Untitled

Intro

This script uses data compiled by *analyseData.R*.

Load libraries

```r
library(lme4)
```

```
## Warning: package 'lme4' was built under R version 3.2.5
```

```
## Loading required package: Matrix
```

```
## Warning: package 'Matrix' was built under R version 3.2.5
```

```r
library(sjPlot)
```

```
## Warning: package 'sjPlot' was built under R version 3.2.5
```

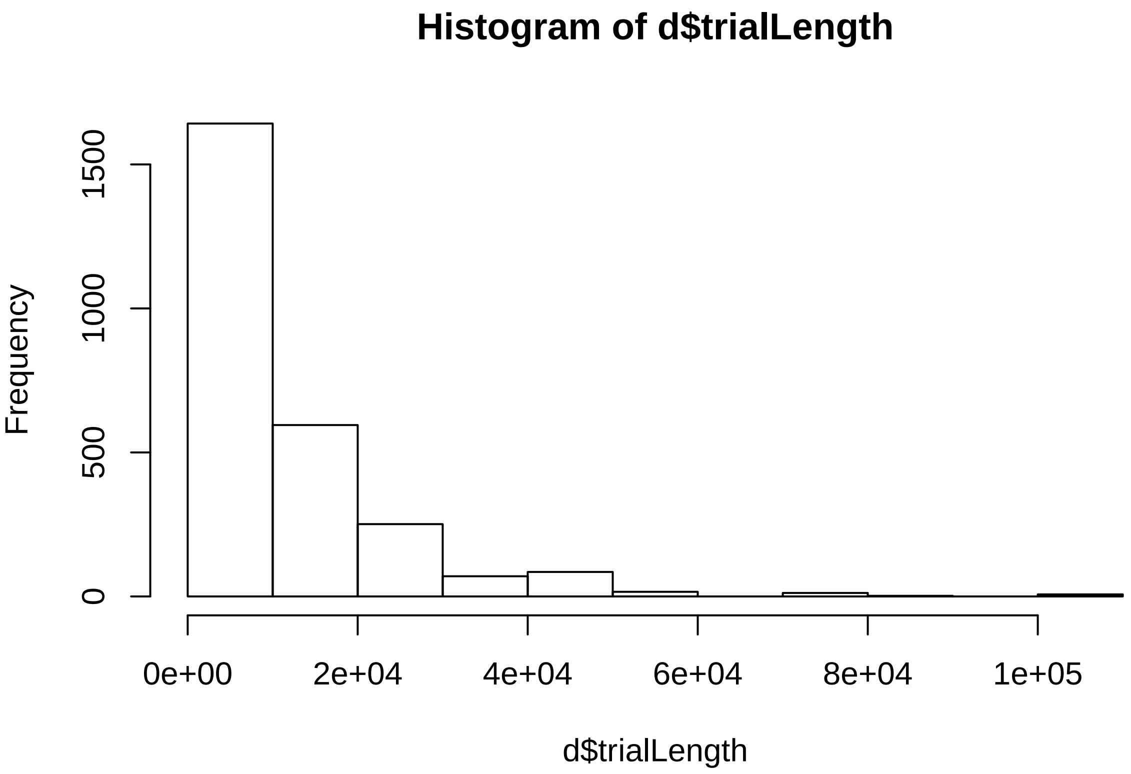
Load data

```r
d = read.csv("../../data/FinalSignalData.csv")
```

