```r
getwd()
```

```
## [1] "C:/Users/naszh/Google Drive (shulai@iu.edu)/IUB/Shiffrin Lab/mix_experiment/analysis"
```

```r
knitr::opts_knit$set(root.dir = "/home/shulai/Documents/exp1_data0")
knitr::opts_knit$set(root.dir ="C:/Users/naszh/Google Drive (shulai@iu.edu)/IUB/Shiffrin Lab/mix_experi

rn=c("Block","Trial","Condition","OldNew","Setsize","Serpos","Lag",
  "Response","Correctness","RT","WhichProbe",
  paste("prob",seq(1,6),sep=""),"surveyq")
# read.table("cmvman1048.txt",head=FALSE,sep="",fill = TRUE,col.names = rn)
```

Basic

```r
subnum=16+5
basen="cmvmspec1_"
```

Functions

load data

```r
ld=function(basen,subnum){
  for (i in 1:subnum){
    if (i==1){
      d=read.table(paste(basen,i,".txt",sep=""),head=FALSE,sep="",fill = TRUE,col.names = rn)
      d=d %>% mutate(Subnum=i) #%>% replace_na(list(surveyq=surveyq[length(surveyq)]))
    }  else{
      d0=read.table(paste(basen,i,".txt",sep=""),head=FALSE,sep="",fill = TRUE,col.names = rn)
      d0=d0 %>% mutate(Subnum=i) #%>% replace_na(list(surveyq=surveyq[length(surveyq)]))
      d=rbind(d,d0)
    }
     d=d%>% select(Subnum,everything()) %>% arrange(Subnum) %>% filter(RT>0)
  }
  return(d)
}
```

plot RT

```r
plot_rtall=function(d,tit){
  dase=summarySEwithin(data=d,measurevar = "RT",withinvars = c("Setsize","Correctness","OldNew","Condit
  # print(dase)
  da1se=subset(dase,Correctness==1)
  p1=ggplot(data=da1se,aes(Setsize,RT))+
  geom_point(aes(color=as.factor(OldNew),shape=as.factor(Condition),group=OldNew),size=5)+
  geom_line(aes(color=as.factor(OldNew),linetype=as.factor(Condition),
              group=interaction(OldNew,Condition)))+
  scale_color_manual(name="Old-New",#breaks=c(1,0),
                     labels=c(`1`="Old", `2`="New"),
                     values=c("#F23005","#FFBE73"))+
  scale_shape_discrete(name="Condition",
                     labels = c(`1`="CMpos_s",`2`="CMpos_reg",`3`="CMneg_h",`4`="CMneg_l",`5`="vm"))+
```

```
    scale_linetype_discrete(name="Condition",
                          labels =c(`1`="CMpos_s",`2`="CMpos_reg",`3`="CMneg_h",`4`="CMneg_l",`5`="vm"))+
    ggtitle(paste("Mean CorrectRT - Set Size",tit))
    return(p1)
}
```

plot Correct

```
plot_error=function(d,tit){
  da_p=summarySEwithin(data=d,measurevar = "Correctness",withinvars = c("Setsize","OldNew","Condition")
  # da_p
  p1=ggplot(data=da_p,aes(Setsize,1-Correctness))+
    geom_point(aes(color=as.factor(OldNew),shape=as.factor(Condition),group=OldNew),size=5)+
    geom_line(aes(color=as.factor(OldNew),linetype=as.factor(Condition),
                group=interaction(OldNew,Condition)))+
    scale_color_manual(name="Old-New",#breaks=c(1,0),
                        labels=c(`1`="Old", `2`="New"),
                        values=c("#F23005","#FFBE73"))+
    scale_shape_discrete(name="Condition",
                        labels = c(`1`="CMpos_s",`2`="CMpos_reg",`3`="CMneg_h",`4`="CMneg_l",`5`="vm"))+
    scale_linetype_discrete(name="Condition",
                        labels = c(`1`="CMpos_s",`2`="CMpos_reg",`3`="CMneg_h",`4`="CMneg_l",`5`="vm"))+
    ggtitle(paste("Error Rate- Set Size - ",tit))+
    scale_y_continuous("Probability of Error")
  return(p1)
  }
```

mutate new condition

```
creatnewc=function(dc){
  d0=dc %>% mutate(Condition=as.numeric(Condition)) %>%
  mutate(specondi=case_when( Condition %in% as.factor(1:4)~ Condition,
                              Condition==5&OldNew==1 ~ 5, #c5=vm-old
                              Condition==5&OldNew==2 ~ 6) ) %>%  #6~vm-new
  mutate(specondi=as.factor(specondi))
  return(d0)
}
```

plot rt blockwise

```
plot_rtblockwise = function(d,tit){
  # d=dc
  dp3=creatnewc(d)%>% filter(Correctness==1)
  dp3=summarySEwithin(data=dp3, measurevar = "RT", withinvars = c("Block","Setsize","specondi"))

  Condition_n=c("CMpos_s","CMpos_reg","CMneg_h","CMneg_l","vm_old","vm_new");names(Condition_n)=as.chara

  p=ggplot(dp3,aes(Block,RT))+
    geom_point(aes(color=Setsize))+
    geom_line(aes(color=Setsize,group=interaction(Setsize)))+
    ggtitle(paste("RT accross blocks -"),tit)+
    facet_wrap(specondi~.,
```

```
              labeller = labeller(specondi=Condition_n) ,ncol=3)
              # labeller = label_both)
    return(p)



}

plot_rtblockwise2=function(d,tit){
    dp3=creatnewc(d) %>% filter(Correctness==1)
    dp34=summarySEwithin(data=dp3, measurevar = "RT", withinvars =
                    c("Block","specondi"))
    Condition_n=c("CMpos_s","CMpos_reg","CMneg_h","CMneg_l","vm_old","vm_new");names(Condition_n)=as.cha
  p=ggplot(dp34,aes(Block,RT))+
    geom_point(aes(color=specondi))+
    geom_line(aes(color=specondi,
                group=specondi))+
    scale_color_discrete(labels = Condition_n )+
    ggtitle(paste("RT accross blocks"),tit)
  return(p)
}
```

