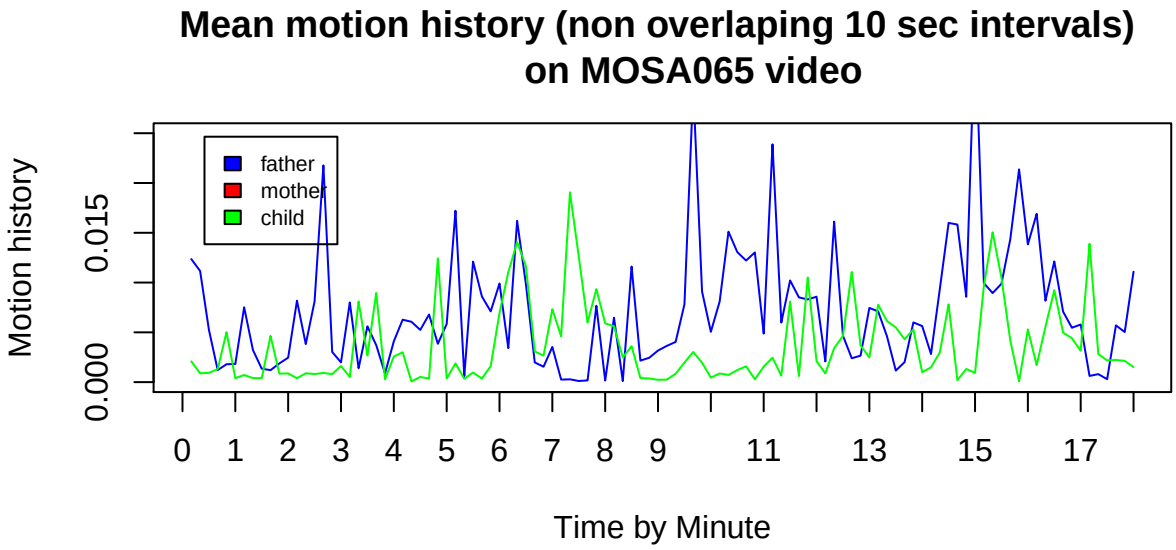

Mean motion history (non overlaping 10 sec intervals)
on JOCE014 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

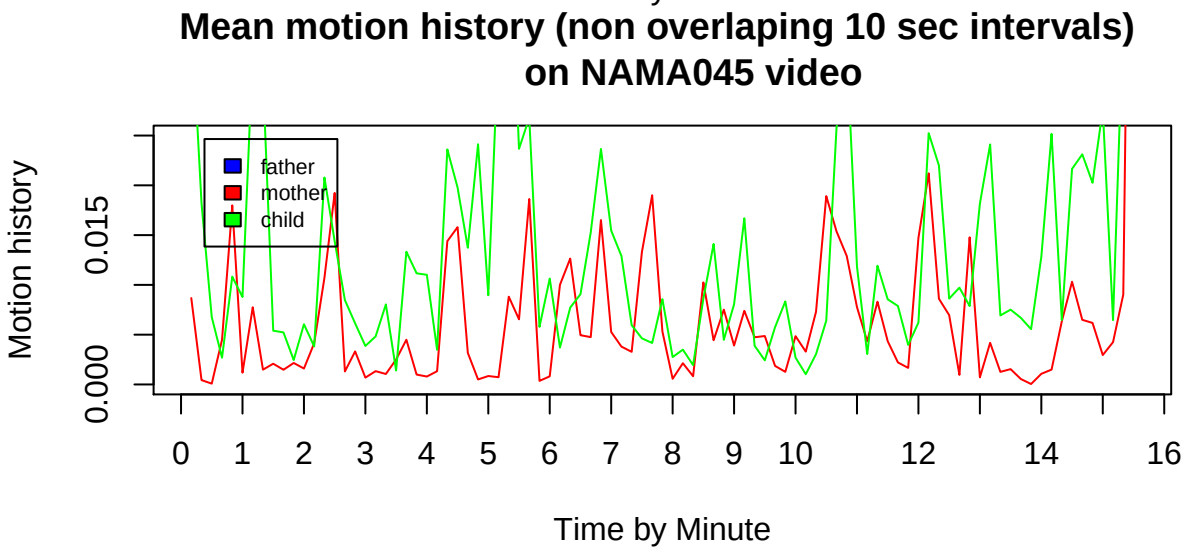

Mean motion history (non overlaping 10 sec intervals)
on LACL video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

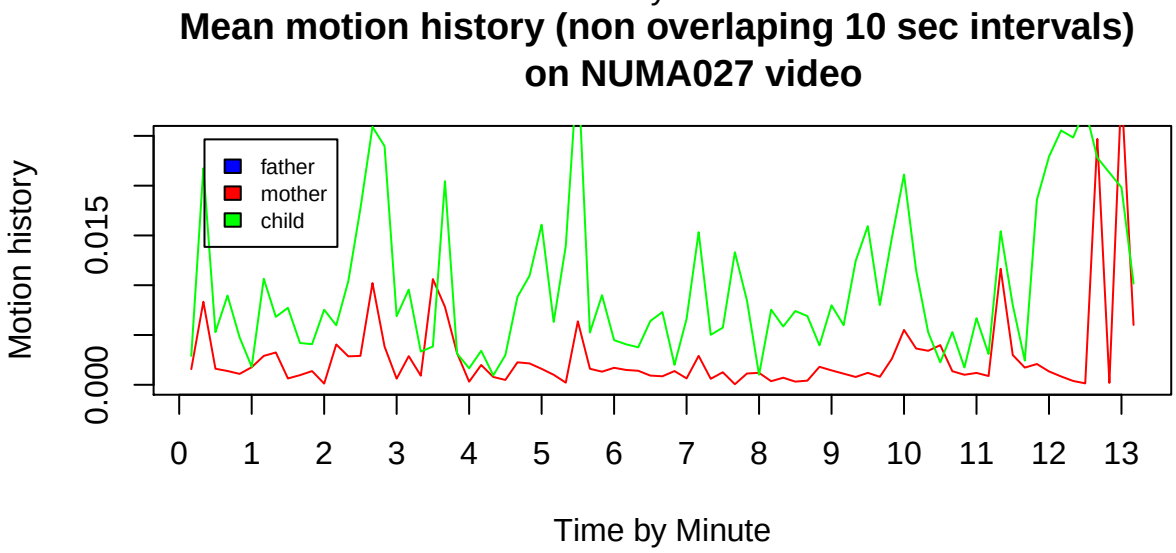

Mean motion history (non overlaping 10 sec intervals)
on MAEL048 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14
Time by Minute

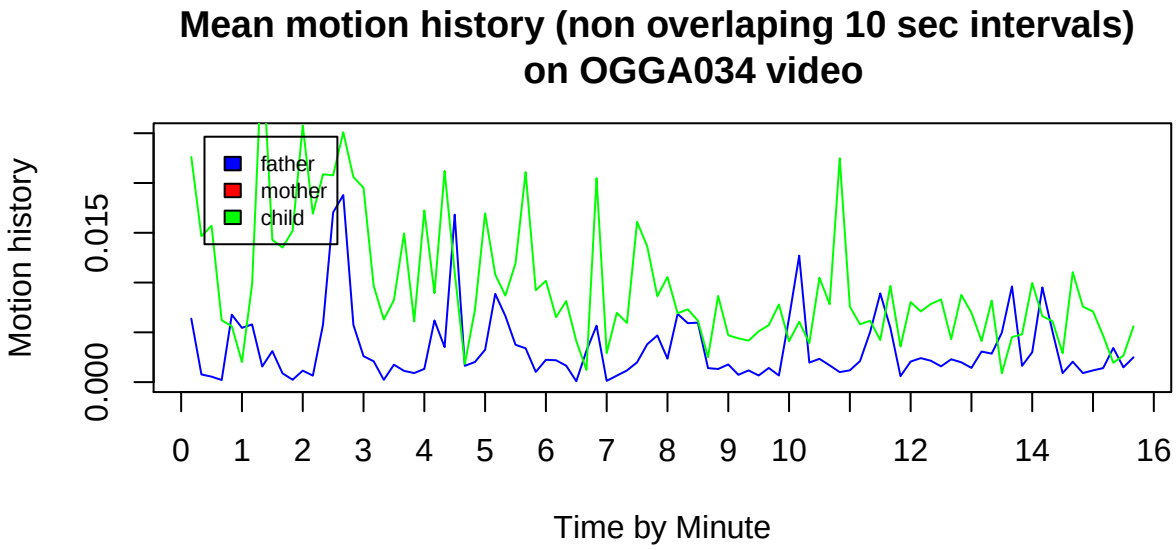

Mean motion history (non overlaping 10 sec intervals)
on MAME20 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

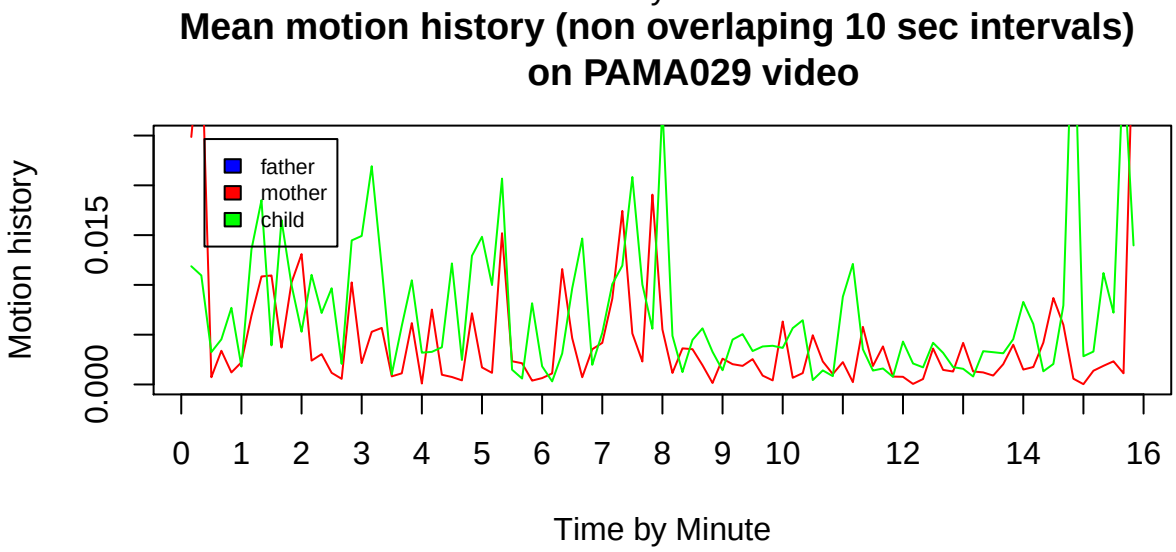

Mean motion history (non overlaping 10 sec intervals)
on MIPH043 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

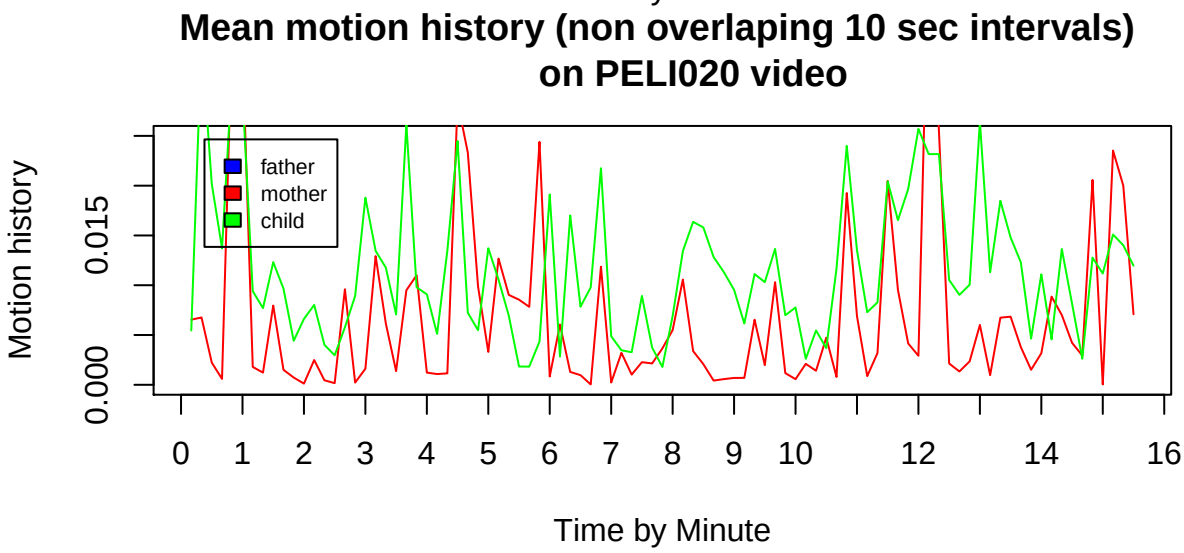

Mean motion history (non overlaping 10 sec intervals)
on MOSA065 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 11 13 15 17
Time by Minute

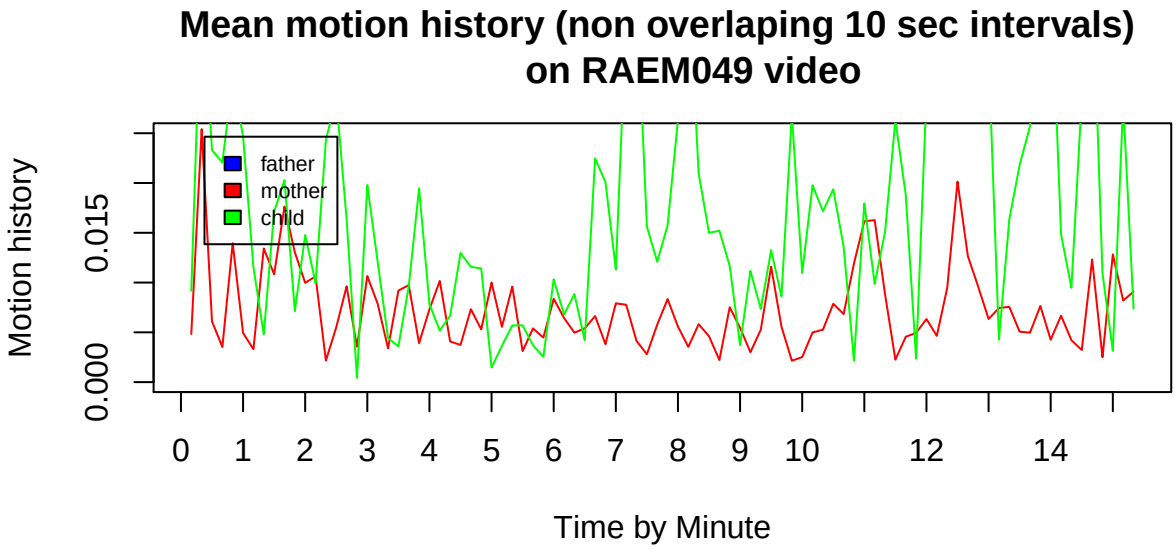

Mean motion history (non overlaping 10 sec intervals)
on NAMA045 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

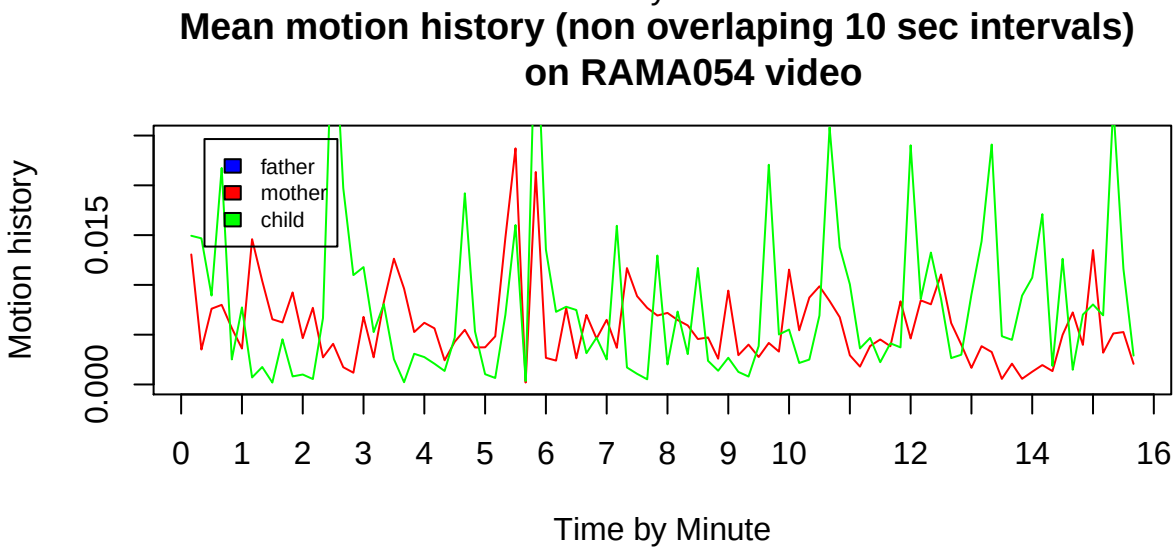

Mean motion history (non overlaping 10 sec intervals)
on NUMA027 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Time by Minute

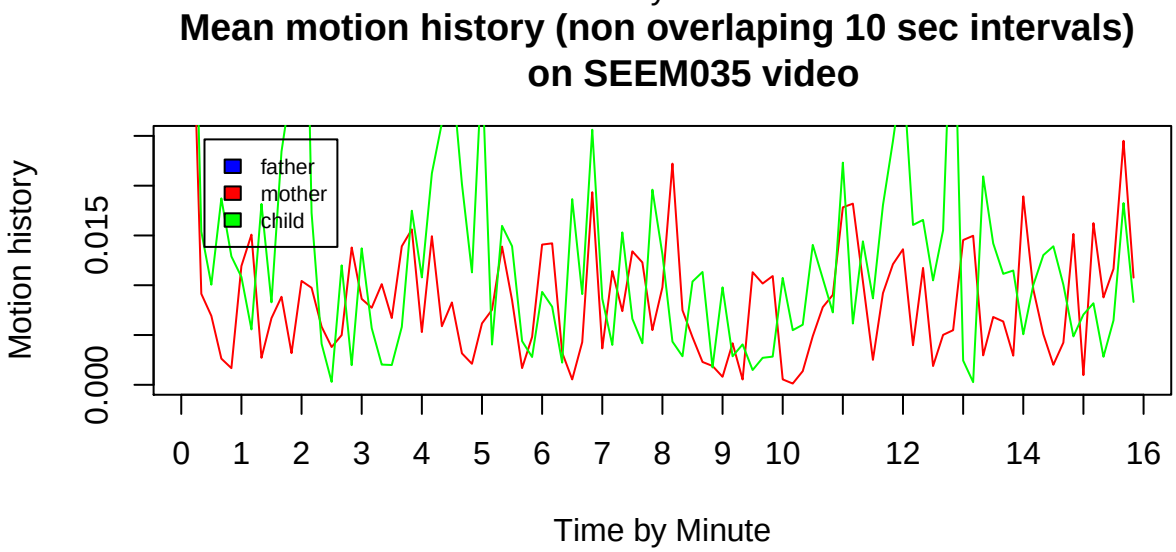

Mean motion history (non overlaping 10 sec intervals)
on OGGA034 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

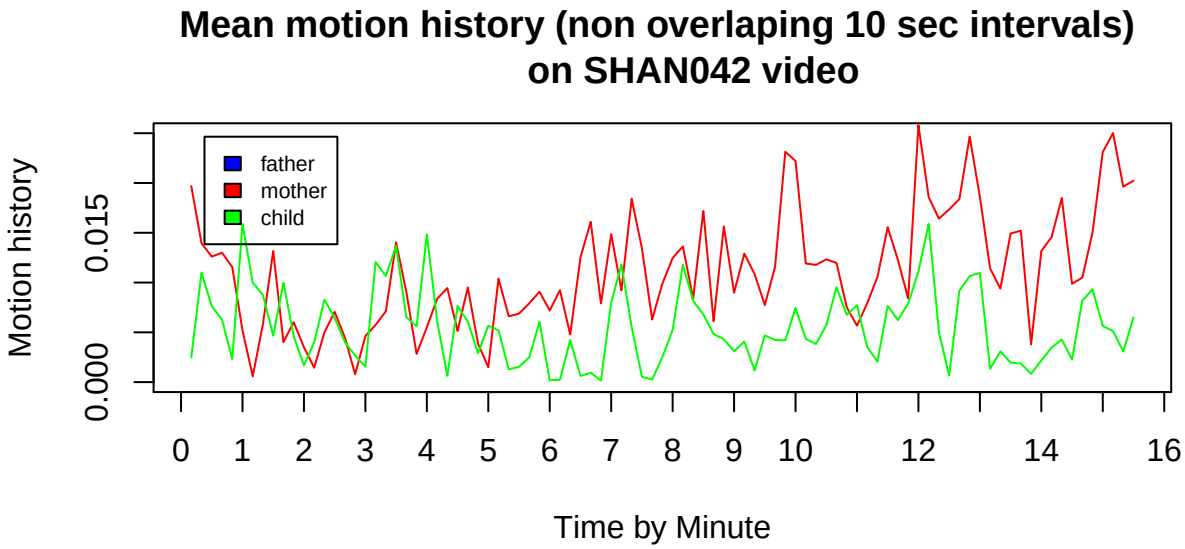

Mean motion history (non overlaping 10 sec intervals)
on PAMA029 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

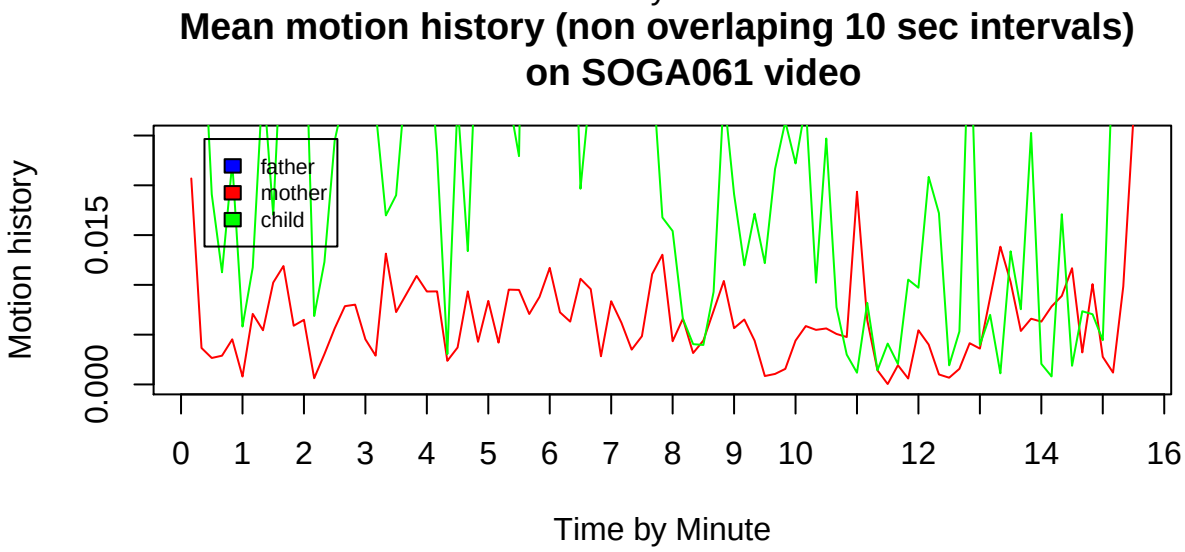

Mean motion history (non overlaping 10 sec intervals)
on PELI020 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute

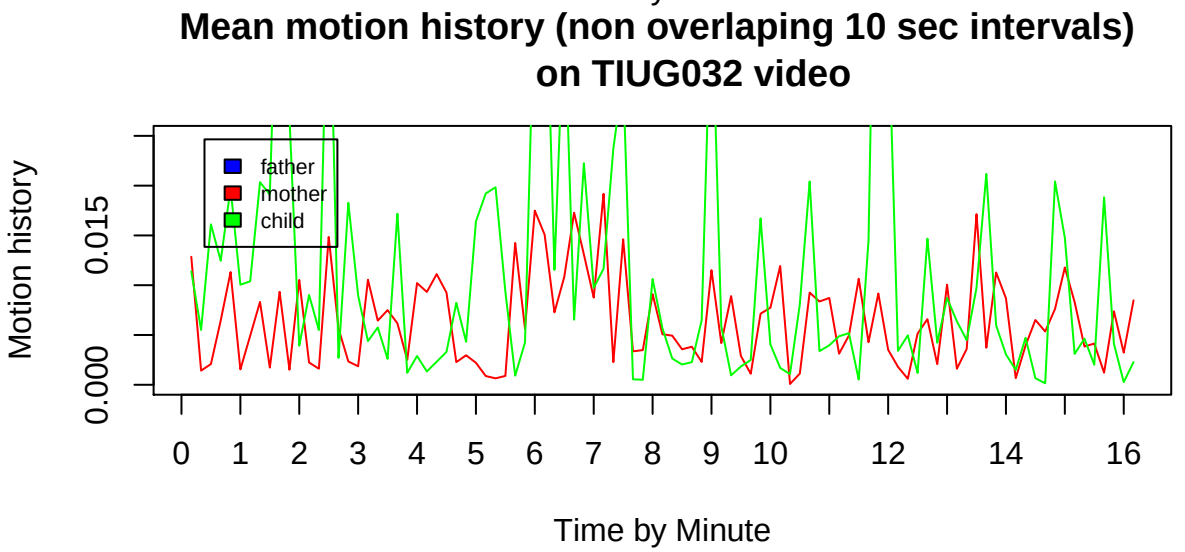

Mean motion history (non overlaping 10 sec intervals)
on RAEM049 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14
Time by Minute

