Experiment 4: Ratings Analyses

2022-08-16

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Setup	
• Variable names:	
 Experiment: exp4 Type * d = data * m = model * est = log odds estimate from model * OR = odds ratio converted from est Analysis * Lik = likability ratings * Acc = accomplishment ratings * Imp = importance ratings 	
<pre>exp4_d <- read.csv("/data/exp4_data.csv",</pre>	
<pre>## 'data.frame': 8771 obs. of 10 variables: ## \$ Participant : Factor w/ 1253 levels "Exp4_P1", "Exp4_P10",: 520 520 520 520 520 520 ## \$ Condition : Factor w/ 3 levels "first", "full",: 1 1 1 1 1 1 1 1 1 1</pre>) 520 1143 114

\$ Item : Factor w/ 63 levels "Ashley Cook",..: 1 18 21 22 25 28 50 5 7 15 ... ## \$ Male : int 0 1 0 0 1 1 1 1 1 0 ...

\$ GenderRating: num 6.24 2.61 6.82 5.34 1.28 4.39 3.87 5.22 1.24 5.86 ...

```
## $ Female : int 1 0 1 1 0 0 0 0 0 1 ...
## $ Other : int 0 0 0 0 0 0 0 0 0 0 ...
## $ Likeable : int 2 1 3 2 4 3 3 3 2 4 ...
## $ Accomplished: int 1 2 1 4 2 2 2 5 3 3 ...
## $ Important : int 2 1 5 5 1 4 3 3 2 2 ...
```

Center gender rating for names: Original scale from 1 to 7, with 1 as most masculine and 7 as most feminine. Mean-centered with higher still as more feminine.

Set contrasts for name conditions, now weighted to account for uneven sample sizes. This uses Scott Fraundorf's function for weighted contrasts. (The psycholing package version doesn't support doing 2v1 comparisons, only 1v1.) Condition1 is Last vs First+Full. Condition2 is First vs Full.

```
source("centerfactor.R")
contrasts(exp4_d$Condition) <- centerfactor(
  exp4_d$Condition, c("last","first"))
contrasts(exp4_d$Condition)</pre>
```

```
## [,1] [,2]
## first 0.3312051 -0.497605746
## full 0.3312051 0.502394254
## last -0.6687949 0.002394254
```

Flip ratings from 1=most likeable/accomplished/important to 7=most L/A/I, to make interpreting models easier, then mean-center.

```
exp4_d %<>% mutate(
   LikeableFlip = recode(Likeable,
        '1'=7, '2'=6, '3'=5, '4'=4, '5'=3, '6'=2, '7'=1),
AccomplishedFlip = recode(Accomplished,
        '1'=7, '2'=6, '3'=5, '4'=4, '5'=3, '6'=2, '7'=1),
ImportantFlip = recode(Important,
        '1'=7, '2'=6, '3'=5, '4'=4, '5'=3, '6'=2, '7'=1),
LikeableCentered = scale(
    LikeableFlip, scale=FALSE),
AccomplishedCentered = scale(
    AccomplishedFlip, scale=FALSE),
ImportantCentered = scale(
    ImportantFlip, scale=FALSE))
```

```
$ GenderRating
                         : num 6.24 2.61 6.82 5.34 1.28 4.39 3.87 5.22 1.24 5.86 ...
##
##
   $ Item
                         : Factor w/ 63 levels "Ashley Cook",..: 1 18 21 22 25 28 50 5 7 15 ...
                                0 1 0 0 1 1 1 1 1 0 ...
##
   $ Male
                                1011000001...
##
  $ Female
                         : int
##
   $ Other
                         : int
                                0 0 0 0 0 0 0 0 0 0 ...
   $ Likeable
                                2 1 3 2 4 3 3 3 2 4 ...
##
                         : int
   $ Accomplished
                                1 2 1 4 2 2 2 5 3 3 ...
##
                         : int
                         : int 2 1 5 5 1 4 3 3 2 2 ...
##
   $ Important
##
   $ GenderRatingCentered: num [1:8771, 1] 2.03 -1.6 2.61 1.13 -2.93 ...
    ..- attr(*, "scaled:center")= num 4.21
##
   $ LikeableFlip
                         : num 6756455564 ...
   $ AccomplishedFlip
                                7 6 7 4 6 6 6 3 5 5 ...
##
                         : num
##
   $ ImportantFlip
                         : num 6733745566...
                         : num [1:8771, 1] 0.561 1.561 -0.439 0.561 -1.439 ...
##
  $ LikeableCentered
##
    ..- attr(*, "scaled:center")= num 5.44
##
   $ AccomplishedCentered: num [1:8771, 1] 1.446 0.446 1.446 -1.554 0.446 ...
    ..- attr(*, "scaled:center")= num 5.55
##
  $ ImportantCentered
                         : num [1:8771, 1] 0.849 1.849 -2.151 -2.151 1.849 ...
    ..- attr(*, "scaled:center")= num 5.15
```

