ModelReportBaseline

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Load the packages

customize theme

```
 theme_new <- theme_bw() +
  theme(panel.border = element_blank(),
        panel.grid.major = element_blank(),
        panel.grid.minor = element_blank(),
        axis.line = element_line(colour = "black"),
        strip.background = element_rect(color = "white", fill = "white"),
        panel.grid = element_blank())
```

load all experiment data

```
options(mc.cores = parallel::detectCores())
rstan_options (auto_write=TRUE)
# flag for saving figures
saveFigure = TRUE
# flag for generating CSV
generateSCV = TRUE
# flag for running rstan model and saving the results
runModels = FALSE
# path of model result
rstanmodelPath = 'RSTANMODELS'
modelResultPath = paste0(rstanmodelPath, '/Baseline')
```

Define the Rstan models and functions to plot

Baseline : models for the short and long groups, and prediction of the RP.

V1: load the parameters generated by model Baseline(“a_s”, “b_s”, “a_l”, “b_l”, “p_wf”)

Baseline: Model for short and long groups

Definisiton of the function to predicte the parameters of Bayesian by runing Rstan model

run Baseline RStan Models

display the model restults

load the model result data

Analysis on the Rstan model parameters

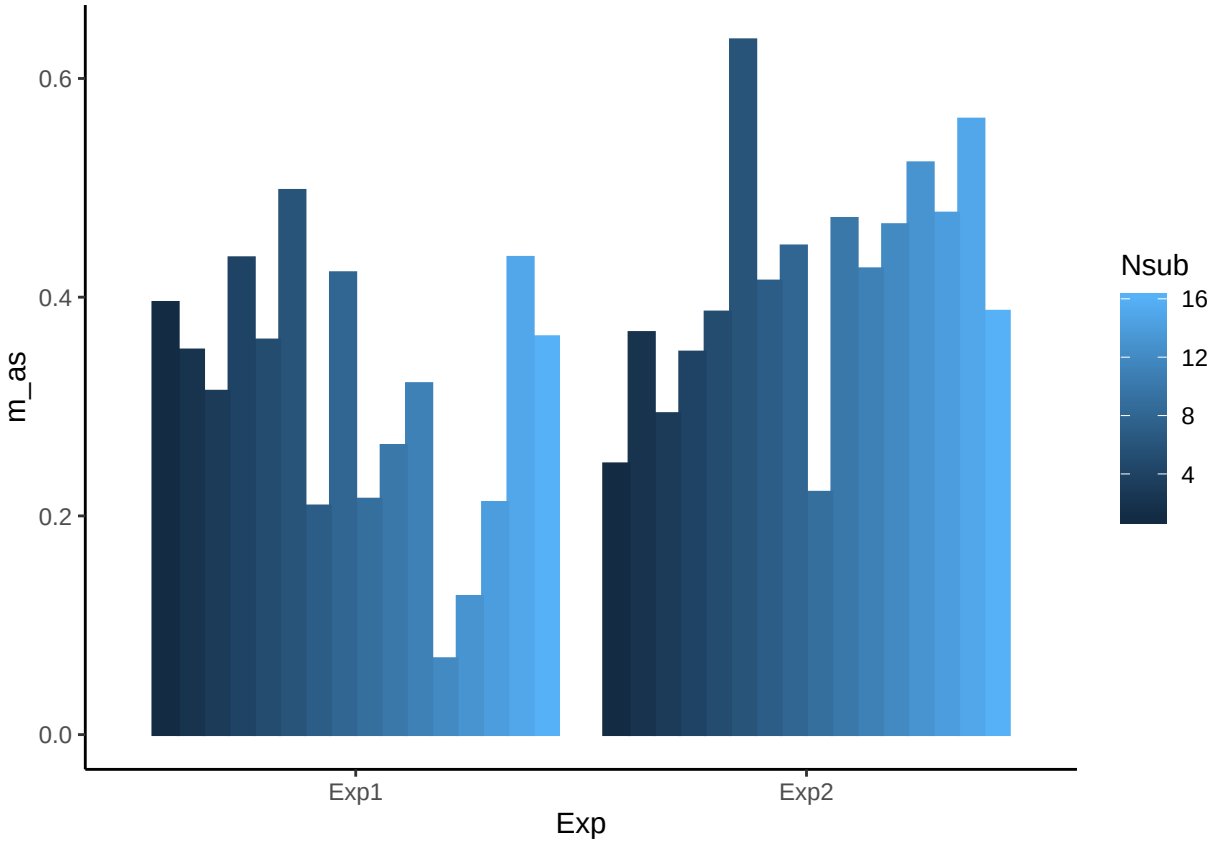
```
 # AllDat_Bayparlist$model <- factor(AllDat_Bayparlist$model, labels = c( "Hierarchical local-global mo
m_Baypar <- dplyr::group_by(AllDat_Bayparlist, Exp, Nsub) %>%
  dplyr::summarize(m_as = mean(a_s), m_al = mean(a_l),
            m_bs = mean(b_s), m_bl = mean(b_l),
```

```
            m_p_wf = mean(p_wf))
m_Baypar
```

```
## # A tibble: 32 x 7
## # Groups:   Exp [2]
##    Exp    Nsub  m_as   m_al  m_bs  m_bl m_p_wf
##    <chr> <dbl> <dbl>  <dbl> <dbl> <dbl>  <dbl>
##  1 Exp1      1 0.395 0.611  0.326 0.651  0.188
##  2 Exp1      2 0.352 0.459  0.334 0.704  0.134
##  3 Exp1      3 0.314 0.761  0.447 0.453  0.198
##  4 Exp1      4 0.436 0.0771 0.163 0.924  0.175
##  5 Exp1      5 0.361 0.149  0.424 0.857  0.218
##  6 Exp1      6 0.498 0.577  0.138 0.629  0.151
##  7 Exp1      7 0.209 0.257  0.629 0.865  0.135
##  8 Exp1      8 0.422 0.463  0.321 0.718  0.173
##  9 Exp1      9 0.215 0.724  0.692 0.560  0.165
## 10 Exp1     10 0.264 0.309  0.622 0.920  0.189
## # ... with 22 more rows
```