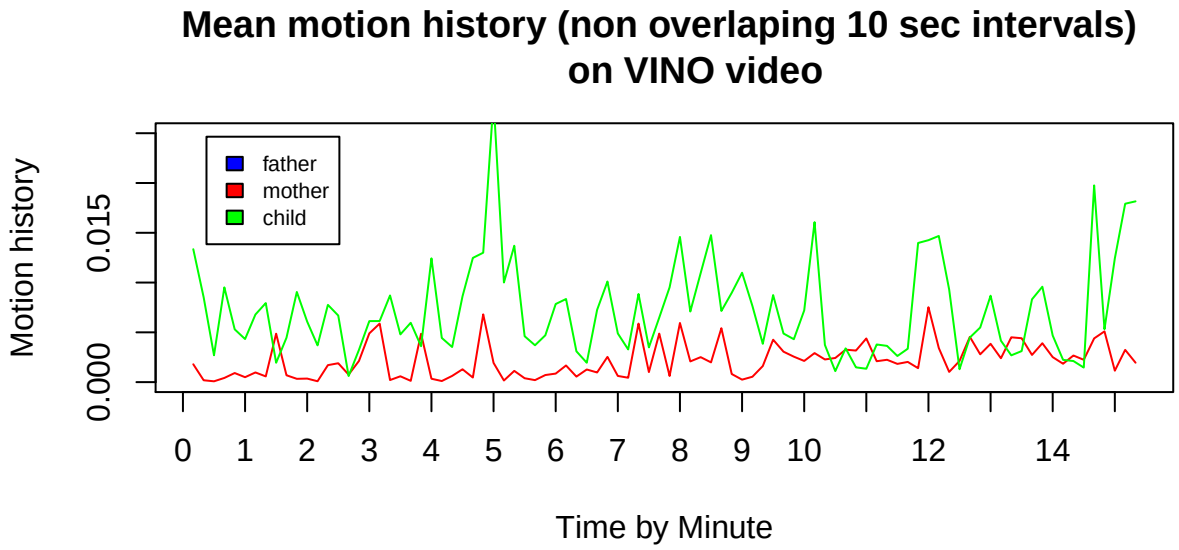

Mean motion history (non overlaping 10 sec intervals)
on RAMA054 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute


Mean motion history (non overlaping 10 sec intervals)
on SEEM035 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute


Mean motion history (non overlaping 10 sec intervals)
on SHAN042 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute


Mean motion history (non overlaping 10 sec intervals)
on SOGA061 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute


Mean motion history (non overlaping 10 sec intervals)
on TIUG032 video
Motion history
0.000
0.015
father
mother
child
0 1 2 3 4 5 6 7 8 9 10 12 14 16
Time by Minute



Export no log data in text files

```
videoIndex <- 1
# videoName is the name of current video
for (videoName in unique(data$family)){
# Compute slinding interval for each participant

      print(paste("Computing slidedFather", videoName))
      slidedFather <- SlidingInterval("father", videoIndex, 5, data)

      print(paste("Computing slidedMother", videoName))
      slidedMother <- SlidingInterval("mother", videoIndex, 5, data)

      print(paste("Computing slidedChild", videoName))
      slidedChild <- SlidingInterval("child", videoIndex, 5, data)

      slidedVideo <- data.frame(
        slidedFather, slidedMother, slidedChild,
        "video"=rep(families[videoIndex], length(slidedFather)),
        frame_index = 1:length(slidedFather))
# write the file
            write.csv(slidedVideo, paste("../Data/CSV/filtered/noLog/",videoName, ".slideddata.csv", sep
      videoIndex <-(videoIndex+1)
      }
```

Export log data in text files

```
videoIndex <- 1
# videoName is the name of current video
for (videoName in unique(data$family)){
# Compute slinding interval for each participant
      print(paste("Computing slidedFather", videoName))
```

```
      slidedFather <- SlidingInterval("logFather", videoIndex, 5, data)
      print(paste("Computing slidedMother", videoName))
      slidedMother <- SlidingInterval("logMother", videoIndex, 5, data)
      print(paste("Computing slidedChild", videoName))
      slidedChild <- SlidingInterval("logChild", videoIndex, 5, data)

      slidedVideo <- data.frame(
        slidedFather, slidedMother, slidedChild,
        "video"=rep(families[videoIndex], length(slidedFather)),
        frame_index = 1:length(slidedFather))
# write the file
            write.csv(slidedVideo, paste("../Data/CSV/filtered/log/",videoName, ".log.slideddata.csv", s
      videoIndex <-(videoIndex+1)
      }
```

SyncPy utilisation for creating synchrony dataframe

After extracting filtered motion motion history with mean on sliding interval (overlapping interval) of 5 frames

And after puting this data on a CSV file slideddata.csv

We import this data on python Script with panda module Call_S_Estimator.py

This script will compute the synchrony between each dyad of the interaction and of the whole group

It will return a csv file for each video SSIXXXX.csv with XXXX the name of the video (F1044C, F1044D1, etc) that we can import with R with

this following function

```
print("SSI Files Directory")
```

```
## [1] "SSI Files Directory"
```

```
SSIlogFilesList <- list.files("../Data/CSV/Synchrony/log/S_estimator", full.name=TRUE)
#SSIlogFilesList
```

```
print("SSI Files Directory")
```

```
## [1] "SSI Files Directory"
```

```
SSInoLogFilesList <- list.files("../Data/CSV/Synchrony/noLog/S_estimator", full.name=TRUE)
#SSInoLogFilesList
```

```
SSIlog <- data.frame(video="Name")
for (file in SSIlogFilesList){
    SSIalone <- read.csv(file)
 #   print(str(SSIalone))
    SSIlog <- rbind.fill(SSIlog, SSIalone)}
str(SSIlog)
```

```
## 'data.frame':    1055 obs. of  6 variables:
##  $ video    : chr  "Name" "1606" "1606" "1606" ...
##  $ X        : int  NA 0 1 2 3 4 5 6 7 8 ...
##  $ Interval : int  NA 1 2 3 4 5 6 7 8 9 ...
##  $ Time_min : num  NA 0 0.5 1 1.5 2 2.5 3 3.5 4 ...
##  $ SSI_fa_ch: num  NA 0.06097 0.015151 0.008147 0.000207 ...
##  $ SSI_mo_ch: num  NA NA NA NA NA NA NA NA NA NA ...
```

```
SSIlog$video <- as.factor(SSIlog$video)
SSIlog <- SSIlog[-which(SSIlog$video=="Name"),]
SSIlog$Interval <- NULL
SSIlog <- rename (SSIlog, c("video" = "family"))
SSIlog <- rename (SSIlog, c("X" = "SSI-interval"))
```

```
SSInoLog <- data.frame(video="Name")
for (file in SSInoLogFilesList){
#    print(file)
    SSIalone <- read.csv(file)
  #  print(str(SSIalone))
    SSInoLog<- rbind.fill(SSInoLog, SSIalone)}
SSInoLog$video <-as.factor(SSInoLog$video)
SSInoLog <- SSInoLog[-which(SSInoLog$video=="Name"),]
SSInoLog$Interval <- NULL
SSInoLog <- rename (SSIlog, c("video" = "family"))
```

```
## The following `from` values were not present in `x`: video
```

```
SSInoLog <- rename (SSIlog, c("X" = "SSI-interval"))
```

```
## The following `from` values were not present in `x`: X
```

```
#SSInoLog$action <- rep(NA, nrow(SSInoLog))
#SSInoLog[which(video == & timeMin==)]$action
```

Description of SSIlog data frame

```
str(SSIlog)
```

```
## 'data.frame':    1054 obs. of  5 variables:
##  $ family      : Factor w/ 35 levels "1606","BAJE059",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ SSI-interval: int  0 1 2 3 4 5 6 7 8 9 ...
##  $ Time_min    : num  0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 ...
##  $ SSI_fa_ch   : num  0.06097 0.015151 0.008147 0.000207 0.023456 ...
##  $ SSI_mo_ch   : num  NA NA NA NA NA NA NA NA NA NA ...
```

```
#View(SSI)
```

Data dictionnary of SSIlog data frame

- **family** : code of the family
- SSI-interval** : interval of SSI
- **Time_min** : Time in minutes
- **SSI_fa_ch** : SSI index of Synchrony between father and child
- **SSI_mo_ch** : SSI index of Synchrony between mother and child

Description of noLogSSI data frame

```
str(SSInoLog)
```

```
## 'data.frame':    1054 obs. of  5 variables:
##  $ family      : Factor w/ 35 levels "1606","BAJE059",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ SSI-interval: int  0 1 2 3 4 5 6 7 8 9 ...
##  $ Time_min    : num  0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 ...
##  $ SSI_fa_ch   : num  0.06097 0.015151 0.008147 0.000207 0.023456 ...
##  $ SSI_mo_ch   : num  NA NA NA NA NA NA NA NA NA NA ...
```

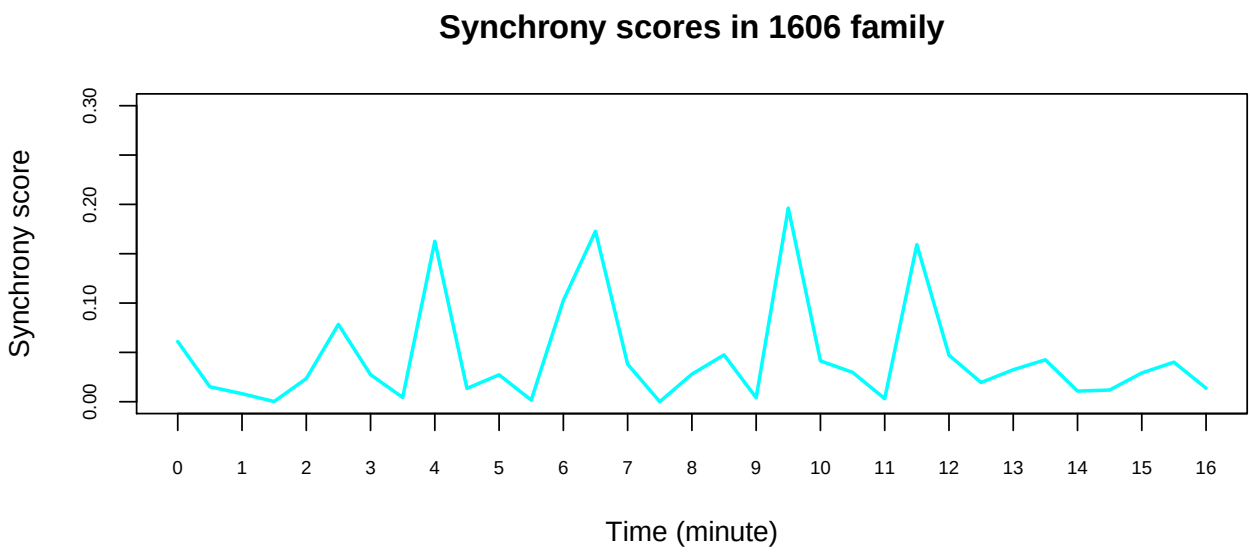
```
#View(SSInoLog)
```

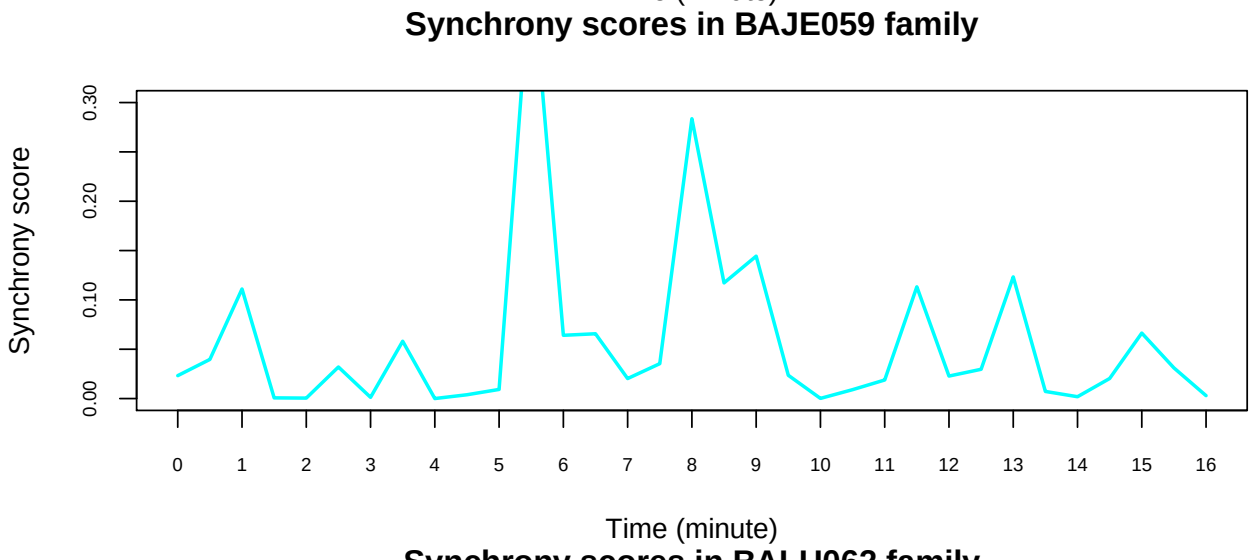
Data dictionnary of SSIlog data frame

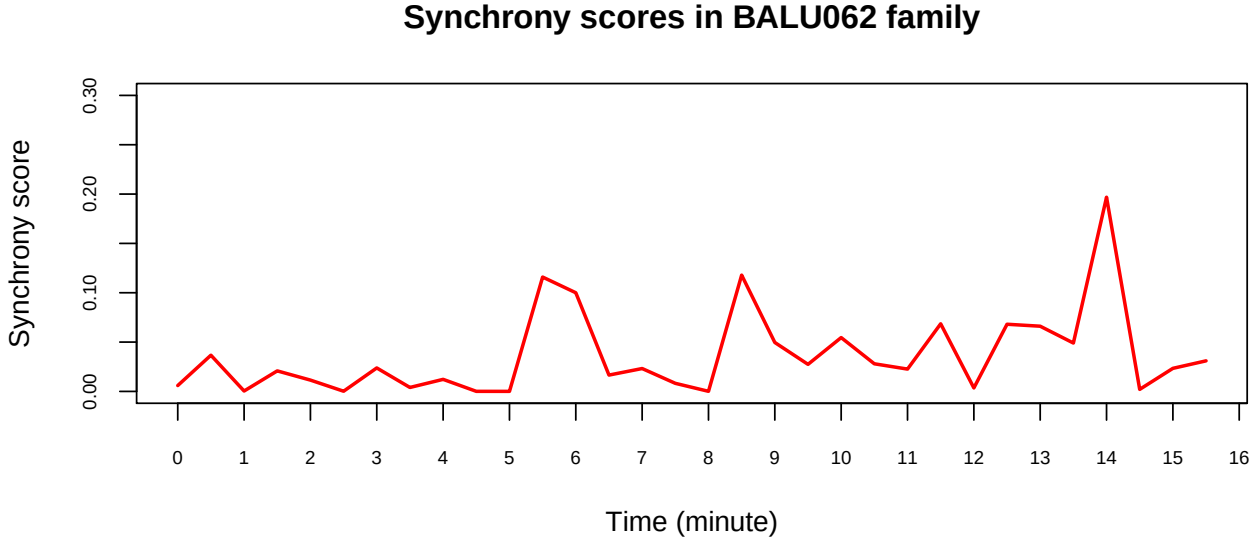
- **family** : code of the family
- **SSI-interval** : interval of SSI
- **Time_min** : Time in minutes
- **SSI_fa_ch** : SSI index of Synchrony between father and child
- **SSI_mo_ch** : SSI index of Synchrony between mother and child

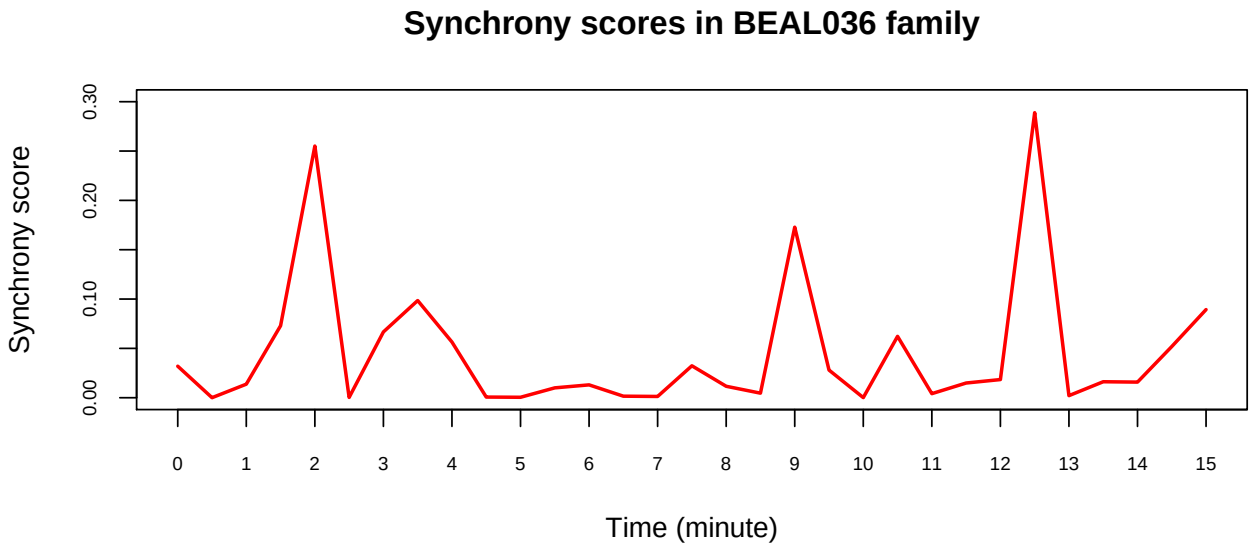
Synchrony scores log for each dyad, triad and for the whole group

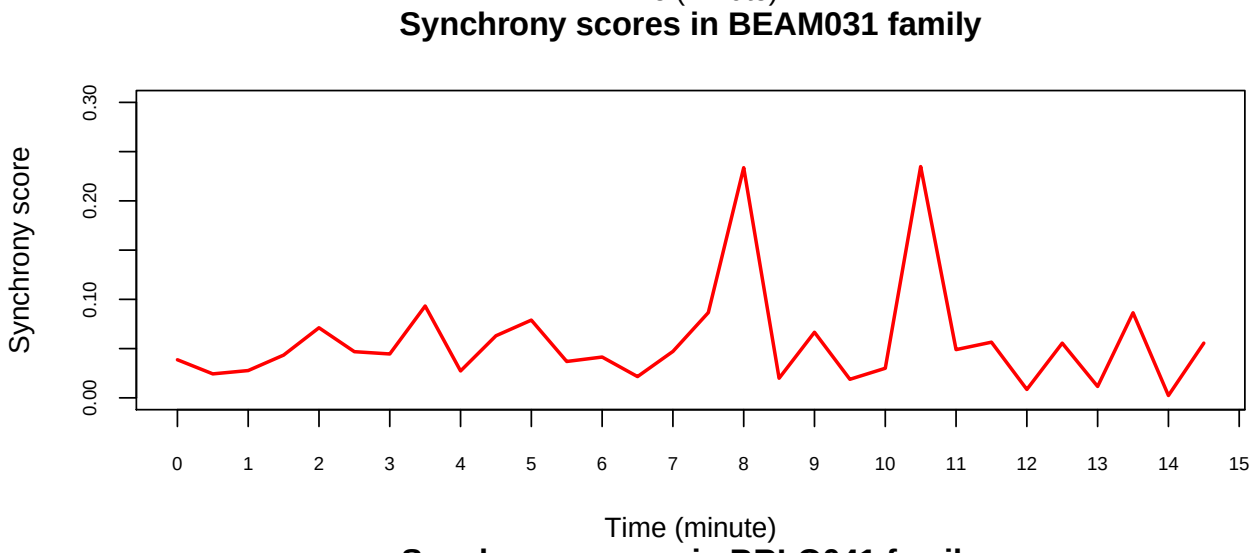
```
par(mar=c(4,4,4,3), mfrow=c(1,1))
for (i in unique(SSIlog$family)){
      if (all(!is.na(SSIlog[which(SSIlog$family==i),]$SSI_mo_ch)==TRUE)){
        #print(SSIlog[which(SSIlog$family==i),]$Time_min)
        #print(str(SSIlog[which(SSIlog$family==i),]$SSI_mo_ch))
            plot(SSIlog[which(SSIlog$family==i),]$Time_min, SSIlog[which(SSIlog$family==i),]$SSI_mo_ch,
                 ylim=c(0, 0.3), main=paste("Synchrony scores in", i, "family"), xlab = "Time (minute)"

      else if(all(!is.na(SSIlog[which(SSIlog$family==i),]$SSI_fa_ch)==TRUE)){
    plot(SSIlog[which(SSIlog$family==i),]$Time_min, SSIlog[which(SSIlog$family==i),]$SSI_fa_ch,
              ylim=c(0, 0.3), main=paste("Synchrony scores in", i, "family"), xlab = "Time (minute)", yl
  else{print("error")}}
```

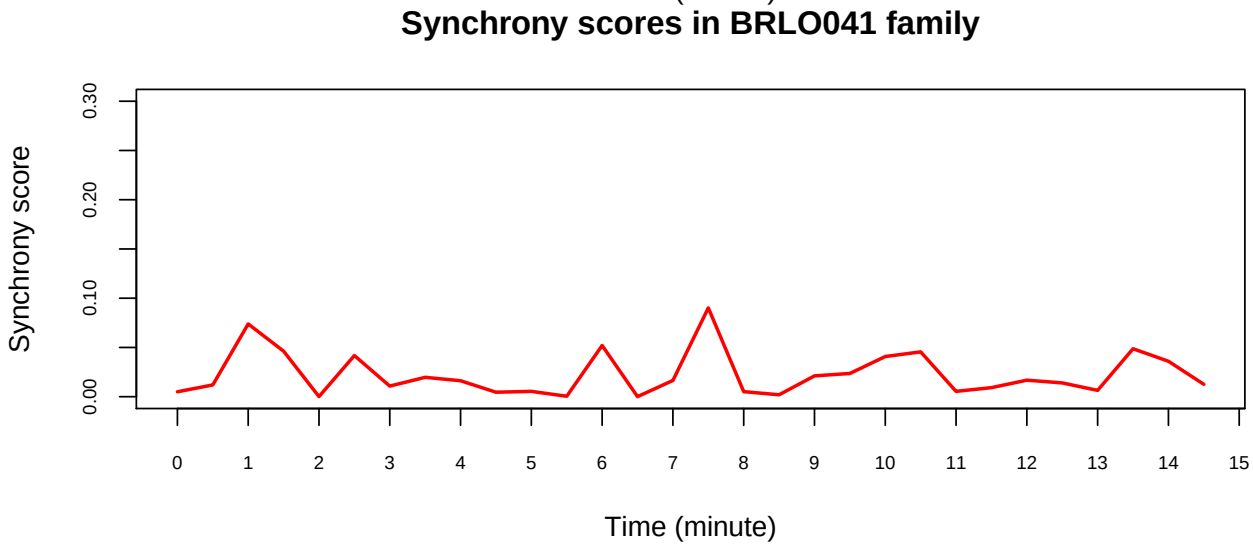

Synchrony scores in 1606 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

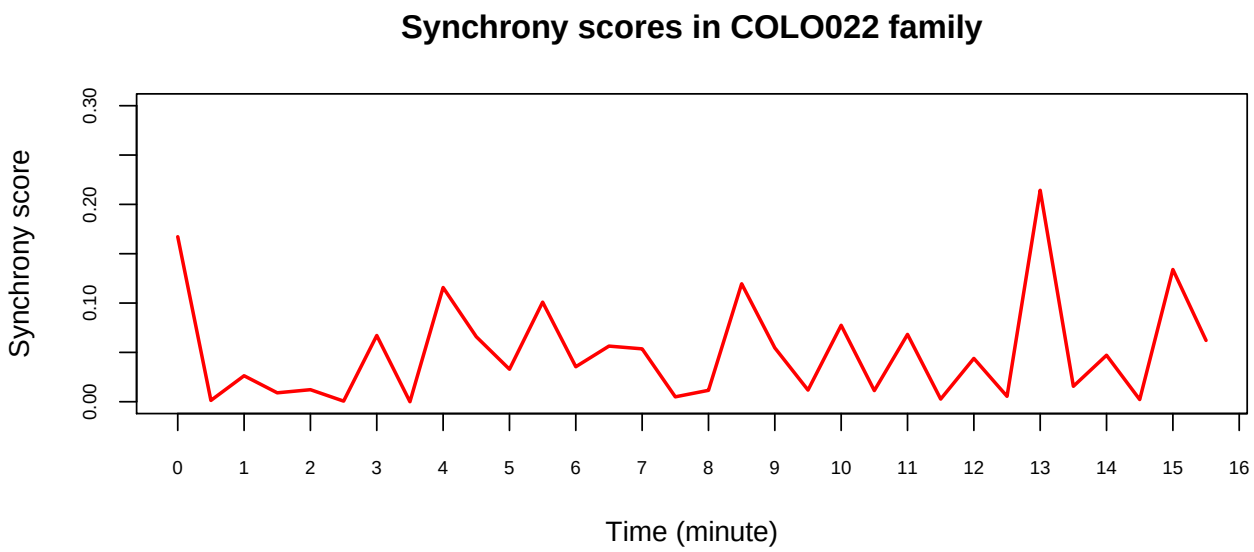

Synchrony scores in BAJE059 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

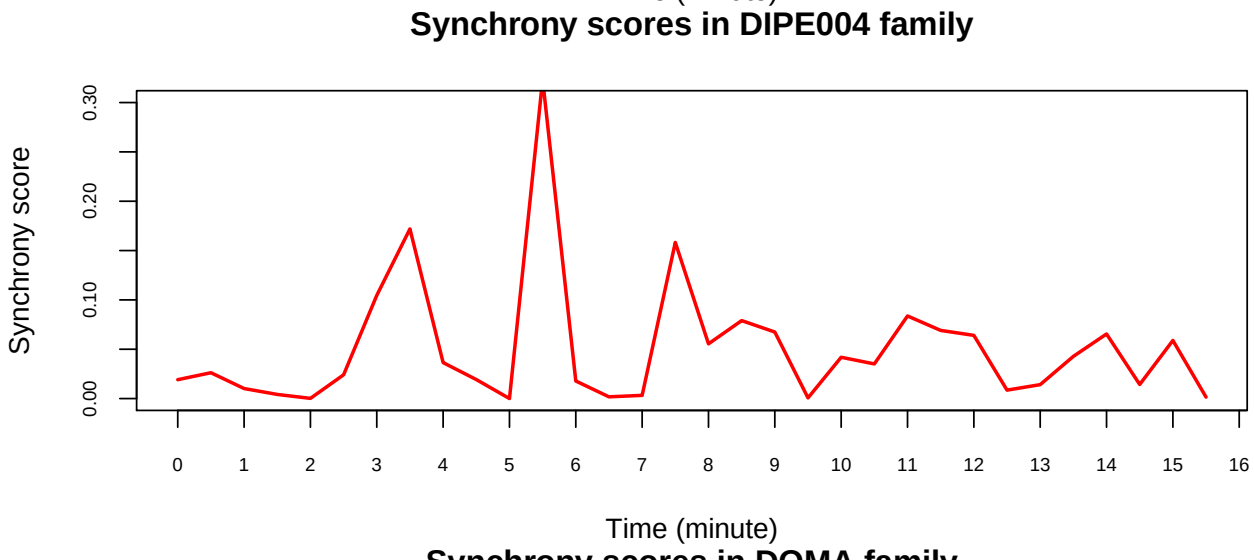

Synchrony scores in BALU062 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