Likeability

Summary statistics:

```
summary(exp4_d$Likeable)
##
                    Median
                               Mean 3rd Qu.
                                                Max.
      Min. 1st Qu.
     1.000
             1.000
                      2.000
##
                              2.561
                                       3.000
                                               7.000
summary(exp4_d$LikeableFlip)
##
      Min. 1st Qu.
                    Median
                               Mean 3rd Qu.
                                                Max.
##
     1.000
            5.000
                      6.000
                              5.439
                                      7.000
                                               7.000
sd(exp4_d$Likeable)
```

```
## [1] 1.392179
```

Does the Likeability rating of the character predict how likely the character is to be recalled as female, as opposed to male or other? The maximal model includes random intercepts by item, but not by participant.

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
     Approximation) (p-values based on Wald z-scores) [glmerMod]
  Family: binomial (logit)
## Formula:
## Female ~ 1 + GenderRatingCentered + LikeableCentered + GenderRatingCentered:LikeableCentered +
##
       Condition + GenderRatingCentered:Condition + LikeableCentered:Condition +
       GenderRatingCentered:LikeableCentered:Condition + (1 | Item)
##
      Data: exp4_d
##
##
##
        AIC
                 BIC
                       logLik deviance df.resid
##
     9066.8
              9158.8 -4520.4
                                9040.8
                                           8758
##
## Scaled residuals:
                10 Median
      Min
                                3Q
                                       Max
## -4.4522 -0.5946 -0.2609 0.5931 5.5758
##
## Random effects:
  Groups Name
                       Variance Std.Dev.
           (Intercept) 0.3372
                                0.5807
## Item
## Number of obs: 8771, groups: Item, 63
##
## Fixed effects:
##
                                                     Estimate Std. Error
                                                                           z value
## (Intercept)
                                                    -0.244453
                                                                0.078424 -3.117059
## GenderRatingCentered
                                                     0.751745
                                                                0.044492 16.896062
## LikeableCentered
                                                     0.086624
                                                                0.019205 4.510472
## Condition1
                                                     0.119371
                                                                0.055402 2.154647
## Condition2
                                                     0.066950
                                                                0.065302
                                                                          1.025240
## GenderRatingCentered:LikeableCentered
                                                     0.103182
                                                                0.011834 8.719053
## GenderRatingCentered:Condition1
                                                     0.124923
                                                                0.035196
                                                                          3.549338
## GenderRatingCentered:Condition2
                                                    -0.099175
                                                                0.042892 -2.312214
## LikeableCentered:Condition1
                                                     0.044613
                                                                0.038171
                                                                          1.168758
## LikeableCentered:Condition2
                                                     0.091444
                                                                0.046297
                                                                          1.975159
## GenderRatingCentered:LikeableCentered:Condition1 0.019182
                                                                0.023407
                                                                          0.819486
## GenderRatingCentered:LikeableCentered:Condition2
                                                     0.001836
                                                                0.029003
                                                                          0.063300
                                                    Pr(>|z|) Pr(>|t|)
## (Intercept)
                                                       0.002 0.001827 **
## GenderRatingCentered
                                                       0.000 < 2e-16 ***
## LikeableCentered
                                                       0.000 6.47e-06 ***
## Condition1
                                                       0.031 0.031189 *
## Condition2
                                                       0.305 0.305250
## GenderRatingCentered:LikeableCentered
                                                       0.000 < 2e-16 ***
## GenderRatingCentered:Condition1
                                                       0.000 0.000386 ***
## GenderRatingCentered:Condition2
                                                       0.021 0.020766 *
## LikeableCentered:Condition1
                                                       0.243 0.242501
## LikeableCentered:Condition2
                                                       0.048 0.048250 *
## GenderRatingCentered:LikeableCentered:Condition1
                                                       0.413 0.412509
## GenderRatingCentered:LikeableCentered:Condition2
                                                       0.950 0.949528
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' 1
##
## Correlation of Fixed Effects:
               (Intr) GndrRC LkblCn Cndtn1 Cndtn2 GnRC:LC GRC:C1 GRC:C2 LkC:C1
##
## GndrRtngCnt -0.028
```