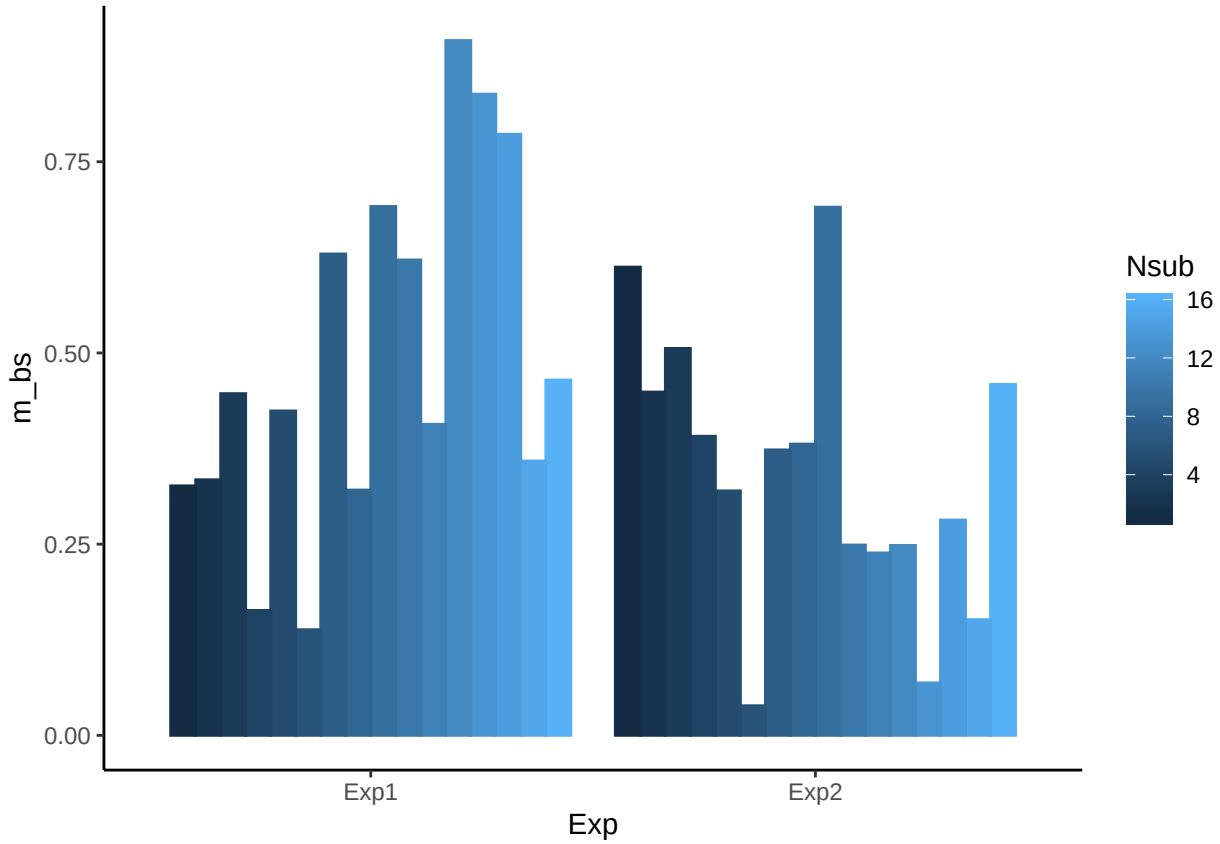
p_wf in models

```
ggplot(m_Baypar, aes(x = Exp, y = m_as, color = Nsub, fill = Nsub, group = Nsub)) +
    geom_bar(stat = "identity",
             position = position_dodge()) + theme_new
```

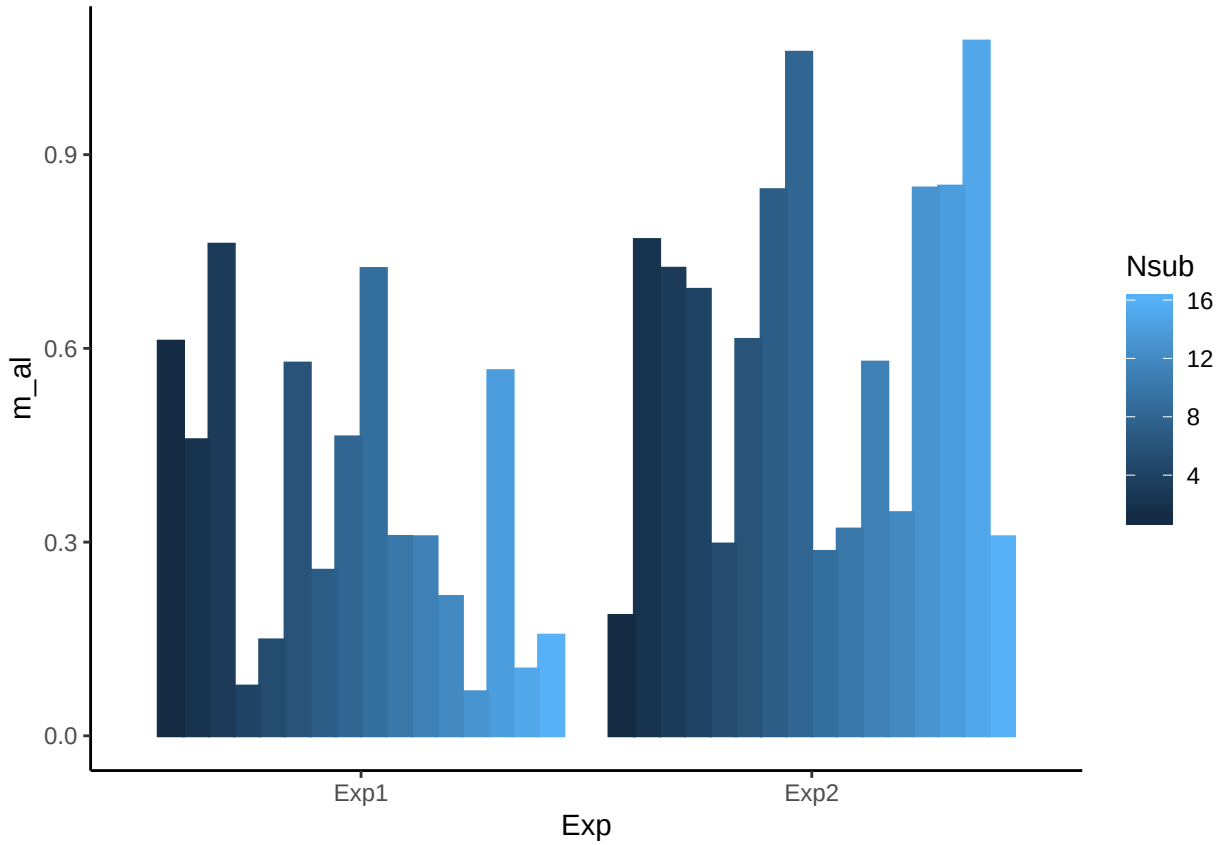



```
ggplot(m_Baypar, aes(x = Exp, y = m_bs, color = Nsub, fill = Nsub, group = Nsub)) +
    geom_bar(stat = "identity",
```

