SDsanitycheck

2025-06-15

This file contains analyses (not on the entire data set) that would confirm the phenomenon of stress deafness (by comparing voicing to stress). There is not really enough data to run these.

```
table = read.delim ("data/SDsanitycheck.txt", stringsAsFactors=TRUE)
options(width = 200)
head(table)
```

```
##   participant training LexTale trialIndex item correct      Xtype contrast    pair response accuracy
## 1     p929263   stress   71.25          1  i44       A irrelevant  voicing   faces        B        0
## 2     p929263   stress   71.25          2   i5       A    extreme   stress extract        A        1
## 3     p929263   stress   71.25          3  i48       A irrelevant  voicing    dose        B        0
## 4     p929263   stress   71.25          4   i2       B    extreme   stress  refund        B        1
## 5     p929263   stress   71.25          5  i46       A irrelevant  voicing   faces        A        1
## 6     p929263   stress   71.25          6  i47       B irrelevant  voicing    dose        A        0
```

```
tail(table)
```

```
##     participant training LexTale trialIndex item correct      Xtype contrast    pair response accura
## 363     p162417   stress   76.25         41  i33       A irrelevant  voicing  device        B
## 364     p162417   stress   76.25         42  i24       A  ambiguous   stress conduct        B
## 365     p162417   stress   76.25         43  i42       B irrelevant  voicing  device        A
## 366     p162417   stress   76.25         44  i22       B  ambiguous   stress conduct        B
## 367     p162417   stress   76.25         45  i20       A  ambiguous   stress extract        B
## 368     p162417   stress   76.25         48   i8       A    extreme   stress extract        A
```

set contrast for contrast type Voicing is expected to be easiest, thus coded positively:

```
levels (table$contrast)
```

```
## [1] "stress"  "voicing"
```

```
contrast <- cbind (c(-0.5, 0.5))
colnames (contrast) <- c("-S+V")
contrasts (table$contrast) <- contrast
contrasts (table$contrast)
```

```
##         -S+V
## stress  -0.5
## voicing  0.5
```

Is accuracy in general worse on stress contrast than on voicing?

```
library(lme4)
```

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

```
contrastModel = glmer(formula = accuracy ~ contrast + (contrast | participant) + (1 | item), data = tabl
```

```
## boundary (singular) fit: see help('isSingular')
```

```
summary(contrastModel)
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace Approximation) ['glmerMod']
##  Family: binomial  ( logit )
## Formula: accuracy ~ contrast + (contrast | participant) + (1 | item)
##    Data: table
##
##      AIC      BIC   logLik deviance df.resid
##    471.2    494.6   -229.6    459.2      362
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.7477 -1.1191  0.5747  0.7046  1.0919
##
## Random effects:
##  Groups      Name         Variance Std.Dev. Corr
##  item        (Intercept)  0.2243   0.4736
##  participant (Intercept)  0.1852   0.4304
##              contrast-S+V 0.3165   0.5626   1.00
## Number of obs: 368, groups:  item, 40; participant, 10
##
## Fixed effects:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    0.8175     0.2028   4.031 5.55e-05 ***
## contrast-S+V   0.5499     0.3443   1.597     0.11
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr)
## contrst-S+V 0.552
## optimizer (Nelder_Mead) convergence code: 0 (OK)
## boundary (singular) fit: see help('isSingular')
```

adding a contrast for training

This is post-hoc: we've seen those trained in the stress-ignoring lesson more so have the expected voicing over stress advantage, thus "nonStress" is coded positively and "stress" training is coded negatively.

```
levels (table$training)
```

```
## [1] "nonStress" "stress"
```

```
traincontrast <- cbind (c(0.5, -0.5))
colnames (traincontrast) <- c("-stress+nonStress")
contrasts (table$training) <- traincontrast
contrasts (table$training)
```

```
##           -stress+nonStress
## nonStress               0.5
## stress                 -0.5
```

```
library(lme4)
contrastModel = glmer(formula = accuracy ~ contrast * training + (contrast | participant) + (training |
```

```
## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, : Model failed to conve
```

```r
summary(contrastModel)
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace Approximation) ['glmerMod']
##  Family: binomial  ( logit )
## Formula: accuracy ~ contrast * training + (contrast | participant) + (training |      item)
##    Data: table
##
##      AIC      BIC   logLik deviance df.resid
##    467.0    506.1   -223.5    447.0      358
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.9442 -1.0857  0.4654  0.7564  1.1063
##
## Random effects:
##  Groups      Name                        Variance  Std.Dev. Corr
##  item        (Intercept)                 0.3345241 0.57838
##              training-stress+nonStress 0.3945165 0.62811  1.00
##  participant (Intercept)                 0.0461587 0.21485
##              contrast-S+V                0.0004719 0.02172  -1.00
## Number of obs: 368, groups:  item, 40; participant, 10
##
## Fixed effects:
##                                         Estimate Std. Error z value Pr(>|z|)
## (Intercept)                               0.8847     0.1826   4.845 1.27e-06 ***
## contrast-S+V                              0.6332     0.3257   1.944  0.05184 .
## training-stress+nonStress                 0.9075     0.3321   2.733  0.00628 **
## contrast-S+V:training-stress+nonStress    1.5233     0.5710   2.668  0.00764 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) cn-S+V trn-+S
## contrst-S+V 0.310
## trnng-str+S 0.402  0.237
## cnt-S+V:-+S 0.242  0.430  0.343
## optimizer (Nelder_Mead) convergence code: 0 (OK)
## Model failed to converge with max|grad| = 0.00271705 (tol = 0.002, component 1)
```

This converges; interaction p-value isn't valid when removing slopes for training/contrast so won't simplify