Auditory Mountain

July 20 2015

Contents

Individual analyses **1**

Frequency threshold task 1

Thresholds of each participant among sessions 3

Detection threshold in function of identification threshold 4

Detection threshold in function of identification threshold pre vs. post tests 5

Detection threshold in function of identification threshold first vs. second tests 6

Auditory mountain task 6

Participant's scores 7

Accuracy of trials 8

Durations of trials 9

Accuracy in function of duration for each trial 9

Accuracy in function of frequency of the target tone 10

Comparison of frequency thresholds and accuracy 11

Global analyses **12**

Frequency threshold task 12

Mean of thresholds among sessions 13

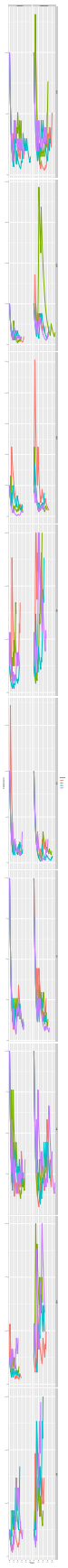
Session info 13

Individual analyses

Frequency threshold task

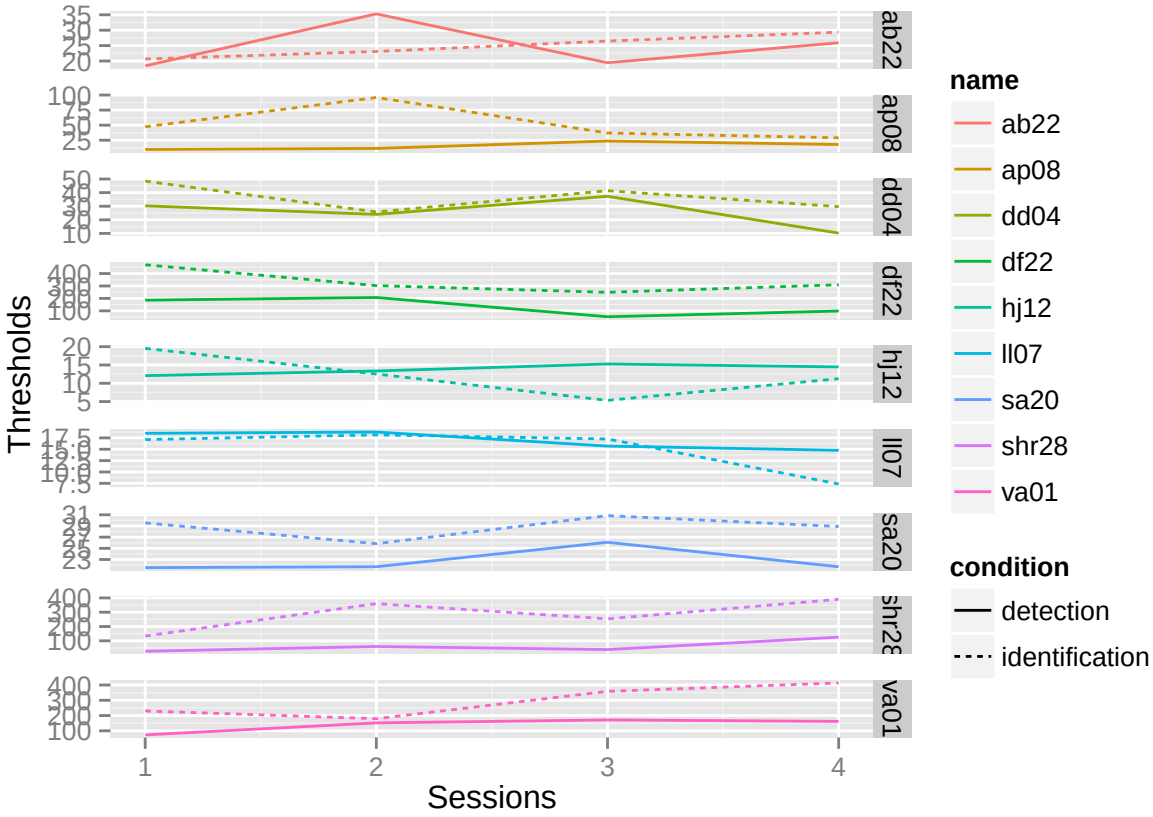
The frequency thresholds are calculated from an adaptive procedure where deltaF is decreased when a wrong answer is provided and increased for a right answer. The evolution of the delta F values across trials for the detection and identification tasks is ploted bellow:

```
plotDeltaF
```