```
## LikeblCntrd 0.035 -0.010
               0.014 0.002 -0.026
## Condition1
## Condition2 -0.013 0.012 -0.027 -0.019
## GndrRtnC:LC -0.004
                     0.079 - 0.149
                                    0.020
                                           0.024
## GndrRtnC:C1 0.004
                      0.034
                             0.019 -0.132
                                          0.020
## GndrRtnC:C2 0.012 -0.029
                            0.024 0.020 -0.115 -0.030
                                                         -0.046
## LkblCntr:C1 -0.008 0.006 0.078
                                   0.091 -0.017 -0.011
                                                         -0.012 0.015
## LkblCntr:C2 -0.009 0.010 -0.029 -0.015 0.046
                                                  0.004
                                                          0.015
                                                                0.013 -0.020
## GndRC:LC:C1 0.008 0.002 -0.010 -0.013
                                          0.016
                                                 0.109
                                                          0.176 -0.021 -0.125
## GndRC:LC:C2 0.011 -0.014 0.006 0.016 0.012 -0.058
                                                        -0.019 0.155 0.005
##
              LkC:C2 GRC:LC:C1
## GndrRtngCnt
## LikeblCntrd
## Condition1
## Condition2
## GndrRtnC:LC
## GndrRtnC:C1
## GndrRtnC:C2
## LkblCntr:C1
## LkblCntr:C2
              0.005
## GndRC:LC:C1
## GndRC:LC:C2 -0.127 -0.044
```

- Characters who are rated more Likeable are more likely to be recalled as female across conditions
- Interaction with Name Gender Rating: stronger effect of Likeability rating for more feminine names
- Interaction with Condition (F vs F): n.s. after multiple comparisons
- No other interactions significant

Accomplishment

Summary statistics:

```
summary(exp4 d$Accomplished)
##
      Min. 1st Qu.
                     Median
                                Mean 3rd Qu.
                                                 Max.
             1.000
     1.000
                      2.000
                               2.446
                                       3.000
                                                7.000
summary(exp4_d$AccomplishedFlip)
##
      Min. 1st Qu.
                     Median
                                Mean 3rd Qu.
                                                 Max.
     1.000
##
             5.000
                      6.000
                               5.554
                                       7.000
                                                7.000
sd(exp4_d$Accomplished)
```

```
## [1] 1.371271
```

Does the Accomplishment rating of the character predict how likely the character is to be recalled as female, as opposed to male or other? The maximal model includes random intercepts by item, but not by participant.