Descriptive stats

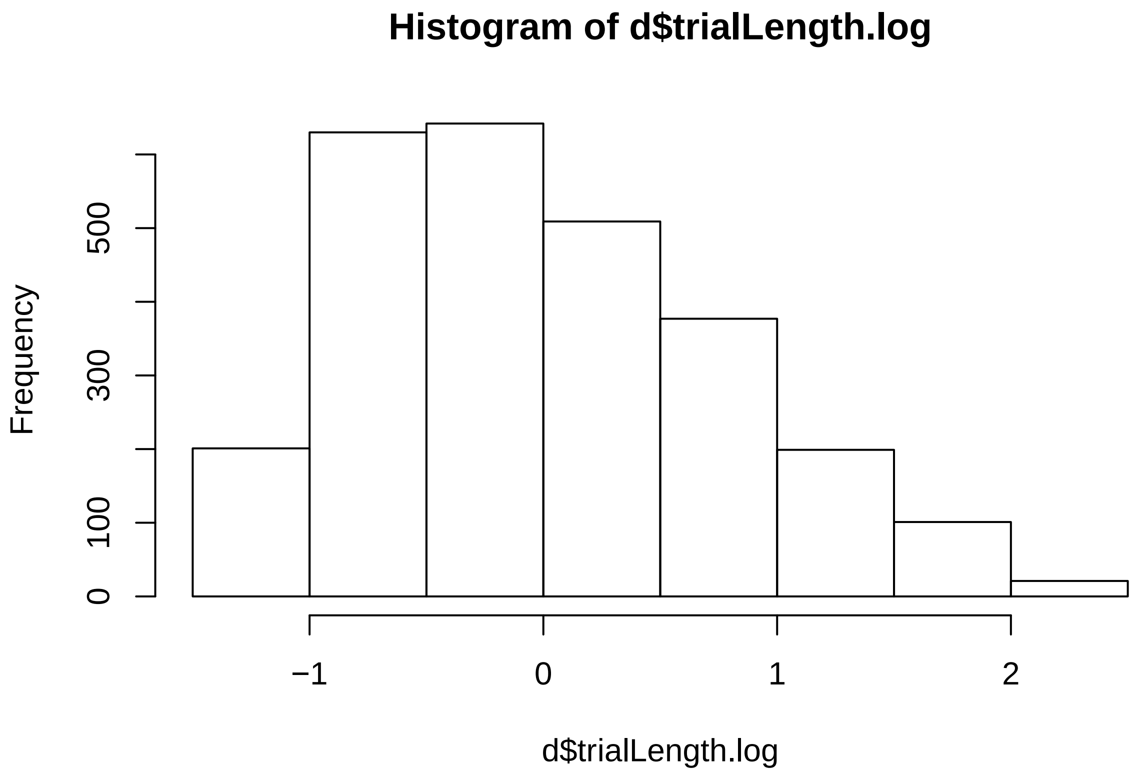
The distribution of trial times is very skewed:

```r
hist(d$trialLength)
```



So we transform it using a log transform, then center the data.

```
d$trialLength.log = log(d$trialLength)
meanLogTrialLength = mean(d$trialLength.log)
d$trialLength.log = d$trialLength.log - meanLogTrialLength
hist(d$trialLength.log)
```



Here's a graph showing the distribution of trial lengths by conditions:

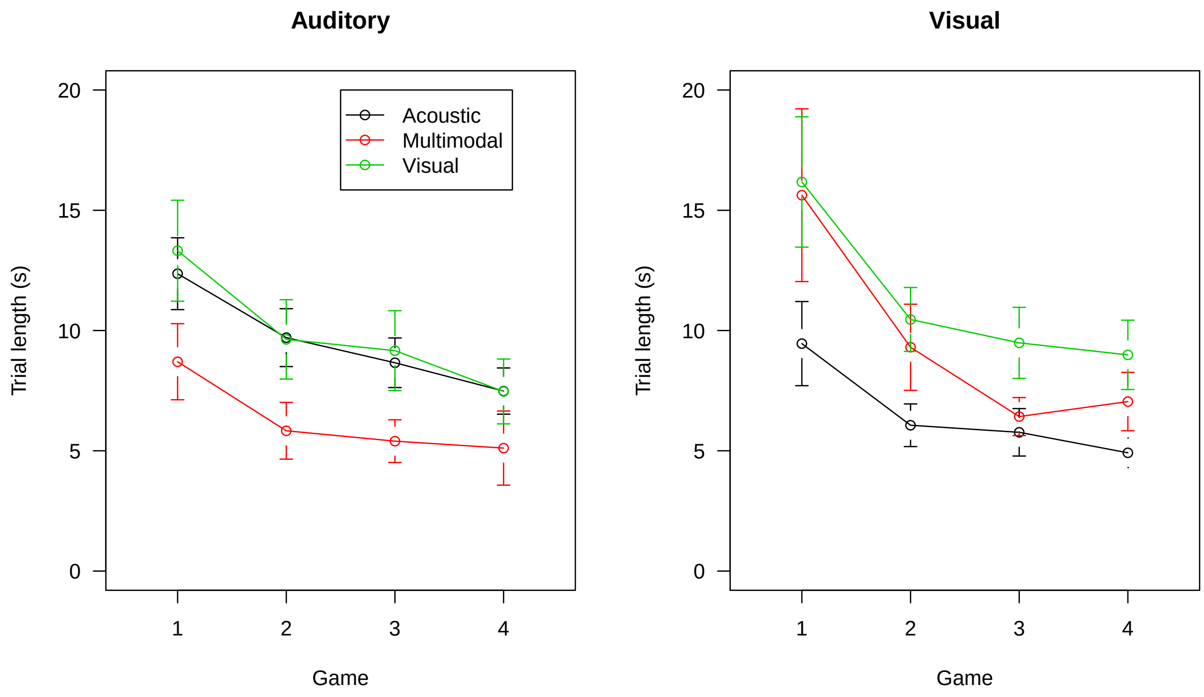


Figure 1: The efficiency of trials in different conditions

Mixed models

Make a series of models with random effects for dyad, director and item.

```
m0 = lmer(trialLength ~ 1 +
            (1|dyadNumber) + (1|playerId) + (1|itemId),
          data=d)
m1 = lmer(trialLength ~ 1 + modalityCondition +
            (1|dyadNumber) + (1|playerId) + (1|itemId),
          data=d)
m2 = lmer(trialLength ~ 1 + modalityCondition + condition +
            (1|dyadNumber) + (1|playerId) + (1|itemId),
          data=d)
m3 = lmer(trialLength ~ 1 + modalityCondition + condition + game +
            (1|dyadNumber) + (1|playerId) + (1|itemId),
          data=d)
m4 = lmer(trialLength ~ 1 + modalityCondition * condition + game +
            (1|dyadNumber) + (1|playerId) + (1|itemId),
          data=d)
m5 = lmer(trialLength ~ 1 + (modalityCondition * condition) + game + (game:condition) +
            (1|dyadNumber) + (1|playerId) + (1|itemId),
          data=d)
m6 = lmer(trialLength ~ 1 + modalityCondition * condition * game +
            (1|dyadNumber) + (1|playerId),
          data=d)
```

Compare the fit of the models:

```
anova(m0,m1,m2,m3,m4,m5,m6)
```

```
## refitting model(s) with ML (instead of REML)

## Data: d
## Models:
## m0: trialLength ~ 1 + (1 | dyadNumber) + (1 | playerId) + (1 | itemId)
## m1: trialLength ~ 1 + modalityCondition + (1 | dyadNumber) + (1 |
## m1:     playerId) + (1 | itemId)
## m2: trialLength ~ 1 + modalityCondition + condition + (1 | dyadNumber) +
## m2:     (1 | playerId) + (1 | itemId)
## m3: trialLength ~ 1 + modalityCondition + condition + game + (1 |
## m3:     dyadNumber) + (1 | playerId) + (1 | itemId)
## m4: trialLength ~ 1 + modalityCondition * condition + game + (1 |
## m4:     dyadNumber) + (1 | playerId) + (1 | itemId)
## m5: trialLength ~ 1 + (modalityCondition * condition) + game + (game:condition) +
## m5:     (1 | dyadNumber) + (1 | playerId) + (1 | itemId)
## m6: trialLength ~ 1 + modalityCondition * condition * game + (1 |
## m6:     dyadNumber) + (1 | playerId)
##    Df   AIC   BIC logLik deviance    Chisq Chi Df Pr(>Chisq)
## m0  5 57488 57517 -28739    57478
## m1  7 57487 57528 -28737    57473   4.7477      2    0.09312 .
## m2  8 57485 57533 -28735    57469   3.6752      1    0.05523 .
## m3  9 57223 57276 -28603    57205 264.1137      1  < 2.2e-16 ***
## m4 11 57141 57206 -28560    57119  86.0349      2  < 2.2e-16 ***
## m5 12 57100 57171 -28538    57076  43.2921      1  4.715e-11 ***
## m6 15 57184 57272 -28577    57154   0.0000      3    1.00000
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
finalModel = m6
```