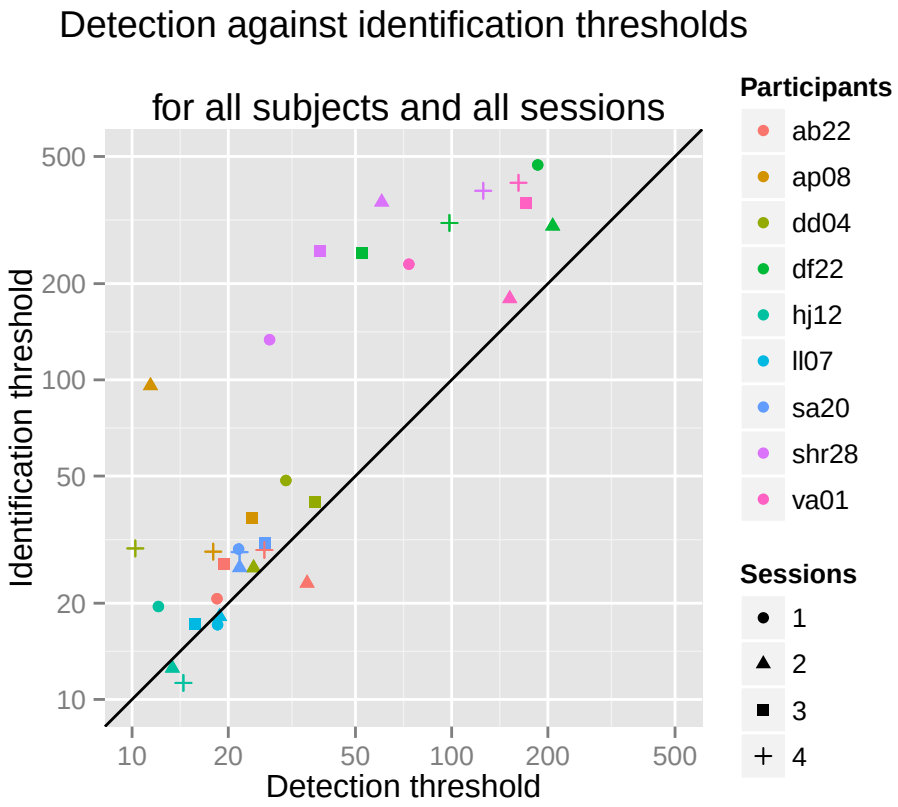


Thresholds of each participant among sessions

The thresholds are calculated from the DeltaF values corresponding to the last 10 reversals. The procedure was repeated two times before training (sessions 1 and 2) and two times after (sessions 3 and 4). The figure bellow shows these thresholds across sessions for the detection and identification conditions:

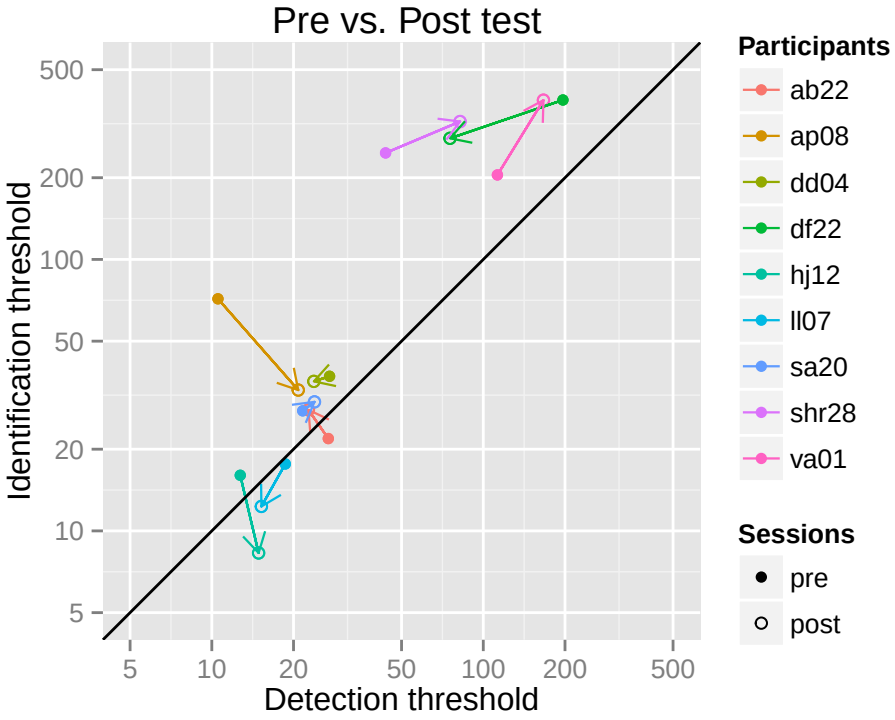


Detection threshold in function of identification threshold

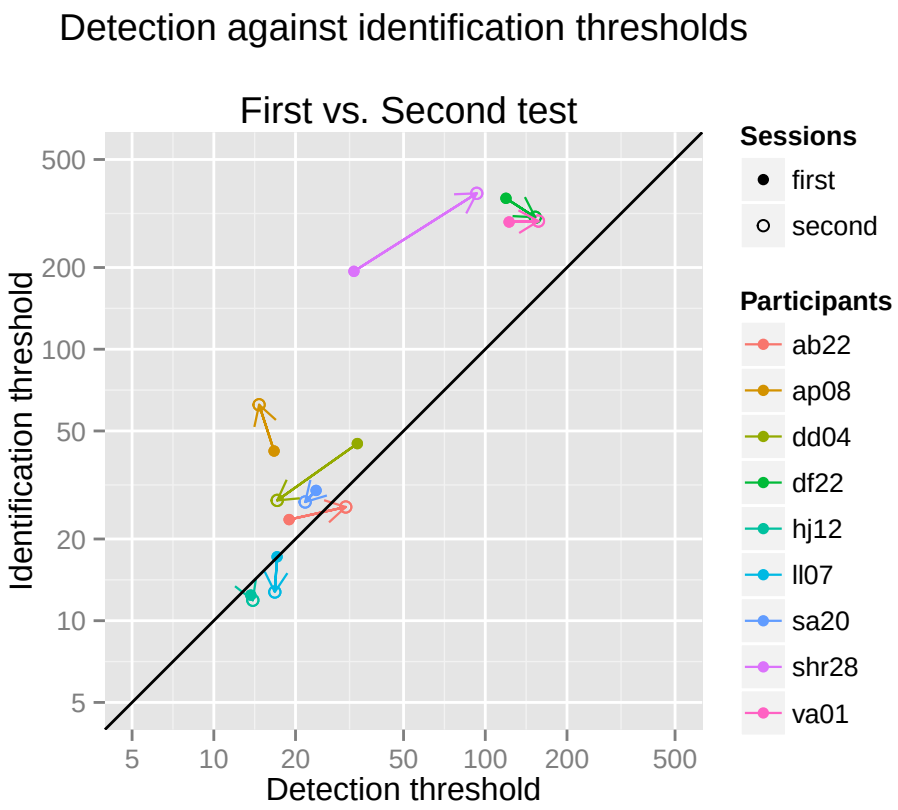


Detection threshold in function of identification threshold pre vs. post tests

Detection against identification thresholds



Detection threshold in function of identification threshold first vs. second tests



Auditory mountain task

Mean results (in percent error):