participant wise

```
plot_rtblockpar=function(d,tit){
    dp3=creatnewc(dc) %>% filter(Correctness==1)
    dp34=summarySEwithin(data=dp3, measurevar = "RT", withinvars =
                    c("Block","specondi","Subnum"))
    Condition_n=c("CMpos_s","CMpos_reg","CMneg_h","CMneg_l","vm_old","vm_new");names(Condition_n)=as.cha
  p=ggplot(dp34,aes(Block,RT))+
    geom_point(aes(color=specondi))+
    geom_line(aes(color=specondi,
                group=specondi))+
    scale_color_discrete(labels = Condition_n )+
    ggtitle(paste("RT accross blocks across participant"),tit)+
    facet_wrap(Subnum~.,ncol=3)
  return(p)
}
```

load data

```
d=ld(basen,subnum)
d=d%>%mutate_at(c("Setsize","OldNew","Condition"),as.factor)
```
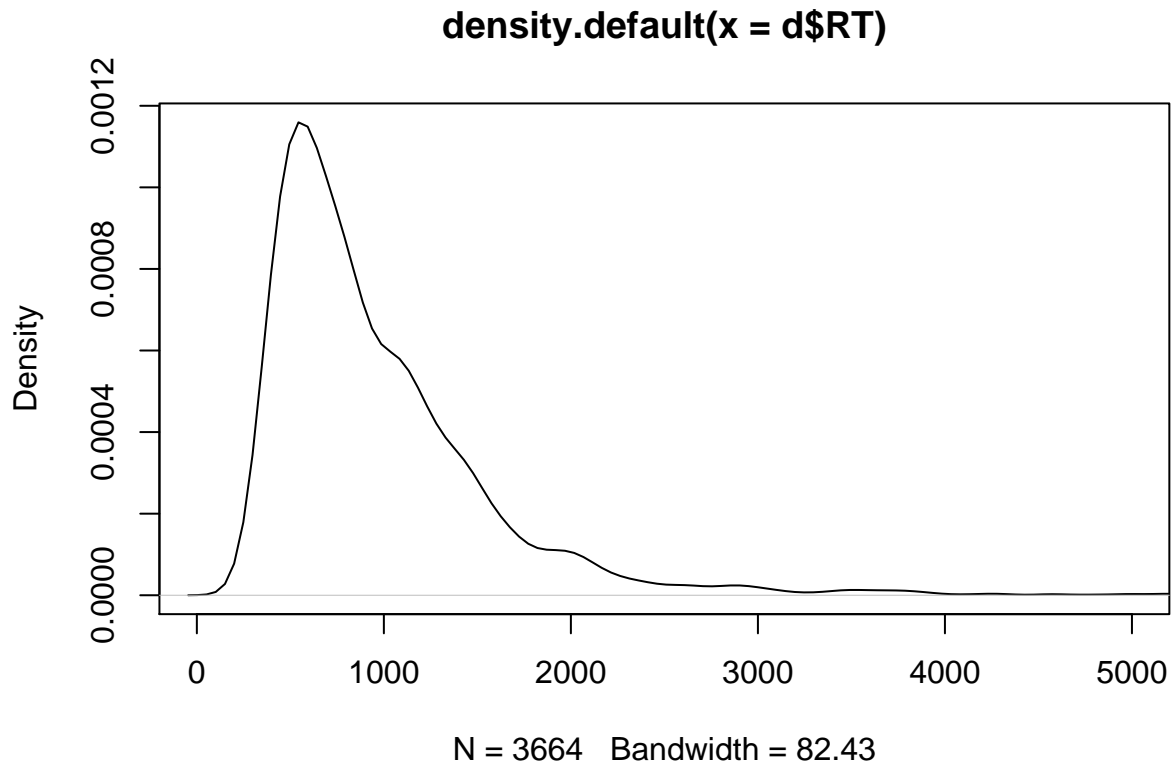
clean data

```
plot(density(d$RT),xlim=c(0,5000))
```

density.default(x = d$RT)

N = 3664   Bandwidth = 82.43

```
# d$Trial[d$RT>4000]
#
# d[d$Trial<10,]

dc=d%>%filter(RT<5000&RT!=0)
```

