

REWOD_PIT_RM

R code for FOR REWOD_PIT

last modified on Nov 2018 by David

SETUP

```
# Set working directory
analysis_path <- '~/rewod/DATABASES/' # for this to work the script needs to be sourced
setwd(analysis_path)

# open dataset
REWOD_PIT <- read.delim(file.path(analysis_path, 'REWOD_PIT.txt'), header = T, sep = '|') # read in dataset

## subsetting into 3 different tasks
REWOD_PIT.all <- REWOD_PIT
REWOD_RIM <- subset (REWOD_PIT.all, task == 'Reminder')
REWOD_PE <- subset (REWOD_PIT.all, task == 'Partial_Extinction')
REWOD_PIT <- subset (REWOD_PIT.all, task == 'PIT')

# define factors
REWOD_RIM$id <- factor(REWOD_RIM$id)
REWOD_RIM$trial <- factor(REWOD_RIM$trial)
REWOD_RIM$task <- factor(REWOD_RIM$task)
REWOD_RIM$session <- factor(REWOD_RIM$session)
REWOD_RIM$reward <- factor(REWOD_RIM$reward)

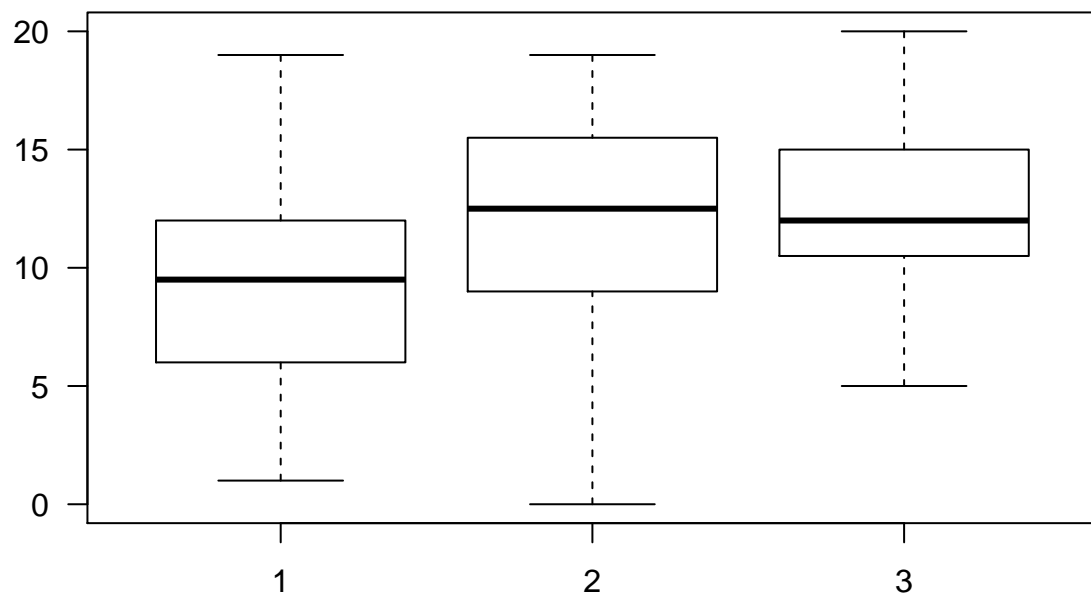
REWOD_PE$id <- factor(REWOD_PE$id)
REWOD_PE$trial <- factor(REWOD_PE$trial)
REWOD_PE$task <- factor(REWOD_PE$task)
REWOD_PE$session <- factor(REWOD_PE$session)
REWOD_PE$reward <- factor(REWOD_PE$reward)

REWOD_PIT$id <- factor(REWOD_PIT$id)
#REWOD_PIT$trial <- factor(REWOD_PIT$trial)
REWOD_PIT$task <- factor(REWOD_PIT$task)
REWOD_PIT$session <- factor(REWOD_PIT$session)
```

