PowerSD

2025-06-12

```
table = read.delim ("data/StressConCleaned.txt", stringsAsFactors=TRUE)
```

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

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

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

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

```
library(simr)
```

```
## Loading required package: lme4
```

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

```
##
## Attaching package: 'simr'
```

```
## The following object is masked from 'package:lme4':
##
##     getData
```

```
minModel = glmer(formula = accuracy ~ training + (1 | participant) + (training | item), data = table, fa
summary(minModel)
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
## Formula: accuracy ~ training + (1 | participant) + (training | item)
##    Data: table
##
##      AIC      BIC   logLik deviance df.resid
##    300.4    320.9   -144.2    288.4      217
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -1.8036 -1.0353  0.5133  0.7621  1.1428
##
## Random effects:
##  Groups      Name                        Variance Std.Dev. Corr
##  item        (Intercept)                 0.39887  0.6316
##              training-nonStress+stress   0.85463  0.9245   -1.00
##  participant (Intercept)                 0.04483  0.2117
```

```
## Number of obs: 223, groups:  item, 24; participant, 10
##
## Fixed effects:
##                            Estimate Std. Error z value Pr(>|z|)
## (Intercept)                  0.5877     0.2104   2.794  0.00521 **
## training-nonStress+stress  -0.1802     0.3819  -0.472  0.63699
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr)
## trnng-nnSt+ -0.375
```

```r
fixef(minModel)["training-nonStress+stress"] = .30
```

```r
simrOptions(progress = FALSE)

set.seed(1334439)
powerSim(minModel, nsim=300)
```

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```
## Power for predictor 'training', (95% confidence interval):
##       12.67% ( 9.12, 16.97)
##
## Test: Likelihood ratio
##
## Based on 300 simulations, (19 warnings, 0 errors)
## alpha = 0.05, nrow = 223
##
## Time elapsed: 0 h 1 m 10 s
```

What would power be for 30 participants?

```
model2 <- extend(minModel, along="participant", n=30)

powerSim(model2, nsim=300)
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## Power for predictor 'training', (95% confidence interval):
##       20.33% (15.93, 25.34)
##
## Test: Likelihood ratio
##
## Based on 300 simulations, (15 warnings, 0 errors)
## alpha = 0.05, nrow = 669
##
## Time elapsed: 0 h 2 m 30 s
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