# Manipulation check

```
  a=array()
  for(i in 1:10){
    a[i]=sum(d$WhichProbe==i)/sum(length(d$Block))
  }
a
```

```
##  [1] 0.10725983 0.09989083 0.14546943 0.06741266 0.09579694 0.09497817
##  [7] 0.09497817 0.10343886 0.10289301 0.08788210
```
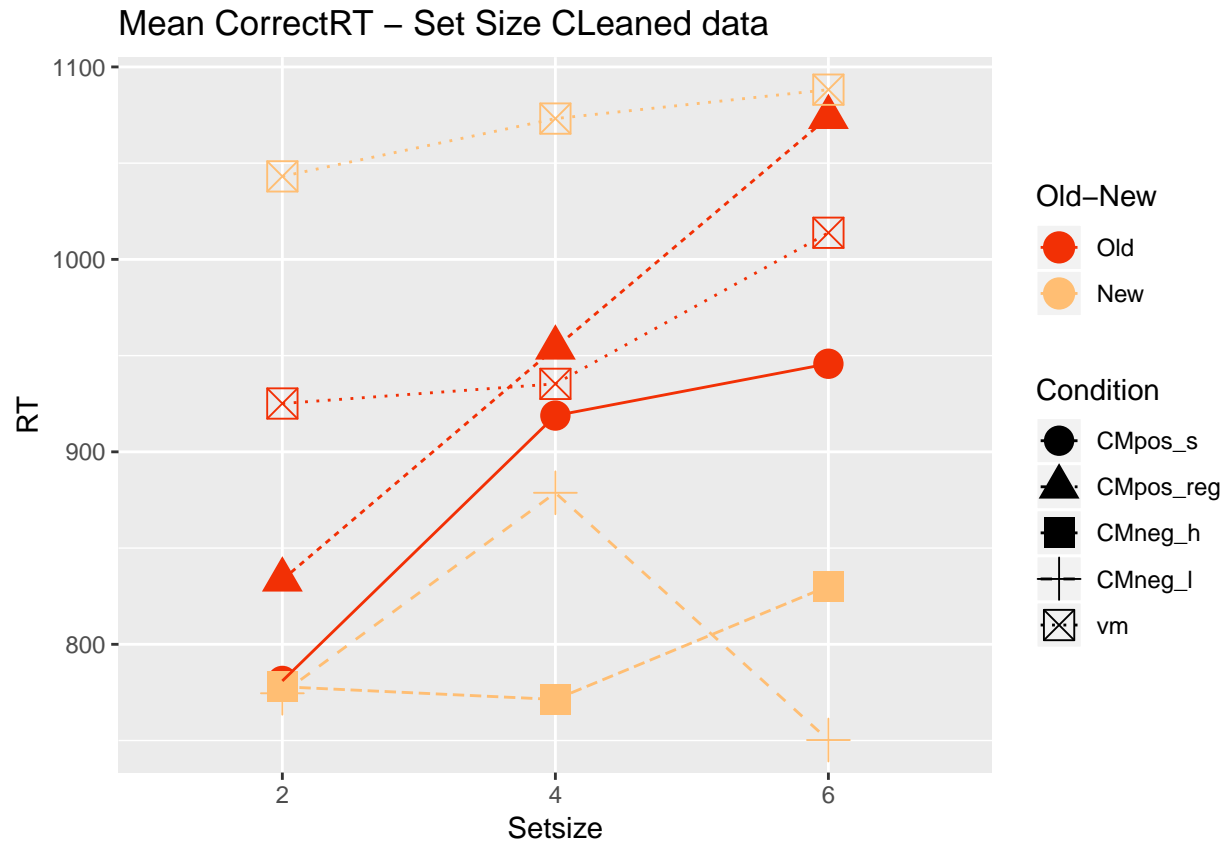
Plor rt for correct rsponse

```
plot_rtall(d,"orignal")
```

```
## Automatically converting the following non-factors to factors: Correctness
```

```