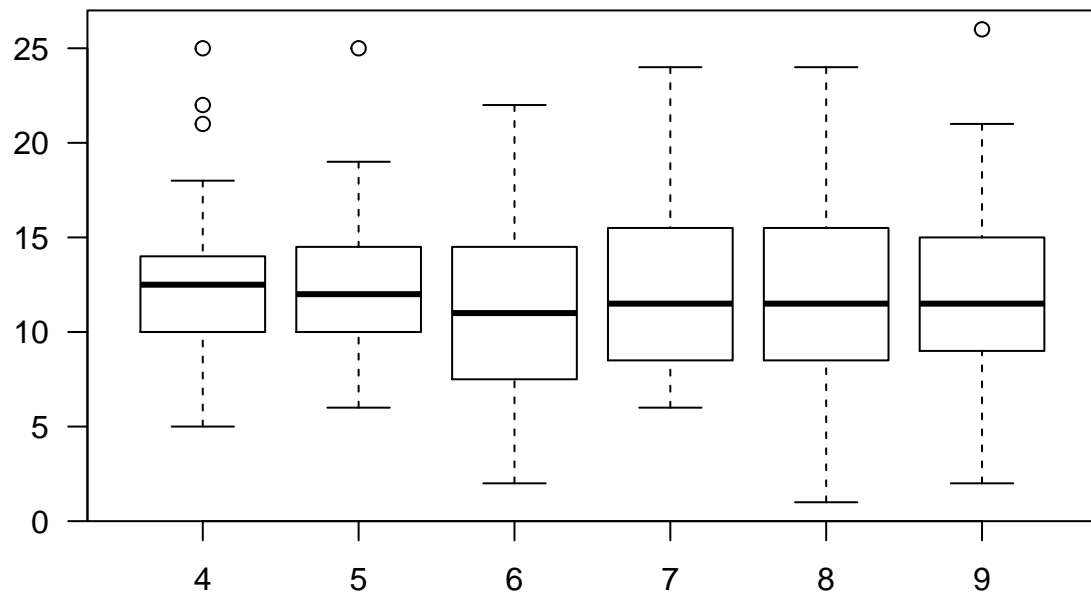
PLOTS

plot (non-averaged per participant)

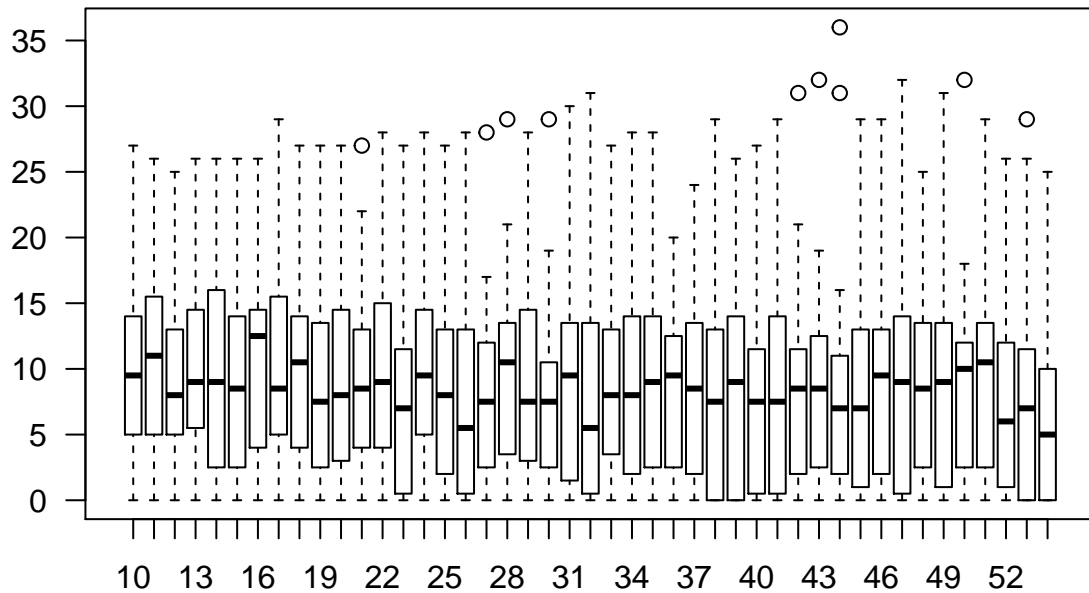
```
#n_grips RIM
boxplot(REWOD_RIM$n_grips ~ REWOD_RIM$trial, las = 1)
```



```
#n_grips PE  
boxplot(REWOD_PE$n_grips ~ REWOD_PE$trial, las = 1)
```



```
#n_grips PIT  
boxplot(REWOD_PIT$n_grips ~ REWOD_PIT$trial, las = 1)
```