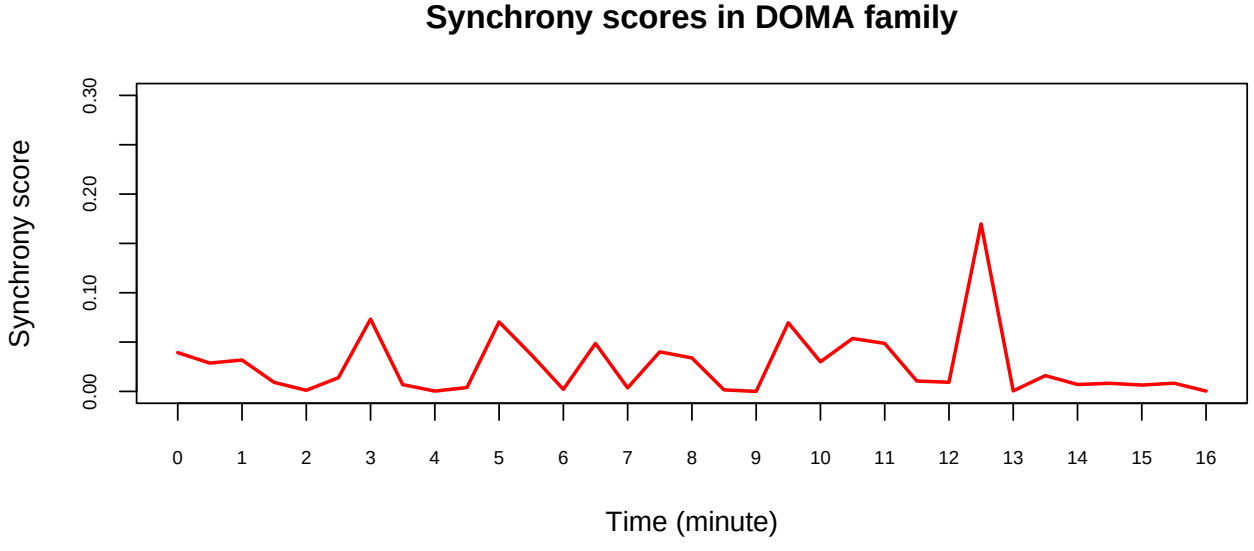

Synchrony scores in BEAL036 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

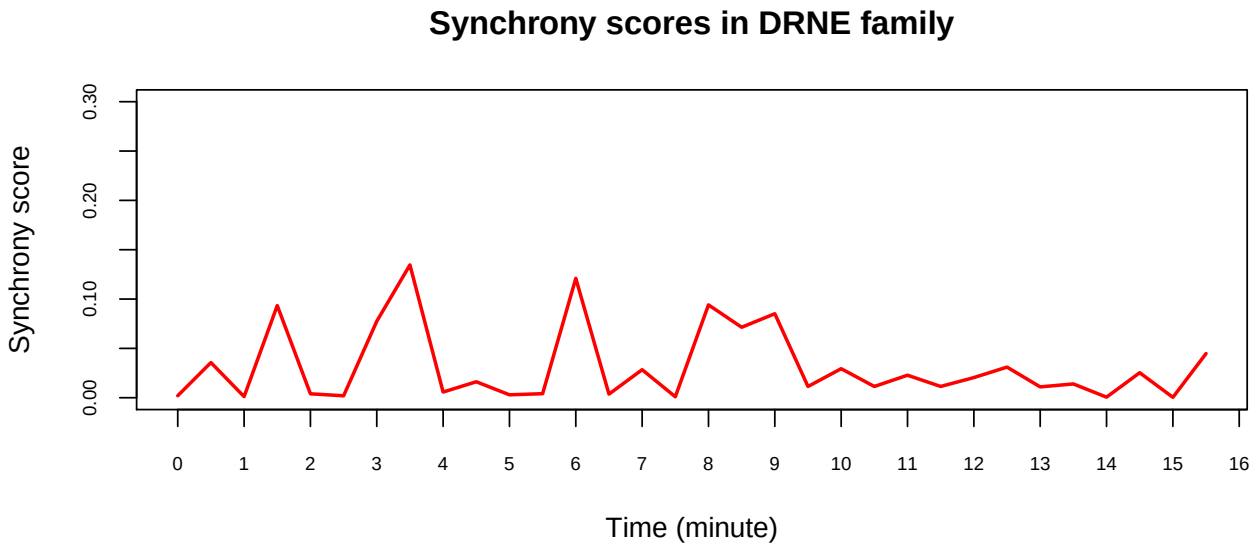

Synchrony scores in BEAM031 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

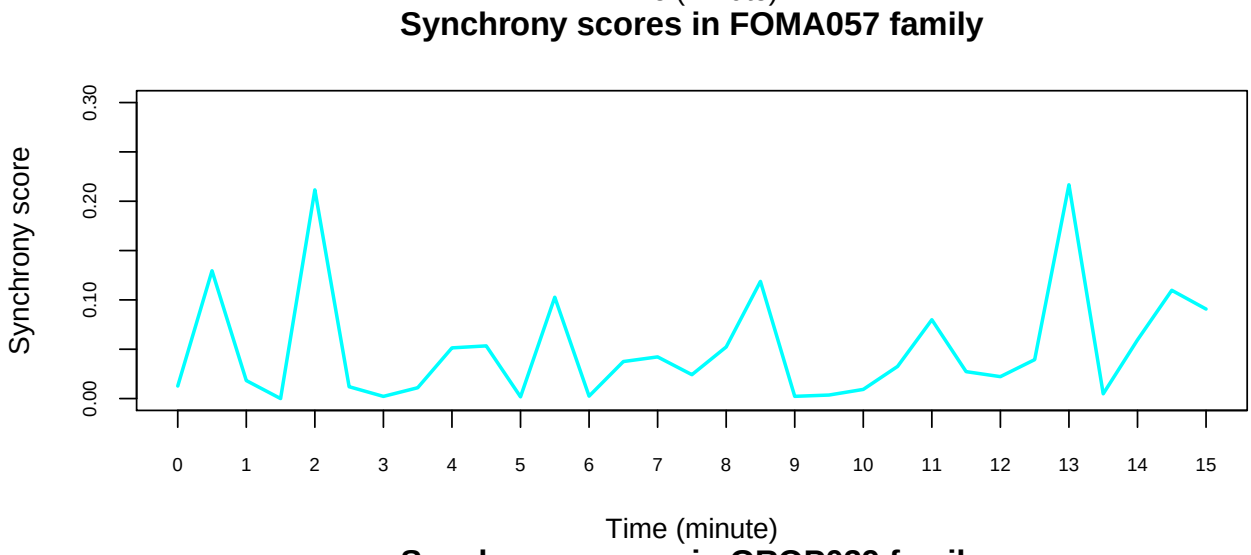

Synchrony scores in BRLO041 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

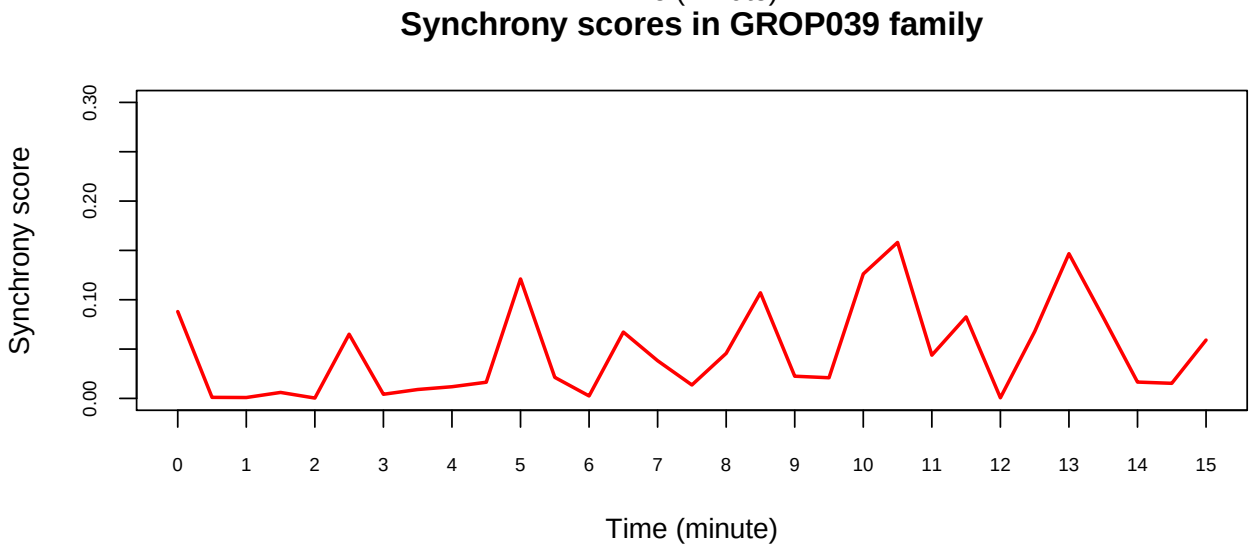

Synchrony scores in COLO022 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

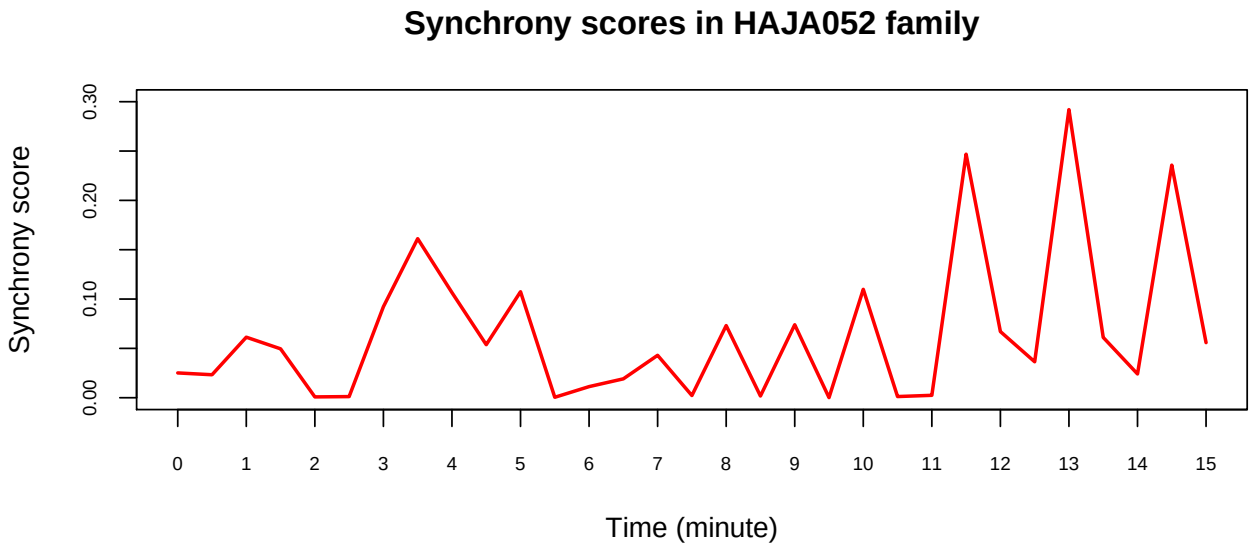

Synchrony scores in DIPE004 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

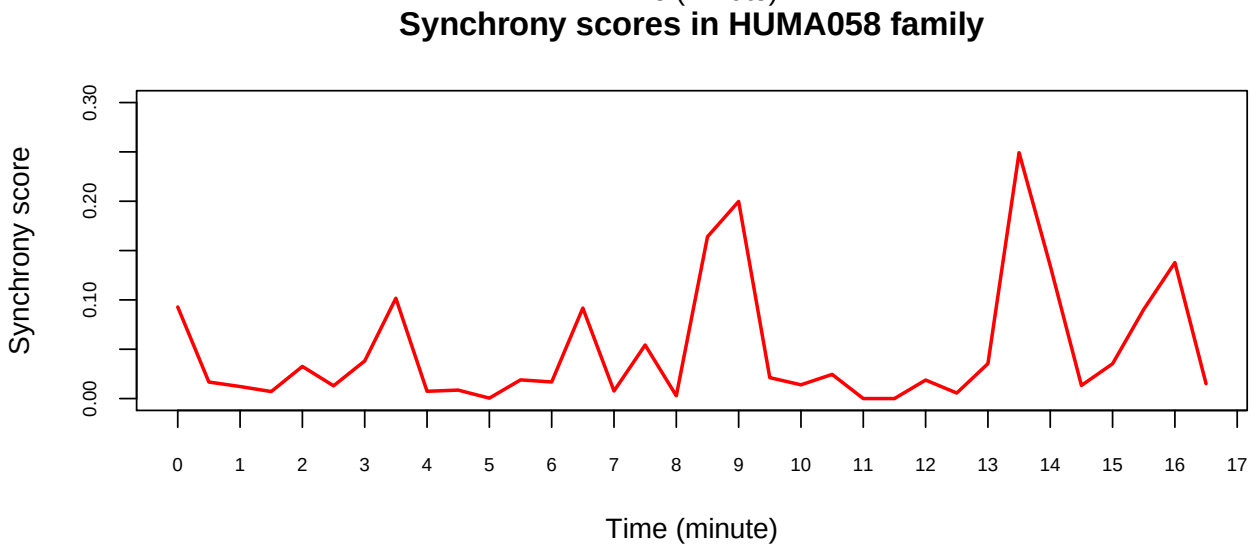

Synchrony scores in DOMA family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

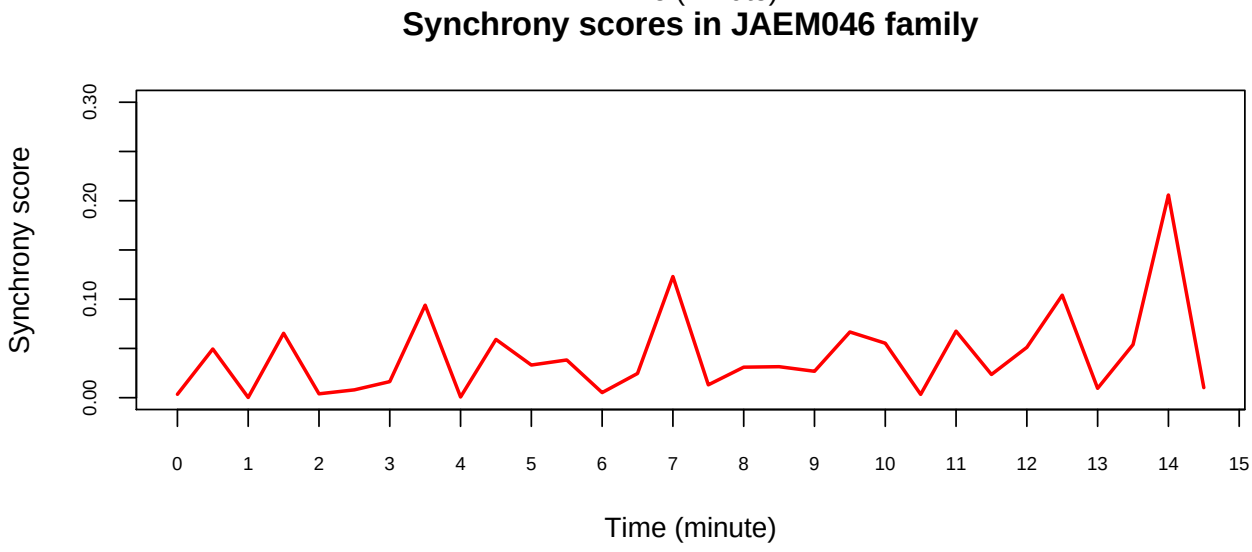

Synchrony scores in DRNE family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

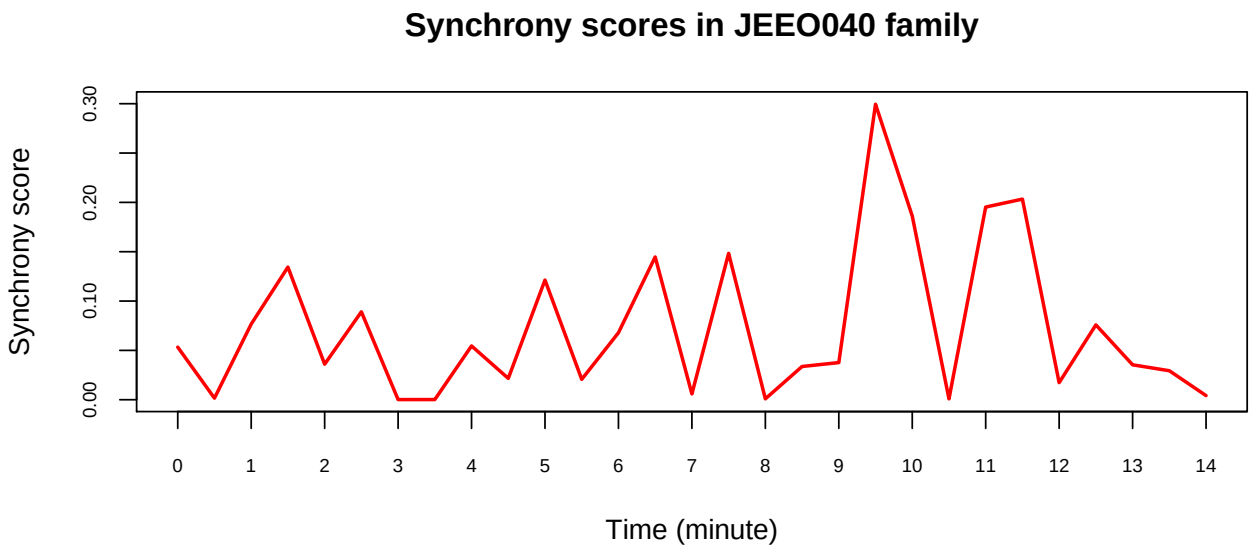

Synchrony scores in FOMA057 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

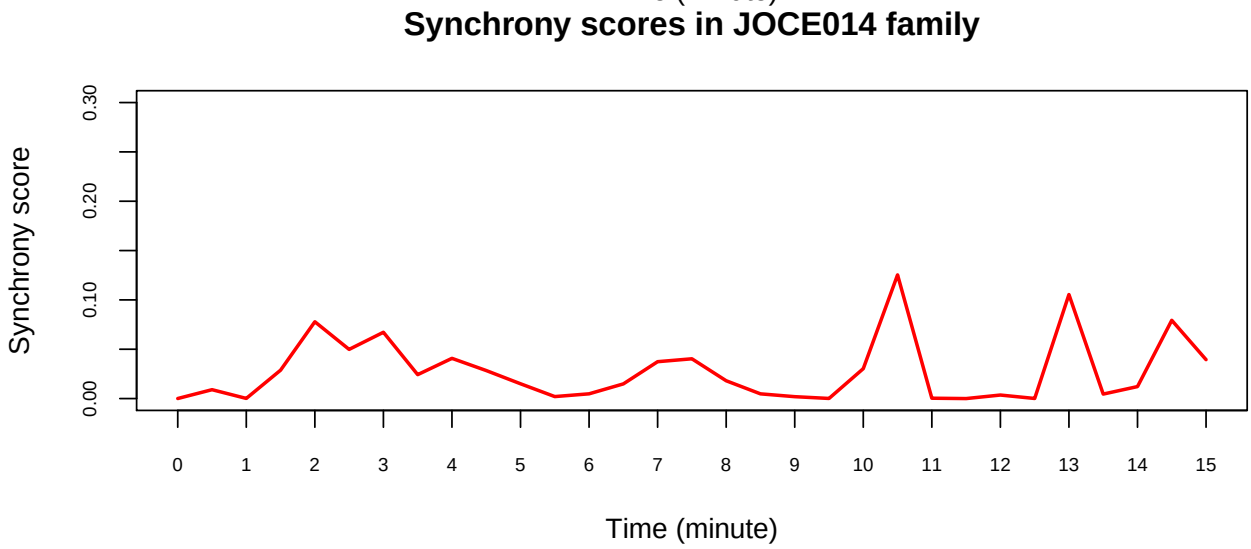

Synchrony scores in GROP039 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

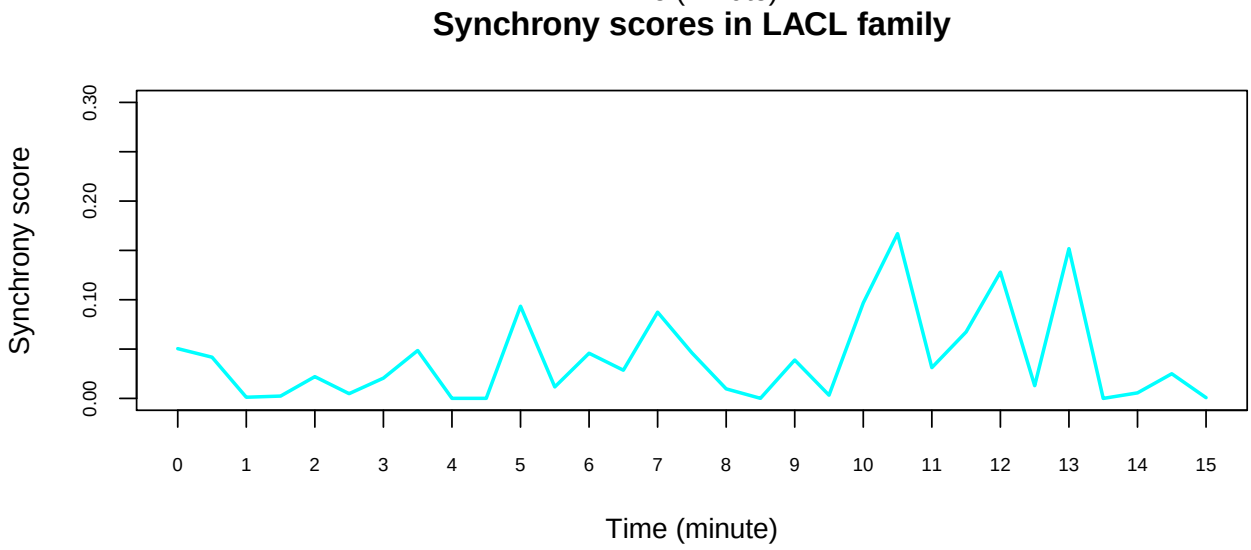

Synchrony scores in HAJA052 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

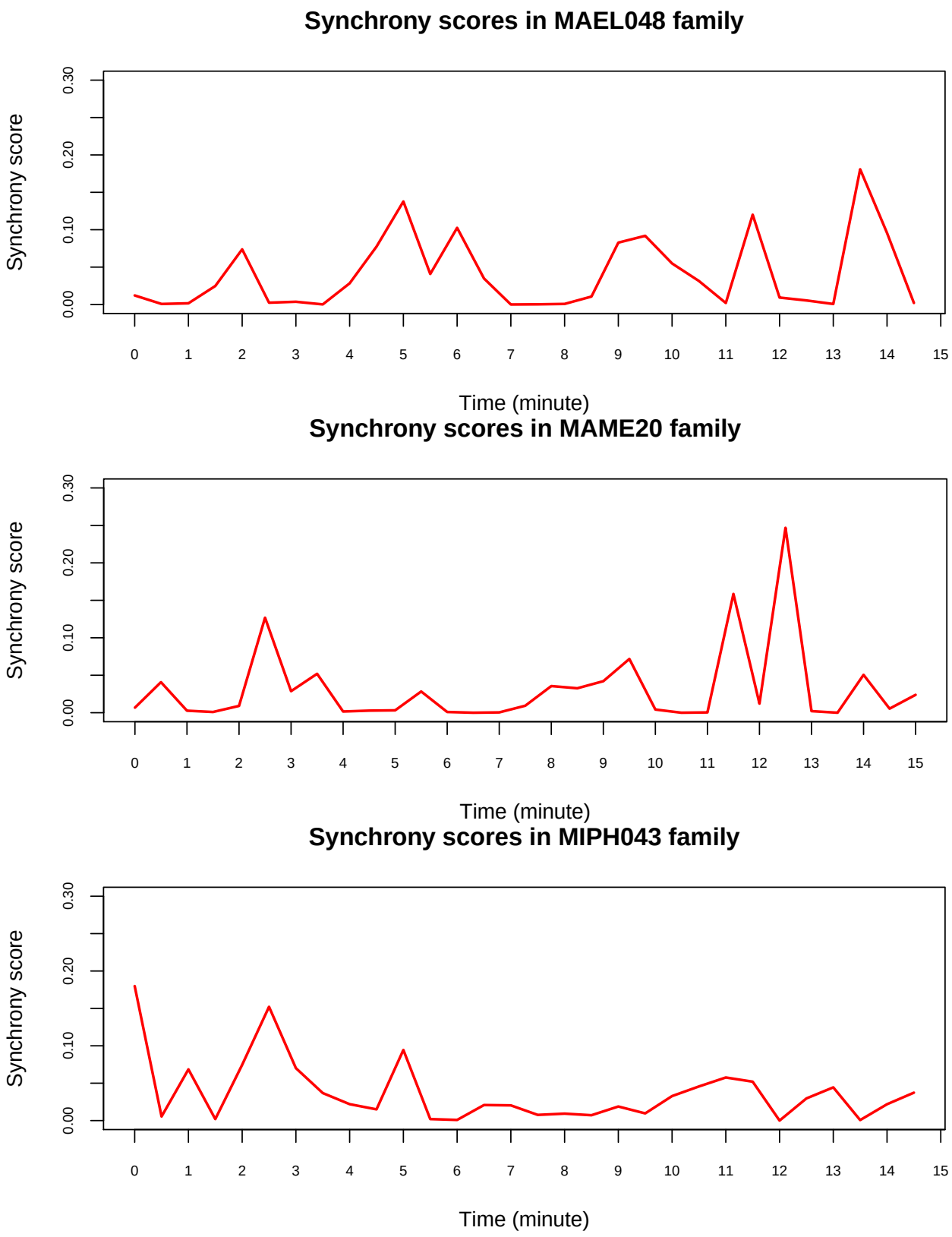

Synchrony scores in HUMA058 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Time (minute)