## Warning in qt(conf.interval/2 + 0.5, datac$N - 1): NaNs produced
```

Mean CorrectRT – Set Size orignal
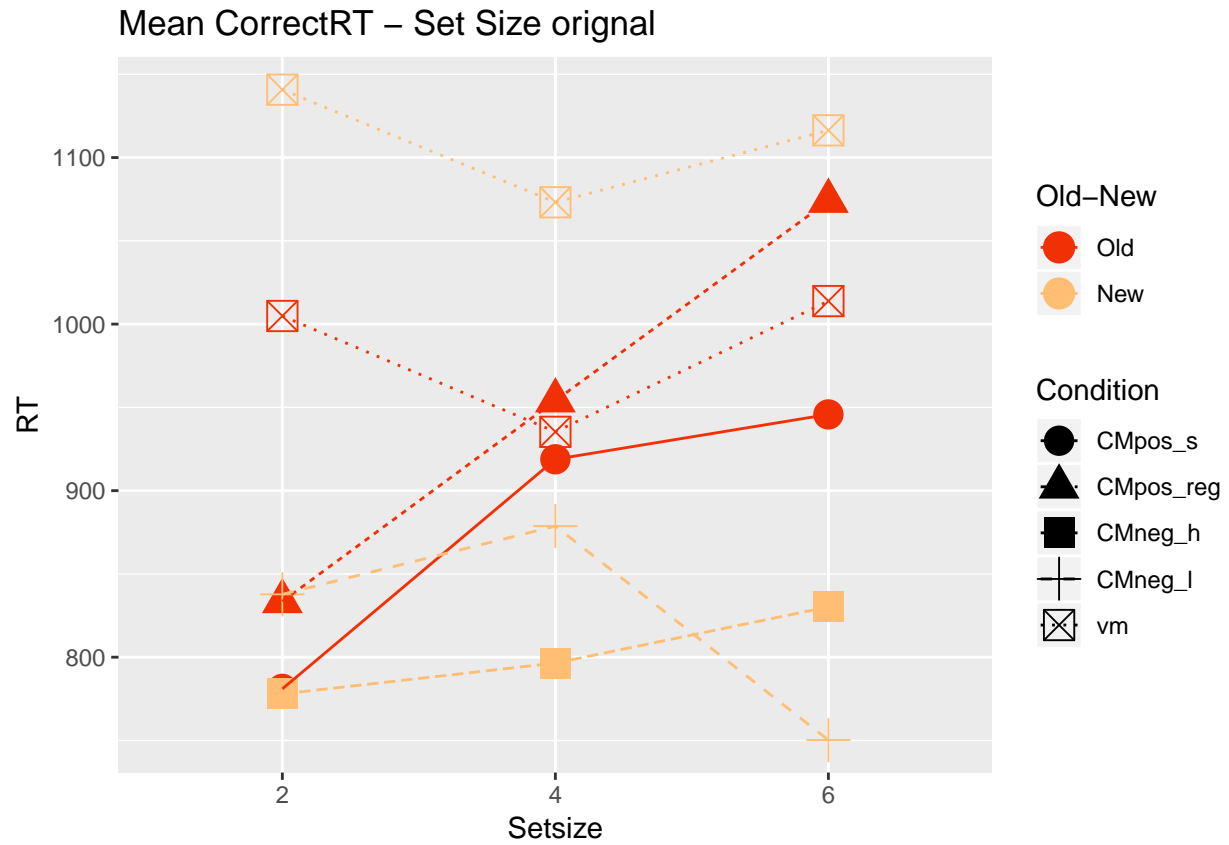

```
plot_rtall(dc,"CLeaned data")
```

```
## Automatically converting the following non-factors to factors: Correctness
```

```
## Warning in qt(conf.interval/2 + 0.5, datac$N - 1): NaNs produced
```
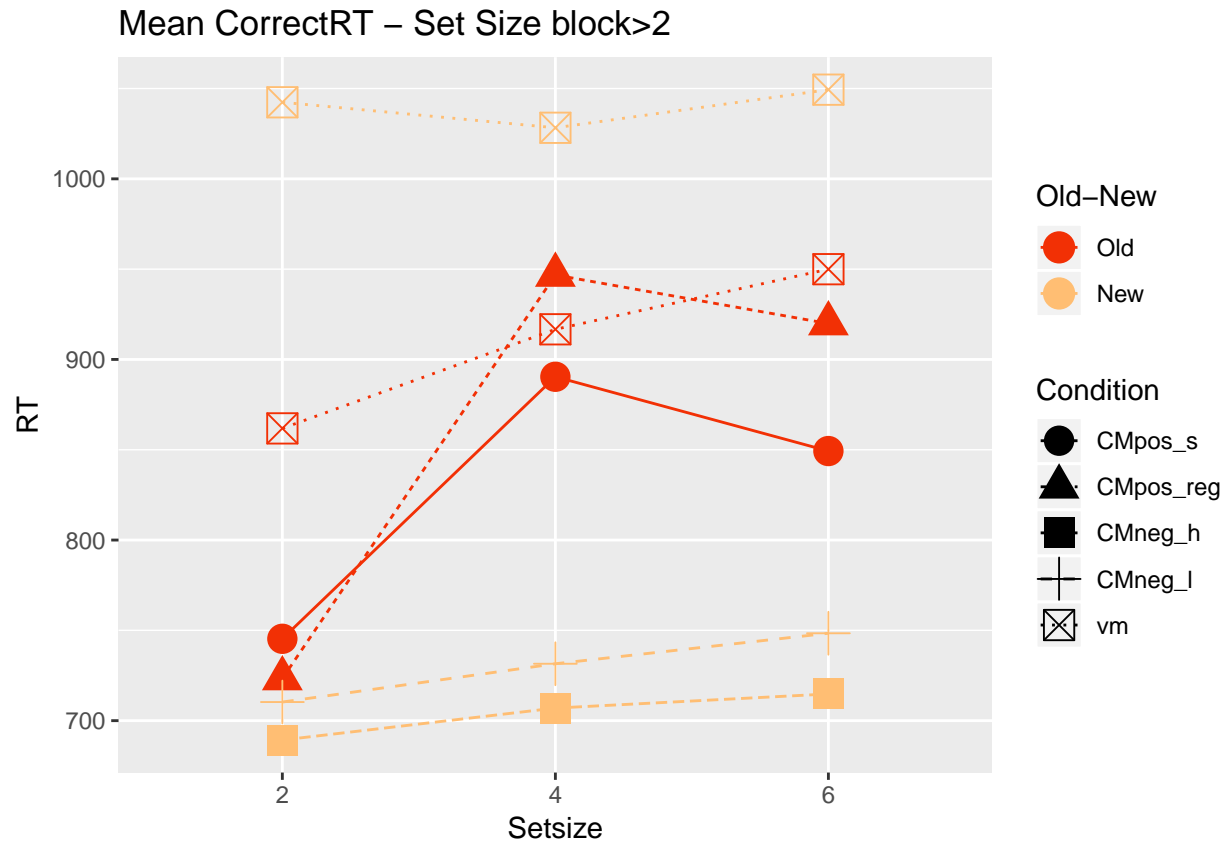
Mean CorrectRT – Set Size CLeaned data

```
plot_rtall(filter(dc,Block>2),"block>2")
```