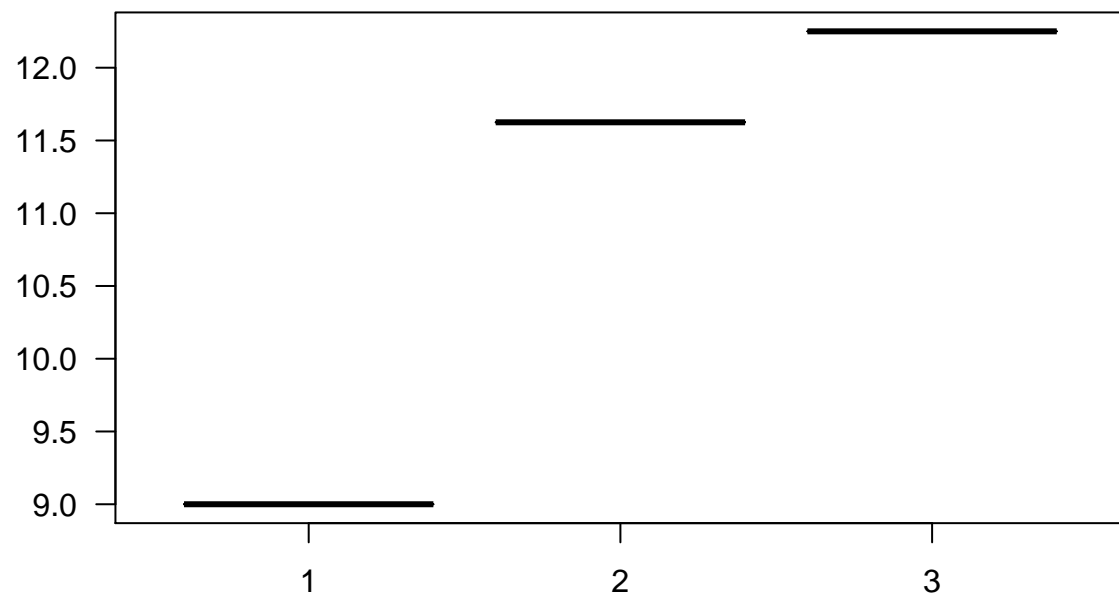


plot overall effect

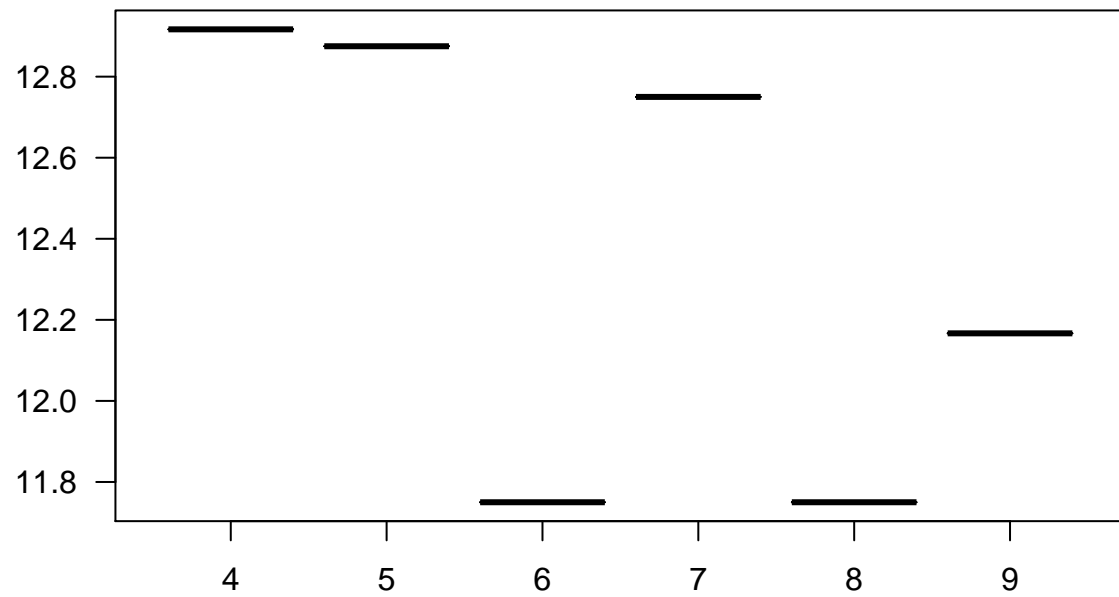
```
# get means by trial
RIM.bt = ddply(REWOD_RIM, .(trial), summarise, n_grips = mean(n_grips, na.rm = TRUE))
PE.bt = ddply(REWOD_PE, .(trial), summarise, n_grips = mean(n_grips, na.rm = TRUE))
PIT.bt = ddply(REWOD_PIT, .(trial), summarise, n_grips = mean(n_grips, na.rm = TRUE))
# get means by trial & condition
PIT.bct = ddply(REWOD_PIT, .(condition, trial), summarise, n_grips = mean(n_grips, na.rm = TRUE))

