Colour experiment

```
library(ggplot2)
library(lme4)
```

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

```
##
## Attaching package: 'lme4'
```

```
## The following object is masked from 'package:stats':
##
##     sigma
```

Load data

```
variants = read.csv('../data/processedData/variants_summary.csv', stringsAsFactors = F)
```

LMER models

```
m0 = lmer(log(1 + freq_week_4_withinColour) ~
            1
          + (1 | colourName),
          data=variants)
m1 = lmer(log(1 + freq_week_4_withinColour) ~
            (indexical) +
            + (1 | colourName),
          data=variants)
m2 = lmer(log(1 + freq_week_4_withinColour) ~
            (indexical) +
            (Teach)
          + (1 | colourName),
          data=variants)

m3 = lmer(log(1 + freq_week_4_withinColour) ~
            (indexical) +
            (Teach) + (TryMarked)
          + (1 | colourName),
          data=variants)

m4 = lmer(log(1 + freq_week_4_withinColour) ~
            (indexical) +
            (Teach) * (TryMarked)
          + (1 | colourName),
          data=variants)

m5 = lmer(log(1 + freq_week_4_withinColour) ~
            (indexical) +
            (Teach) * (TryMarked) +
```

```
            log(freq_week_1+1)
          + (1 | colourName),
          data=variants)
```

Results

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

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

```
## Data: variants
## Models:
## m0: log(1 + freq_week_4_withinColour) ~ 1 + (1 | colourName)
## m1: log(1 + freq_week_4_withinColour) ~ (indexical) + +(1 | colourName)
## m2: log(1 + freq_week_4_withinColour) ~ (indexical) + (Teach) + (1 |
## m2:     colourName)
## m3: log(1 + freq_week_4_withinColour) ~ (indexical) + (Teach) + (TryMarked) +
## m3:     (1 | colourName)
## m4: log(1 + freq_week_4_withinColour) ~ (indexical) + (Teach) * (TryMarked) +
## m4:     (1 | colourName)
## m5: log(1 + freq_week_4_withinColour) ~ (indexical) + (Teach) * (TryMarked) +
## m5:     log(freq_week_1 + 1) + (1 | colourName)
##    Df     AIC     BIC logLik deviance   Chisq Chi Df Pr(>Chisq)
## m0  3 -139.04 -131.57 72.519  -145.04
## m1  5 -139.93 -127.49 74.967  -149.93  4.8971      2    0.08642 .
## m2  6 -139.07 -124.14 75.537  -151.07  1.1396      1    0.28573
## m3  7 -152.99 -135.57 83.495  -166.99 15.9169      1  6.618e-05 ***
## m4  8 -151.53 -131.62 83.767  -167.53  0.5426      1    0.46136
## m5  9 -166.59 -144.20 92.297  -184.59 17.0603      1  3.621e-05 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

There was a significant main effect of try marking (beta = -0.012 , std.err = 0.014 , Wald t = -0.87 ; log likelihood difference = 8 , df = 1 , Chi Squared = 15.92 , p = 6.6e-05).

There was a significant main effect of frequency in week 1 (beta = 0.13 , std.err = 0.031 , Wald t = 4.2 ; log likelihood difference = 8.5 , df = 1 , Chi Squared = 17.06 , p = 3.6e-05).

There was a marginal main effect of indexicality (beta = 0.032 , std.err = 0.039 , Wald t = 0.83 ; log likelihood difference = 2.4 , df = 2 , Chi Squared = 4.9 , p = 0.086).