Automatically converting the following non-factors to factors: Correctness

Warning in qt(conf.interval/2 + 0.5, datac$N - 1): NaNs produced

Mean CorrectRT – Set Size block>2

VM-New is weird, let's see what if block>2

frequent inference

Want: 1-2 cmpos vs cm neg 1-5 cmpos vs vm pos 2-5 cmneg vs vm pos

```
#make new condition variable for every conditions

dcmut=creatnewc(dc) %>% filter(Correctness==1)

# Want: 1-2 cmpos vs cm neg
#       1-5 cmpos vs vm pos
#       2-5 cmneg vs vm pos
TukeyHSD(data=dcmut,aov(RT~Condition,data=dc))
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = RT ~ Condition, data = dc)
##
## $Condition
##             diff       lwr       upr      p adj
## 2-1   54.2289868  -58.63958 167.097557 0.6842350
## 3-1 -112.4581922 -215.80754  -9.108847 0.0249903
## 4-1 -113.0883211 -239.56777  13.391131 0.1049962
## 5-1  107.8900971   22.52787 193.252321 0.0051475
## 3-2 -166.6871790 -272.20620 -61.168156 0.0001621
```
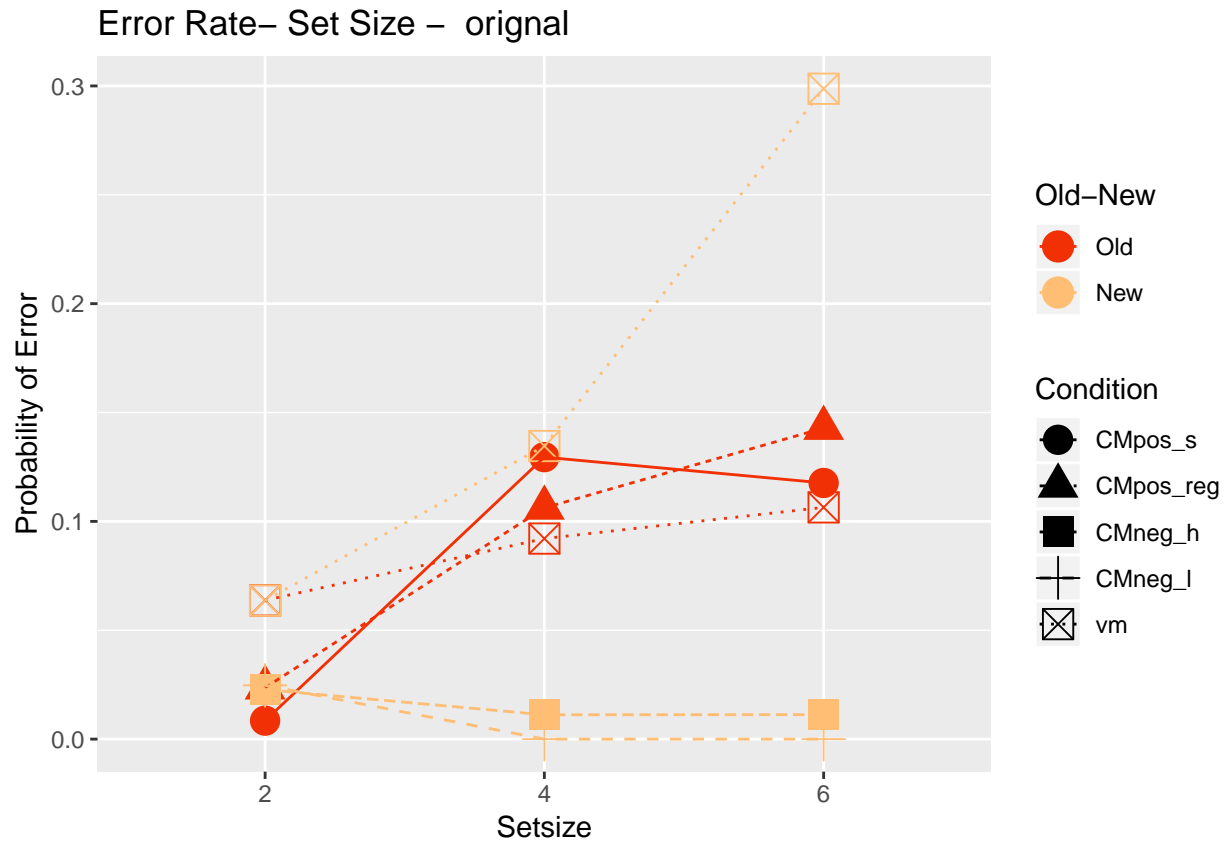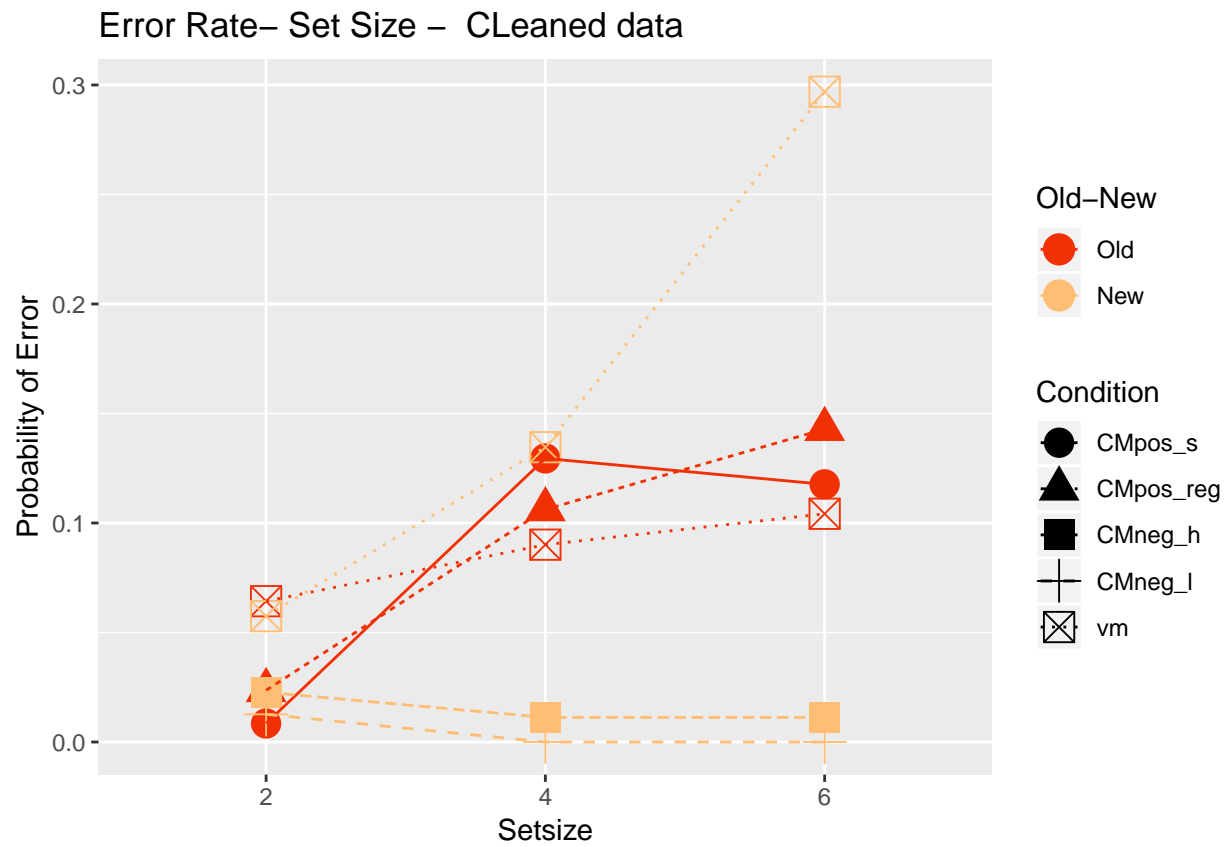
```
## 4-2 -167.3173079 -295.57575 -39.058862 0.0034464
## 5-2   53.6611103  -34.31551 141.637735 0.4561557
## 4-3   -0.6301289 -120.59680 119.336541 1.0000000
## 5-3  220.3482893  144.97151 295.725073 0.0000000
## 5-4  220.9784182  116.10886 325.847976 0.0000001
```