# get means by participant
RIM.bs = ddply(REWOD_RIM, .(id, trial), summarise, n_grips = mean(n_grips, na.rm = TRUE)) #not condition
PE.bs = ddply(REWOD_PE, .(id, trial), summarise, n_grips = mean(n_grips, na.rm = TRUE)) #not condition
PIT.bs = ddply(REWOD_PIT, .(id, condition, trial), summarise, n_grips = mean(n_grips, na.rm = TRUE))

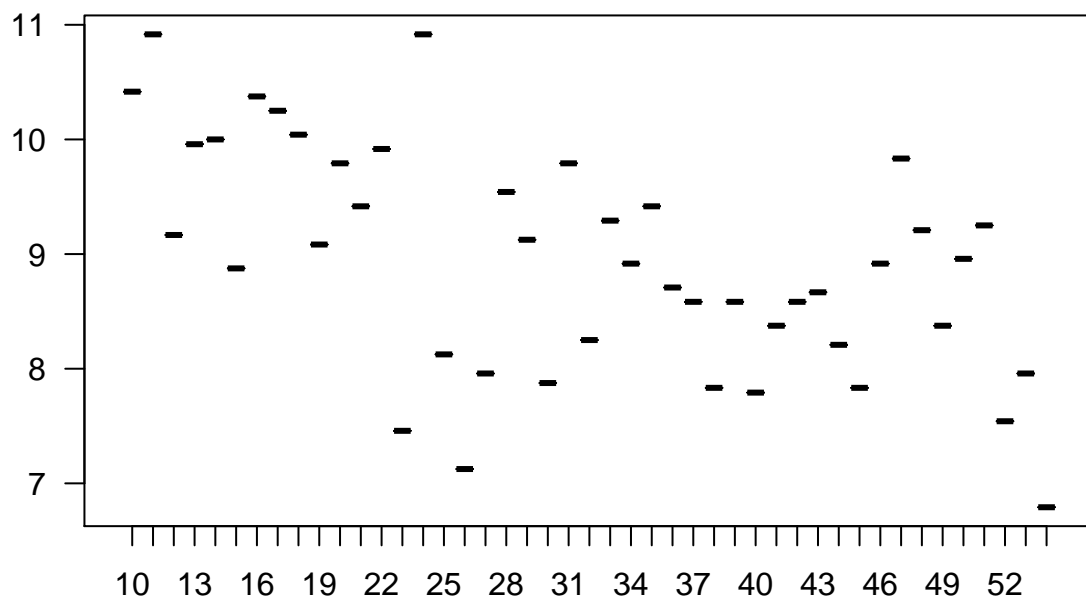
# ngrips average per trial
boxplot(RIM.bt$n_grips ~ RIM.bt$trial, las = 1)
```



```
boxplot(PE.bt$n_grips ~ PE.bt$trial, las = 1)
```