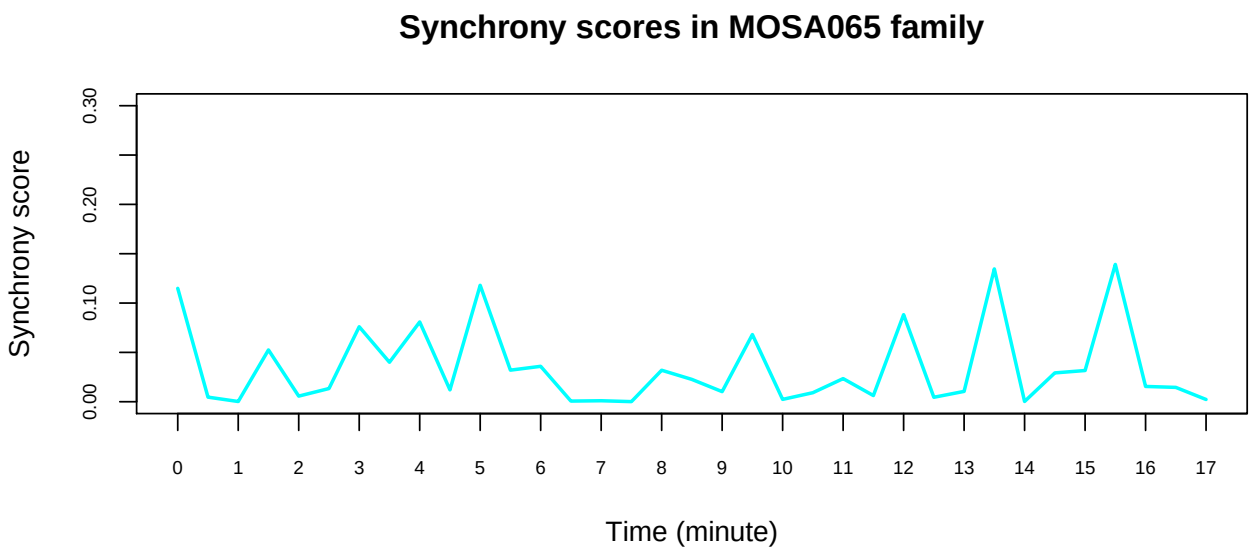

Synchrony scores in JAEM046 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

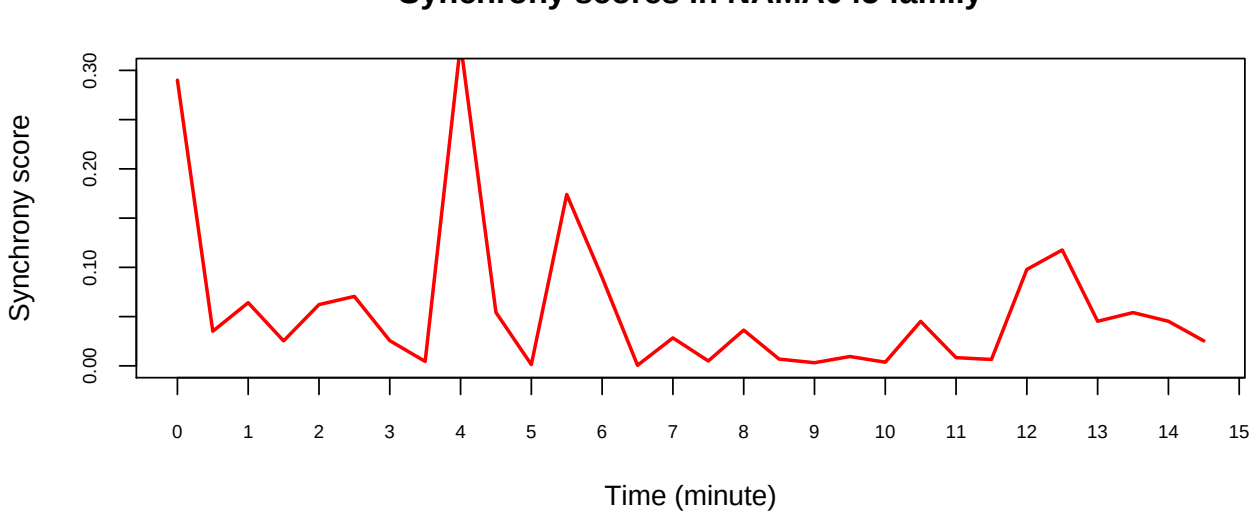

Synchrony scores in JEEO040 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Time (minute)

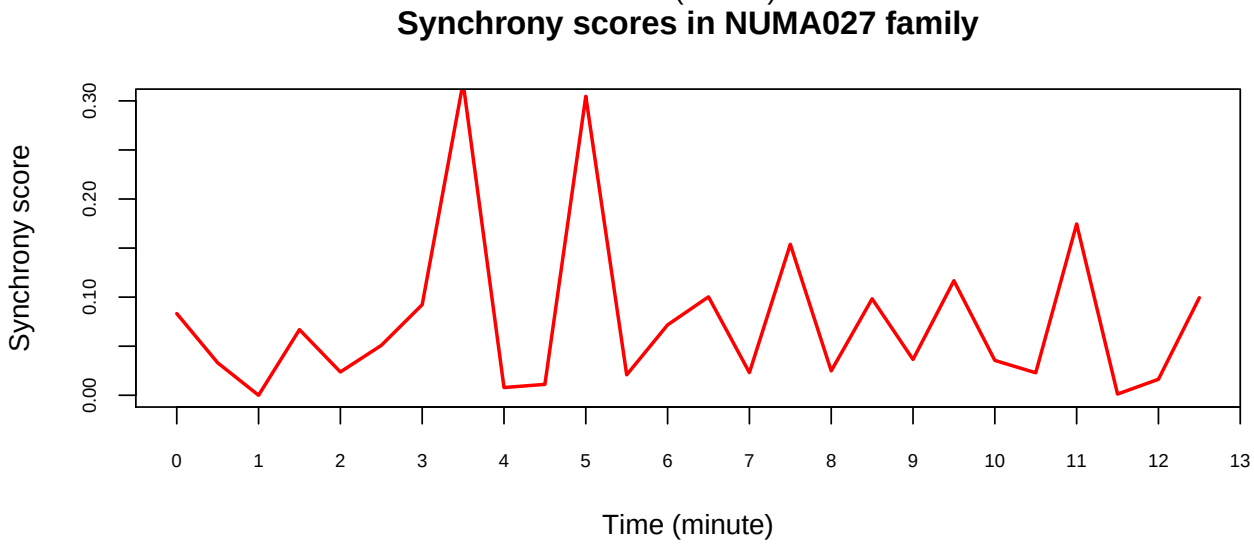

Synchrony scores in JOCE014 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

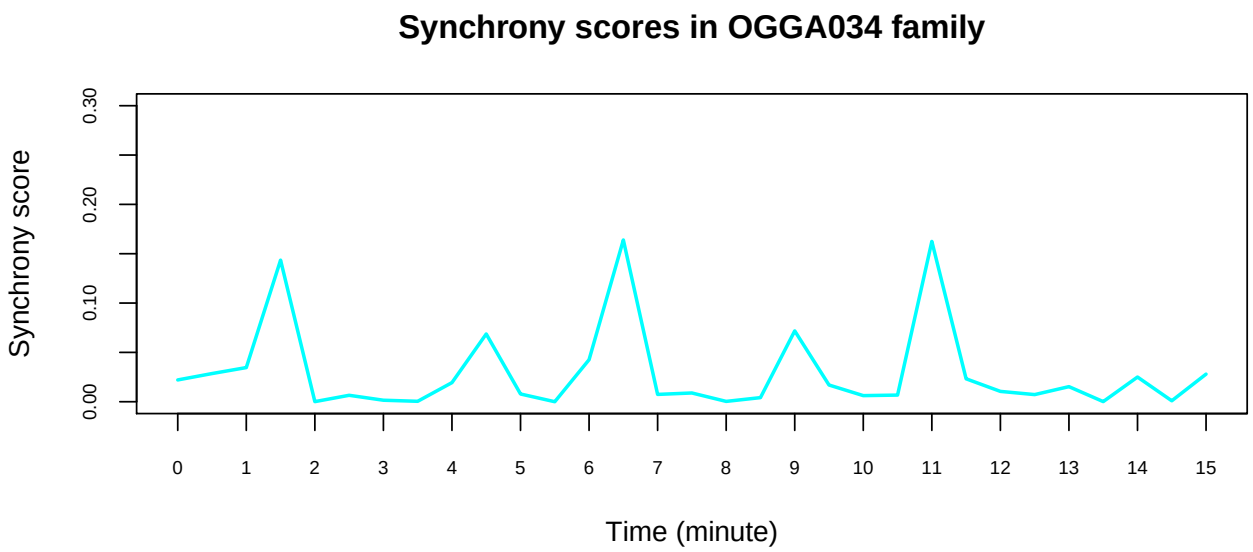

Synchrony scores in LACL family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

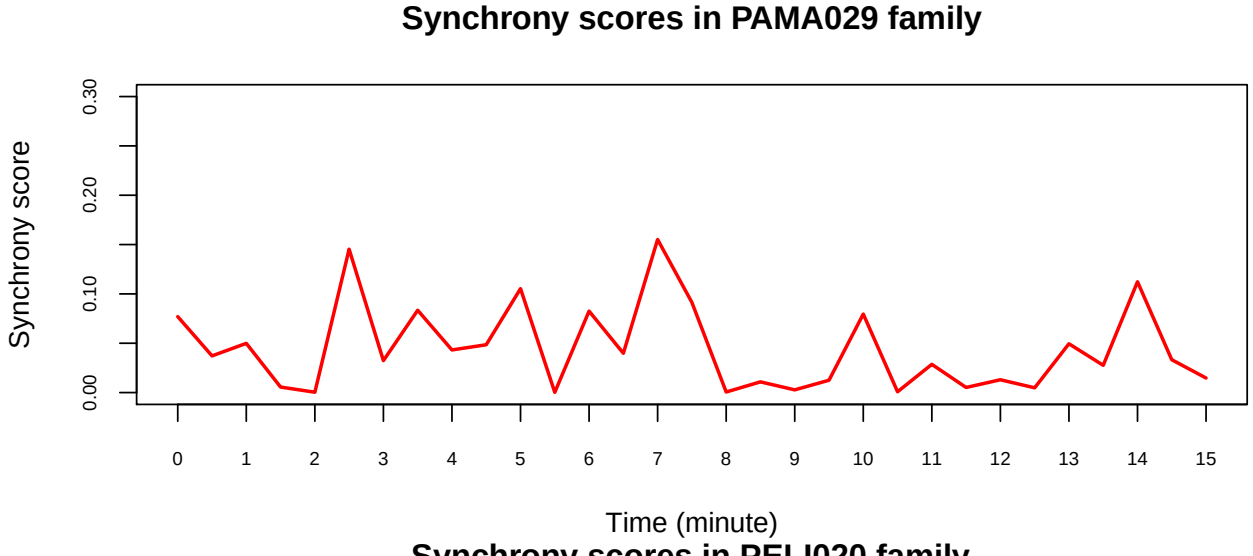

Synchrony scores in MAEL048 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)
Synchrony scores in MAME20 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)
Synchrony scores in MIPH043 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

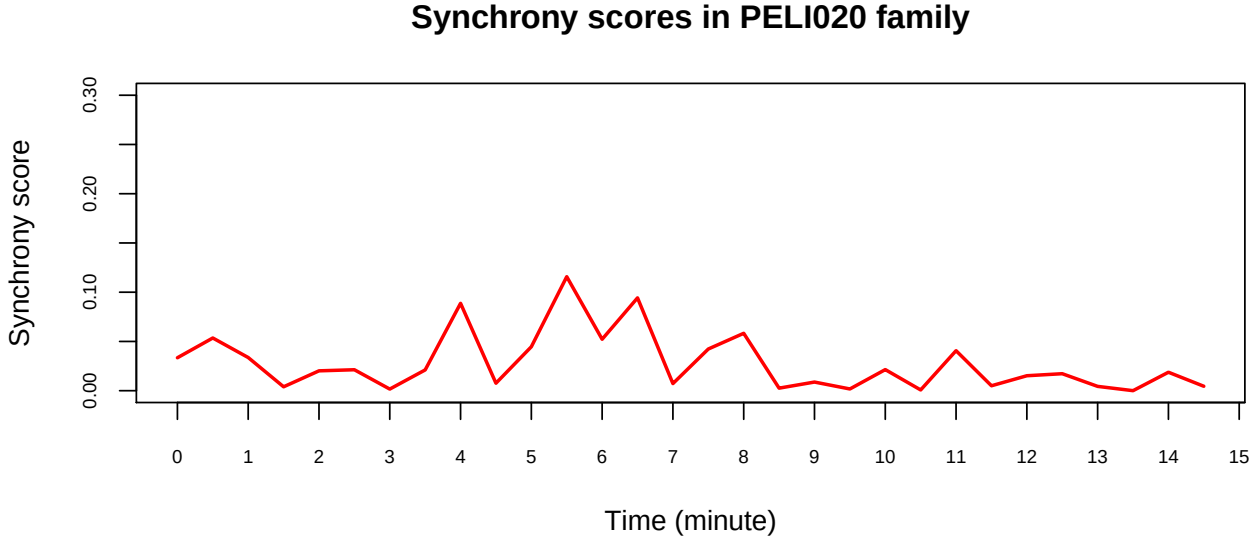

Synchrony scores in MOSA065 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Time (minute)

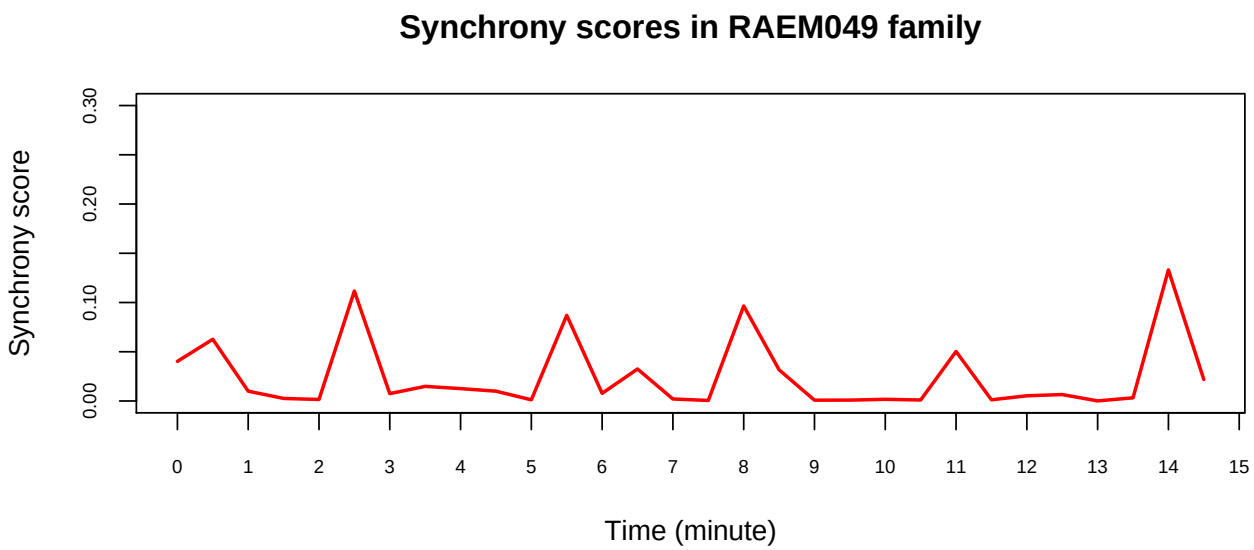

Synchrony scores in NAMA045 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

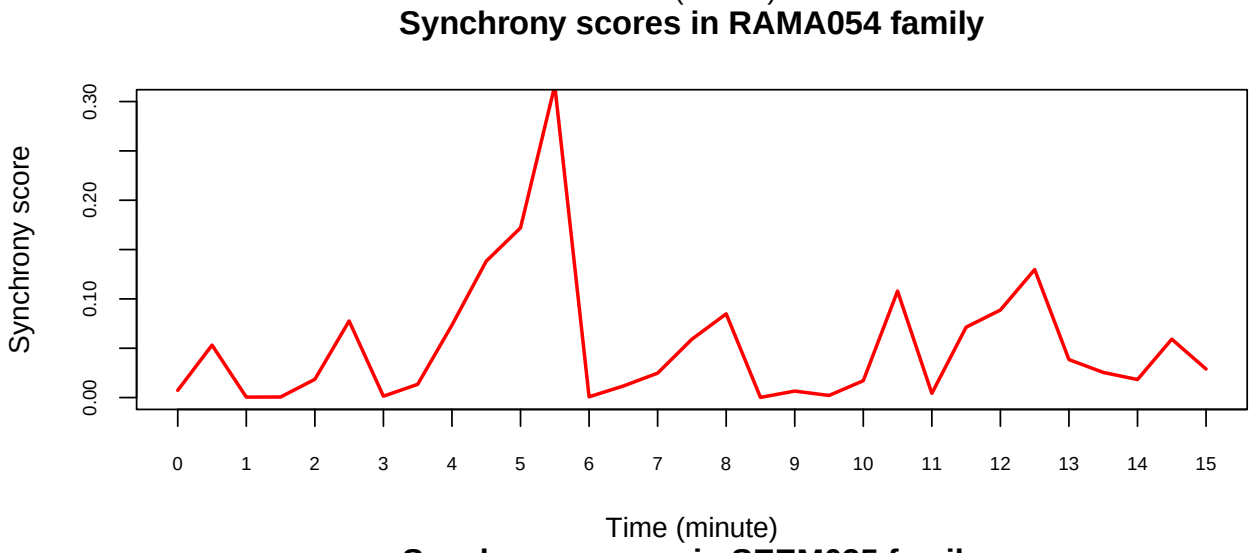

Synchrony scores in NUMA027 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Time (minute)

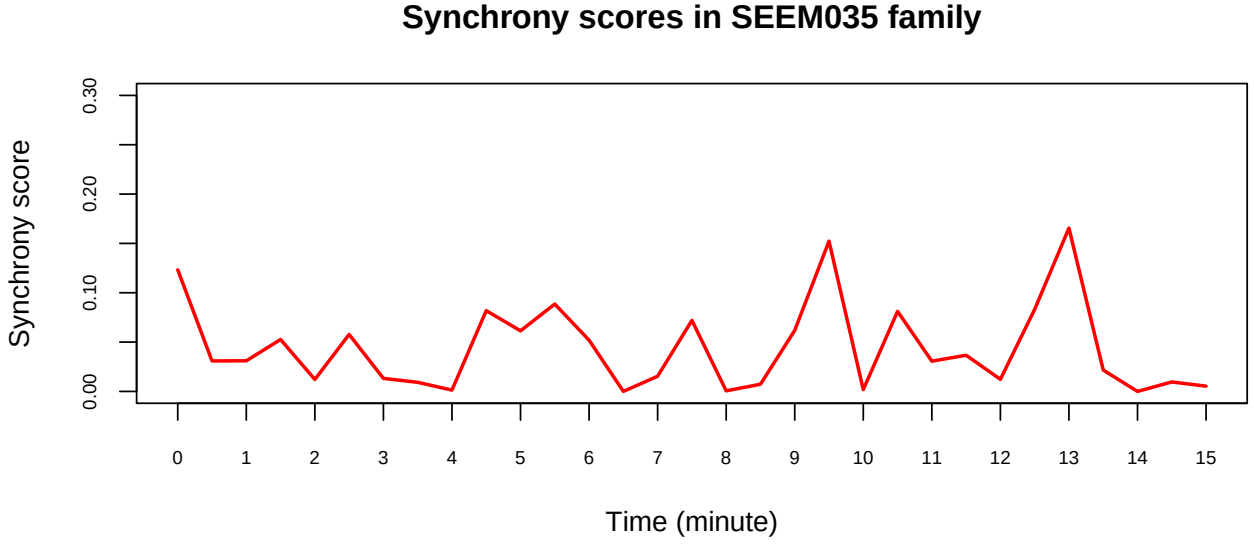

Synchrony scores in OGGA034 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

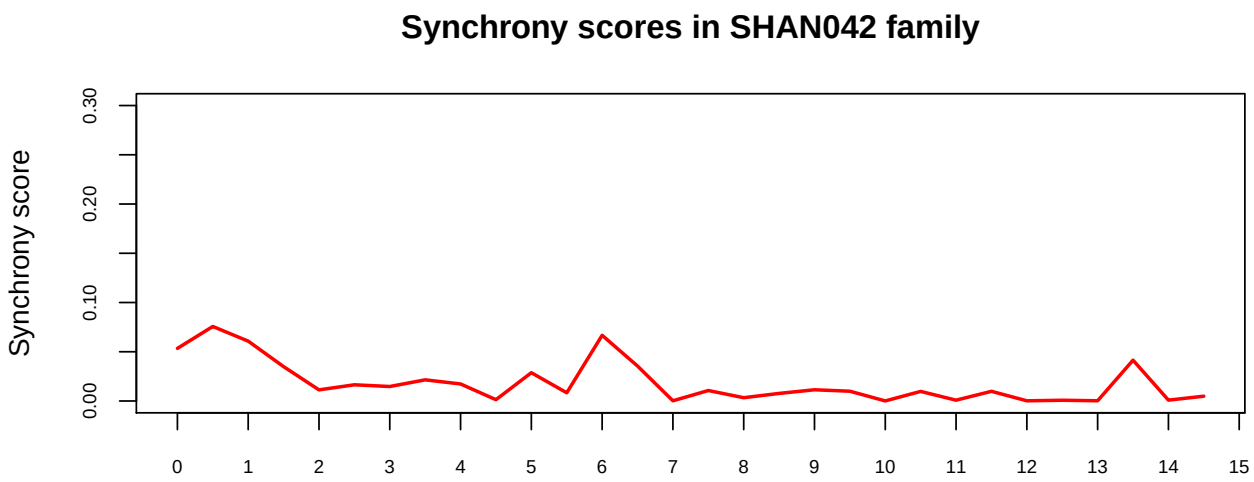

Synchrony scores in PAMA029 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

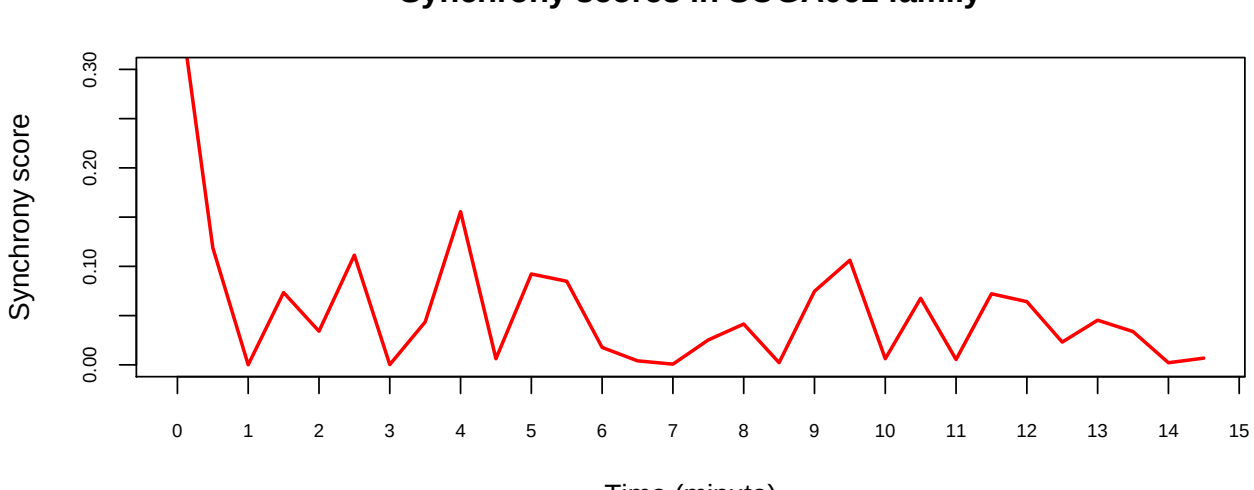

Synchrony scores in PELI020 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

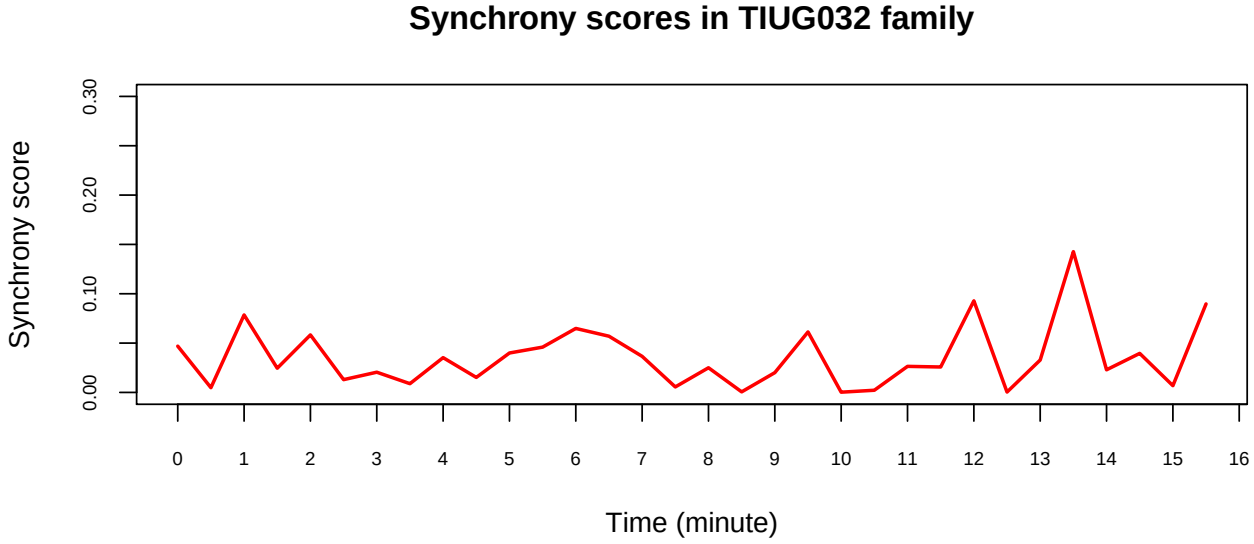

Synchrony scores in RAEM049 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

