

# Experiment 4: Supplementary Analyses

Bethany Gardner

4/07/2022

## Contents

<b>Setup</b>	<b>1</b>
<b>Without <i>Other</i> Responses</b>	<b>2</b>
<b>Quadratic Name Gender Rating</b>	<b>3</b>
<b>Participant Gender</b>	<b>5</b>
Setup/Data Summary . . . . .	5
Model: Condition * Name Gender * Participant Gender . . . . .	6

## Setup

Load data and select columns used in model. See data/exp4\_data\_about.txt for more details.

```
d <- read.csv("../data/exp4_data.csv", stringsAsFactors=TRUE) %>%
  rename("Participant"="SubjID", "Item"="Name") %>%
  select(Participant, Condition, SubjGender, GenderRating, Item, Male, Female, Other)
str(d)
```

```
## 'data.frame':   8771 obs. of  8 variables:
## $ Participant : Factor w/ 1253 levels "R_00dmdQaotbTidXz",...: 1001 1001 1001 1001 1001 1001 1001 1001 23
## $ Condition   : Factor w/ 3 levels "first","full",...: 1 1 1 1 1 1 1 1 1 ...
## $ SubjGender   : Factor w/ 5 levels "female","male",...: 2 2 2 2 2 2 2 2 2 ...
## $ 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 ...
## $ Male         : int   0 1 0 0 1 1 1 1 1 0 ...
## $ Female       : int   1 0 1 1 0 0 0 0 0 1 ...
## $ Other        : int   0 0 0 0 0 0 0 0 0 0 ...
```

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.

```
d %>% mutate(GenderRatingCentered=scale(d$GenderRating, scale=FALSE))
```

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(d$Condition) <- centerfactor(d$Condition, c("last","first"))
contrasts(d$Condition)
```

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

## Without *Other* Responses

The first supplementary analysis tests if excluding *other* responses (2.99% of total responses) affects the pattern of results.

```
o <- sum(d$Other)
o
```

```
## [1] 262
```

```
o/length(d$Other)
```

```
## [1] 0.02987117
```

Exclude *other* responses.

```
d.noOther <- d %>% filter(Other==0)
```

Effect of Name Condition (first name, last name, full name) and first name Gender Rating on likelihood of a *female* response, as opposed to a *male* response, with *other* responses excluded. Participant and Item are again included as random intercepts, with items defined as the unique first, last and first + last name combinations.

```
m.noOther <- glmer(Female ~ Condition * GenderRatingCentered +
                    (1|Participant) + (1|Item),
                    data=d.noOther, family=binomial)
summary(m.noOther)
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##   Family: binomial   ( logit )
##   Formula: Female ~ Condition * GenderRatingCentered + (1 | Participant) +
##           (1 | Item)
##   Data: d.noOther
##
##           AIC          BIC    logLik deviance df.resid
```

```
##      8737.3      8793.7     -4360.6      8721.3        8501
##
## Scaled residuals:
##      Min        1Q      Median        3Q        Max
## -3.4146 -0.5648 -0.2574  0.5646  4.7423
##
## Random effects:
##   Groups      Name      Variance Std.Dev.
##   Participant (Intercept) 0.05031  0.2243
##   Item          (Intercept) 0.36891  0.6074
## Number of obs: 8509, groups: Participant, 1232; Item, 63
##
## Fixed effects:
##
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)      -0.16410     0.08196   -2.002   0.0453 *
## Condition1         0.13514     0.05783    2.337   0.0194 *
## Condition2         0.11301     0.06837    1.653   0.0983 .
## GenderRatingCentered 0.76972     0.04650   16.554   <2e-16 ***
## Condition1:GenderRatingCentered 0.13700     0.03522    3.890   0.0001 ***
## Condition2:GenderRatingCentered -0.09189     0.04315   -2.130   0.0332 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##              (Intr) Cndtn1 Cndtn2 GndrRC C1:GRC
## Condition1      0.016
## Condition2     -0.010 -0.012
## GndrRtngCnt    -0.022  0.005  0.013
## Cndtn1:GnRC     0.004 -0.101  0.020  0.038
## Cndtn2:GnRC     0.012  0.020 -0.085 -0.025 -0.038
```

Compared to the main model:

- Intercept and Condition2:GenderRatingCentered (difference between Last Name and First+Full name conditions) potentially smaller differences
- Condition2 now trending

## Quadratic Name Gender Rating

The second supplementary analysis tested the effect of squared name gender rating, such that larger values meant names with stronger gender associations (masc or fem), and smaller values meant names with weaker gender associations.