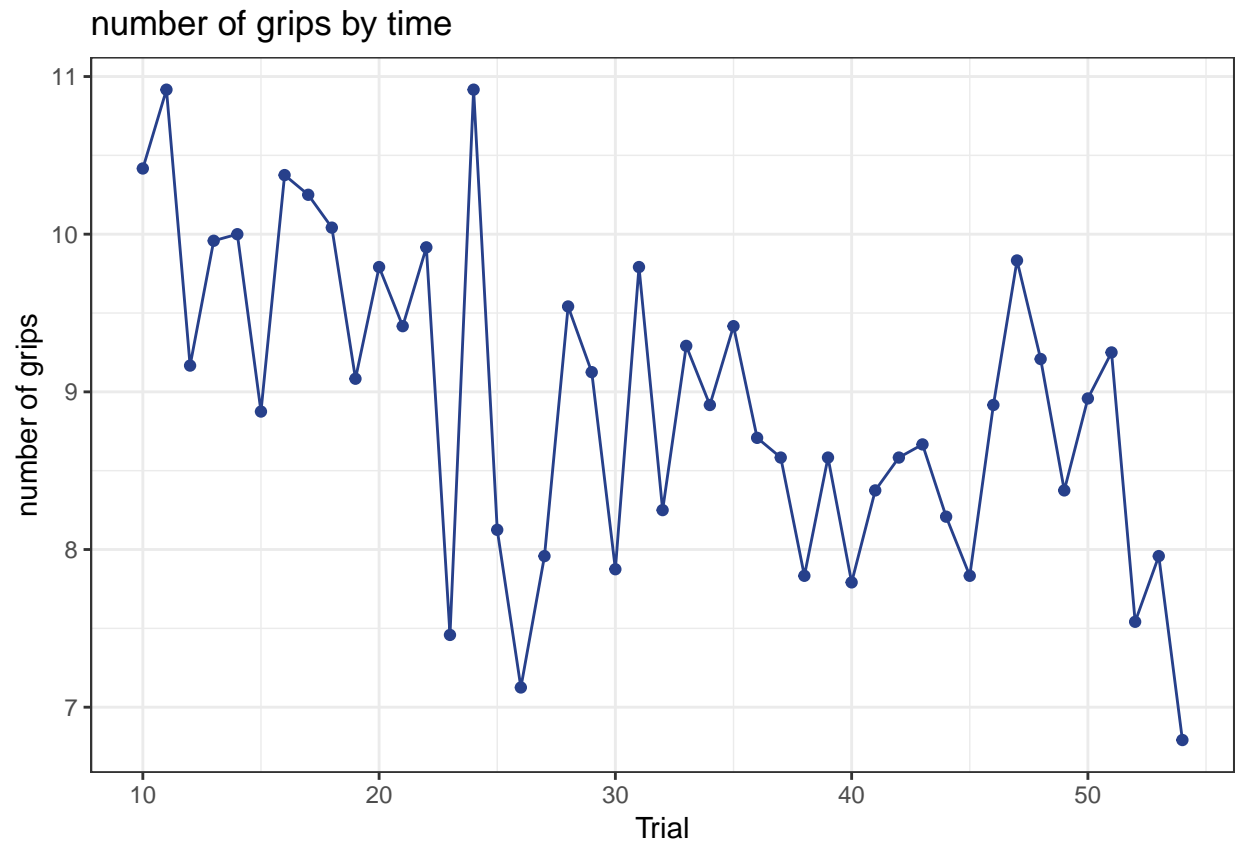


```
boxplot(PIT.bt$n_grips ~ PIT.bt$trial, las = 1)
```



plot `n_grips` to see the trajectory of learning (overall average by trials)

```
ggplot(PIT.bt, aes(x = trial, y = n_grips, fill = I('royalblue1'), color = I('royalblue4')) +
  geom_point() + geom_line(group=1) +
  guides(color = "none", fill = "none") +
  guides(color = "none", fill = "none") +
  theme_bw() +
  labs(
    title = "number of grips by time",
    x = "Trial",
    y = "number of grips"
  )
)
```