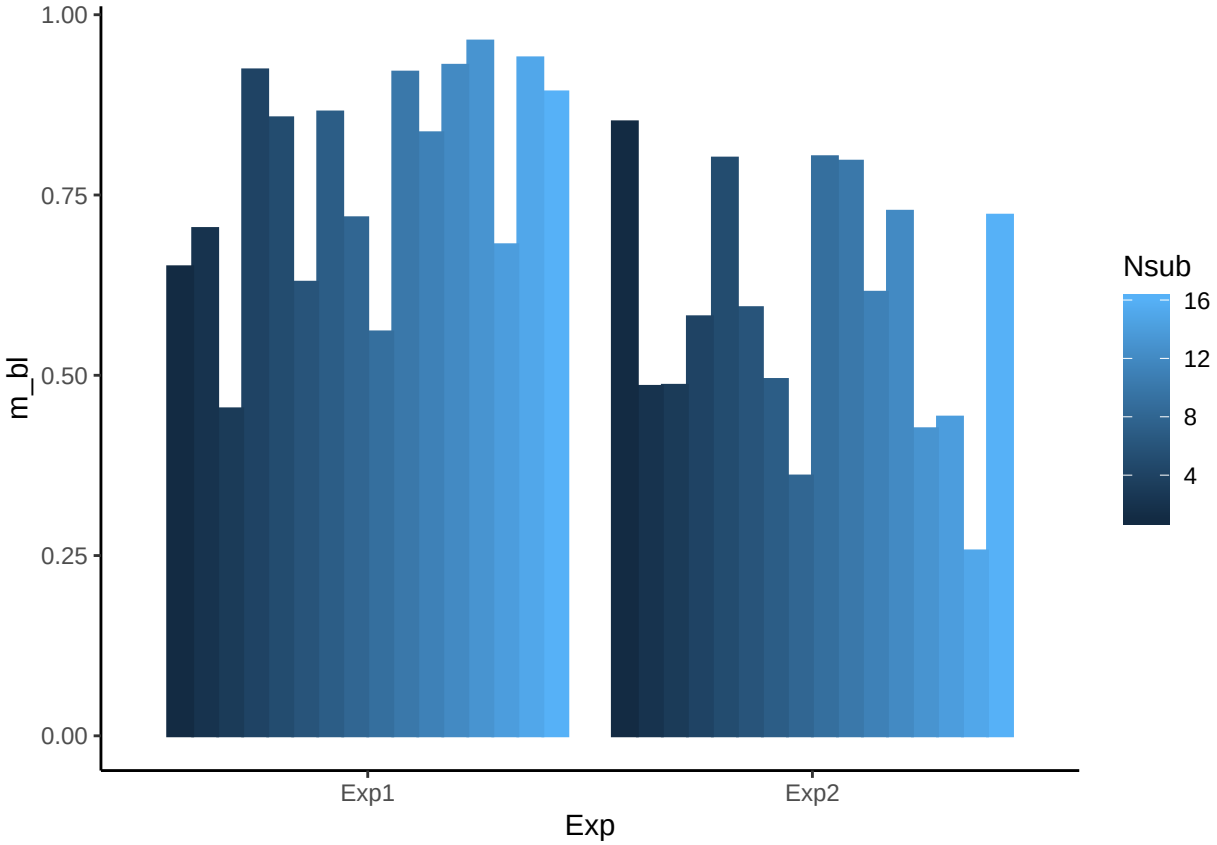
```
            position = position_dodge()) + theme_new
```