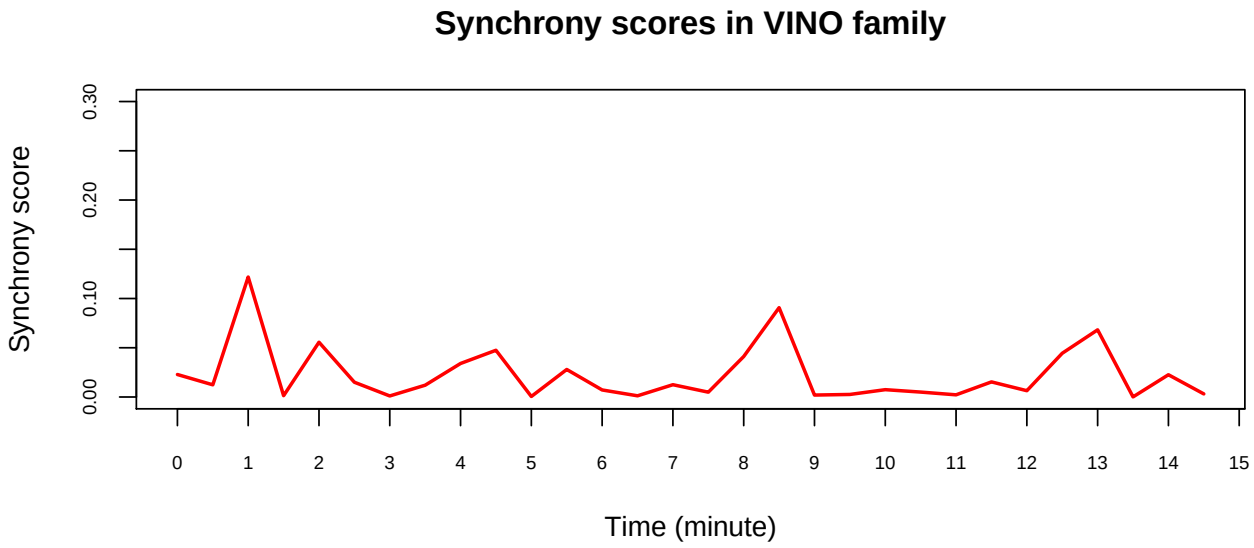

Synchrony scores in RAMA054 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)


Synchrony scores in SEEM035 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)


Synchrony scores in SHAN042 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

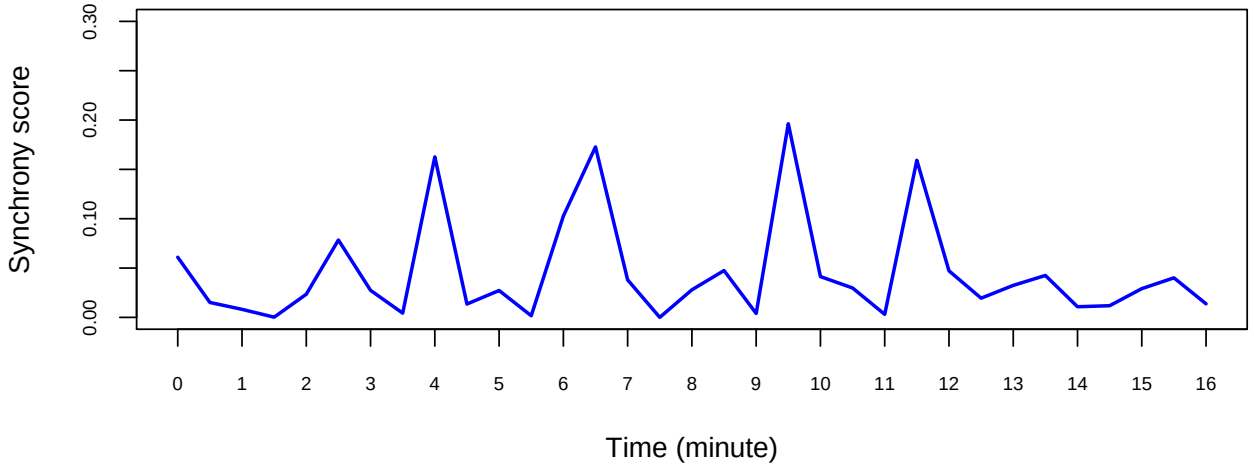

Synchrony scores in SOGA061 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

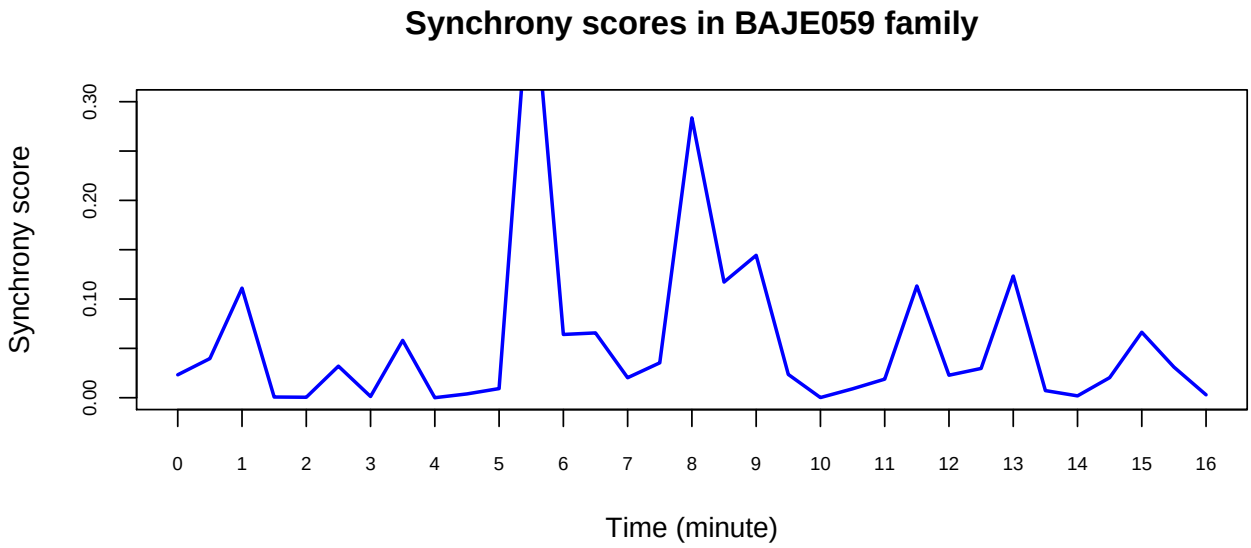

Synchrony scores in TIUG032 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

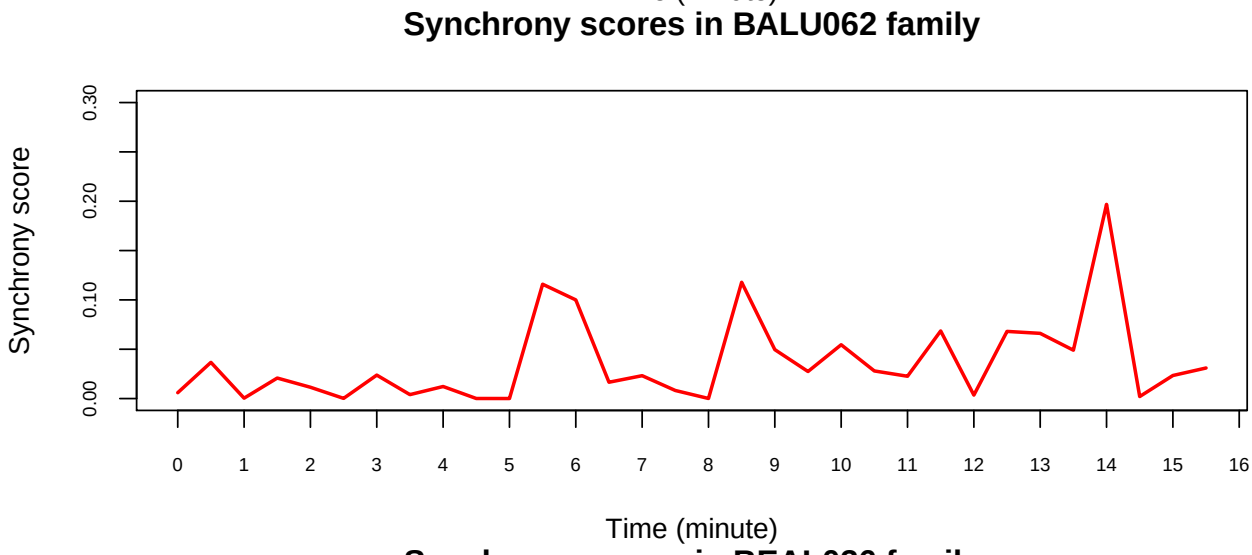


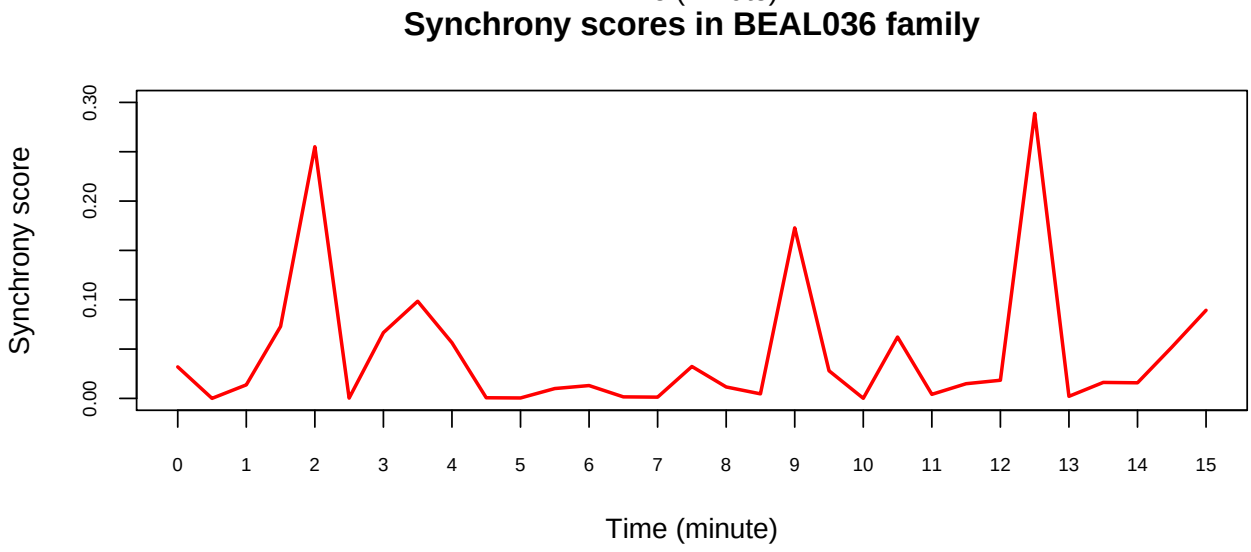
Synchrony scores noLog for each dyad, triad and for the whole group

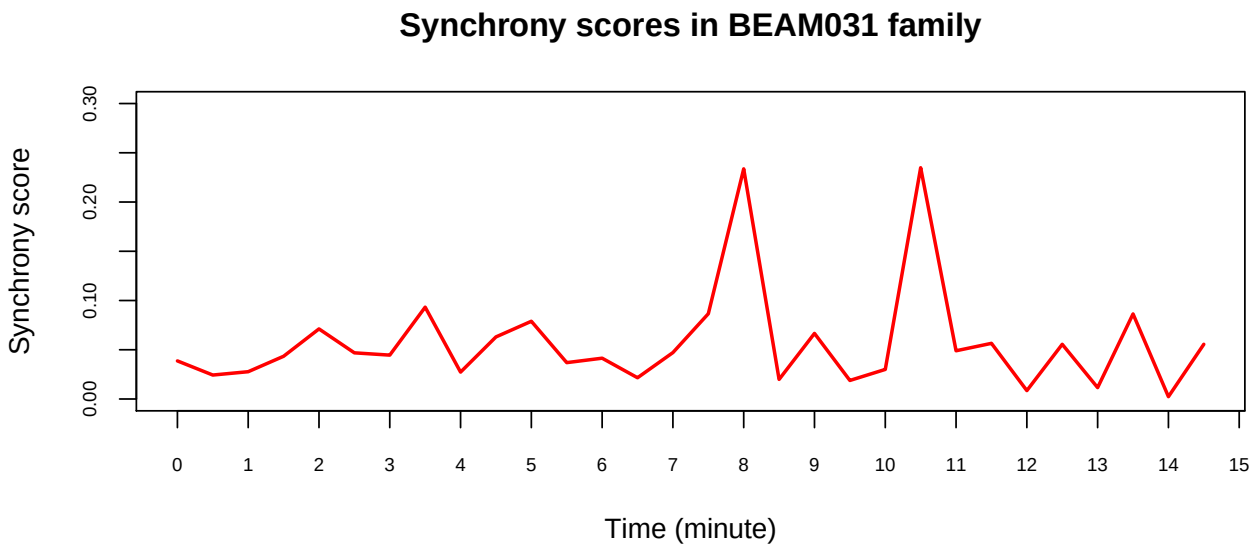
```
par(mar=c(4,4,4,3), mfrow=c(1,1))
for (i in unique(SSInoLog$family)){
      if (all(!is.na(SSInoLog[which(SSIlog$family==i),]$SSI_mo_ch)==TRUE)){
        plot(SSInoLog[which(SSIlog$family==i),]$Time_min, SSInoLog[which(SSInoLog$family==i),]$SSI_mo_ch
             ylim=c(0, 0.3), main=paste("Synchrony scores in", i, "family"), xlab = "Time (minute)", yla

      else if(all(!is.na(SSInoLog[which(SSIlog$family==i),]$SSI_fa_ch)==TRUE)){
#    print(str(SSInoLog[which(SSInoLog$family==i),]$SSI_fa_ch))
    plot(SSInoLog[which(SSIlog$family==i),]$Time_min, SSInoLog[which(SSIlog$family==i),]$SSI_fa_ch, ylim
      else{print("error")}}
```

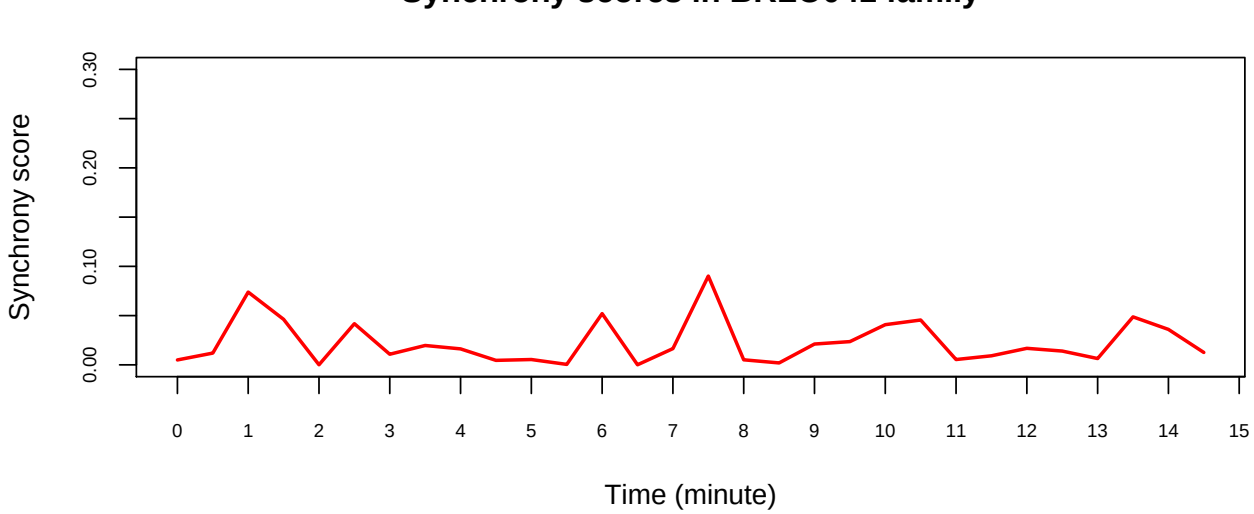


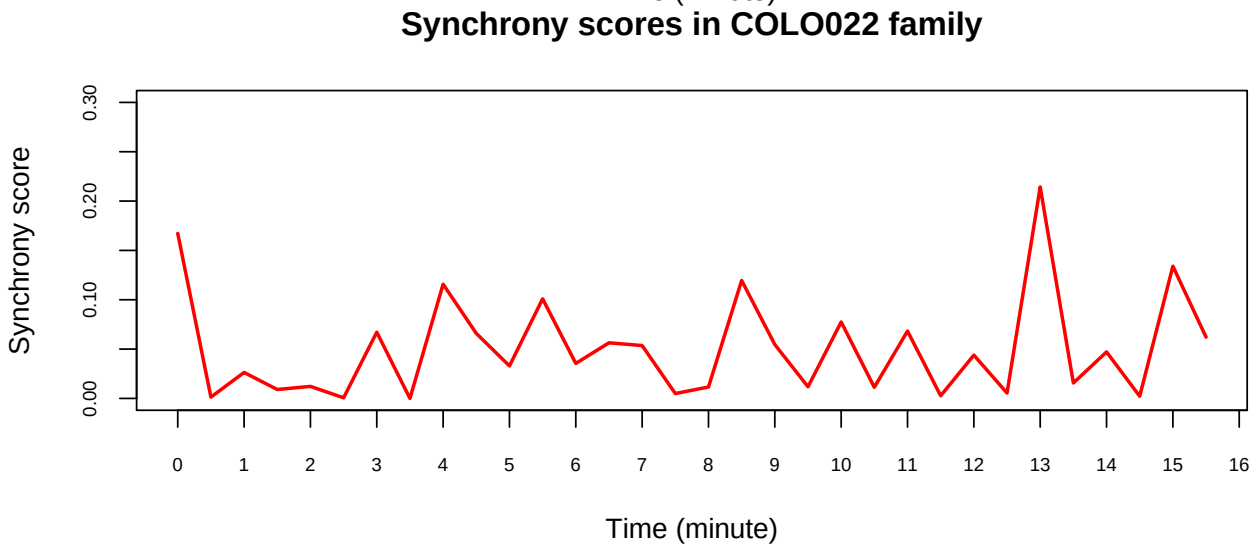

Synchrony scores in BAJE059 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

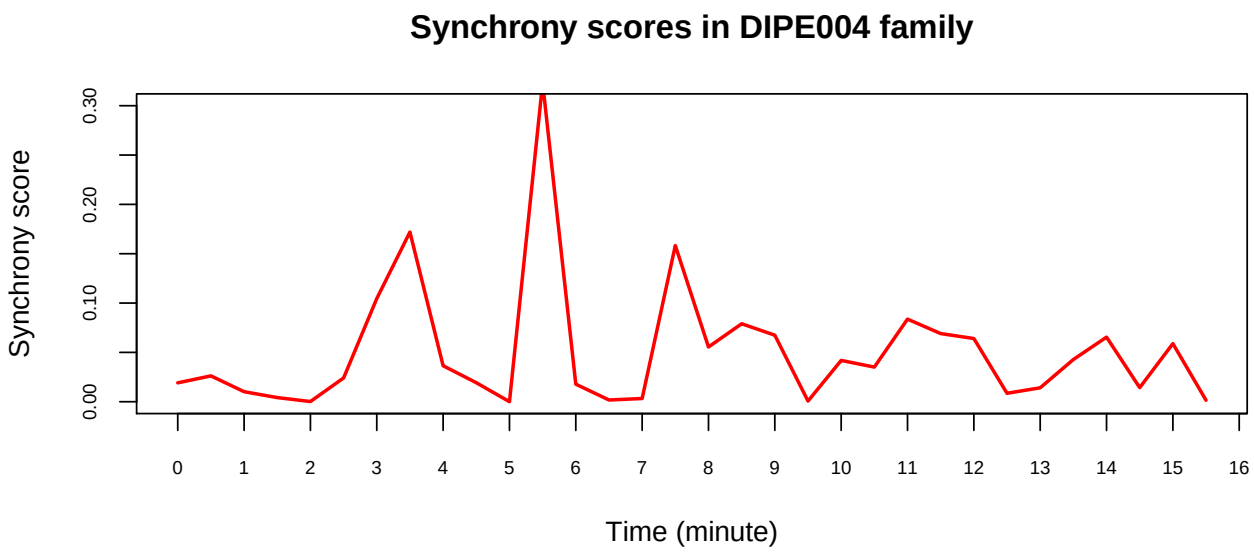

Synchrony scores in BALU062 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

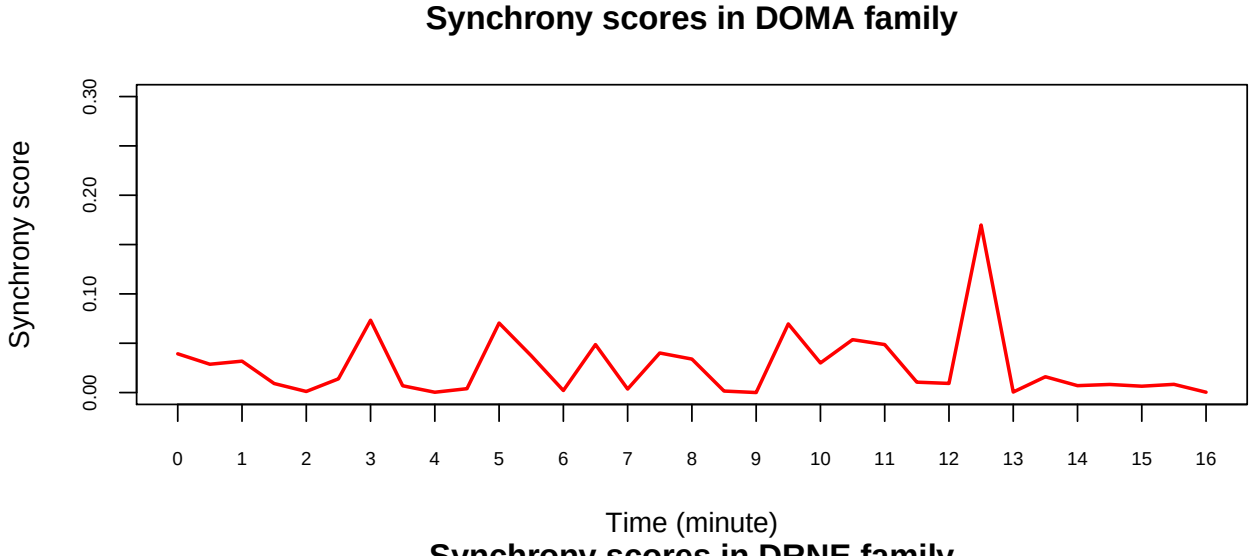

Synchrony scores in BEAL036 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

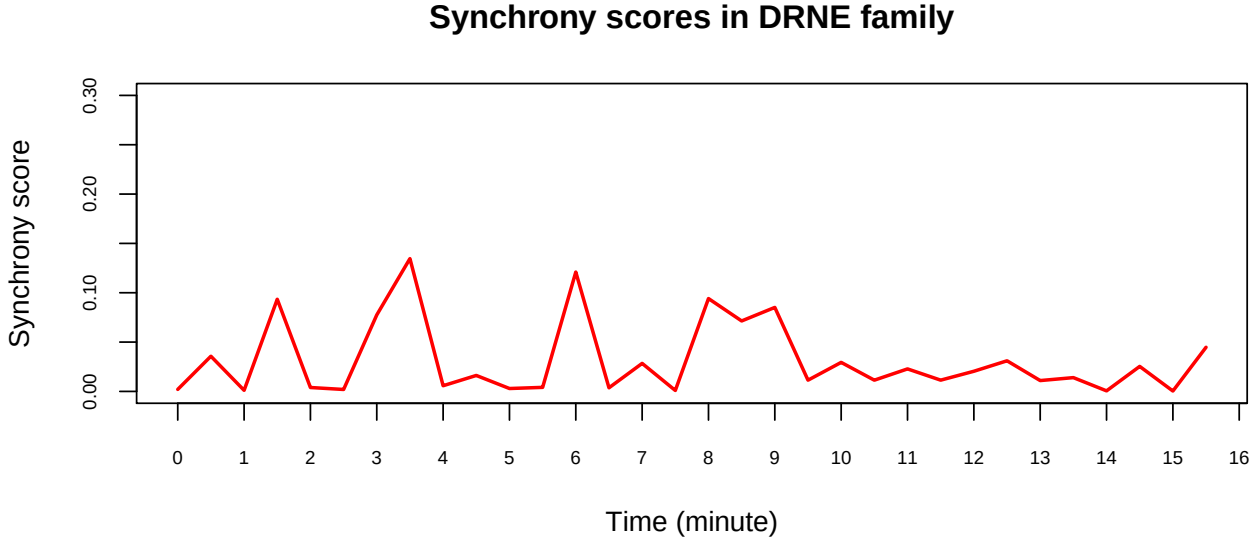

Synchrony scores in BEAM031 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