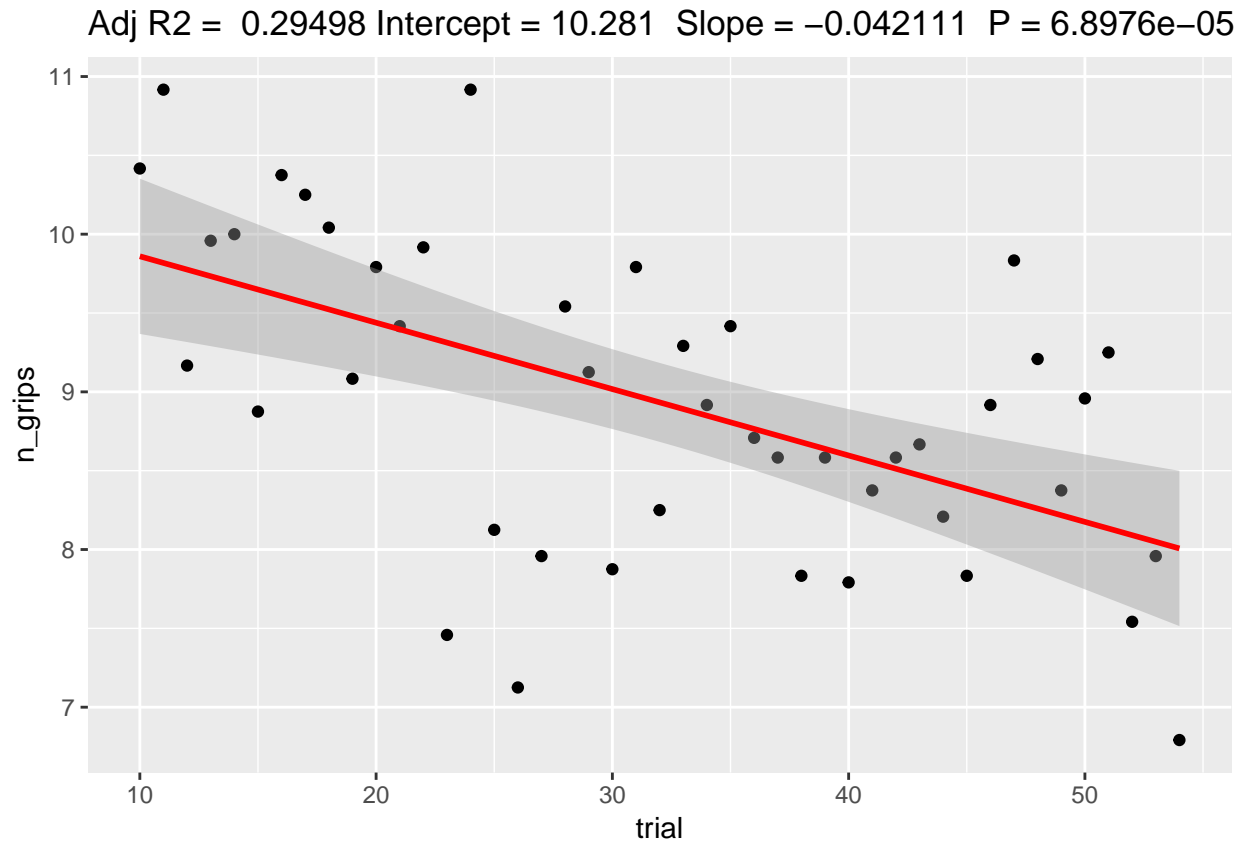


```
#OR different representation
ggplotRegression <- function (fit) {

  ggplot(fit$model, aes_string(x = names(fit$model)[2], y = names(fit$model)[1])) +
    geom_point() +
    stat_smooth(method = "lm", col = "red") +
    labs(title = paste("Adj R2 = ", signif(summary(fit)$adj.r.squared, 5),
                      " Intercept = ", signif(fit$coef[[1]], 5),
                      " Slope = ", signif(fit$coef[[2]], 5),
                      " P = ", signif(summary(fit)$coef[2,4], 5)))

}

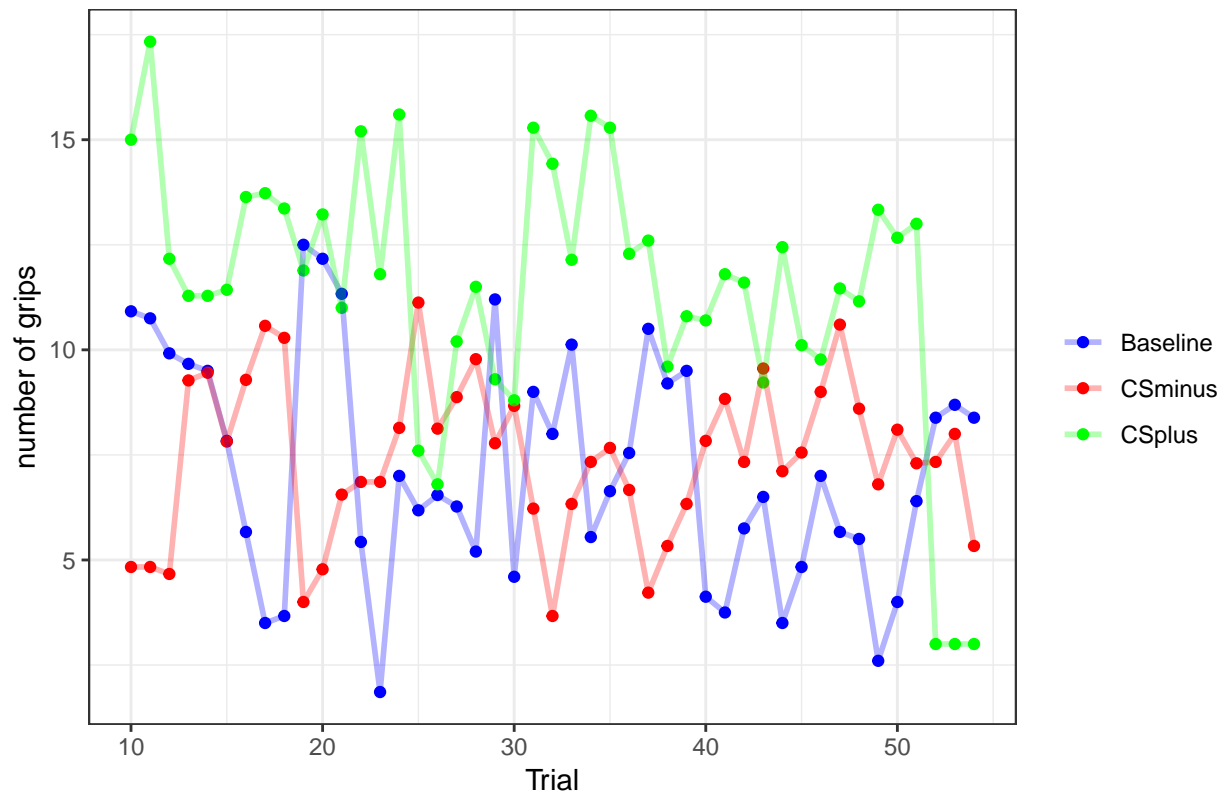
# plot number of grips by time with regression line
ggplotRegression(lm(n_grips ~ trial, data = PIT.bt))
```

