

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')
```