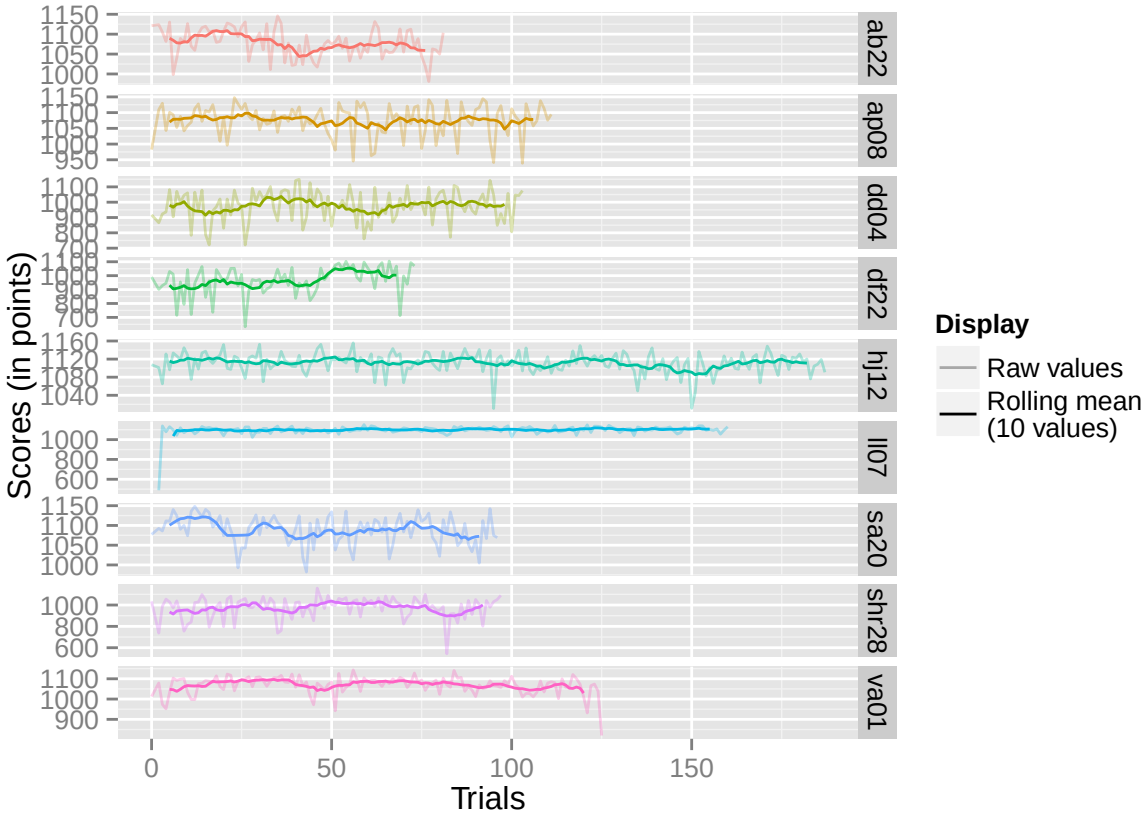
Y-axis: 2.4274914%

Here are the plots of scores, accuracy and duration in function of trials. The accuracy is the difference between the choosen tone and the highest tone. The Duration is the duration in seconds of each trial. The Score is a mixed value calculated from accuracy and duration according to this equation:

$$(\frac{1}{(\frac{duration}{100}+1)^2}+1)\times(\frac{600\times accuracy}{100})^2$$

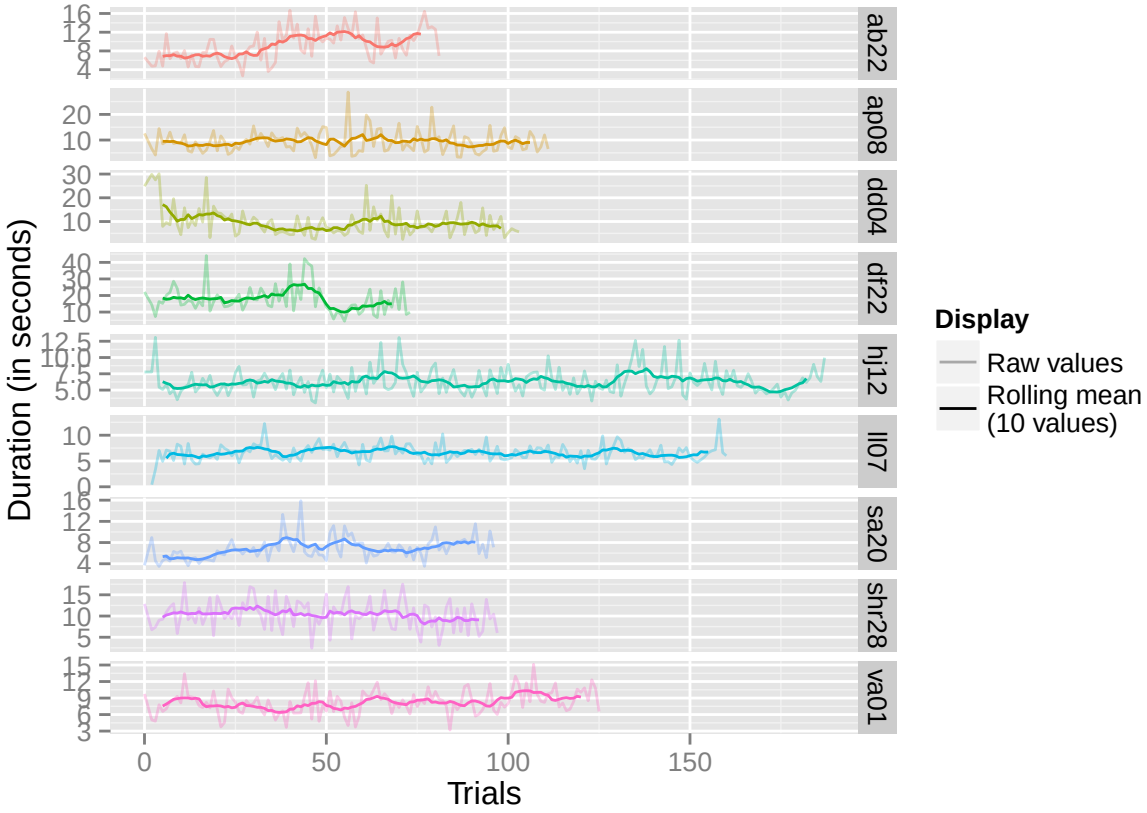
With this equation the time score is a multiplier between 1 for a very long trial and 2 for a very short one (few seconds). Thus, the accuracy score can be doubled with speed. The accuracy score is 600 maximum (the idea was to make a score in order to have the pleasure to cross 1000 points when the performance is great). For accuracy and time, the power function is used to provide the maximum of points near the perfect score and have a lot of difference when it is harder.