plot `n_grips` to see the trajectory of learning (overall average by trials) by conditions

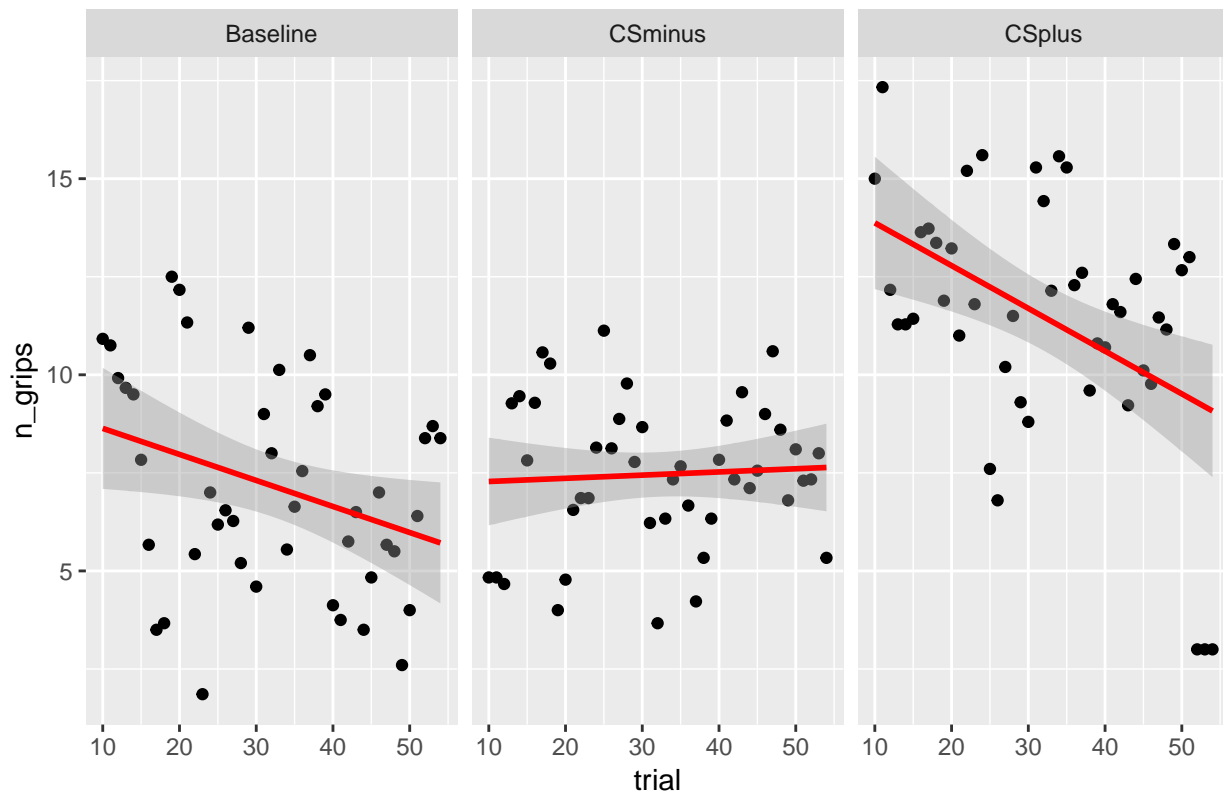
```
ggplot(PIT.bct, aes(x = trial, y = n_grips, color = condition)) +
  geom_point() +
  geom_line(aes(group = condition), alpha = .3, size = 1) +
  scale_colour_manual("",
                      values = c("CSplus"="green", "CSminus"="red", "Baseline"="blue")) +
  theme_bw() +
  labs(
    title = "number of grips By Time By condition",
    x = "Trial",
    y = "number of grips"
  )
```