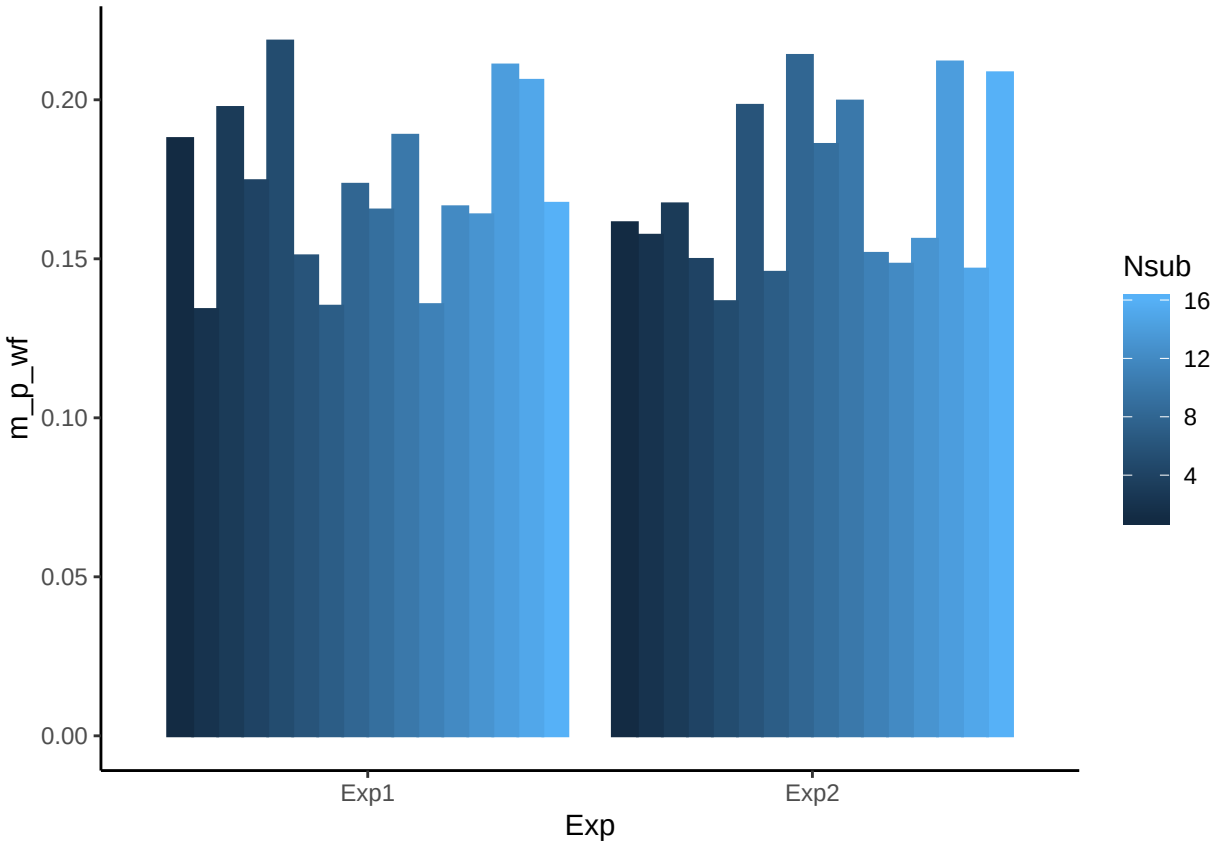

```
ggplot(m_Baypar, aes(x = Exp, y = m_al, color = Nsub, fill = Nsub, group = Nsub)) +
    geom_bar(stat = "identity",
             position = position_dodge())+
  theme_new
```




```
ggplot(m_Baypar, aes(x = Exp, y = m_bl, color = Nsub, fill = Nsub, group = Nsub)) +
    geom_bar(stat = "identity",
             position = position_dodge()) +
   theme_new
```




```
ggplot(m_Baypar, aes(x = Exp, y = m_p_wf, color = Nsub, fill = Nsub, group = Nsub)) +
    geom_bar(stat = "identity",
             position = position_dodge()) +
  theme_new
```



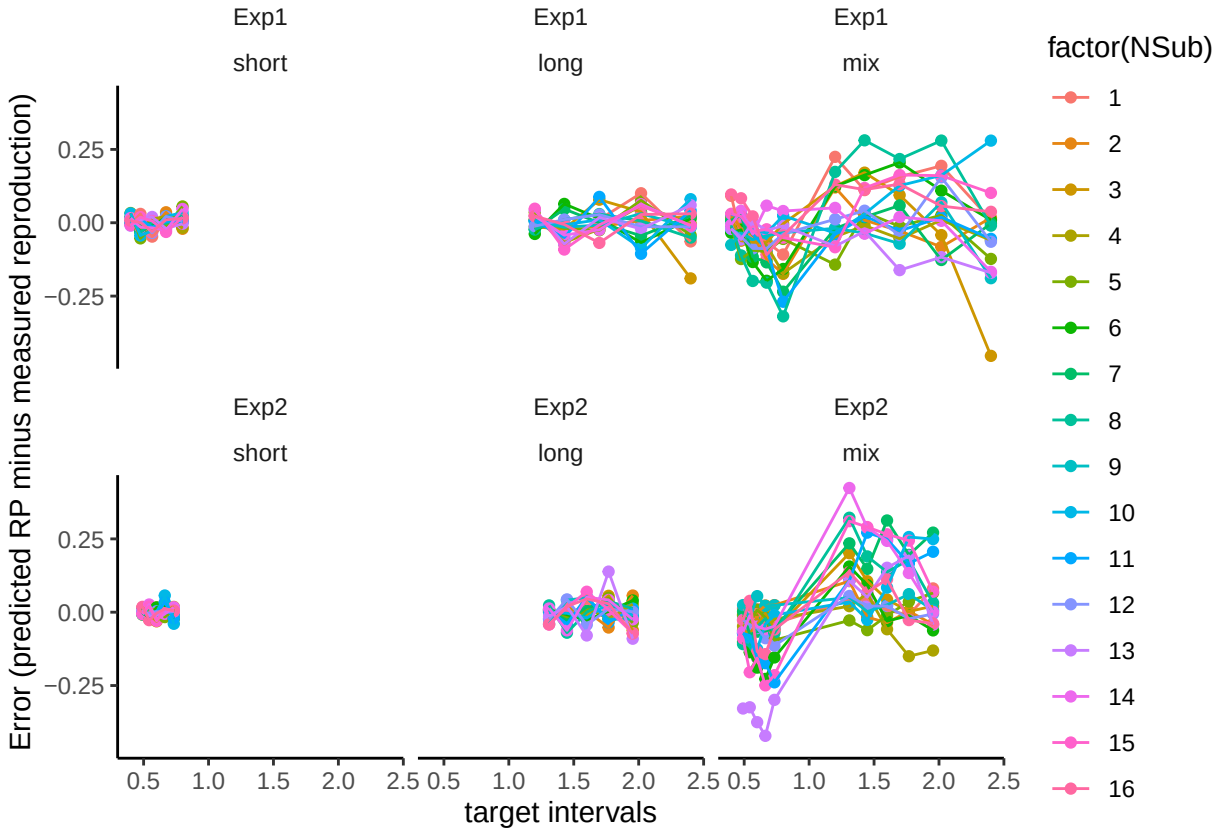
Prediction results (short blocks and long blocks)

```
predY <- group_by(PredY_Baseline, targetDur, Exp, NSub, group) %>%
  summarize(m_RP = mean(RP), n = n(), sd_RP = sd(RP)/ sqrt(n-1),m_predY = mean(predY), sd_predY = sd(pr
predY$m_rpErr = predY$m_predY - predY$m_RP
predY$m_relativeErr = predY$m_rpErr / predY$targetDur
predY
```