Participant's scores



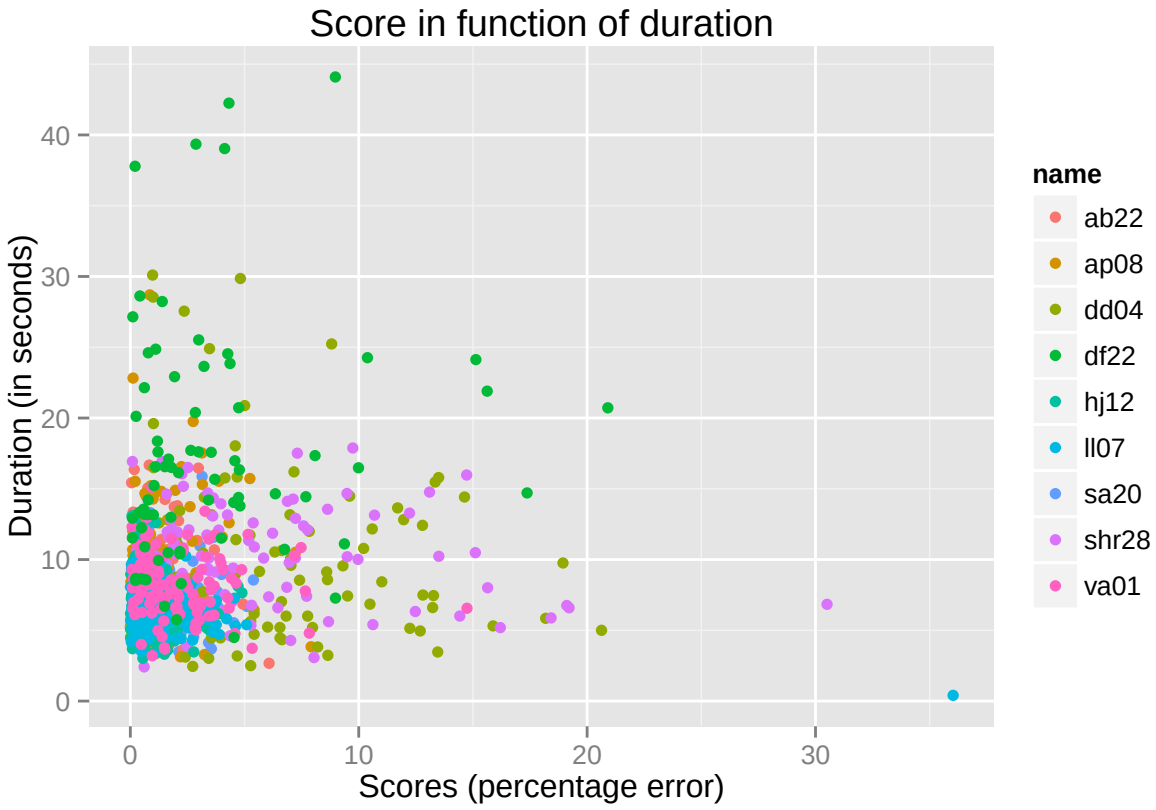
Accuracy of trials

Durations of trials

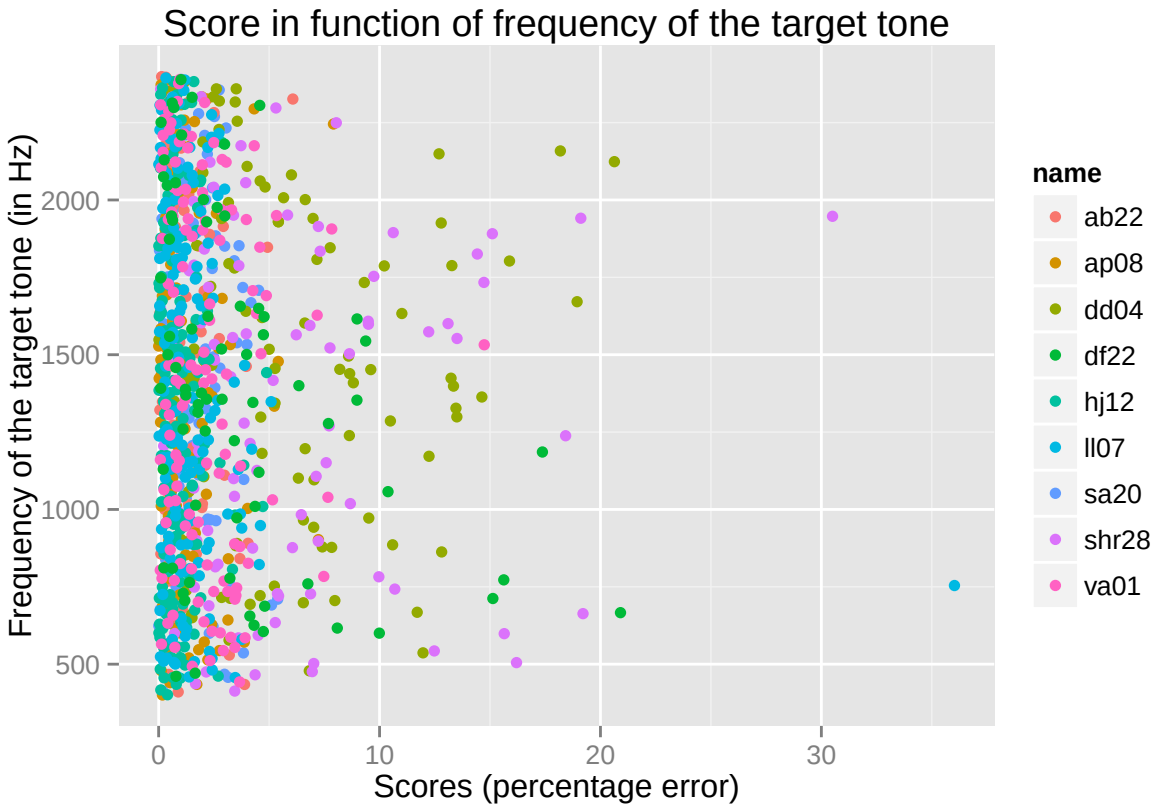


Accuracy in function of duration for each trial