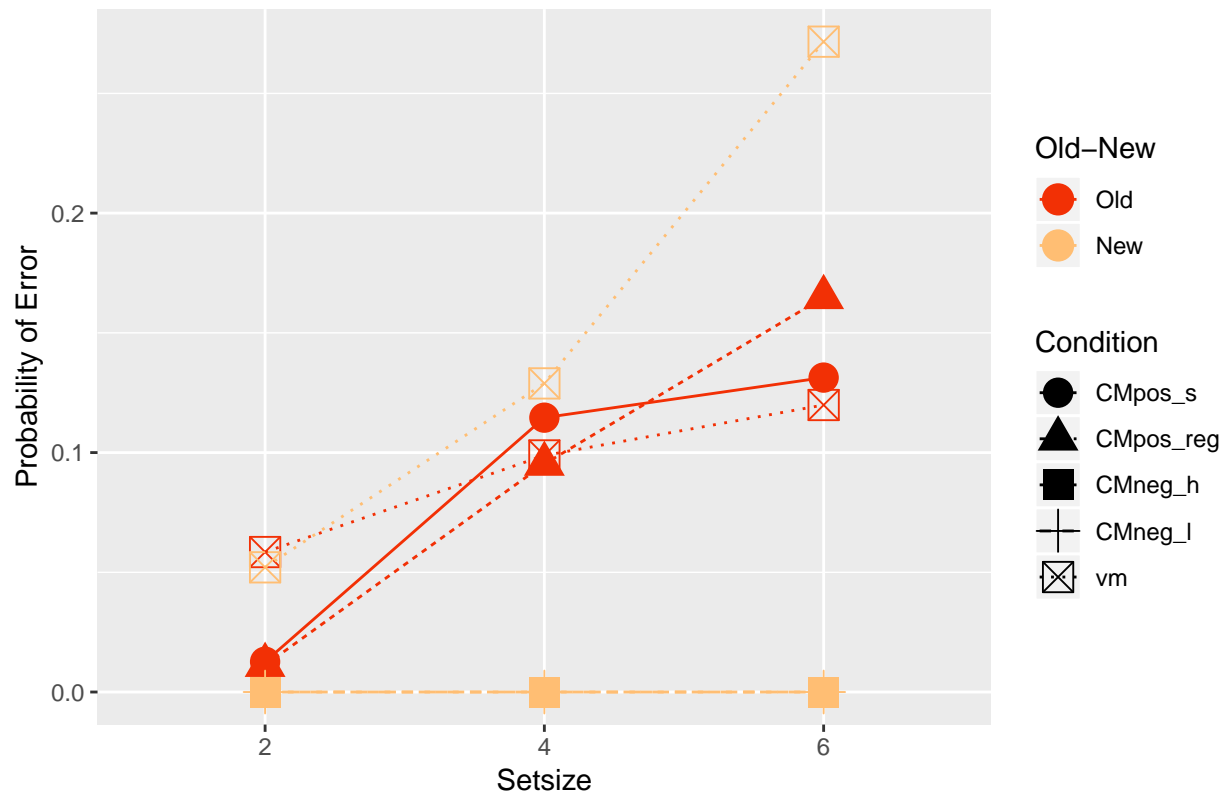## plot correcness

```
plot_error(d,"orignal")
```



```
plot_error(dc,"CLeaned data")
```

Error Rate– Set Size – CLeaned data

```
plot_error(filter(dc,Block>2),"block>2")
```

Error Rate– Set Size – block>2

##freq Want: 1-2 cmpos vs cm neg
1-5 cmpos vs vm pos
2-5 cmneg vs vm pos

```r
TukeyHSD(data=dcmut,aov(Correctness~Condition,data=dc))
```

```
##   Tukey multiple comparisons of means
##     95% family-wise confidence level
##
## Fit: aov(formula = Correctness ~ Condition, data = dc)
##
## $Condition
##            diff         lwr         upr       p adj
## 2-1 -0.00110541 -0.05618985  0.05397903 0.9999980
## 3-1  0.07402093  0.02358226  0.12445960 0.0006044
## 4-1  0.08497689  0.02324979  0.14670399 0.0016368
## 5-1 -0.02321054 -0.06487077  0.01844968 0.5491046
## 3-2  0.07512634  0.02362878  0.12662390 0.0006668
## 4-2  0.08608230  0.02348698  0.14867762 0.0016619
## 5-2 -0.02210513 -0.06504129  0.02083103 0.6244228
## 4-3  0.01095596 -0.04759264  0.06950456 0.9863335
## 5-3 -0.09723147 -0.13401840 -0.06044455 0.0000000
## 5-4 -0.10818743 -0.15936803 -0.05700684 0.0000001
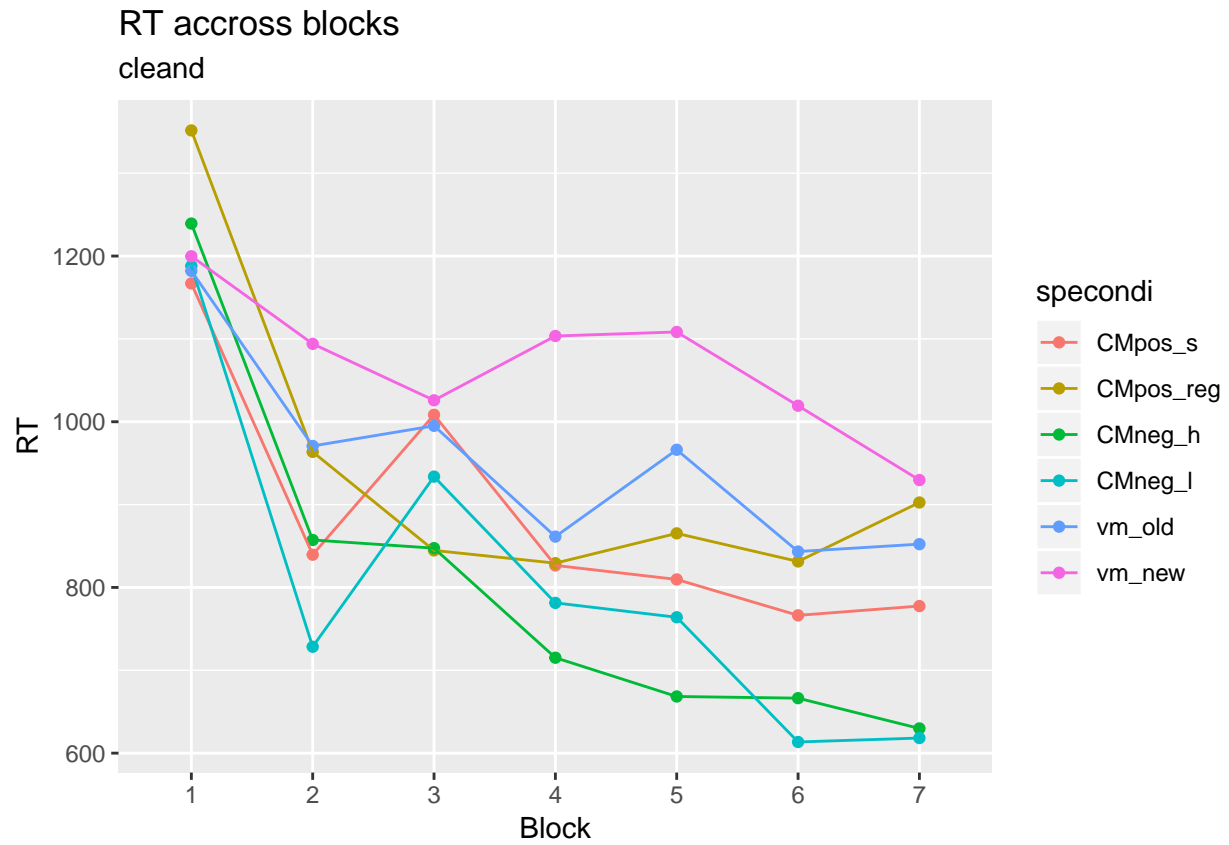```

# plot RT- Blockwise