```
exp4_m_acc <- buildmer(</pre>
  formula=(Female ~ Condition * GenderRatingCentered *
    AccomplishedCentered + (1|Participant) + (1|Item)),
  data=exp4_d, family=binomial,
  direction=c("order"), quiet=TRUE)
summary(exp4_m_acc)
## Generalized linear mixed model fit by maximum likelihood (Laplace
     Approximation) (p-values based on Wald z-scores) [glmerMod]
  Family: binomial (logit)
## Formula:
## Female ~ 1 + GenderRatingCentered + AccomplishedCentered + GenderRatingCentered:AccomplishedCentered
       Condition + GenderRatingCentered:Condition + AccomplishedCentered:Condition +
##
##
       GenderRatingCentered:AccomplishedCentered:Condition + (1 |
##
      Data: exp4 d
##
##
        AIC
                       logLik deviance df.resid
##
     9082.2
              9174.2 -4528.1
                                9056.2
                                            8758
##
## Scaled residuals:
                10 Median
                                3Q
                                       Max
## -4.1200 -0.5912 -0.2519 0.5987 5.7663
## Random effects:
                       Variance Std.Dev.
## Groups Name
## Item
           (Intercept) 0.3385
                                0.5818
## Number of obs: 8771, groups: Item, 63
##
## Fixed effects:
##
                                                          Estimate Std. Error
## (Intercept)
                                                         -0.243204 0.078552
## GenderRatingCentered
                                                          0.749198
                                                                     0.044554
## AccomplishedCentered
                                                          0.047072
                                                                     0.019043
## Condition1
                                                          0.113323
                                                                     0.055390
## Condition2
                                                          0.071078
                                                                     0.065376
## GenderRatingCentered:AccomplishedCentered
                                                          0.108068
                                                                     0.011716
## GenderRatingCentered:Condition1
                                                          0.126130
                                                                     0.035188
## GenderRatingCentered:Condition2
                                                         -0.100900
                                                                     0.043082
## AccomplishedCentered:Condition1
                                                          0.012340
                                                                     0.038401
## AccomplishedCentered:Condition2
                                                          0.079506
                                                                     0.046748
## GenderRatingCentered:AccomplishedCentered:Condition1
                                                          0.056186
                                                                     0.023330
## GenderRatingCentered:AccomplishedCentered:Condition2 -0.009309
                                                                     0.029285
##
                                                           z value Pr(>|z|)
## (Intercept)
                                                         -3.096102
                                                                      0.002
## GenderRatingCentered
                                                         16.815545
                                                                      0.000
## AccomplishedCentered
                                                          2.471823
                                                                      0.013
## Condition1
                                                          2.045905
                                                                      0.041
## Condition2
                                                          1.087224
                                                                      0.277
## GenderRatingCentered:AccomplishedCentered
                                                          9.224136
                                                                      0.000
## GenderRatingCentered:Condition1
                                                                      0.000
                                                          3.584509
## GenderRatingCentered:Condition2
                                                         -2.342047
                                                                      0.019
                                                          0.321345
## AccomplishedCentered:Condition1
                                                                      0.748
```