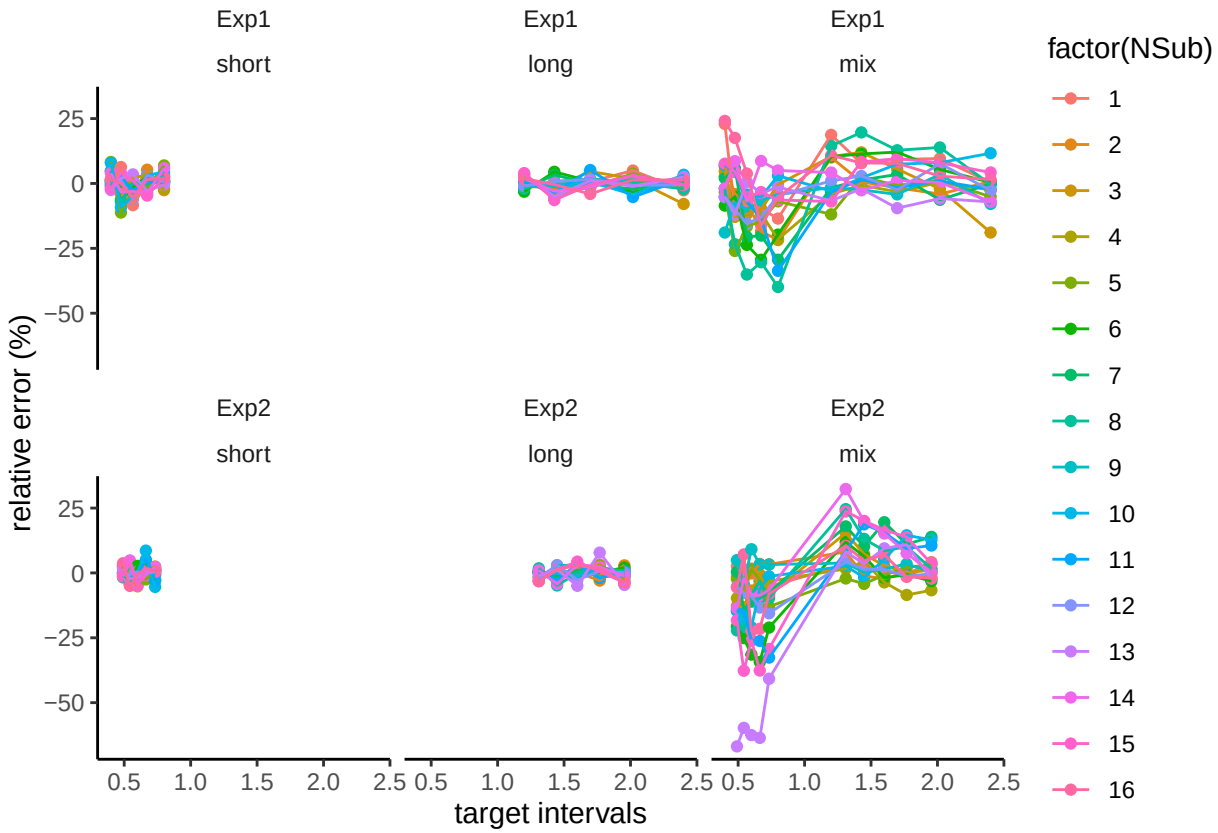
```
## # A tibble: 640 x 11
## # Groups:   targetDur, Exp, NSub [320]
##    targetDur Exp    NSub group  m_RP     n  sd_RP m_predY sd_predY  m_rpErr
##        <dbl> <chr> <dbl> <fct> <dbl> <int>  <dbl>   <dbl>    <dbl>    <dbl>
##  1       0.4 Exp1      1 short 0.531    28 0.0242   0.526 0.000220 -4.94e-3
##  2       0.4 Exp1      1 mix   0.434    14 0.0190   0.526 0.000475  9.18e-2
##  3       0.4 Exp1      2 short 0.486    28 0.0145   0.485 0.000172 -4.98e-4
##  4       0.4 Exp1      2 mix   0.459    14 0.0314   0.485 0.000287  2.61e-2
##  5       0.4 Exp1      3 short 0.489    29 0.0277   0.493 0.000231  3.67e-3
##  6       0.4 Exp1      3 mix   0.474    14 0.0308   0.493 0.000264  1.90e-2
##  7       0.4 Exp1      4 short 0.496    28 0.0221   0.501 0.000173  5.42e-3
##  8       0.4 Exp1      4 mix   0.490    15 0.0195   0.501 0.000390  1.12e-2
##  9       0.4 Exp1      5 short 0.497    29 0.0224   0.531 0.000247  3.32e-2
## 10       0.4 Exp1      5 mix   0.544    14 0.0549   0.530 0.000357 -1.34e-2
## # ... with 630 more rows, and 1 more variable: m_relativeErr <dbl>
```