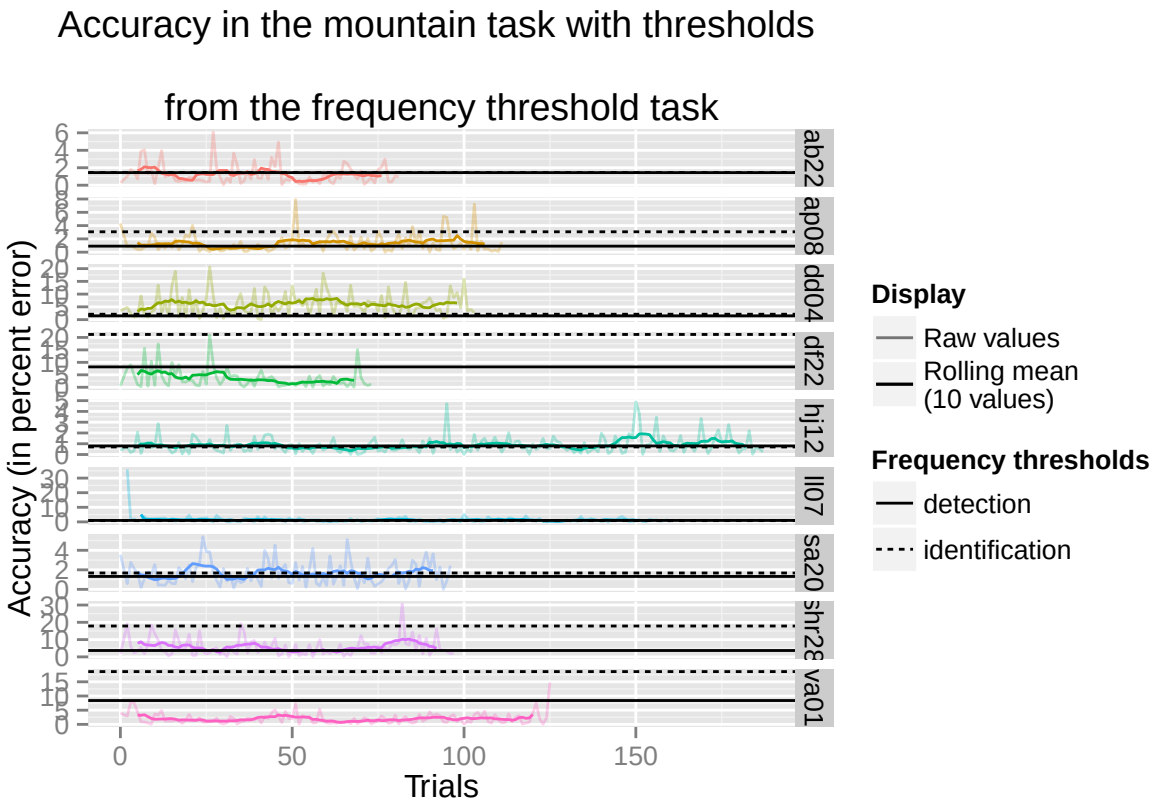
Finally, to see if the variability of the results is associated with duration, here is the plot of scores against duration. Each point is a trial.