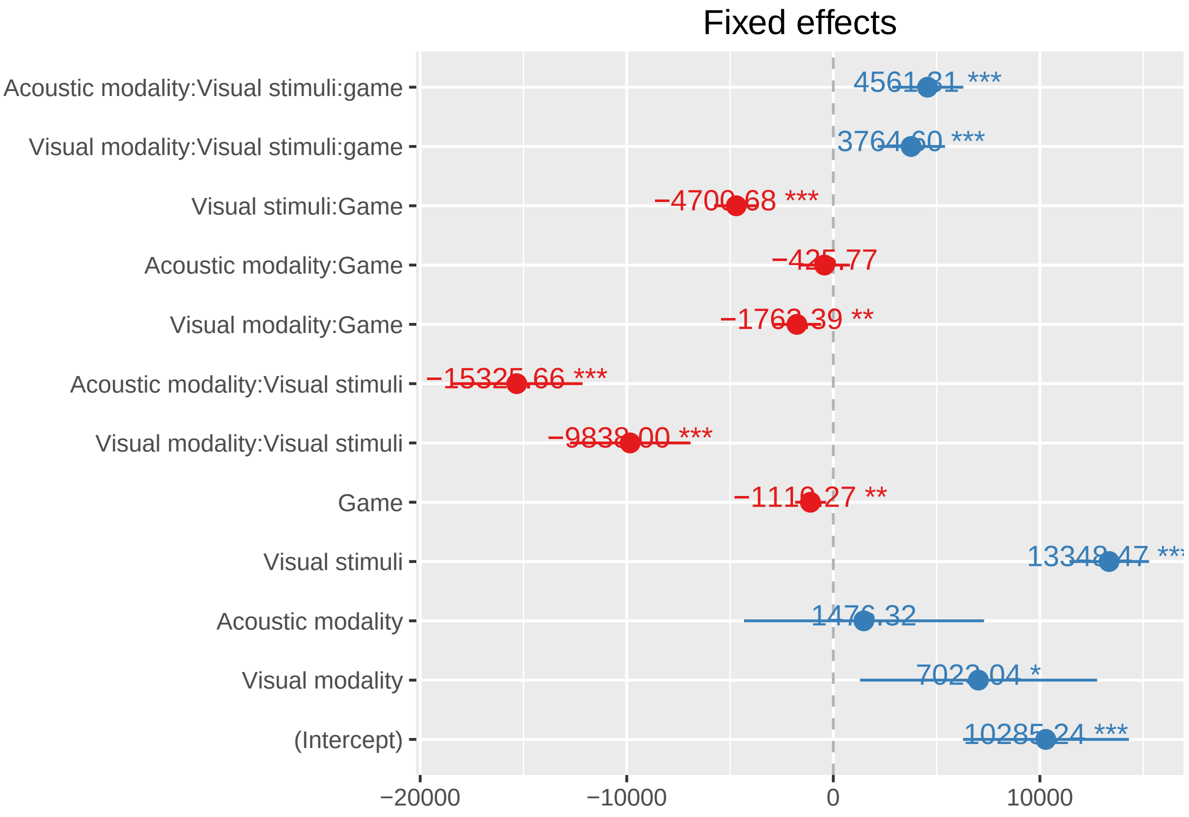
```
feLabels = matrix(c(
"(Intercept)"              ,"Intercept"      ,
"modalityConditionvisual" ,"Visual modality",
"modalityConditionvocal"  , "Acoustic modality",
"conditionVisual" , "Visual stimuli",
"game"              , "Game",
"modalityConditionvisual:conditionVisual"  , "Visual modality:Visual stimuli",
"modalityConditionvocal:conditionVisual" , "Acoustic modality:Visual stimuli",
"modalityConditionvisual:game"    , "Visual modality:Game",
"modalityConditionvocal:game"     , "Acoustic modality:Game",
"conditionVisual:game"             , "Visual stimuli:Game",
"modalityConditionvisual:conditionVisual:game", "Visual modality:Visual stimuli:game",
"modalityConditionvocal:conditionVisual:game", "Acoustic modality:Visual stimuli:game"
), ncol=2, byrow = T)

feLabels2 = as.vector(feLabels[match(names(fixef(m6)),feLabels[,1]),2])
```

Plot the strength of the fixed effects:

```
sjp.lmer(m6, 'fe',
         show.intercept = T,
         sort.est=NULL,
         axis.labels = feLabels2[2:12])
```

```
## Computing p-values via Wald-statistics approximation (treating t as Wald z).
```


Fixed effects
Acoustic modality:Visual stimuli:game
Visual modality:Visual stimuli:game
Visual stimuli:Game
Acoustic modality:Game
Visual modality:Game
Acoustic modality:Visual stimuli
Visual modality:Visual stimuli
Game
Visual stimuli
Acoustic modality
Visual modality
(Intercept)
4561.81 ***
3764.60 ***
−4700.68 ***
−1762.39 **
−15325.66 ***
−9838.00 ***
−1110.27 **
13348.47 ***
7022.04 *
10285.24 ***