The predication of short and long blocks

```
#plot Error in predication
  ggplot(data=predY, aes(x= targetDur, y=m_rpErr, group = factor(NSub), color= factor(NSub))) +
    geom_point()+geom_line()+
    labs(x="target intervals", y="Error (predicted RP minus measured reproduction)")+
  facet_wrap(Exp~group) +
  theme_new
```

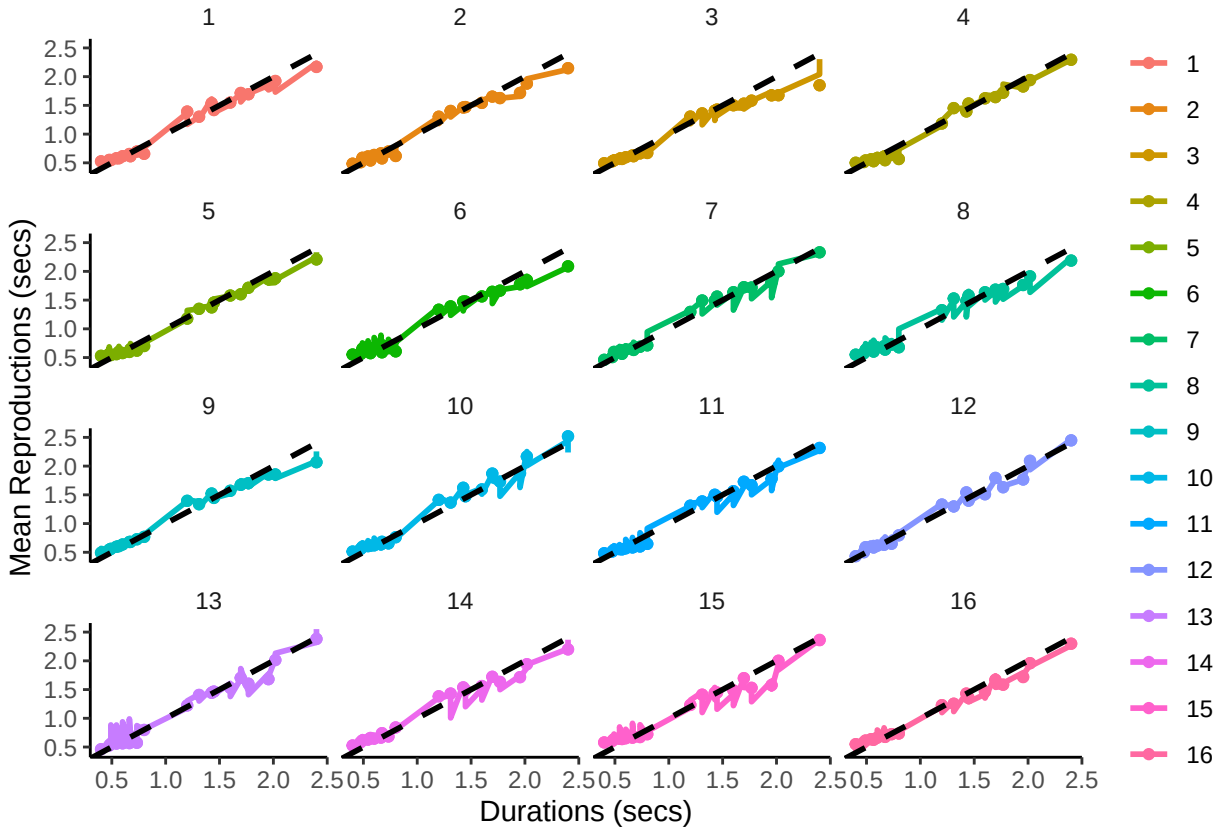



```
#plot relative Error for mixed blocks
 fig_rerr_model <-  ggplot(data=predY, aes(x= targetDur, y=m_relativeErr*100, group = factor(NSub), col
     geom_point()+ geom_line()+
    labs(x="target intervals", y="relative error (%)")+
  facet_wrap(Exp~group) +
  theme_new

fig_rerr_model
```




```
ggsave(file.path('figures','fig_rerr_model.png'), fig_rerr_model, width = 7, height = 5)
```