Accuracy in function of frequency of the target tone



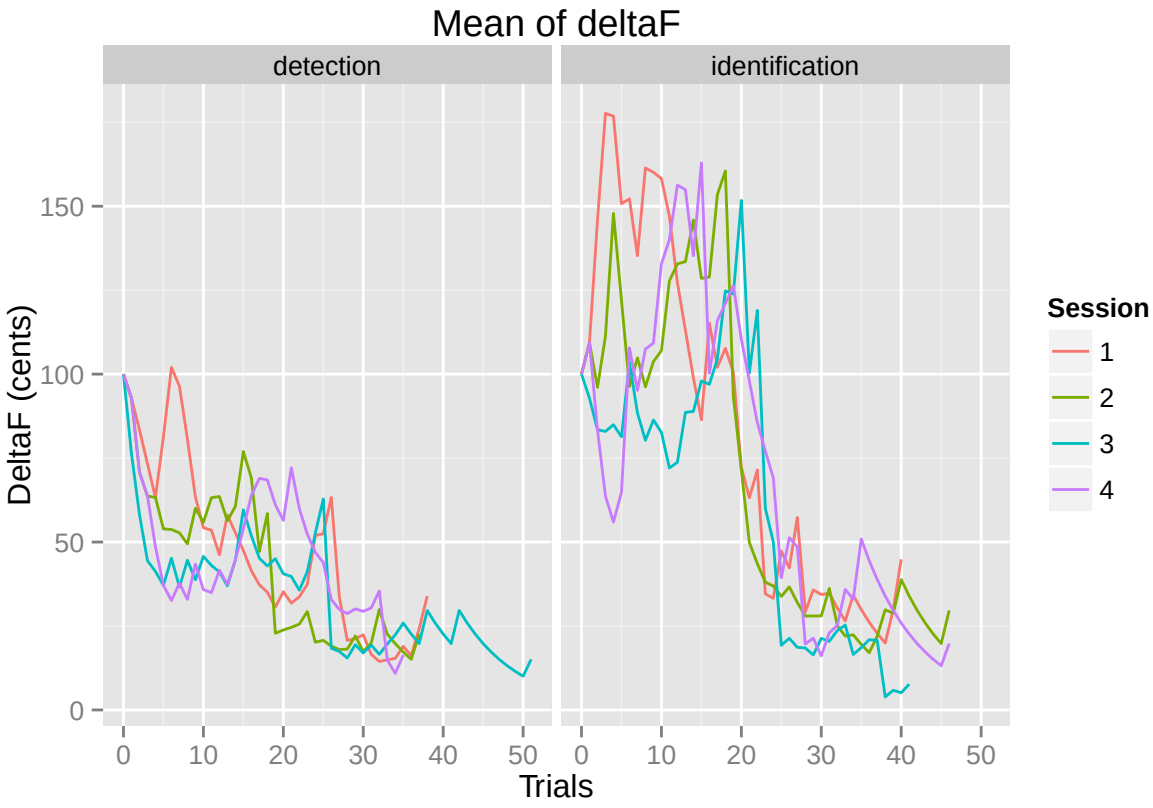
Comparison of frequency thresholds and accuracy



