

# Flanker task

```
library(dplyr)
library(ggplot2)
library(plotrix)
setwd("~/Desktop/COGMASTER/Cours S2/PCBS/data")

lilas <- read.csv("lilas.xpd", comment.char="#")
martin <- read.csv("martin.xpd", comment.char="#")
amelie <- read.csv("amelie.xpd", comment.char="#")
clarissa <- read.csv("clarssa.xpd", comment.char="#")
nathan <- read.csv("nathan.xpd", comment.char="#")
nicolas <- read.csv("nicolas.xpd", comment.char="#")
```

```
data<-rbind(lilas,martin, amelie, clarissa, nathan, nicolas)
```

First we only keep the trials without errors (pressing the “<-” key when the middle arrow was pointing the left, and pressing the “->” key when the middle arrow was pointing the right)

```
DataWithoutErrors <-data.frame()
for ( i in 1:nrow(data)){
  if (data$stimulus[i]=="rincong" | data$stimulus[i]=="rcong"){
    if(data$respkey[i]==275){
      DataWithoutErrors<- rbind(DataWithoutErrors, data[i,])
    }
  }
  if (data$stimulus[i]=="lincong" | data$stimulus[i]=="lcong" ){
    if(data$respkey[i]==276){
      DataWithoutErrors<- rbind(DataWithoutErrors, data[i,])
    }
  }
}
```

Then we separate the file into two file, one for the congruent trials (all arrows pointed the same direction), and one for the incongruent trials (the middle arrows pointed the opposite direction as the flanking arrows)

```

incongruent=data.frame()
congruent=data.frame()

for ( i in 1:nrow(DataWithoutErrors)){
  if (DataWithoutErrors$stimulus[i]=="rincong" | DataWithoutErrors$stimulus[i]=="l
incong"){
    incongruent<- rbind(incongruent, DataWithoutErrors[i,])
  }
  if (DataWithoutErrors$stimulus[i]=="rcong" | DataWithoutErrors$stimulus[i]=="lco
ng" ){
    congruent<- rbind(congruent, DataWithoutErrors[i,])
  }
}

congruent$RT <- as.numeric(congruent$RT)
incongruent$RT <- as.numeric(incongruent$RT)
congruent$type <- "congruent"
incongruent$type <- "incongruent"

```

Finally we analyse the data: we do a t-test for each participant, to see whether there is a difference between the reaction time in the congruent and in the incongruent trials.

```

for ( i in c(1,2,10024, 10025, 10026, 10027)){
  print(i)
  print( t.test(congruent$RT[which(congruent$subject_id==i )], incongruent$RT[whic
h(incongruent$subject_id==i )]))
}

```

```

## [1] 1
##
## Welch Two Sample t-test
##
## data: congruent$RT[which(congruent$subject_id == i)] and incongruent$RT[which(
incongruent$subject_id == i)]
## t = -1.5607, df = 23.438, p-value = 0.132
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -111.85833 15.59871
## sample estimates:
## mean of x mean of y
## 397.5625 445.6923
##
## [1] 2
##
## Welch Two Sample t-test
##
## data: congruent$RT[which(congruent$subject_id == i)] and incongruent$RT[which(
incongruent$subject_id == i)]
## t = -3.6802, df = 18.881, p-value = 0.001604
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -184.47841 -50.67993

```

```

## sample estimates:
## mean of x mean of y
## 411.6875 529.2667
##
## [1] 10024
##
## Welch Two Sample t-test
##
## data: congruent$RT[which(congruent$subject_id == i)] and incongruent$RT[which(
incongruent$subject_id == i)]
## t = -3.0163, df = 23.925, p-value = 0.005983
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -148.90472 -27.90362
## sample estimates:
## mean of x mean of y
## 477.0625 565.4667
##
## [1] 10025
##
## Welch Two Sample t-test
##
## data: congruent$RT[which(congruent$subject_id == i)] and incongruent$RT[which(
incongruent$subject_id == i)]
## t = -2.4638, df = 18.152, p-value = 0.02396
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -155.09674 -12.37442
## sample estimates:
## mean of x mean of y
## 408.1875 491.9231
##
## [1] 10026
##
## Welch Two Sample t-test
##
## data: congruent$RT[which(congruent$subject_id == i)] and incongruent$RT[which(
incongruent$subject_id == i)]
## t = -2.2283, df = 15.284, p-value = 0.04128
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
## -328.31546 -7.55954
## sample estimates:
## mean of x mean of y
## 409.0625 577.0000
##
## [1] 10027
##
## Welch Two Sample t-test
##
## data: congruent$RT[which(congruent$subject_id == i)] and incongruent$RT[which(
incongruent$subject_id == i)]
## t = -4.8386, df = 26.866, p-value = 4.756e-05
## alternative hypothesis: true difference in means is not equal to 0

```

```
## 95 percent confidence interval:
```

```
## -92.70975 -37.48668
```

```
## sample estimates:
```

```
## mean of x mean of y
```

```
## 391.6875 456.7857
```

5 out of the 6 participants had a significantly ( $p < 0.05$ ) higher reaction time in the incongruent trials compared to the congruent trials. Only the first subject did not show a significant difference although the mean reaction time in the incongruent trials was higher than in the congruent ones.

Below you can find a graph for a better visualization of the data.