```
# head(d)
```

```
plot_rtblockwise(dc,"cleand")
```

```
## Automatically converting the following non-factors to factors: Block
```


RT accross blocks –
cleand
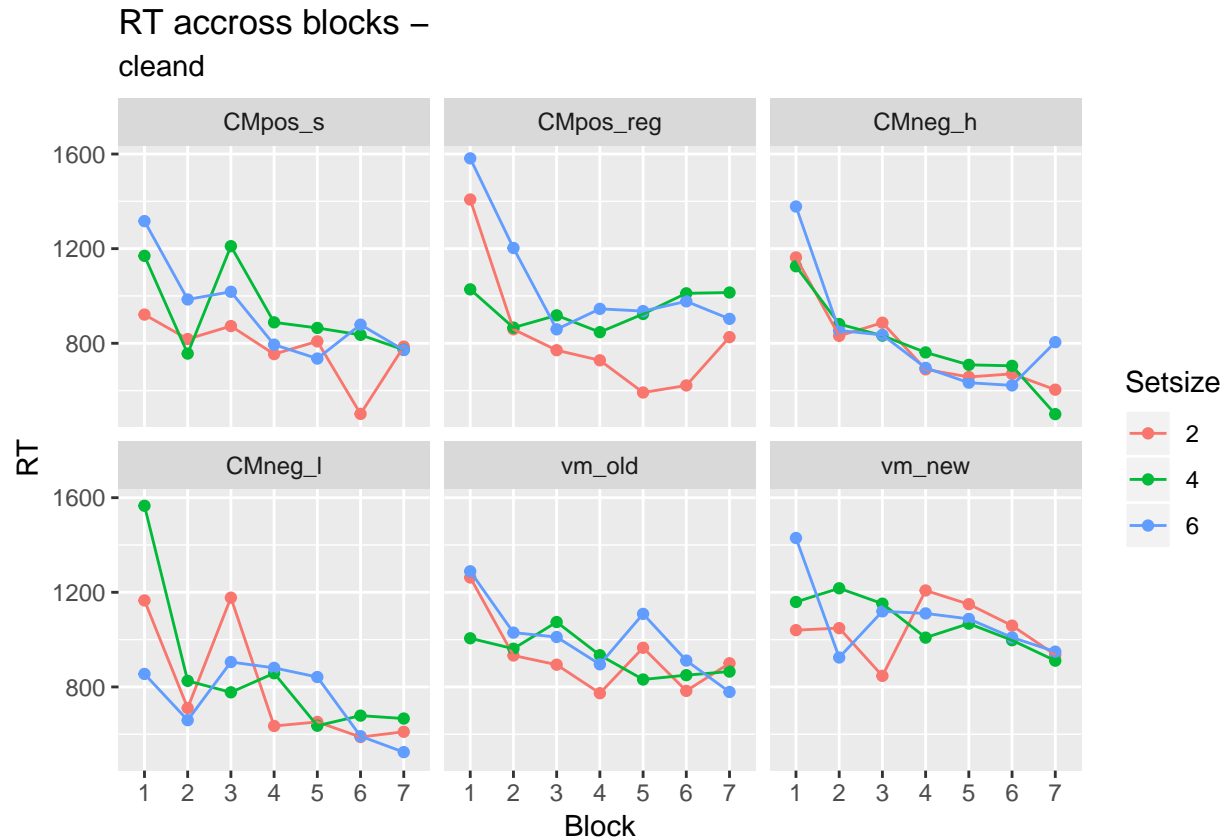
```
plot_rtblockwise2(dc,"cleand")
```

```
## Automatically converting the following non-factors to factors: Block
```

RT accross blocks
cleand