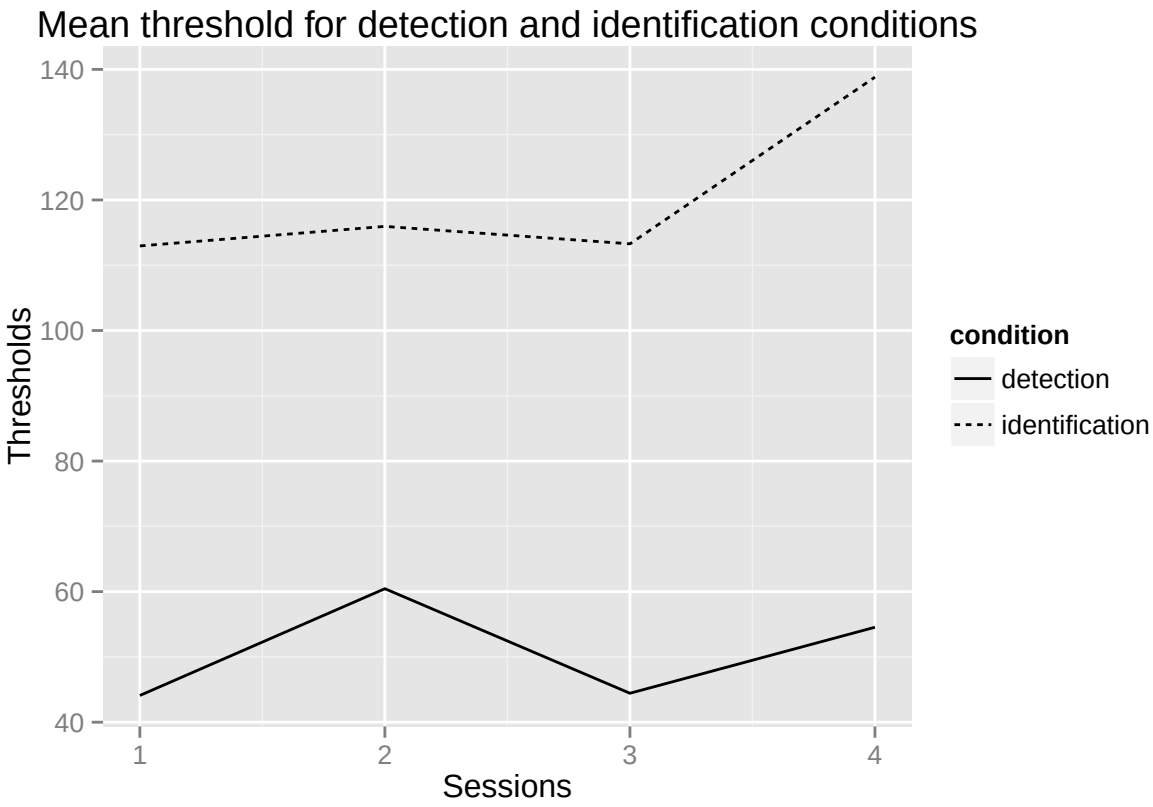
Global analyses

Frequency threshold task

Mean of deltaF in function of trials in the detection and identification task



Mean of thresholds among sessions



Session info

```
devtools::session_info()
```

```
## Session info -------------------------------------------------------------

##  setting  value
##  version  R version 3.1.3 (2015-03-09)
##  system   x86_64, darwin13.4.0
##  ui       X11
##  language (EN)
##  collate  en_US.UTF-8
##  tz       Europe/Paris

## Packages -----------------------------------------------------------------

##  package      * version date       source
##  colorspace     1.2-6   2015-03-11 CRAN (R 3.1.3)
##  curl           0.9.1   2015-07-04 CRAN (R 3.1.3)
##  devtools     * 1.8.0   2015-05-09 CRAN (R 3.1.3)
##  digest         0.6.8   2014-12-31 CRAN (R 3.1.2)
##  evaluate       0.7     2015-04-21 CRAN (R 3.1.3)
##  formatR        1.2     2015-04-21 CRAN (R 3.1.3)
```

```
##  ggplot2      * 1.0.1   2015-03-17 CRAN (R 3.1.3)
##  git2r          0.10.1  2015-05-07 CRAN (R 3.1.3)
##  gridExtra    * 0.9.1   2012-08-09 CRAN (R 3.1.2)
##  gtable         0.1.2   2012-12-05 CRAN (R 3.1.2)
##  htmltools      0.2.6   2014-09-08 CRAN (R 3.1.2)
##  jsonlite       0.9.16  2015-04-11 CRAN (R 3.1.3)
##  knitr          1.10.5  2015-05-06 CRAN (R 3.1.3)
##  labeling       0.3     2014-08-23 CRAN (R 3.1.2)
##  lattice        0.20-30 2015-02-22 CRAN (R 3.1.3)
##  magrittr       1.5     2014-11-22 CRAN (R 3.1.2)
##  MASS           7.3-39  2015-02-24 CRAN (R 3.1.3)
##  memoise        0.2.1   2014-04-22 CRAN (R 3.1.2)
##  munsell        0.4.2   2013-07-11 CRAN (R 3.1.2)
##  plyr           1.8.3   2015-06-12 CRAN (R 3.1.3)
##  proto          0.3-10  2012-12-22 CRAN (R 3.1.2)
##  RColorBrewer * 1.1-2   2014-12-07 CRAN (R 3.1.2)
##  Rcpp           0.11.6  2015-05-01 CRAN (R 3.1.3)
##  reshape2     * 1.4.1   2014-12-06 CRAN (R 3.1.2)
##  rjson        * 0.2.15  2014-11-03 CRAN (R 3.1.2)
##  rmarkdown      0.5.1   2015-01-26 CRAN (R 3.1.2)
##  rstudioapi     0.3.1   2015-04-07 CRAN (R 3.1.3)
##  rversions      1.0.1   2015-06-06 CRAN (R 3.1.3)
##  scales       * 0.2.5   2015-06-12 CRAN (R 3.1.3)
##  stringi        0.4-1   2014-12-14 CRAN (R 3.1.2)
##  stringr        1.0.0   2015-04-30 CRAN (R 3.1.3)
##  xml2           0.1.1   2015-06-02 CRAN (R 3.1.3)
##  yaml           2.1.13  2014-06-12 CRAN (R 3.1.2)
##  zoo          * 1.7-12  2015-03-16 CRAN (R 3.1.3)
```