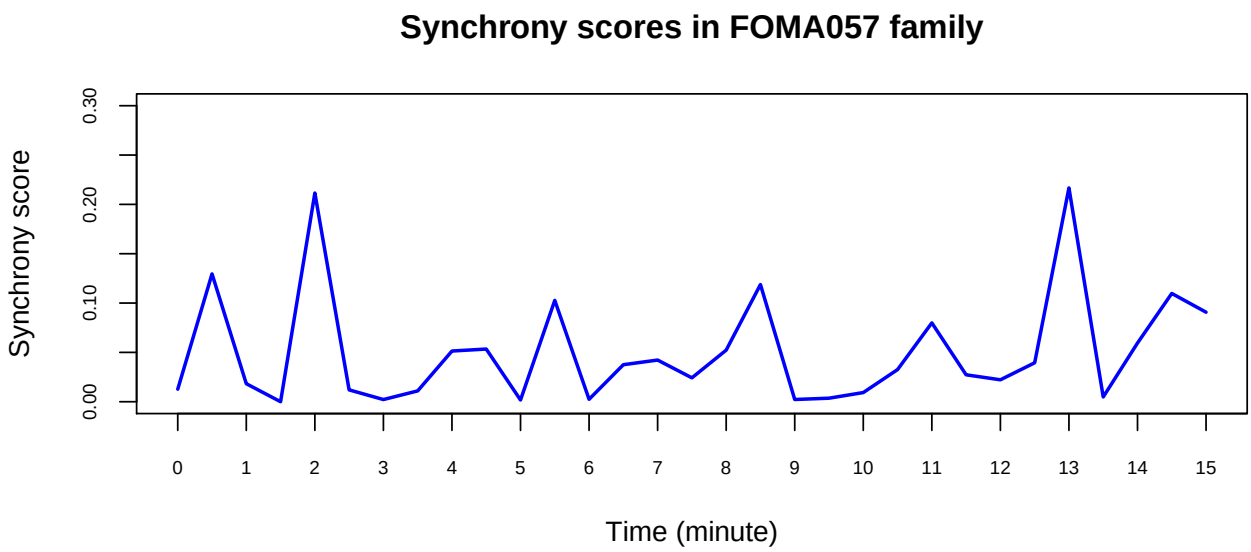

Synchrony scores in BRLO041 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

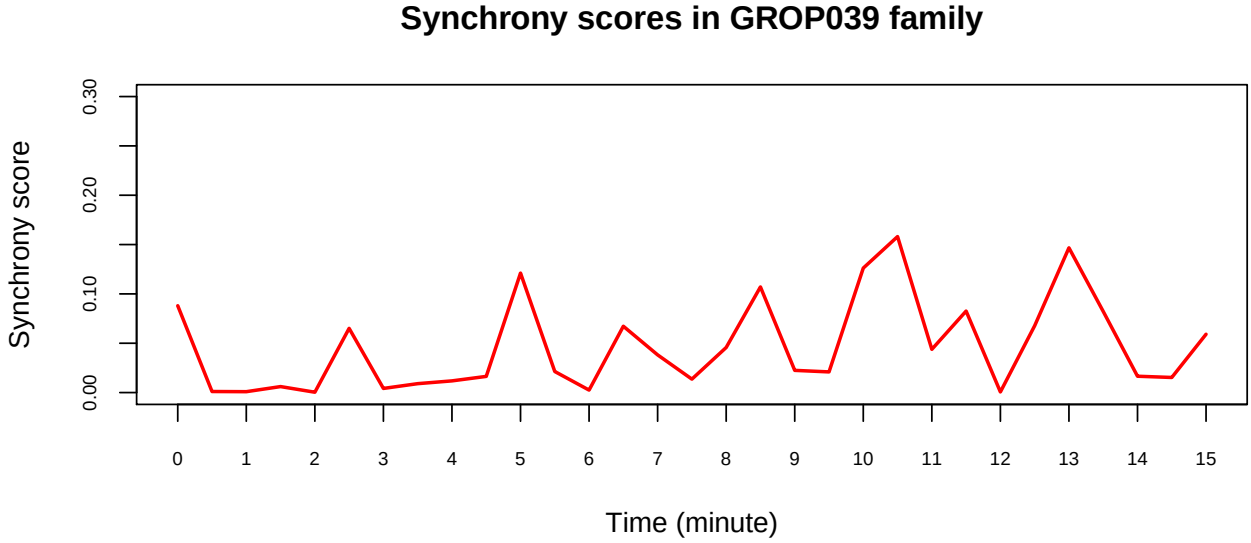

Synchrony scores in COLO022 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

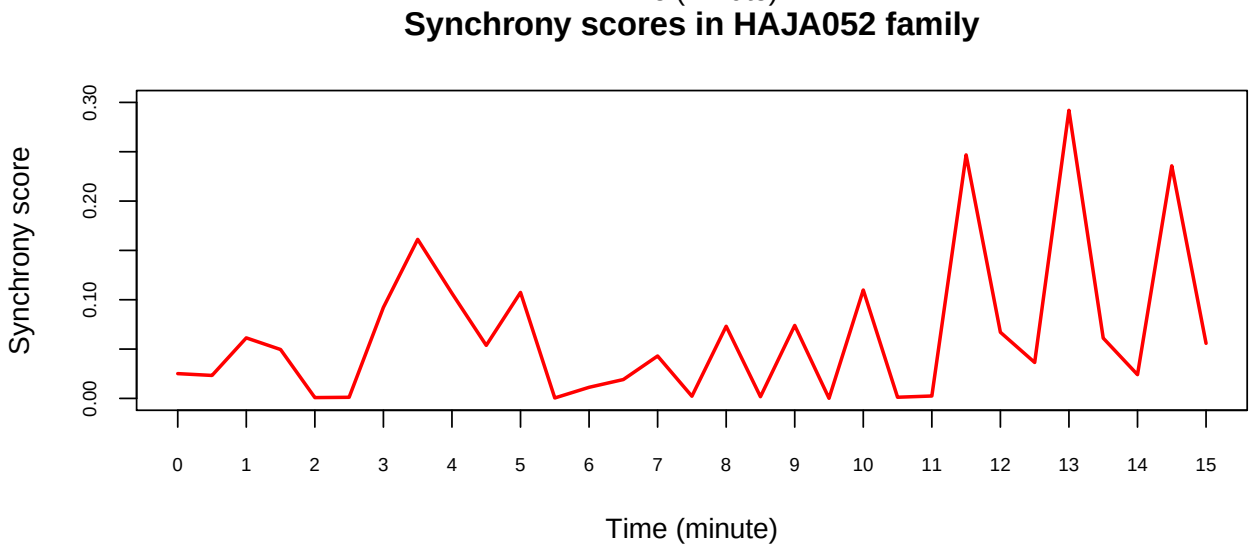

Synchrony scores in DIPE004 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

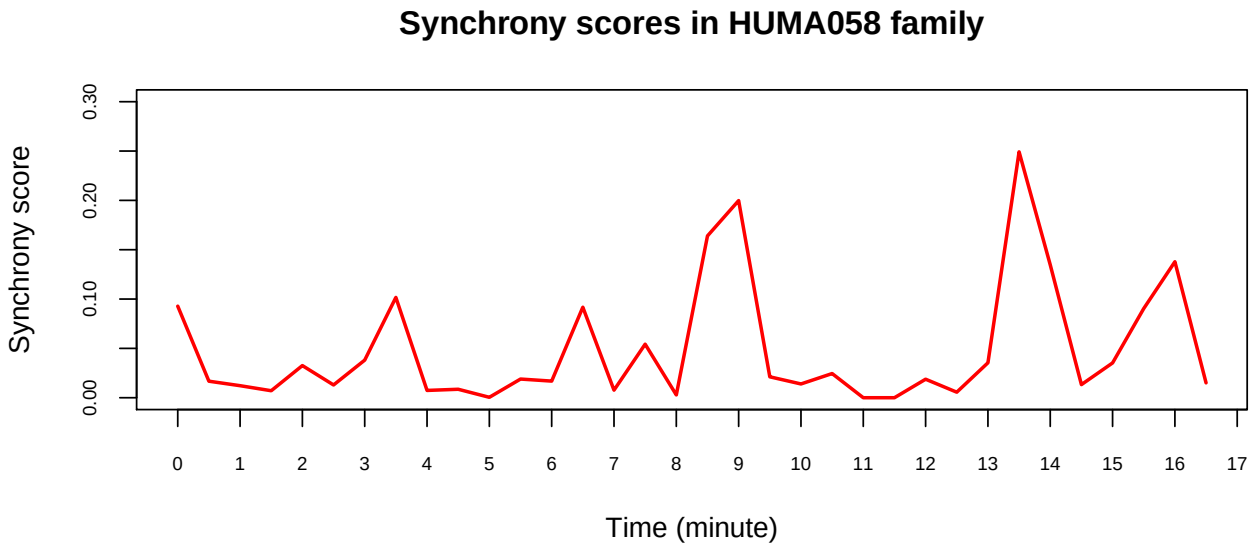

Synchrony scores in DOMA family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

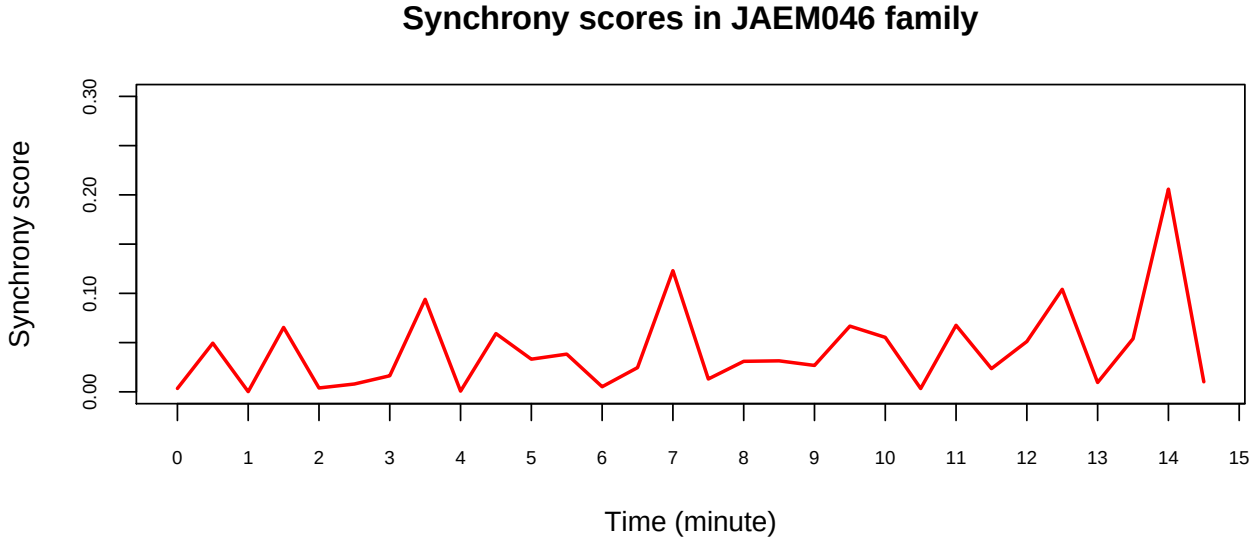

Synchrony scores in DRNE family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Time (minute)

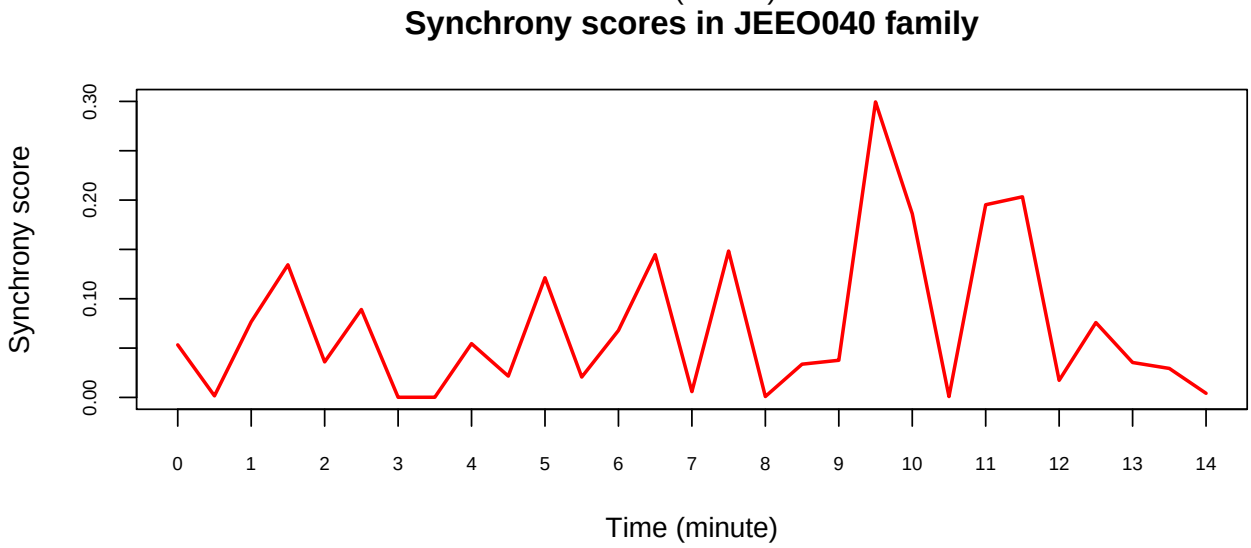

Synchrony scores in FOMA057 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

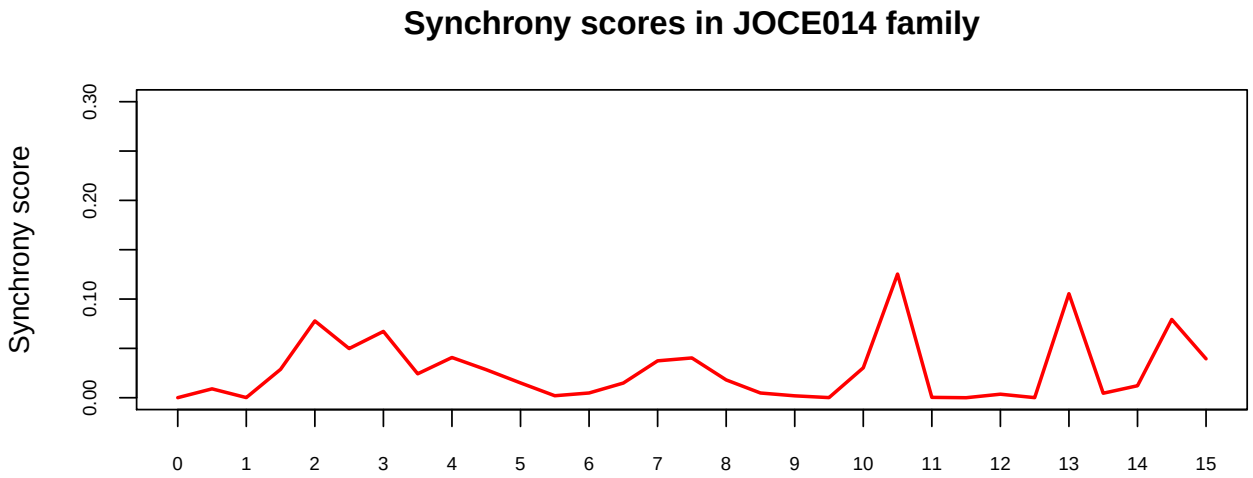

Synchrony scores in GROP039 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

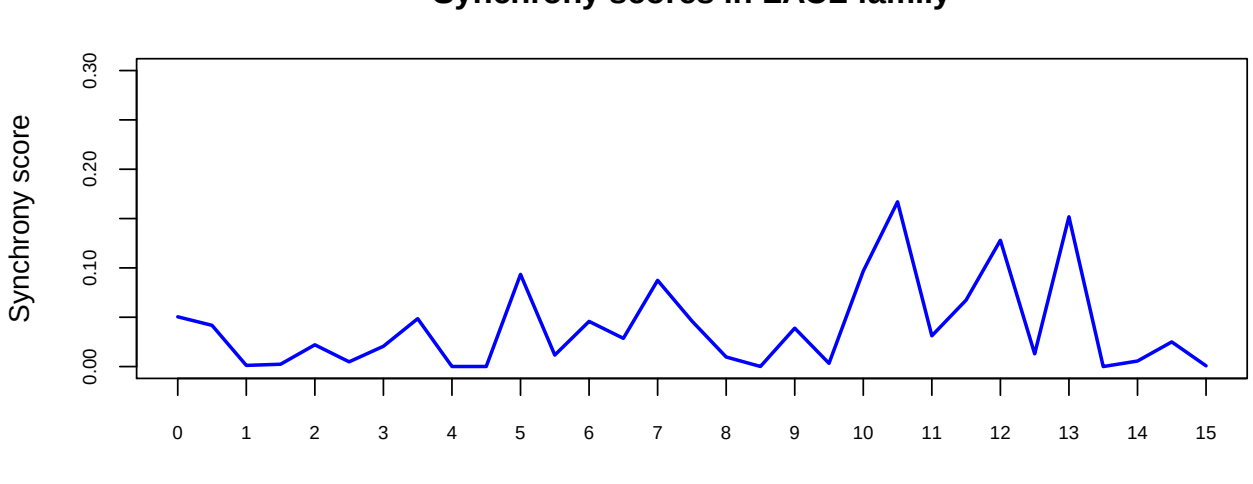

Synchrony scores in HAJA052 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

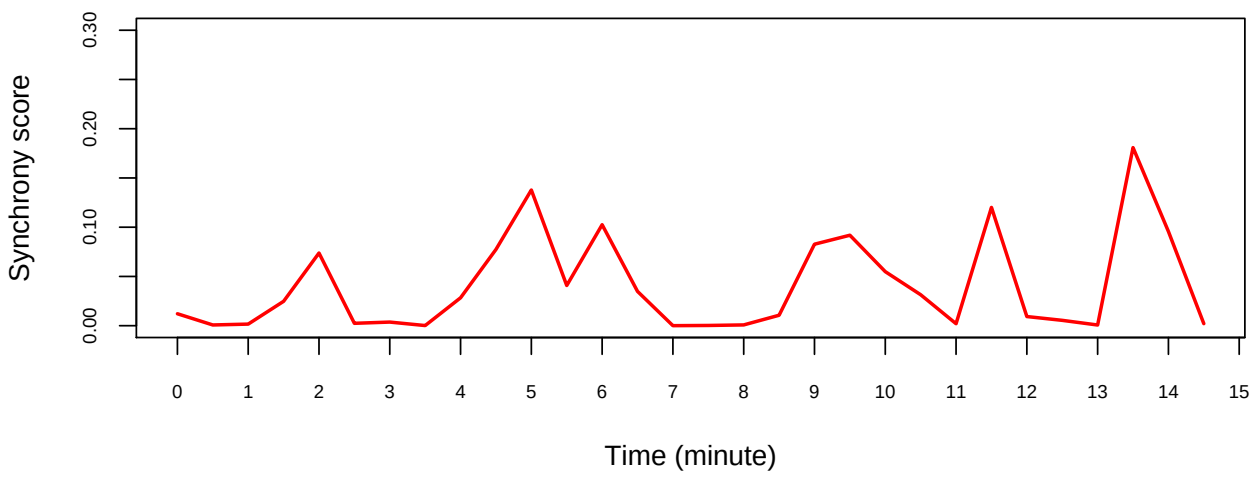

Synchrony scores in HUMA058 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Time (minute)

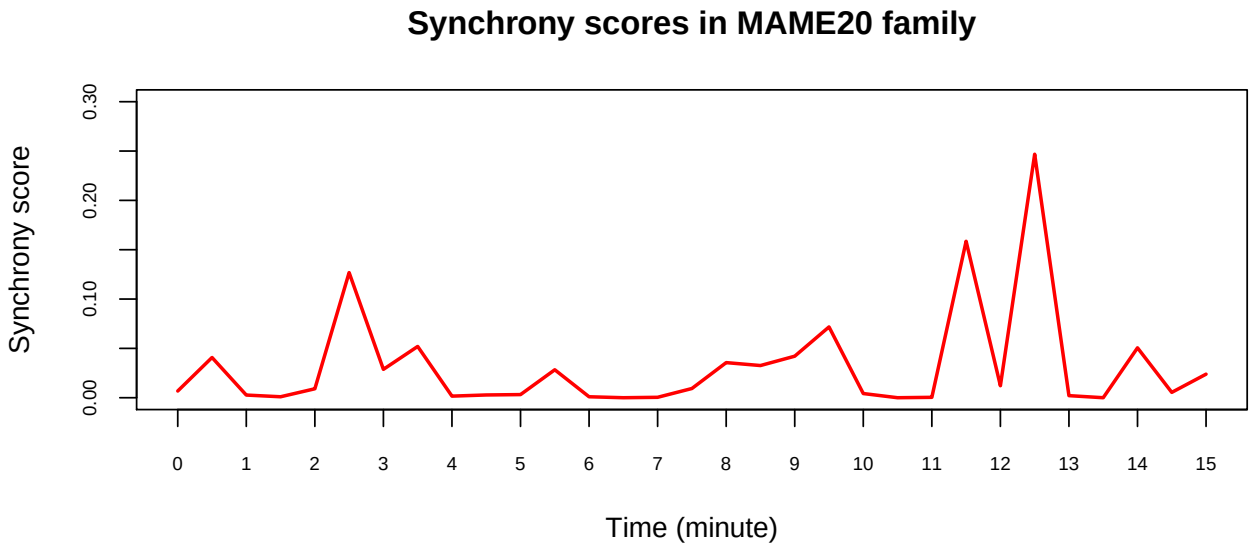

Synchrony scores in JAEM046 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

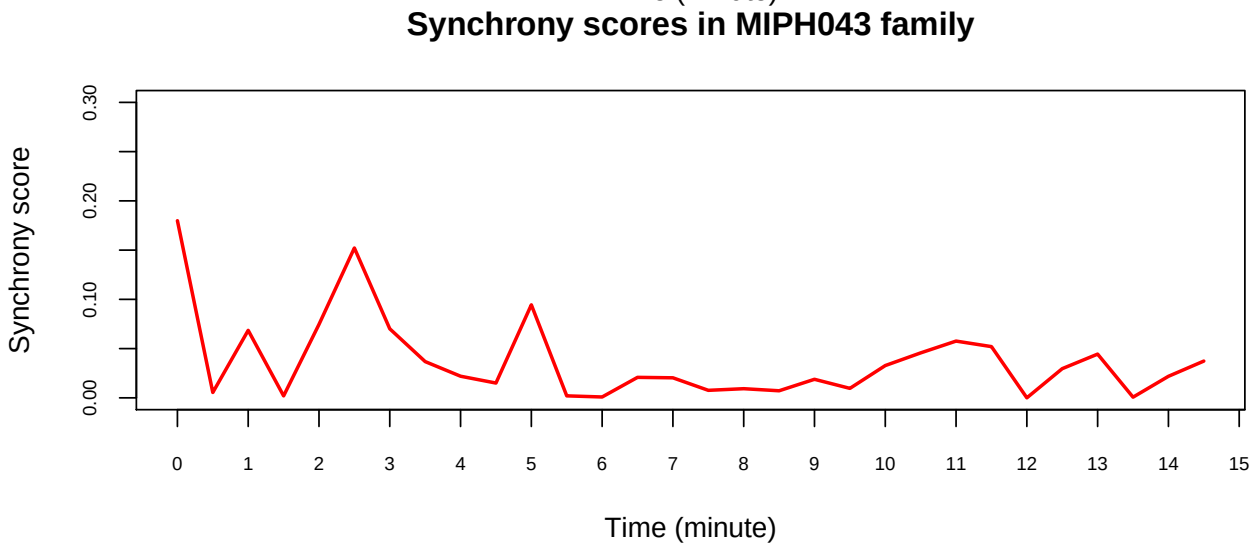

Synchrony scores in JEEO040 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Time (minute)

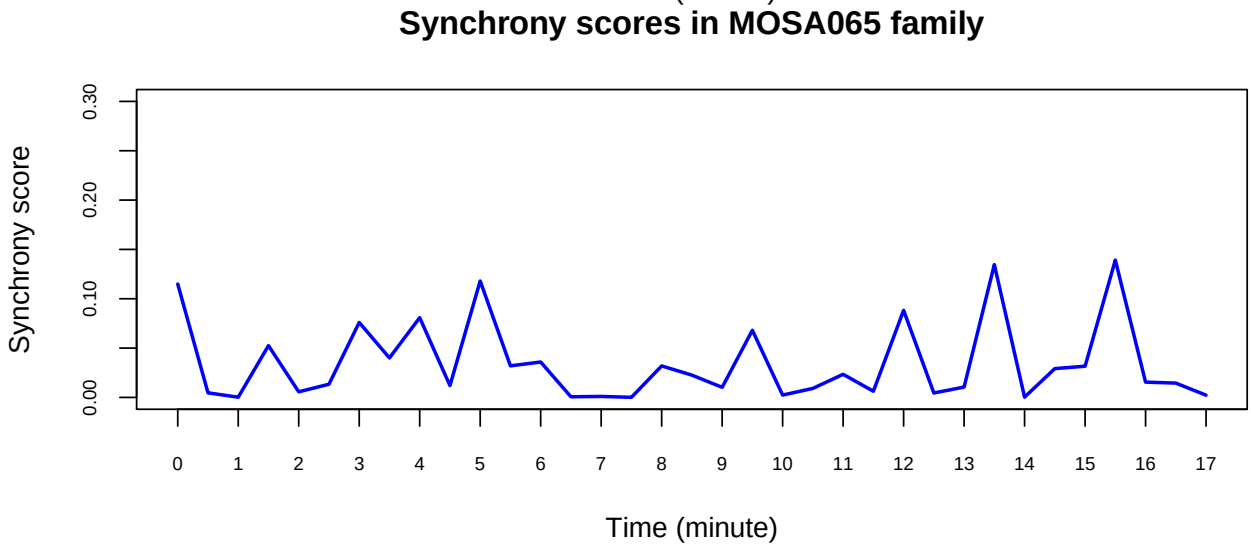

Synchrony scores in JOCE014 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

