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)
```

```
variants$Teach = variants$Teach >1
variants$TryMarked = variants$TryMarked > 1
```

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 -119.81 -112.03 62.906  -125.81
## m1  5 -129.41 -116.44 69.706  -139.41 13.5996      2   0.001114 **
## m2  6 -127.62 -112.05 69.812  -139.62  0.2128      1   0.644589
## m3  7 -126.91 -108.74 70.455  -140.91  1.2851      1   0.256945
## m4  8 -124.92 -104.16 70.459  -140.92  0.0075      1   0.930856
## m5  9 -153.12 -129.77 85.561  -171.12 30.2044      1  3.888e-08 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

There was no significant main effect of try marking (beta = 0.0018 , std.err = 0.025 , Wald t = 0.072 ; log likelihood difference = 0.64 , df = 1 , Chi Squared = 1.29 , p = 0.26).

There was a significant main effect of frequency in week 1 (beta = 0.12 , std.err = 0.021 , Wald t = 5.7 ; log likelihood difference = 15 , df = 1 , Chi Squared = 30.2 , p = 3.9e-08).

There was a significant main effect of indexicality (beta = 0.0083 , std.err = 0.04 , Wald t = 0.21 ; log likelihood difference = 6.8 , df = 2 , Chi Squared = 13.6 , p = 0.0011).

```
#sjp.lmer(m5,'fe')
```