```
## AccomplishedCentered:Condition2
                                                         1.700743
                                                                     0.089
## GenderRatingCentered:AccomplishedCentered:Condition1
                                                        2.408265
                                                                     0.016
## GenderRatingCentered:AccomplishedCentered:Condition2 -0.317879
                                                                     0.751
##
                                                        Pr(>|t|)
## (Intercept)
                                                        0.001961 **
## GenderRatingCentered
                                                         < 2e-16 ***
## AccomplishedCentered
                                                        0.013443 *
## Condition1
                                                        0.040766 *
## Condition2
                                                        0.276938
## GenderRatingCentered:AccomplishedCentered
                                                         < 2e-16 ***
## GenderRatingCentered:Condition1
                                                        0.000338 ***
## GenderRatingCentered:Condition2
                                                        0.019178 *
## AccomplishedCentered:Condition1
                                                        0.747949
                                                        0.088991 .
## AccomplishedCentered:Condition2
## GenderRatingCentered:AccomplishedCentered:Condition1 0.016029 *
## GenderRatingCentered:AccomplishedCentered:Condition2 0.750576
##
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##
               (Intr) GndrRC AccmpC Cndtn1 Cndtn2 GnRC:AC GRC:C1 GRC:C2 AcC:C1
## GndrRtngCnt -0.029
## AccmplshdCn 0.039 -0.008
## Condition1
               0.015 -0.001 -0.009
## Condition2 -0.013 0.013 -0.004 -0.020
## GndrRtnC:AC -0.006 0.074 -0.124 -0.010
## GndrRtnC:C1 0.001 0.037 -0.009 -0.135 0.021
## GndrRtnC:C2 0.012 -0.029 0.015 0.021 -0.125 -0.027
                                                          -0.047
## AccmplsC:C1 -0.001 -0.005 0.084
                                   0.103 -0.002 0.003
                                                         -0.012 0.010
## AccmplsC:C2 -0.004 0.009 -0.063 0.000 0.079
                                                  0.032
                                                          0.010 -0.024 -0.044
## GndRC:AC:C1 -0.005 0.012 0.003 -0.013 0.011
                                                  0.128
                                                           0.177 -0.019 -0.141
## GndRC:AC:C2 0.008 -0.015 0.032 0.009 -0.025 -0.090
                                                         -0.017 0.175 0.024
##
               AcC:C2 GRC:AC:C1
## GndrRtngCnt
## AccmplshdCn
## Condition1
## Condition2
## GndrRtnC:AC
## GndrRtnC:C1
## GndrRtnC:C2
## AccmplsC:C1
## AccmplsC:C2
## GndRC:AC:C1 0.025
## GndRC:AC:C2 -0.120 -0.065
```

- Characters who were rated more Accomplished were more likely to be recalled as female, but this is n.s. after correction for multiple comparisons.
- Interaction with Name Gender Rating: stronger effect of Accomplishment rating for more feminine
- Interaction between Condition (L vs F+F), Name Gender Rating, and Accomplishment: n.s. after correction for multiple comparisons

Importance

Summary statistics:

```
summary(exp4_d$Important)
                               Mean 3rd Qu.
##
      Min. 1st Qu. Median
                                                Max.
##
     1.000
             2.000
                      3.000
                              2.849
                                      4.000
                                               7.000
summary(exp4_d$ImportantFlip)
##
      Min. 1st Qu.
                    Median
                               Mean 3rd Qu.
                                                Max.
##
     1.000
             4.000
                      5.000
                              5.151
                                      6.000
                                               7.000
sd(exp4_d$Important)
## [1] 1.461433
```

Does the Importance rating of the character predict how likely the character is to be recalled as female, as opposed to male or other? The maximal model includes random intercepts by item, but not by participant.

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
     Approximation) (p-values based on Wald z-scores) [glmerMod]
  Family: binomial (logit)
##
## Formula:
## Female ~ 1 + GenderRatingCentered + Condition + GenderRatingCentered:Condition +
       ImportantCentered + GenderRatingCentered:ImportantCentered +
##
       Condition:ImportantCentered + GenderRatingCentered:Condition:ImportantCentered +
##
##
       (1 | Item) + (1 | Participant)
##
      Data: exp4_d
##
##
        AIC
                 BIC
                       logLik deviance df.resid
##
     9110.1
              9209.2 -4541.1
                                9082.1
                                           8757
##
## Scaled residuals:
                1Q Median
                                3Q
##
                                       Max
## -3.4352 -0.5792 -0.2520 0.5759 5.9606
##
## Random effects:
## Groups
                            Variance Std.Dev.
                Name
## Participant (Intercept) 0.2045
                                     0.4523
                (Intercept) 0.3583
                                     0.5986
## Number of obs: 8771, groups: Participant, 1253; Item, 63
```

```
##
## Fixed effects:
##
                                                      Estimate Std. Error
## (Intercept)
                                                     -0.248831
                                                                 0.081533
## GenderRatingCentered
                                                      0.772473
                                                                 0.045915
## Condition1
                                                      0.125494
                                                                0.062103
## Condition2
                                                      0.080001
                                                                 0.072921
## ImportantCentered
                                                      0.009614
                                                                 0.019744
## GenderRatingCentered:Condition1
                                                      0.133313
                                                                 0.034992
## GenderRatingCentered:Condition2
                                                     -0.098339
                                                                 0.042672
## GenderRatingCentered:ImportantCentered
                                                      0.077713
                                                                 0.011593
## Condition1:ImportantCentered
                                                      0.009940
                                                                 0.039430
## Condition2:ImportantCentered
                                                      0.076884
                                                                 0.046679
## GenderRatingCentered:Condition1:ImportantCentered
                                                      0.016044
                                                                 0.023112
## GenderRatingCentered:Condition2:ImportantCentered -0.008273
                                                                 0.028272
##
                                                       z value Pr(>|z|) Pr(>|t|)
## (Intercept)
                                                     -3.051905
                                                                  0.002 0.002274
## GenderRatingCentered
                                                     16.824126
                                                                  0.000 < 2e-16
                                                                  0.043 0.043307
## Condition1
                                                      2.020735
## Condition2
                                                      1.097085
                                                                  0.273 0.272604
## ImportantCentered
                                                      0.486938
                                                                  0.626 0.626303
## GenderRatingCentered:Condition1
                                                      3.809828
                                                                  0.000 0.000139
## GenderRatingCentered:Condition2
                                                                  0.021 0.021192
                                                     -2.304540
## GenderRatingCentered:ImportantCentered
                                                      6.703197
                                                                  0.000 2.04e-11
## Condition1:ImportantCentered
                                                      0.252097
                                                                  0.801 0.800966
## Condition2:ImportantCentered
                                                      1.647085
                                                                  0.100 0.099541
## GenderRatingCentered:Condition1:ImportantCentered 0.694202
                                                                  0.488 0.487555
## GenderRatingCentered:Condition2:ImportantCentered -0.292635
                                                                  0.770 0.769801
##
## (Intercept)
                                                     **
## GenderRatingCentered
                                                     ***
## Condition1
## Condition2
## ImportantCentered
## GenderRatingCentered:Condition1
## GenderRatingCentered:Condition2
## GenderRatingCentered: ImportantCentered
## Condition1:ImportantCentered
## Condition2:ImportantCentered
## GenderRatingCentered:Condition1:ImportantCentered
## GenderRatingCentered:Condition2:ImportantCentered
## ---
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
               (Intr) GndrRC Cndtn1 Cndtn2 ImprtC GnRC:C1 GnRC:C2 GRC:IC Cn1:IC
##
## GndrRtngCnt -0.028
## Condition1
              0.012 0.002
## Condition2 -0.011 0.013 -0.014
## ImprtntCntr 0.025 -0.001 -0.006 0.013
## GndrRtnC:C1 0.001 0.036 -0.118 0.019 -0.008
## GndrRtnC:C2 0.012 -0.029 0.019 -0.109 0.023 -0.044
## GndrRtnC:IC 0.002 0.060 -0.005 0.021 -0.103 0.023 -0.007
## Cndtn1:ImpC -0.001 -0.003 0.069 0.010 0.043 0.005
```

```
## Cndtn2:ImpC 0.004 0.007 0.010 0.056 -0.070 0.015 -0.004
                                                                 0.020 -0.051
## GndRC:C1:IC -0.002 0.010 0.002 0.015 -0.002 0.125
                                                        -0.005
                                                                 0.087 -0.091
## GndRC:C2:IC 0.010 -0.002 0.015 -0.005 0.021 -0.002
                                                         0.135 -0.100 0.019
##
              Cn2:IC GRC:C1:
## GndrRtngCnt
## Condition1
## Condition2
## ImprtntCntr
## GndrRtnC:C1
## GndrRtnC:C2
## GndrRtnC:IC
## Cndtn1:ImpC
## Cndtn2:ImpC
## GndRC:C1:IC 0.019
## GndRC:C2:IC -0.087 -0.074
```

- No main effect of Importance like there was for other ratings
- Interaction with Name Gender Rating: stronger effect of Importance rating for more feminine names