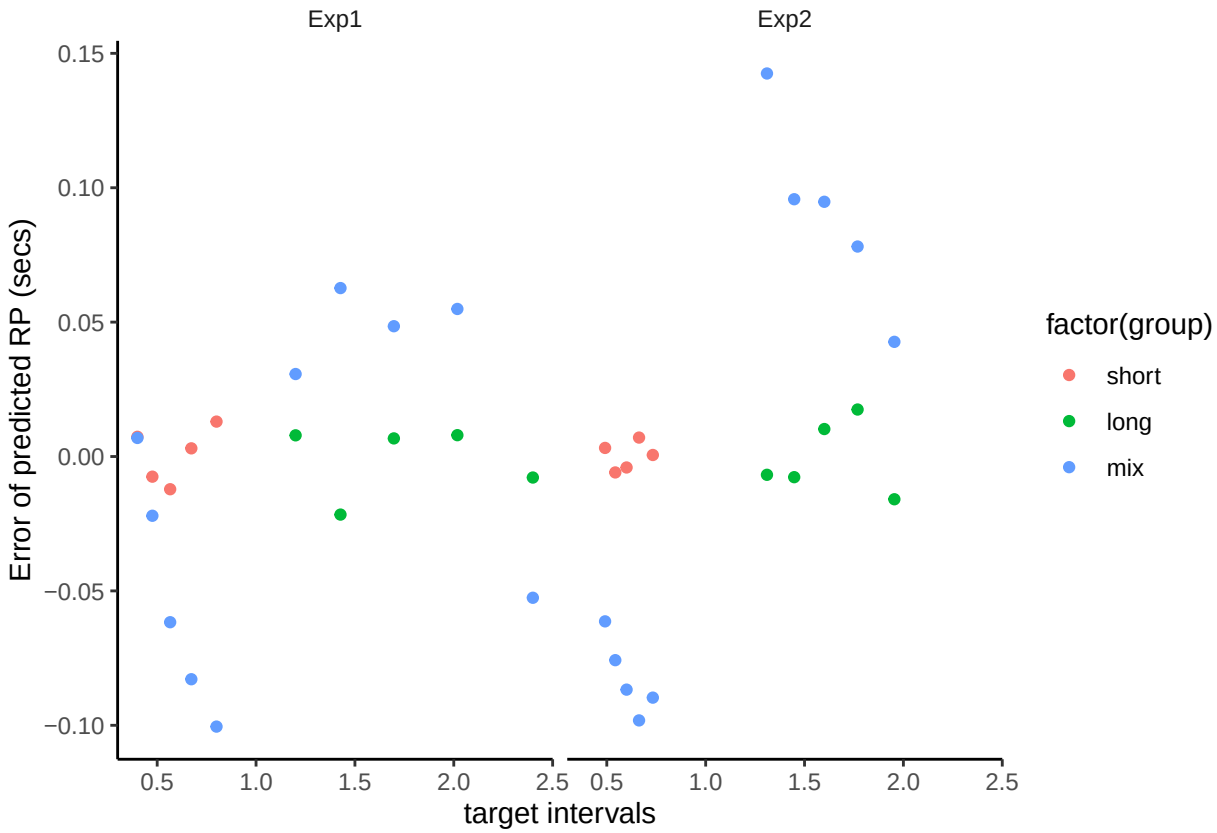
```
#plot the average of the predicted Y under the mixed condition
fig_mpredY = ggplot(predY) +
  geom_point(aes(targetDur, m_predY, group = factor(NSub), color = factor(NSub))) +
  geom_line(aes(targetDur, m_RP, group = factor(NSub), color = factor(NSub)),  size = 1) +
  #geom_errorbar(aes(ymin = m_m_predY-se_m_predY, ymax = m_m_predY + se_m_predY), width = 0.05) +
  geom_abline(slope = 1, linetype = 2, size = 1) + # add diagonal line
  facet_wrap(~Exp) +
  guides(color = guide_legend(title = element_blank())) + # remove legend title
  theme_classic() +
  theme(strip.background = element_blank()) +
  labs(x = "Durations (secs)", y = "Mean Reproductions (secs)", size =15) + theme(legend.position="bott
  facet_wrap(NSub~.) + theme_new

fig_mpredY
```



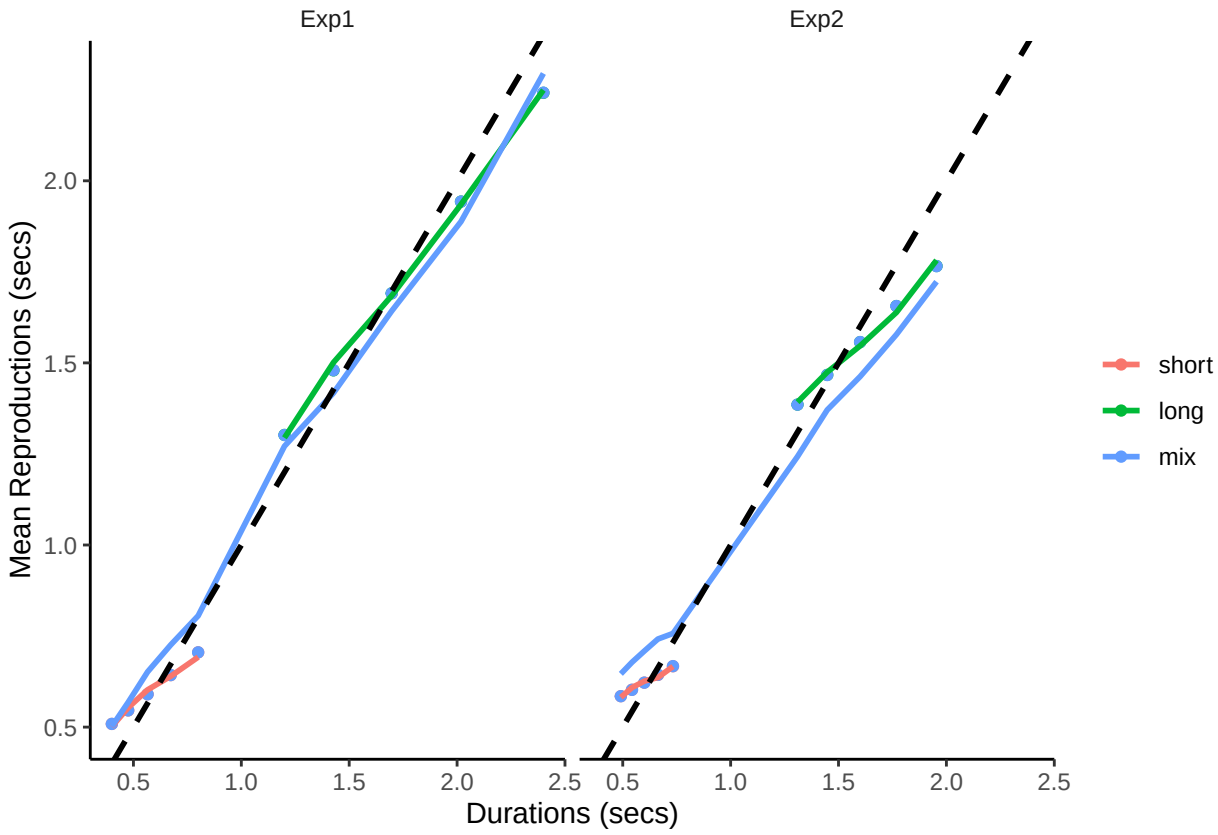

```
ggsave(file.path('figures','fig_mpredY.png'), fig_mpredY, width = 7, height = 5)
```

```
m_predY <- predY%>%
  group_by(targetDur, Exp, group) %>%
  summarize(
    n = n(),
    m_predY = mean(m_predY),
    m_RP = mean(m_RP)
  )
m_predY$m_rpErr =m_predY$m_predY-m_predY$m_RP
```