```
plot_rtblockwise(d,"orgid")
```
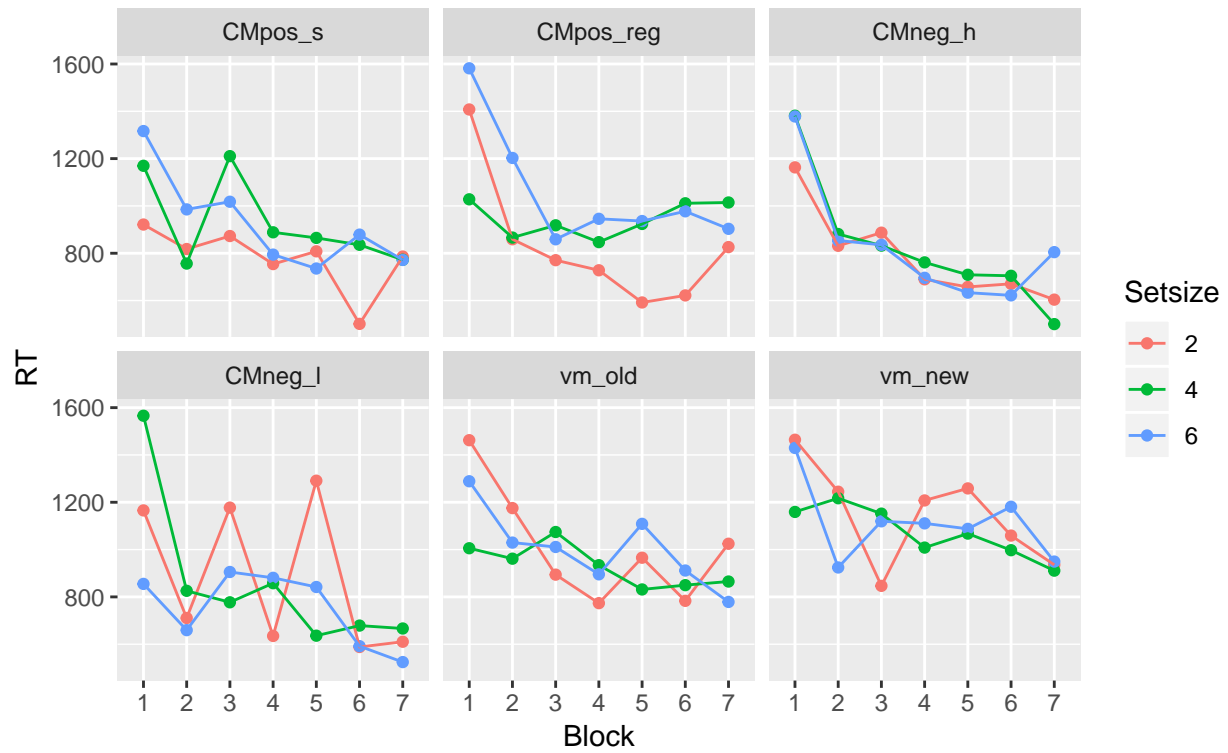
```
## Automatically converting the following non-factors to factors: Block
```
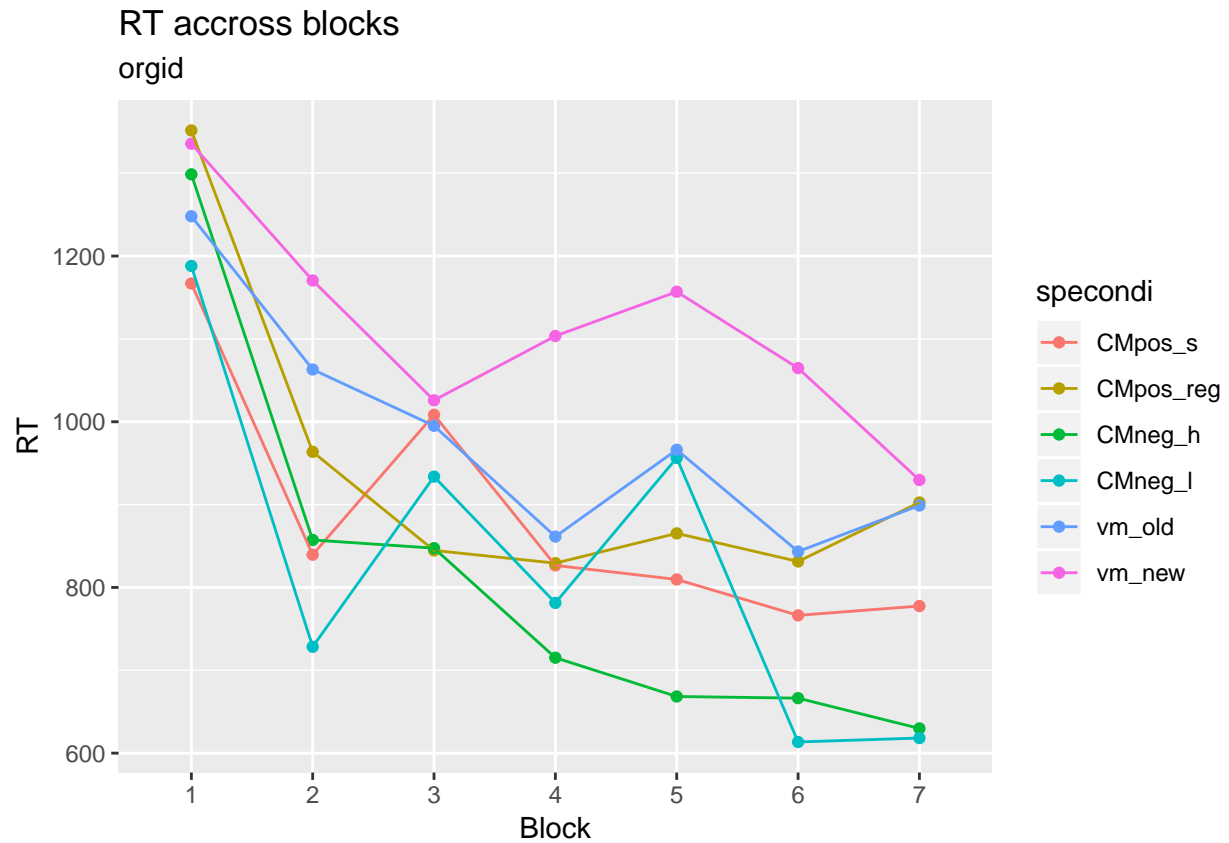
RT accross blocks –
orgid

```
plot_rtblockwise2(d,"orgid")
```

```
## Automatically converting the following non-factors to factors: Block
```

RT accross blocks
orgid

p-participant wise

```
plot_rtblockpar(dc,"cleand")
```

Automatically converting the following non-factors to factors: Block, Subnum

Warning in qt(conf.interval/2 + 0.5, datac$N - 1): NaNs produced

RT accross blocks across participant
cleand