number of grips By Time By condition



```
# plot number of grips by time by condition with regression lign
ggplotRegression(lm(n_grips ~ trial*condition, data = PIT.bct)) +
  facet_wrap(~condition)
```

Adj R2 = 0.42594 Intercept = 9.2978 Slope = -0.066361 P = 0.02155



ANALYSIS

1. number of grips: are participants gripping more on the CSplus condition?

```
#factorise trial
REWOD_PIT$trial      <- factor(REWOD_PIT$trial)

#contrasts
REWOD_PIT$cvalue[REWOD_PIT$condition== 'CSplus']      <- 2
REWOD_PIT$cvalue[REWOD_PIT$condition== 'CSminus']     <- -1
REWOD_PIT$cvalue[REWOD_PIT$condition== 'Baseline']    <- -1
REWOD_PIT$cvalue    <- factor(REWOD_PIT$cvalue)

# lmer analysis ~ condition
main.n_grips = lmer(n_grips ~ cvalue + (1+cvalue|id) + (1|trial), data = REWOD_PIT, REML = FALSE)
anova(main.n_grips)

## Type III Analysis of Variance Table with Satterthwaite's method
##      Sum Sq Mean Sq NumDF  DenDF F value    Pr(>F)
## cvalue 264.67  264.67     1  24.003  14.259 0.0009257 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```

# quick check with classical anova (! this is not reliable)
summary(aov(n_grips ~ cvalue + Error(id / (cvalue)), data = REWOD_PIT))

##
## Error: id
##           Df Sum Sq Mean Sq F value Pr(>F)
## Residuals 23  28814     1253
##
## Error: id:cvalue
##           Df Sum Sq Mean Sq F value Pr(>F)
## cvalue     1   4896     4896  13.65 0.0012 **
## Residuals 23   8252      359
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Error: Within
##           Df Sum Sq Mean Sq F value Pr(>F)
## Residuals 1032  19208    18.61

# model comparison
main.n_grips.0 = lmer(n_grips ~ (1|id) + (1|trial), data = REWOD_PIT, REML = FALSE)
anova(main.n_grips.0, main.n_grips, test = 'Chisq')

## Data: REWOD_PIT
## Models:
## main.n_grips.0: n_grips ~ (1 | id) + (1 | trial)
## main.n_grips: n_grips ~ cvalue + (1 + cvalue | id) + (1 | trial)
##           Df    AIC    BIC logLik deviance Chisq Chi Df Pr(>Chisq)
## main.n_grips.0  4 6857.1 6877.0 -3424.5   6849.1
## main.n_grips    7 6405.4 6440.3 -3195.7   6391.4 457.71      3 < 2.2e-16
##
## main.n_grips.0
## main.n_grips ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

#sentence => main.n_grips is signifincatly better than the null model

```