

# mci\_style\_neu\_expert\_rating\_analysis.R

2024-03-01

```
## EXPERT RATING DATA ANALYSES ##  
# Script reads-in context story rating data, provides descriptive data and  
# computes statistical analyses.  
# To evaluate the stimulus material, four experts rated 50 % of the stories  
# each regarding their For quality control, "fairytaleness" on a 5-point  
# Likert style. We expected fairy-tale context stories to receive higher  
# ratings than the unmarked versions. Stories with outlier ratings were  
# slightly adapted for the main study to increase discriminability.
```

```
## Setup ## -----  
# Encoding  
Sys.setlocale("LC_ALL", "de_DE.UTF-8")
```

```
## [1] "de_DE.UTF-8/de_DE.UTF-8/de_DE.UTF-8/C/de_DE.UTF-8/en_US.UTF-8"
```

```
# Load packages  
library(MASS)          # Version 7.3-51.6  
library(lme4)          # Version 1.1-23  
library(lmerTest)      # Version 3.1-2  
library(afex)          # Version 0.27-2  
library(emmeans)       # Version 1.4.8  
library(tidyverse)     # Version 1.3.0
```

```
## Read-in raw files ## -----  
# Read in rating data file  
d <- read.csv2(here::here("ratings", "raw", "expert_ratings",  
                          "expert_ratings_updated.csv"))  
# Add item numbers  
## Read in raw file
```

```

story_items <- read.csv2(here::here("ratings", "raw", "stimuli", "stimuli.csv"))
## add version and context number
d$context_version <- NA
d$context_number <- NA
for(i in 1:nrow(d)) {
  if(d$Story[i] %in% story_items$fairytale) {
    d$context_version[i] <- "fairytale"
    d$context_number[i] <-
      story_items$context_no[story_items$fairytale==d$Story[i]]
  } else if (d$Story[i] %in% story_items$unmarked) {
    d$context_version[i] <- "unmarked"
    d$context_number[i] <-
      story_items$context_no[story_items$unmarked==d$Story[i]]
  } else {
    print("Error: Non-matching story")
  }
}
# table(is.na(d$context_version)); table(is.na(d$context_number))
# table(d$context_number); table(d$context_version)

# Convert to long df
df<- d[rep(row.names(d), each = 4), ] %>%
  select(context_version, context_number)
df$rating <- rep(seq(1:4), times=100)
row.names(df) <- NULL
df$rating <- NA
d <- d %>% arrange(context_number, context_version)
df <- df %>% arrange(context_number, context_version)
for(i in 1:nrow(d)){
  if(!is.na(d$def.not[i])){r <- rep(1, times=d$def.not[i])} else {r <- c()}
  if(!is.na(d$prob.no[i])){
    r <- c(r,rep(2, times=d$prob.no[i]))}
  if(!is.na(d$undecided[i])){
    r <- c(r,rep(3, times=d$undecided[i]))}
  if(!is.na(d$prob.yes[i])){
    r <- c(r,rep(4, times=d$prob.yes[i]))}
  if(!is.na(d$def.yes[i])){
    r <- c(r,rep(5, times=d$def.yes[i]))}
}

```

```
df$rating[df$context_number==d$context_number[i] &
          df$context_version==d$context_version[i]] <- r
}
```

## ## DESCRIPTIVES OF RATING DATA

*# Descriptives: All context stories*

```
df %>% group_by(context_version) %>%
  summarise(mean=mean(rating),
            sd=sd(rating),
            min=min(rating),
            max=max(rating))
```

```
## # A tibble: 2 x 5
##   context_version mean    sd  min  max
##   <chr>          <dbl> <dbl> <dbl> <dbl>
## 1 fairytale      4.24 0.951    1    5
## 2 unmarked      2.06 1.06     1    5
```

*# Descriptives: Separately for all context stories*

```
df %>% group_by(context_number, context_version) %>%
  summarise(mean=mean(rating),
            sd=sd(rating),
            min=min(rating),
            max=max(rating))
```

## 'summarise()' has grouped output by 'context\_number'. You can override using the  
## '.groups' argument.

```
## # A tibble: 100 x 6
## # Groups:   context_number [50]
##   context_number context_version mean    sd  min  max
##   <int> <chr>          <dbl> <dbl> <dbl> <dbl>
## 1         1 fairytale      4.5 0.577    4    5
## 2         1 unmarked      1.75 0.957    1    3
## 3         2 fairytale      5    0      5    5
## 4         2 unmarked      1.5 1      1    3
```

```
## 5          3 fairytale      4.5 0.577    4    5
## 6          3 unmarked      3    0.816    2    4
## 7          4 fairytale      5    0        5    5
## 8          4 unmarked      1.25 0.5      1    2
## 9          5 fairytale      4.5 0.577    4    5
## 10         5 unmarked      1.5 0.577    1    2
## # i 90 more rows
```

## ## MIXED MODEL ANALYSES

### # Preparation

```
df$style <- factor(df$context_version, levels=c("unmarked", "fairytale"))
t(contrasts.style <- t(cbind(c("unmarked" = -1, "fairytale" = 1))))
```

```
##          [,1]
## unmarked  -1
## fairytale   1
```

```
contrasts(df$style) <- ginv(contrasts.style)
df$rating <- scale(df$rating, center=T, scale=F)
df$context_number <- factor(df$context_number)
control_params <- lmerControl(calc.derivs = FALSE,
                              optimizer = "bobyqa",
                              optCtrl = list(maxfun = 2e5))
```

### # LMM for fairytaleness-rating

```
mod_rating <- lmer_alt(
  rating ~ style + (style||context_number),
  data = df, control = control_params)
```

### #summary(mod\_rating)

```
anova(mod_rating)
```

```
## Type III Analysis of Variance Table with Satterthwaite's method
##      Sum Sq Mean Sq NumDF DenDF F value    Pr(>F)
## style 90.624  90.624     1    49  165.27 < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```