

```
rm (list=ls())
```

```
library(tidyverse)
```

```
library(readxl)
```

```
library(lsr)
```

```
install.packages("ez")
```

```
library(ez)
```

```
install.packages("emmeans")
```

```
library(emmeans)
```

```
library(dplyr)
```

```
install.packages("ggpubr")
```

```
library(ggpubr)
```

```
install.packages("rstatix")
```

```
library(rstatix)
```

```
install.packages("effsize")
```

```
library(effsize)
```

```
install.packages("pwr")
```

```
library(pwr)
```

```
N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "N1Amplitude")
```

```
N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "N1_P2")
```

```
N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "TotalDisp")
```

```
#####Power Analysis#####
```

```
#For Two-Way ANOVA#
```

```
pwr.anova.test(k=6, f=0.25, sig.level=0.05, power=0.8)
```

```
#For Paired-Sample t-test#
```

```
pwr.t.test(d=0.5, sig.level=0.05, power=0.8, type="paired")
```

```
#####Two-Way ANOVA - N1 AMPLITUDE#####
```

```
#Load datafile#
```

```
N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "N1Amplitude")
```

```
#Rename columns#
```

```
data <- N1_Amplitude_results %>%
```

```
  rename(Passive_shortSOI = PassiveCond1,
```

```
         Passive_longSOI = PassiveCond2,
```

```
         Active_shortSOI = ActiveCond1,
```

```
         Active_longSOI = ActiveCond2
```

```
  )
```

```
#Add subject identifier#
```

```
data <- data %>%
```

```
  mutate(subject_id = sprintf("SUB%03d", row_number()))
```

```
#Inspect the means - Descriptive statistics of each condition#
```

```
summarise(data,
```

```
          mean(Passive_shortSOI), sd(Passive_shortSOI),
```

```
          mean(Passive_longSOI), sd(Passive_longSOI))
```

```
summarise(data,
```

```
          mean(Active_shortSOI), sd(Active_shortSOI),
```

```
          mean(Active_longSOI), sd(Active_longSOI))
```

```
#Transforming the dataset into long format#
```

```
data_long <- pivot_longer(data,
```

```
  cols = -subject_id,
```

```
  names_to = c("Attention", "SOI"),
```

```
  names_sep = "_",
```

```

        values_to = "response")

#Run Two-Way Anova#
result <- aov(response ~ Attention * SOI, data = data_long)
summary(result)

#Run Two-way ANOVA with Effect size#
anova <- ezANOVA(data = data_long,
                 dv = response,
                 wid = subject_id,
                 between = .(Attention, SOI),
                 detailed = TRUE)

print(anova)

#clear#
rm (list=ls())

#####Paired Samples t test - N1 AMPLITUDE#####

#Read datafile#
N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "N1Amplitude")

#Calculate Amplitude Ratio#
ddata <- N1_Amplitude_results %>%
  mutate(N1_Amplitude_results, PassiveAR = PassiveCond2/PassiveCond1) %>%
  mutate(N1_Amplitude_results, ActiveAR = ActiveCond2/ActiveCond1)

#Add subject ID#
ddata <- ddata %>%
  mutate(subject_id = sprintf("SUB%03d", row_number()))

```

```

#Transform into long format#
data_long <- pivot_longer(ddata,
  cols = 5:6,
  names_to = "Attention",
  values_to = "response")

#group by - Descriptive Statistics#
dat5 <- group_by(data_long, Attention)
summarise(dat5, mean(response), sd(response))

#Running paired samples t test#
result <- t.test(response ~ Attention, paired=TRUE, data = dat5)
print(result)

#Effect size - cohens d#
cohen.d(response ~ Attention, method = "pooled", data = dat5)

#####Two-Way ANOVA - N1-P2#####

#Load datafile#
N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "N1_P2")

#Rename columns#
data <- N1_Amplitude_results %>%
  rename(Passive_shortSOI = PassiveCond1,
    Passive_longSOI = PassiveCond2,
    Active_shortSOI = ActiveCond1,
    Active_longSOI = ActiveCond2
  )

#Add subject identifier#

```

```

data <- data %>%
  mutate(subject_id = sprintf("SUB%03d", row_number()))

#Inspect the means - Descriptive statistics of each condition#
summarise(data,
  mean(Passive_shortSOI), sd(Passive_shortSOI),
  mean(Passive_longSOI), sd(Passive_longSOI))

summarise(data,
  mean(Active_shortSOI), sd(Active_shortSOI),
  mean(Active_longSOI), sd(Active_longSOI))

#Transforming the dataset into long format#
data_long <- pivot_longer(data,
  cols = -subject_id,
  names_to = c("Attention", "SOI"),
  names_sep = "_",

  values_to = "response")

#Run Two-Way Anova#
result <- aov(response ~ Attention * SOI, data = data_long)
summary(result)

#Run Two-way ANOVA with Effect size#
anova <- ezANOVA(data = data_long,
  dv = response,
  wid = subject_id,
  between = .(Attention, SOI),
  detailed = TRUE)

print(anova)