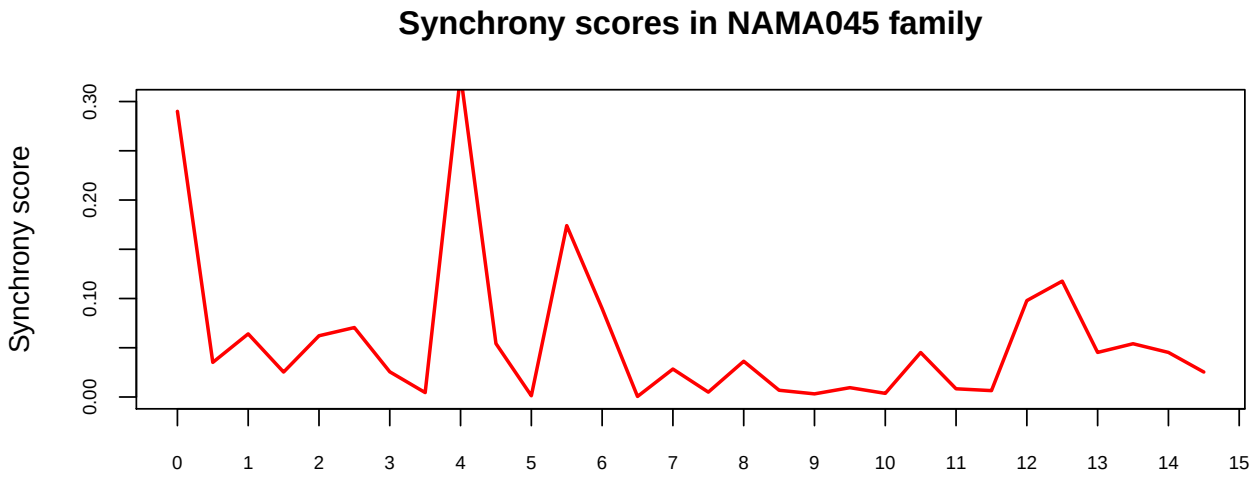

Synchrony scores in LACL family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

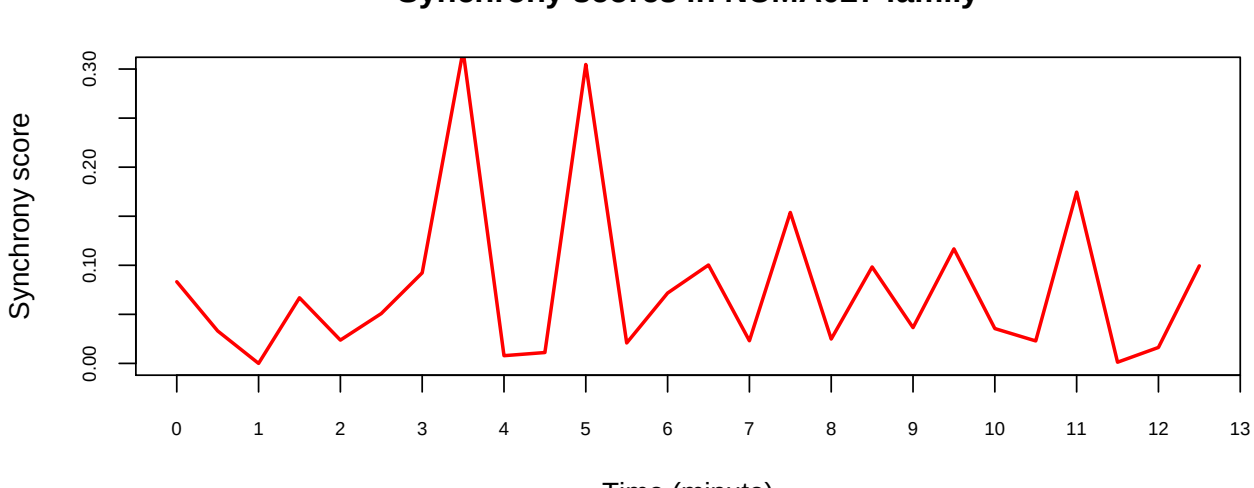

Synchrony scores in MAEL048 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

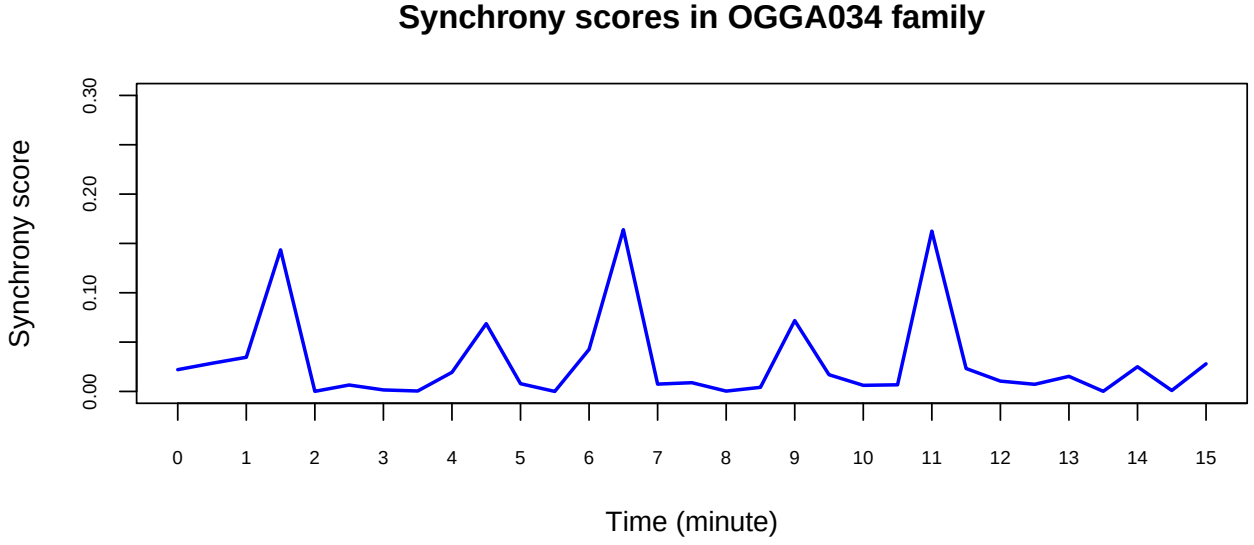

Synchrony scores in MAME20 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

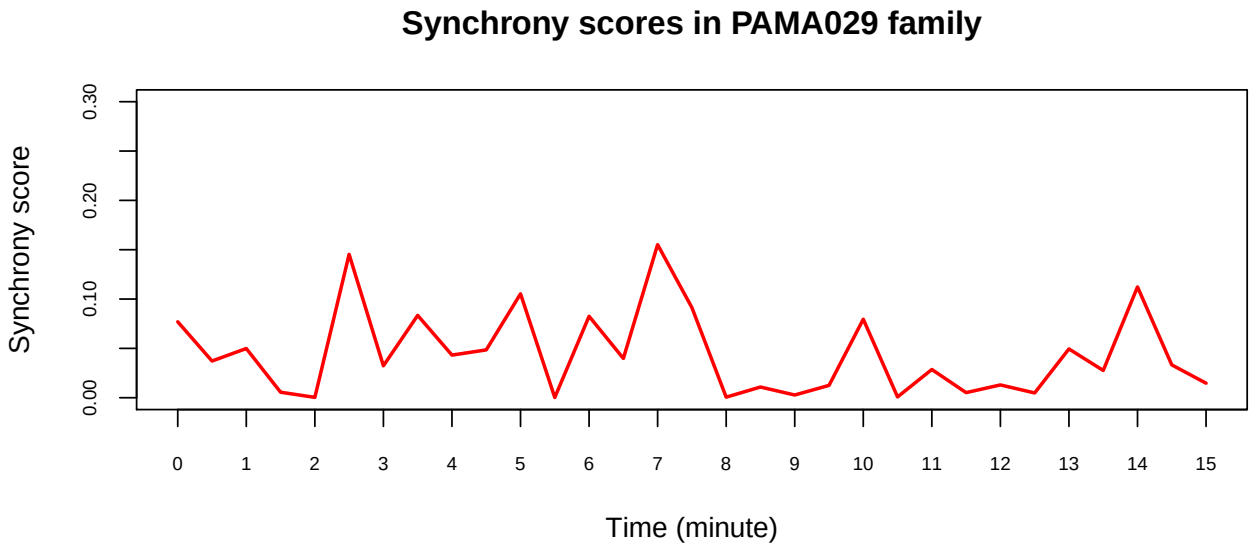

Synchrony scores in MIPH043 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

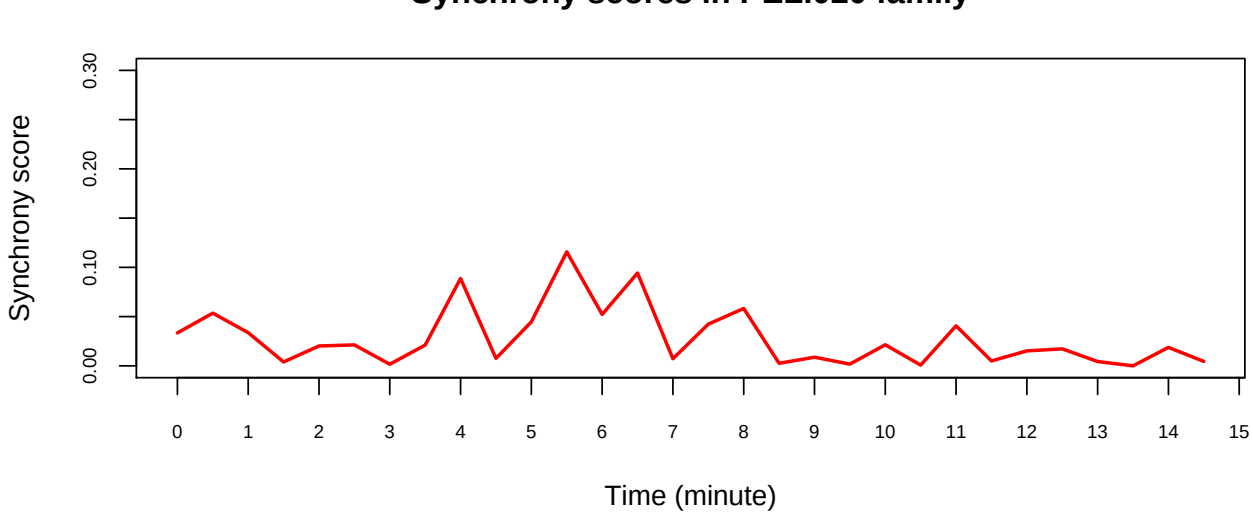

Synchrony scores in MOSA065 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
Time (minute)

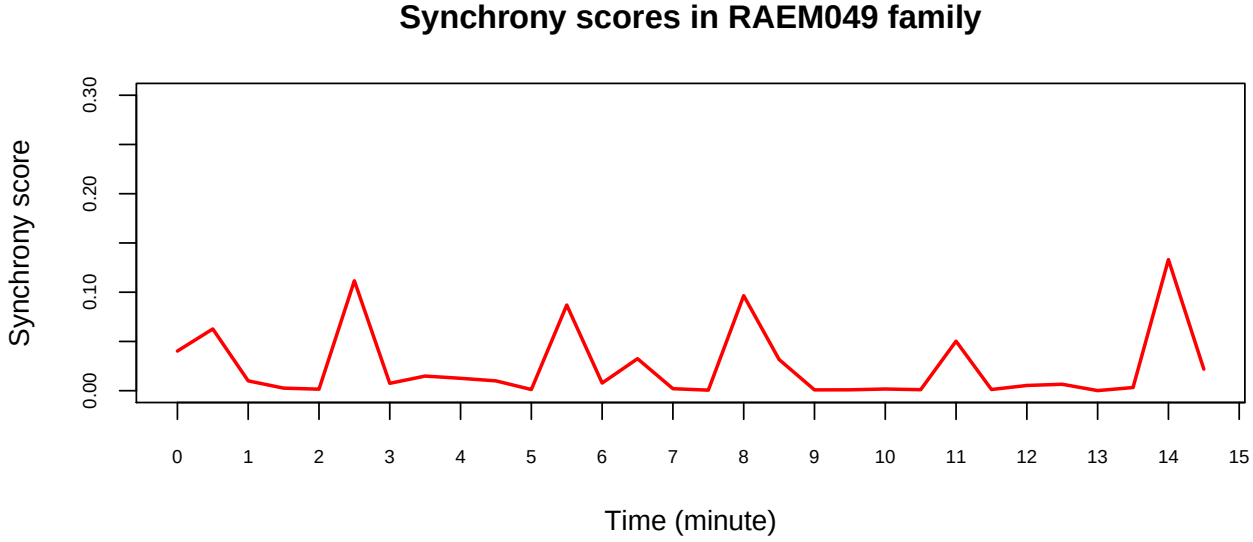

Synchrony scores in NAMA045 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

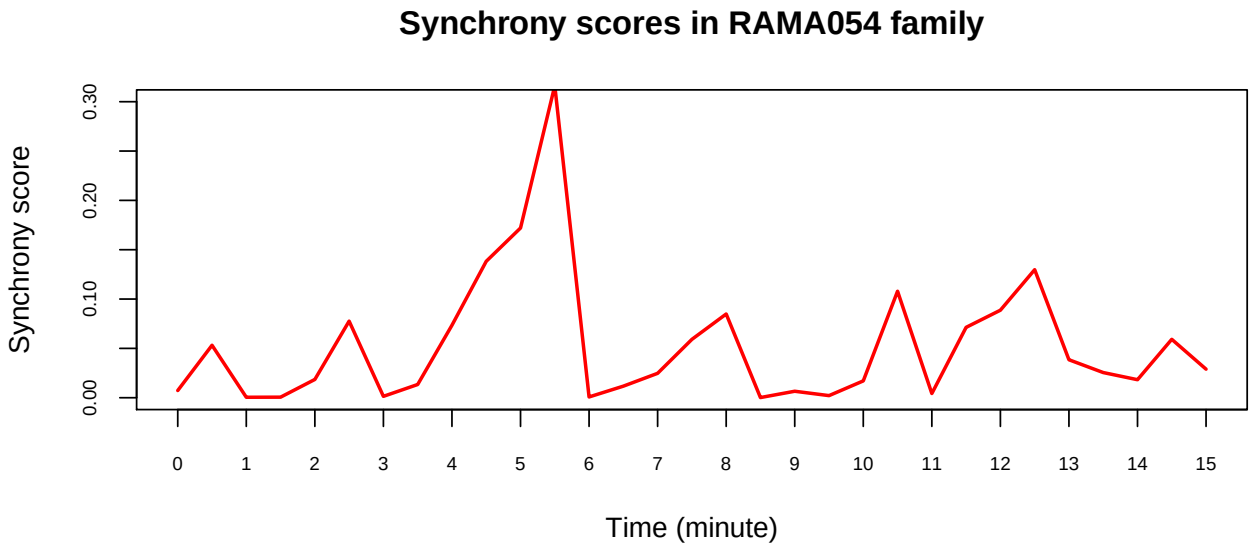

Synchrony scores in NUMA027 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13
Time (minute)

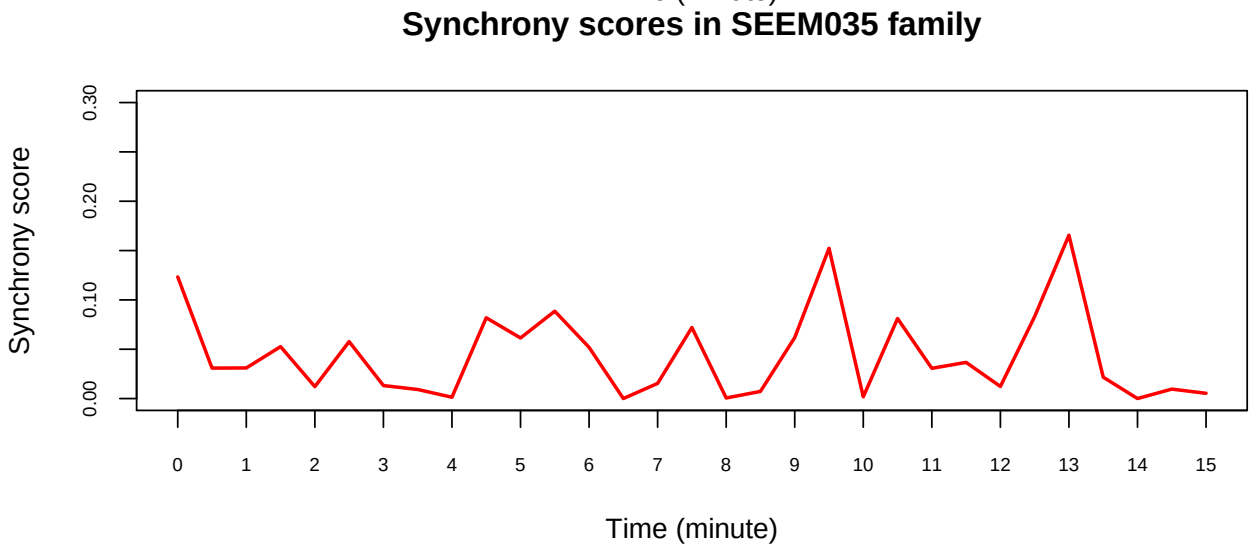

Synchrony scores in OGGA034 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

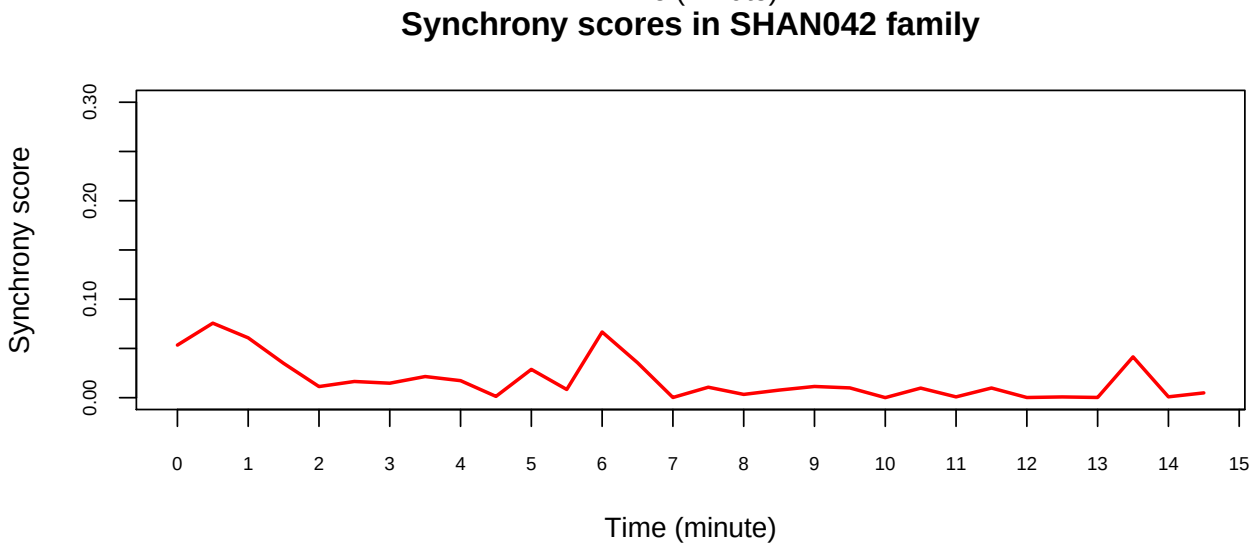

Synchrony scores in PAMA029 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

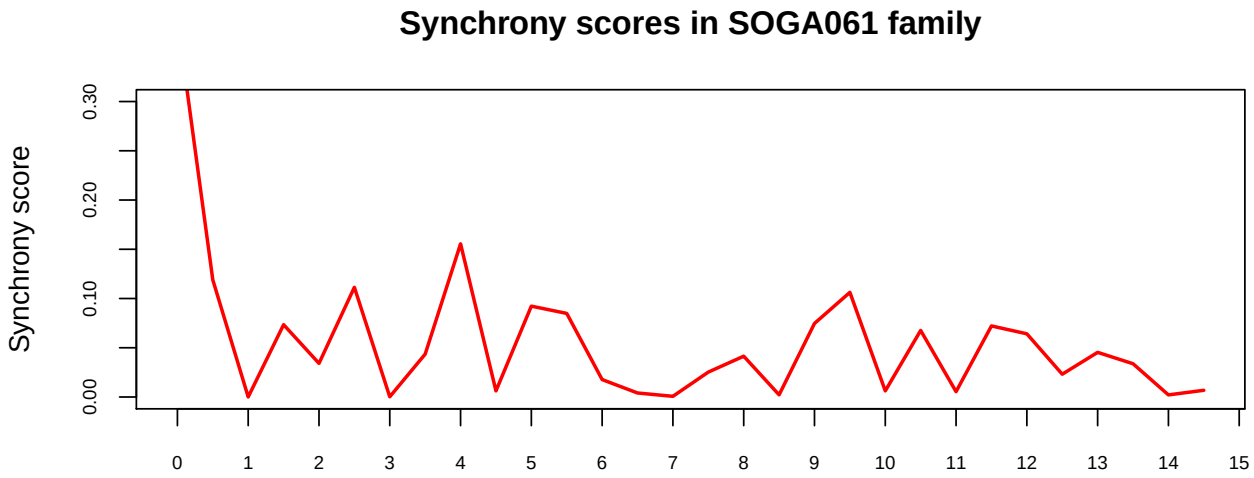

Synchrony scores in PELI020 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

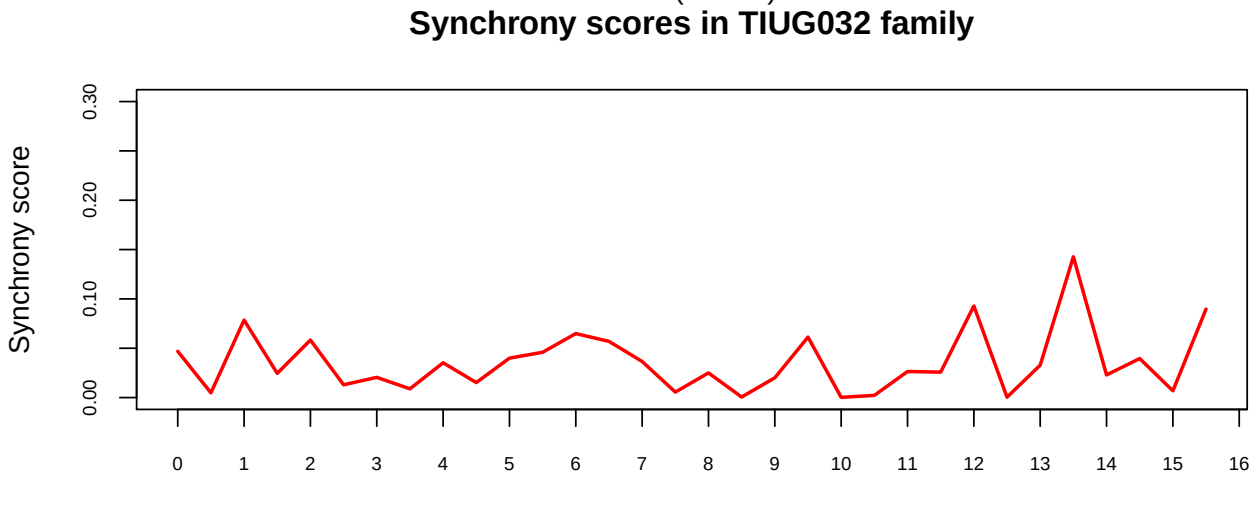

Synchrony scores in RAEM049 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)

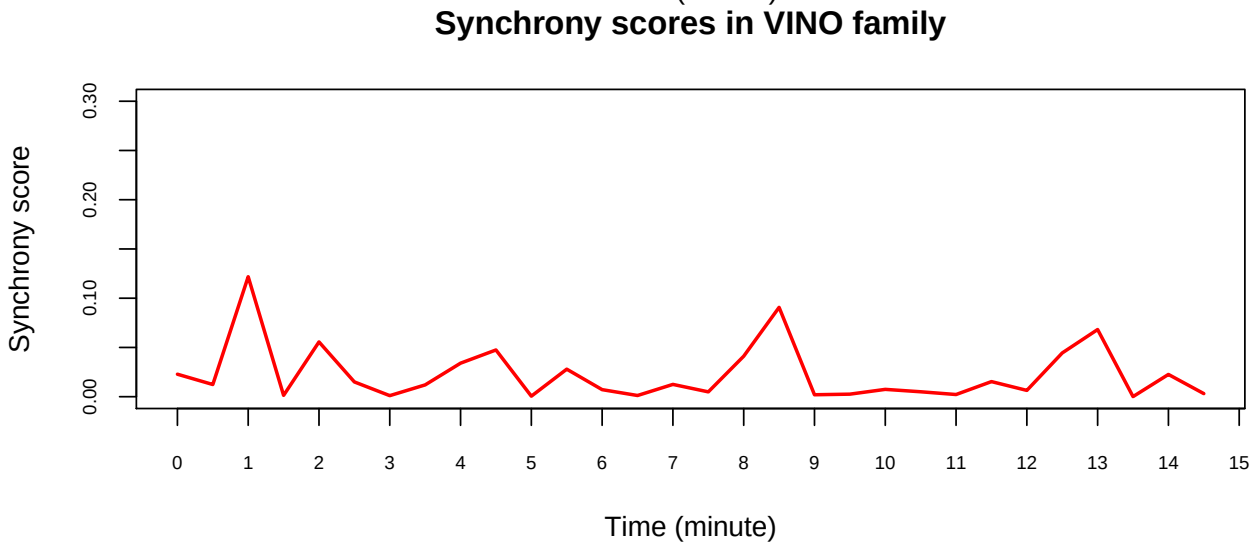

Synchrony scores in RAMA054 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)


Synchrony scores in SEEM035 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)


Synchrony scores in SHAN042 family
Synchrony score
0.00
0.10
0.20
0.30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Time (minute)








```
str(SSInoLog)
```

```
## 'data.frame':    1054 obs. of  5 variables:
```

```
##  $ family      : Factor w/ 35 levels "1606","BAJE059",..: 1 1 1 1 1 1 1 1 1 1 ...
##  $ SSI-interval: int  0 1 2 3 4 5 6 7 8 9 ...
##  $ Time_min    : num  0 0.5 1 1.5 2 2.5 3 3.5 4 4.5 ...
##  $ SSI_fa_ch   : num  0.06097 0.015151 0.008147 0.000207 0.023456 ...
##  $ SSI_mo_ch   : num  NA NA NA NA NA NA NA NA NA NA ...
```

```
SSInoLog <- merge(SSInoLog, cutFrames, by.x="family", by.y="family")
SSInoLog$LabelVideo <- rep(NA, nrow(SSInoLog))
SSInoLog[which(SSInoLog$Time_min < SSInoLog$CutBeforeMin),]$LabelVideo <- "Cut"

SSInoLog[which(SSInoLog$Time_min > SSInoLog$CutBeforeMin & SSInoLog$Time_min < SSInoLog$CutMiddle1Min),]

SSInoLog[which(SSInoLog$Time_min > SSInoLog$CutMiddle1Min & SSInoLog$Time_min < SSInoLog$CutMiddle2Min)

SSInoLog[which(SSInoLog$Time_min > SSInoLog$CutMiddle2Min & SSInoLog$Time_min < SSInoLog$CutFinalMin),]


SSIConflict <- c(SSInoLog[which(SSInoLog$LabelVideo=="Conflict"),]$SSI_mo_ch, SSInoLog[which(SSInoLog$La
mean(SSIConflict, na.rm=TRUE)
```

```
## [1] 0.04153297
```

```
SSINoConflict <- c(SSInoLog[which(SSInoLog$LabelVideo=="No Conflict"),]$SSI_mo_ch, SSInoLog[which(SSInol
mean(SSINoConflict, na.rm=TRUE)
```

```
## [1] 0.0406361
```