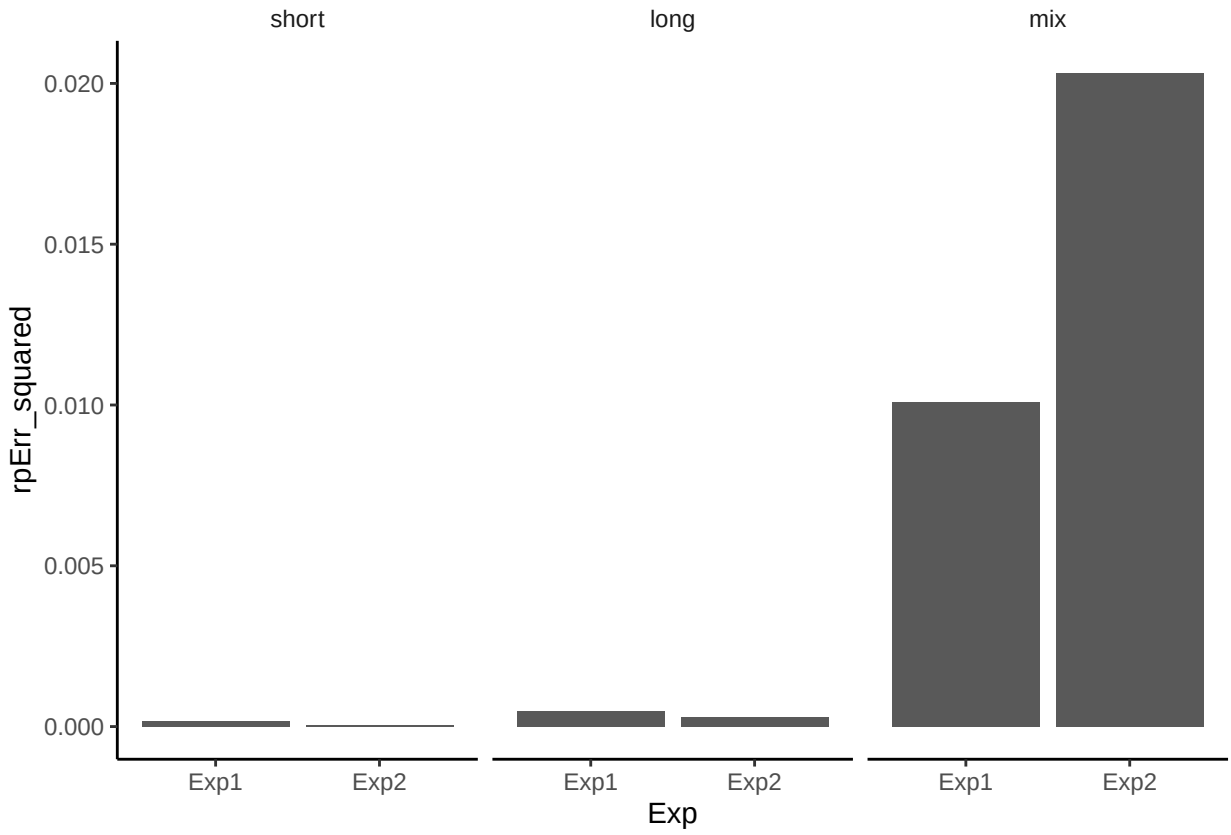
```
#plot Error in predication
  ggplot(data=m_predY, aes(x= targetDur, y=m_rpErr,
                           color = factor(group))) +
    geom_point()+  facet_wrap(~Exp) +
    labs(x="target intervals", y="Error of predicted RP (secs)")+ theme_new
```




```
#plot the average of the predicted Y under the mixed condition
fig_m_predY = ggplot(m_predY) +
  geom_point(aes(targetDur, m_predY, group = factor(group), color = factor(group))) +
  geom_line(aes(targetDur, m_RP, group = factor(group), color = factor(group)),  size = 1) +
  #geom_errorbar(aes(ymin = m_m_predY-se_m_predY, ymax = m_m_predY + se_m_predY), width = 0.05) +
  geom_abline(slope = 1, linetype = 2, size = 1) + # add diagonal line
  facet_wrap(~Exp) +
  guides(color = guide_legend(title = element_blank())) + # remove legend title
  theme_classic() +
  theme(strip.background = element_blank()) +
  labs(x = "Durations (secs)", y = "Mean Reproductions (secs)", size =15) + theme(legend.position="bott
fig_m_predY
```




```
m_predY$rpErr_squared <- m_predY$m_rpErr^2

fig_rpErr_model <- ggplot(m_predY, aes(x = Exp, y = rpErr_squared)) +
    geom_bar(stat = "identity",
             position = position_dodge()) +
    theme(legend.position="bottom")+
    facet_wrap(~group)+
  theme_new

ggsave(file.path('figures','fig_rpErr_model.png'), fig_rpErr_model, width = 7, height = 5)

fig_rpErr_model
```


short
long
mix
0.020
0.015
0.010
0.005
0.000
rpErr_squared
Exp1
Exp2
Exp1
Exp2
Exp1
Exp2
Exp