```

```

#clear#

rm (list=ls())

#####Paired Samples t test - N1-P2#####

#Load datafile#

N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "N1_P2")

#Calculate Amplitude Ratio#

ddata <- N1_Amplitude_results %>%
  mutate(N1_Amplitude_results, PassiveAR = PassiveCond2/PassiveCond1) %>%
  mutate(N1_Amplitude_results, ActiveAR = ActiveCond2/ActiveCond1)

#Add subject ID#

ddata <- ddata %>%
  mutate(subject_id = sprintf("SUB%03d", row_number()))

#Transform into long format#

data_long <- pivot_longer(ddata,
  cols = 5:6,
  names_to = "Attention",
  values_to = "response")

#group by - Descriptive Statistics#

dat5 <- group_by(data_long, Attention)
summarise(dat5, mean(response), sd(response))

#Running paired samples t test#

result <- t.test(response ~ Attention, paired=TRUE, data = dat5)

```

```

print(result)

#Effect size - cohens d#
cohen.d(response ~ Attention, method = "pooled", data = dat5)

#####Two-Way ANOVA - TOTAL VOLTAGE DISPLACEMENT#####

#Load datafile#
N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "TotalDisp")

#Rename columns#
data <- N1_Amplitude_results %>%
  rename(Passive_shortSOI = PassiveCond1,
         Passive_longSOI = PassiveCond2,
         Active_shortSOI = ActiveCond1,
         Active_longSOI = ActiveCond2
  )

#Add subject identifier#
data <- data %>%
  mutate(subject_id = sprintf("SUB%03d", row_number()))

#Inspect the means - Descriptive statistics of each condition#
summarise(data,
  mean(Passive_shortSOI), sd(Passive_shortSOI),
  mean(Passive_longSOI), sd(Passive_longSOI))

summarise(data,
  mean(Active_shortSOI), sd(Active_shortSOI),
  mean(Active_longSOI), sd(Active_longSOI))

```

```
#Transforming the dataset into long format#
```

```
data_long <- pivot_longer(data,  
  cols = -subject_id,  
  names_to = c("Attention", "SOI"),  
  names_sep = "_",  
  
  values_to = "response")
```

```
#Transforming the dataset into long format#
```

```
data_long <- pivot_longer(data,  
  cols = -subject_id,  
  names_to = c("Attention", "SOI"),  
  names_sep = "_",  
  
  values_to = "response")
```

```
#Run Two-Way Anova#
```

```
result <- aov(response ~ Attention * SOI, data = data_long)  
summary(result)
```

```
#Run Two-way ANOVA with Effect size#
```

```
anova <- ezANOVA(data = data_long,  
  dv = response,  
  wid = subject_id,  
  between = .(Attention, SOI),  
  detailed = TRUE)  
  
print(anova)
```

```
#clear#
```

```
rm (list=ls())
```



```
#####Paired Samples t test - TOTAL VOTALGE DISPLACEMENT#####
```

```
#Load datafile#
```

```
N1_Amplitude_results <- read_excel("Results.xlsx", sheet = "TotalDisp")
```

```
#Calculate Amplitude Ratio#
```

```
ddata <- N1_Amplitude_results %>%
```

```
  mutate(N1_Amplitude_results, PassiveAR = PassiveCond2/PassiveCond1) %>%
```

```
  mutate(N1_Amplitude_results, ActiveAR = ActiveCond2/ActiveCond1)
```

```
#Add subject ID#
```

```
ddata <- ddata %>%
```

```
  mutate(subject_id = sprintf("SUB%03d", row_number()))
```

```
#Transform into long format#
```

```
data_long <- pivot_longer(ddata,
```

```
  cols = 5:6,
```

```
  names_to = "Attention",
```

```
  values_to = "response")
```

```
#group by - Descriptive Statistics#
```

```
dat5 <- group_by(data_long, Attention)
```

```
summarise(dat5, mean(response), sd(response))
```

```
#Running paired samples t test#
```

```
result <- t.test(response ~ Attention, paired=TRUE, data = dat5)
```

```
print(result)
```

```
#Effect size - cohens d#
```

```
cohen.d(response ~ Attention, method = "pooled", data = dat5)
```