Demographic and Psychometric data

Demographic description

Sex

```
par(mar=c(3,4,4,4))
barplot(table(psycho$Sex), col=c("red", "blue"), main ="Sex repartition")
```

Age

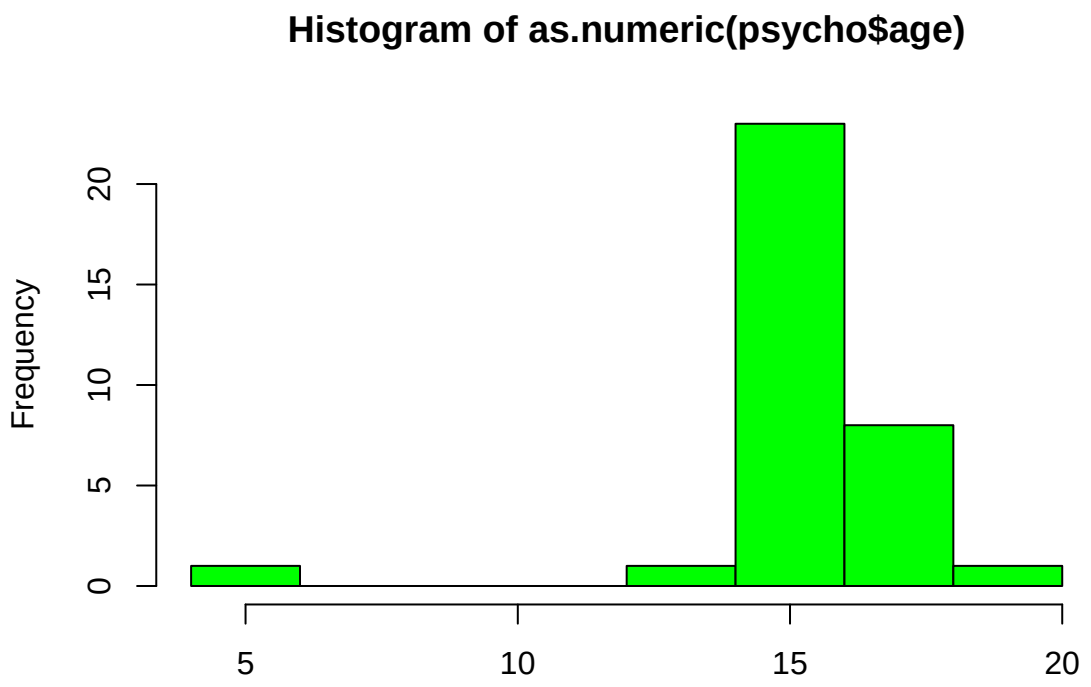
```
psycho$Birthday <- as.Date(psycho$Birthday, format="%d/%m/%y")
psycho$interview_date <- as.Date(psycho$interview_date, format="%d/%m/%y")
str(psycho$Birthday )
```

```
##  Date[1:34], format: "1999-05-27" "1999-12-01" "2000-02-26" "1999-09-22" ...
```

```
str(psycho$interview_date)
```

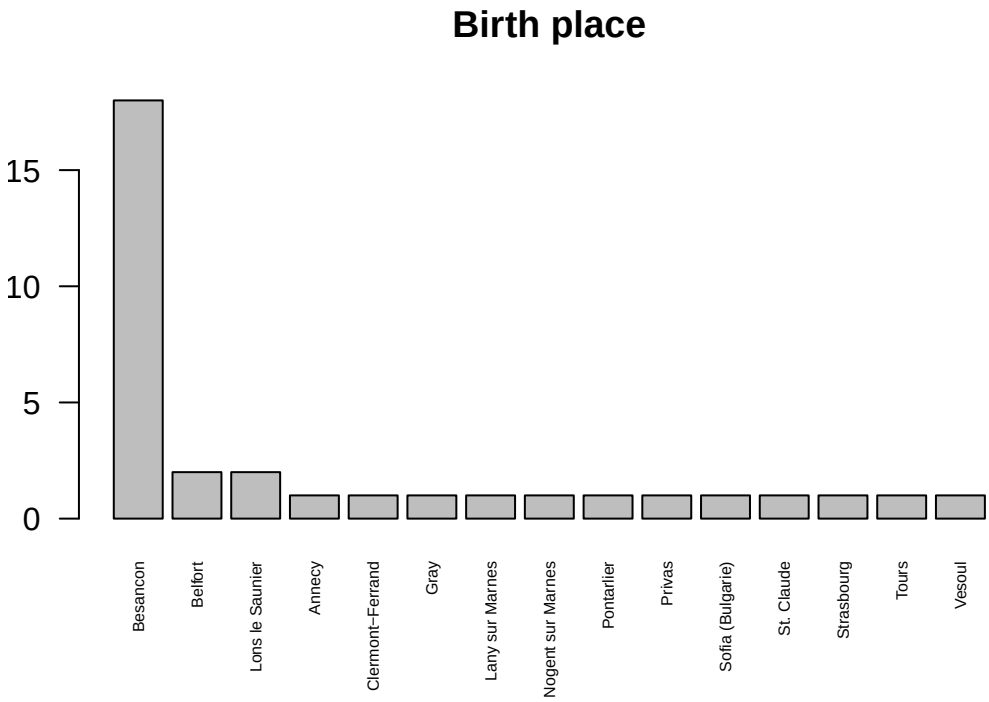
```
##  Date[1:34], format: "2015-03-26" "2015-03-27" "2015-03-18" "2014-12-03" ...
```

```
psycho$age <- (psycho$interview_date-psycho$Birthday)/365.25

par(mar=c(3,4,4,4))
hist(as.numeric(psycho$age), col="green")
```



Birth places

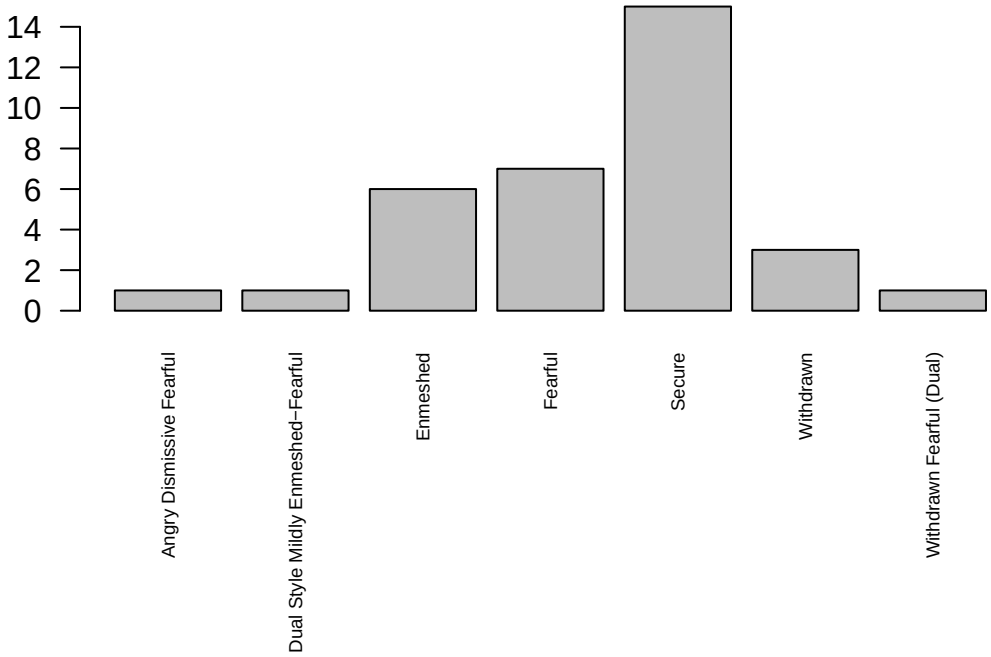
```
par(mar=c(5,4,4,4))
barplot(sort(table(psycho$Birth_place), decreasing = TRUE ), las=2, cex.names=0.5, main="Birth place")
```



Attachement styles

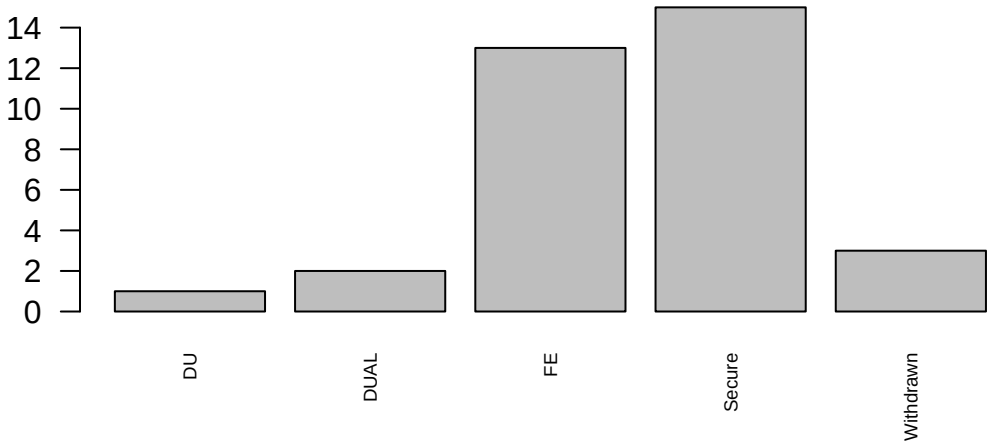
Raw

```
par(mar=c(9,5,3,3))
barplot(table(psycho$attachement_style), las=2, cex.names=0.6)
```



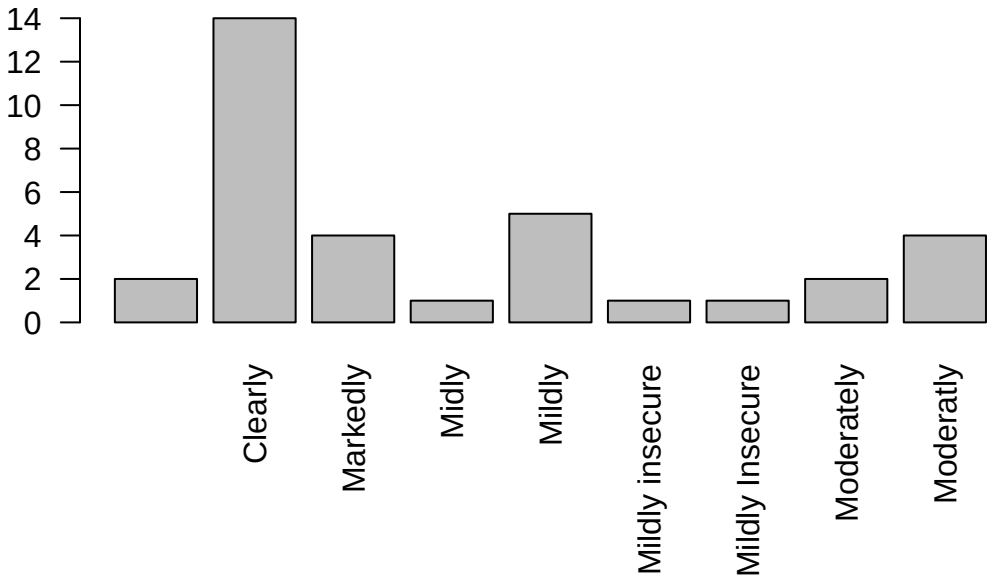
Clusters

```
par(mar=c(9,5,3,3))
barplot(table(psycho$attachement_cluster), las=2, cex.names=0.6)
```



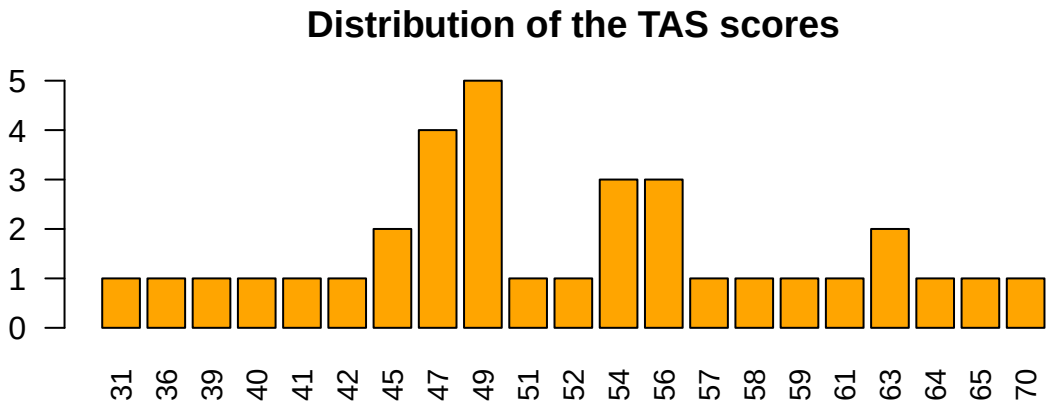
Insecurity level

```
par(mar=c(9,5,3,3))
barplot(table(psycho$insecurite_level), las=2)
```



TAS

```
par(mar=c(3,3,3,3))
barplot(table(psycho$TAS_total), las=2, col="orange", main="Distribution of the TAS scores", cex.name=0
```



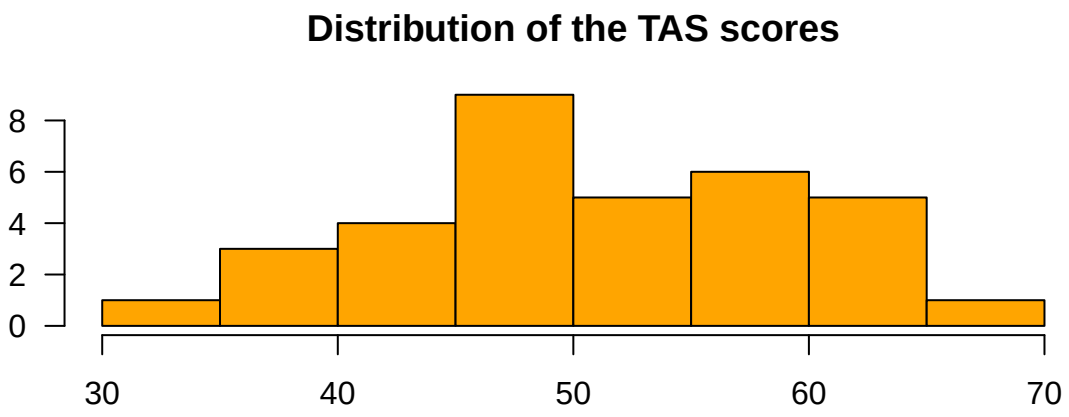

```
hist(psycho$TAS_total, las=1, col="orange", main="Distribution of the TAS scores", cex.name=0.9)
```

```
## Warning in plot.window(xlim, ylim, "", ...): "cex.name" is not a graphical
## parameter
```

```
## Warning in title(main = main, sub = sub, xlab = xlab, ylab = ylab, ...):
## "cex.name" is not a graphical parameter
```

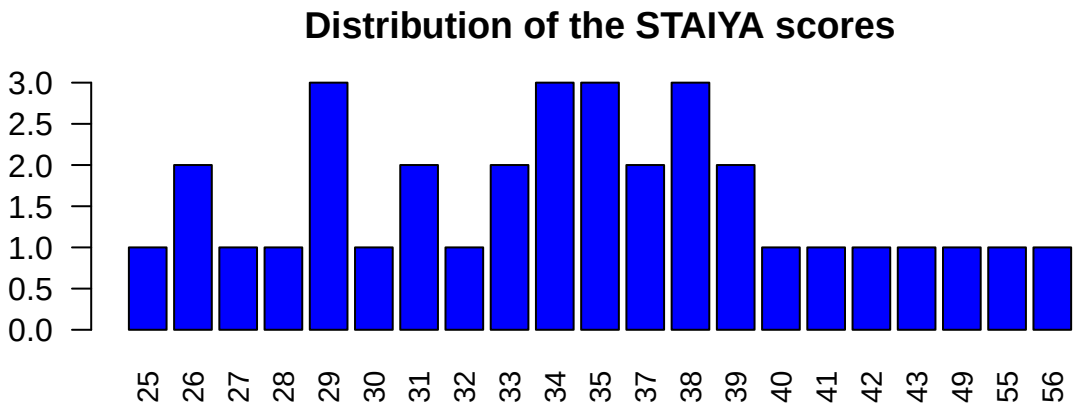
```
## Warning in axis(1, ...): "cex.name" is not a graphical parameter
```

```
## Warning in axis(2, ...): "cex.name" is not a graphical parameter
```



STAIYA

```
par(mar=c(3,3,3,3))
barplot(table(psycho$STAIYA_total), las=2, col="blue", main="Distribution of the STAIYA scores", cex.nam
```



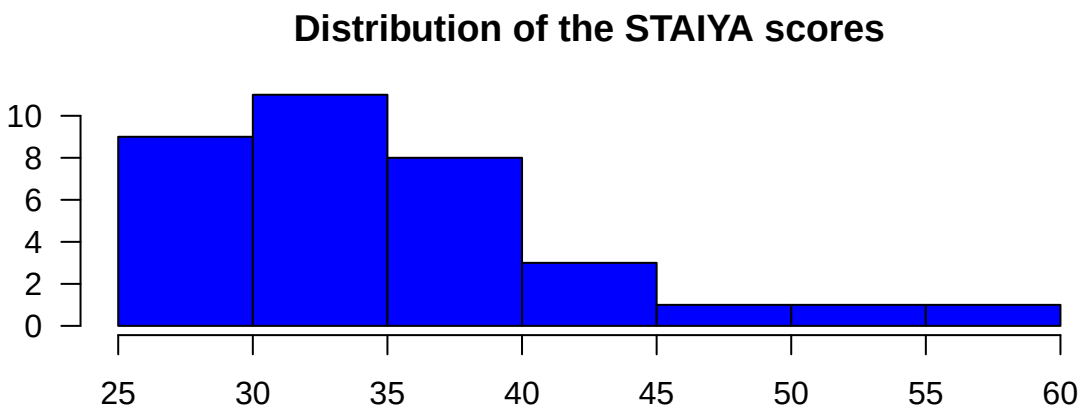

```
hist(psycho$STAIYA_total, las=1, col="blue", main="Distribution of the STAIYA scores", cex.name=0.9)
```

```
## Warning in plot.window(xlim, ylim, "", ...): "cex.name" is not a graphical
## parameter
```

```
## Warning in title(main = main, sub = sub, xlab = xlab, ylab = ylab, ...):
## "cex.name" is not a graphical parameter
```

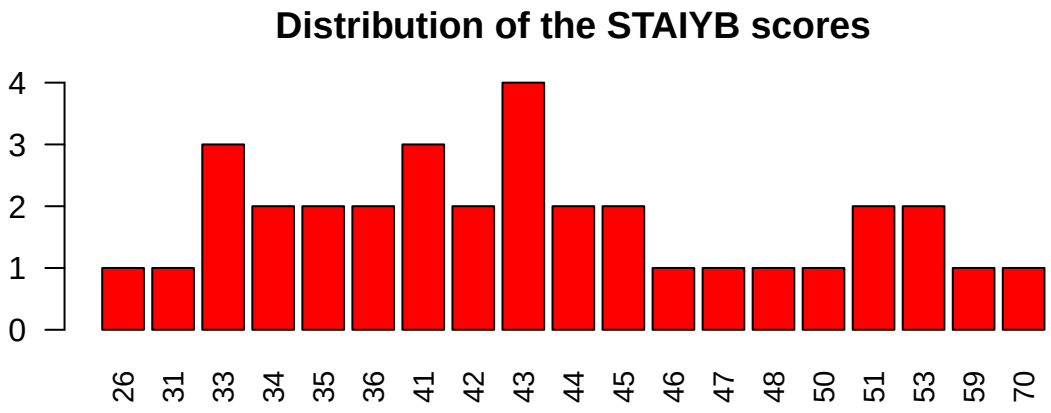
```
## Warning in axis(1, ...): "cex.name" is not a graphical parameter
```

```
## Warning in axis(2, ...): "cex.name" is not a graphical parameter
```



STAIYB

```
par(mar=c(3,3,3,3))
barplot(table(psycho$STAIYB_total), las=2, col="red", main="Distribution of the STAIYB scores", cex.name
```



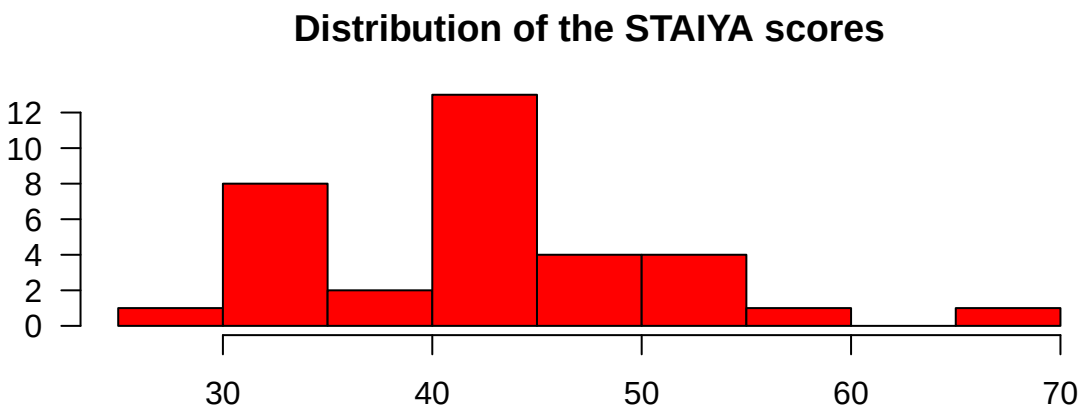

```
hist(psycho$STAIYB_total, las=1, col="red", main="Distribution of the STAIYA scores", cex.name=0.9)
```

```
## Warning in plot.window(xlim, ylim, "", ...): "cex.name" is not a graphical
## parameter
```

```
## Warning in title(main = main, sub = sub, xlab = xlab, ylab = ylab, ...):
## "cex.name" is not a graphical parameter
```

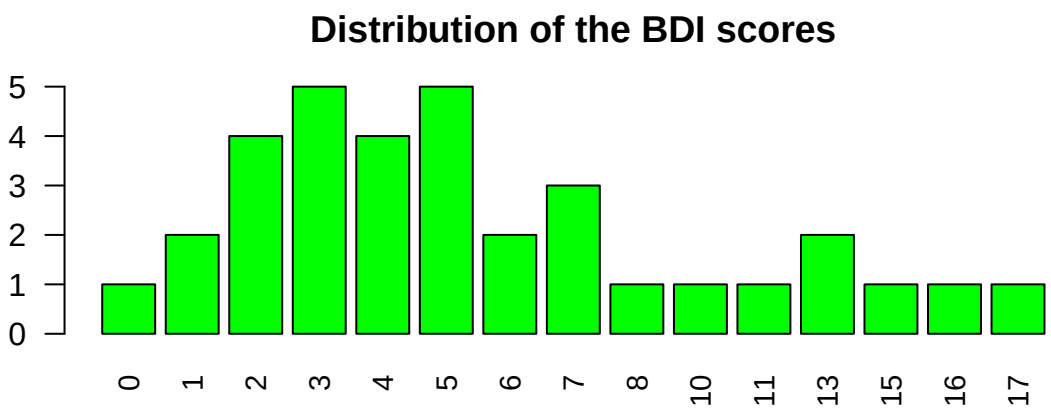
```
## Warning in axis(1, ...): "cex.name" is not a graphical parameter
```

```
## Warning in axis(2, ...): "cex.name" is not a graphical parameter
```



BDI total

```
par(mar=c(3,3,3,3))
barplot(table(psycho$BDI_total), las=2, col="green", main="Distribution of the BDI scores", cex.name=0.9
```



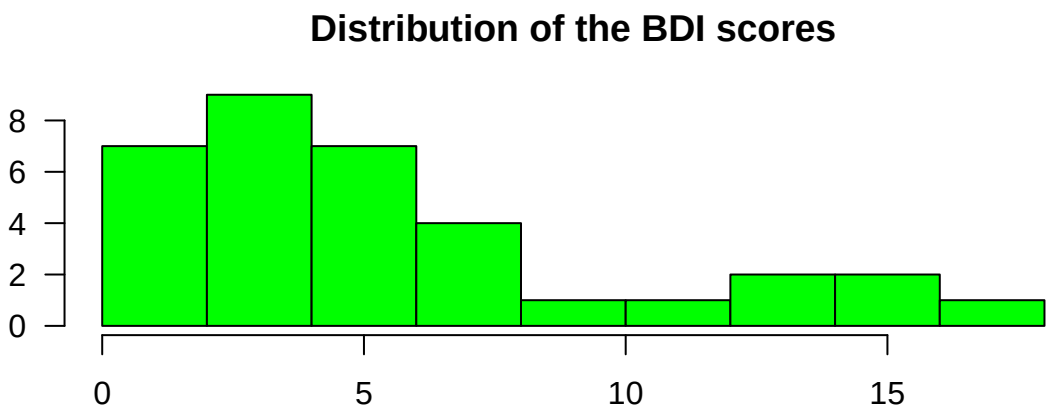

```
hist(psycho$BDI_total, las=1, col="green", main="Distribution of the BDI scores", cex.name=0.9)
```

```
## Warning in plot.window(xlim, ylim, "", ...): "cex.name" is not a graphical
## parameter
```

```
## Warning in title(main = main, sub = sub, xlab = xlab, ylab = ylab, ...):
## "cex.name" is not a graphical parameter
```

```
## Warning in axis(1, ...): "cex.name" is not a graphical parameter
```

```
## Warning in axis(2, ...): "cex.name" is not a graphical parameter
```


Distribution of the BDI scores
8
6
4
2
0
0
5
10
15