```
d %<>% mutate(GenderRatingSquared=GenderRatingCentered^2)

m.quad <- glmer(Female ~ Condition*GenderRatingCentered +
  Condition*GenderRatingSquared +
  (1|Participant) + (1|Item),
  d, family="binomial")
summary(m.quad)
```

```

## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: binomial ( logit )
## Formula:
## Female ~ Condition * GenderRatingCentered + Condition * GenderRatingSquared +
## (1 | Participant) + (1 | Item)
## Data: d
##
##      AIC      BIC   logLik deviance df.resid
##  9142.9   9220.8  -4560.4   9120.9     8760
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.2148 -0.5741 -0.2557  0.5736  5.9912
##
## Random effects:
## Groups      Name      Variance Std.Dev.
## Participant (Intercept) 0.2036   0.4512
## Item          (Intercept) 0.3482   0.5901
## Number of obs: 8771, groups: Participant, 1253; Item, 63
##
## Fixed effects:
##
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    -0.36854    0.11557  -3.189 0.001429 **
## Condition1       0.16076    0.08016   2.006 0.044900 *
## Condition2     -0.07650    0.09273  -0.825 0.409405
## GenderRatingCentered  0.77986    0.04638  16.814 < 2e-16 ***
## GenderRatingSquared  0.03431    0.02628   1.306 0.191653
## Condition1:GenderRatingCentered 0.13226    0.03480   3.800 0.000145 ***
## Condition2:GenderRatingCentered -0.09191    0.04261  -2.157 0.031001 *
## Condition1:GenderRatingSquared -0.01425    0.01933  -0.737 0.461103
## Condition2:GenderRatingSquared  0.05970    0.02351   2.539 0.011108 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##      (Intr) Cndtn1 Cndtn2 GndrRC GndrRS C1:GRC C2:GRC C1:GRS
## Condition1  0.002
## Condition2 -0.003 -0.002
## GndrRtngCnt -0.173  0.003 -0.005
## GndrRtngSqr -0.717 -0.005  0.005  0.212
## Cndtn1:GnRC  0.001 -0.165 -0.009  0.038 -0.003
## Cndtn2:GnRC -0.004 -0.008 -0.154 -0.027  0.029 -0.043
## Cndtn1:GnRS -0.005 -0.636  0.007 -0.003  0.029  0.117  0.056
## Cndtn2:GnRS  0.005  0.006 -0.620  0.034 -0.027  0.058  0.095 -0.045

```

- Condition (F v F) \* Quadratic Gender Rating interaction, but n.s. after correction for multiple comparisons, so not making a big deal of it

# Participant Gender

## Setup/Data Summary

The third supplementary analysis looks at participant gender: if male participants show a larger bias to recall the character as male than non-male participants.

Participants entered their gender in a free-response box.

```
d %>% group_by(SubjGender) %>%  
  summarise(total=n_distinct(Participant)) %>% kable()
```

SubjGender	total
female	555
male	602
non-binary	3
transgender female	1
transgender male	1
NA	91

For this analysis, we exclude participants who did not respond. Because there are not enough participants to create 3 groups, we compare male (male, transgender male) to non-male participants (female, non-binary, transgender female).

```
d.gender <- d %>% filter(SubjGender != "N/A") %>%  
  mutate(SubjGenderMale=(ifelse(  
    SubjGender=="male"|SubjGender=="transgender male", 1, 0)))  
  
d.gender %>% group_by(SubjGenderMale) %>%  
  summarise(total=n_distinct(Participant)) %>% kable()
```

SubjGenderMale	total
0	559
1	603

Summary of responses by condition and participant gender.

```
d.gender %<>% mutate(ResponseAll=case_when(  
  Male==1 ~ "Male",  
  Female==1 ~ "Female",  
  Other==1 ~ "Other"))  
  
d.gender.count_responses <- d.gender %>%  
  group_by(Condition, ResponseAll, SubjGenderMale) %>%  
  summarise(n=n()) %>%  
  pivot_wider(names_from=c(ResponseAll),  
    values_from=n) %>%  
  mutate(Female_MaleOther = Female / (Male+Other),  
    Female_Male = Female / Male) %>%  
  rename("ParticipantGender"="SubjGenderMale")  
d.gender.count_responses$ParticipantGender %<>% recode("0"="Non-male", "1"="Male")  
  
kable(d.gender.count_responses)
```

Condition	ParticipantGender	Female	Male	Other	Female_MaleOther	Female_Male
first	Non-male	676	692	46	0.9159892	0.9768786
first	Male	619	718	14	0.8456284	0.8621170
full	Non-male	624	584	45	0.9920509	1.0684932
full	Male	636	707	57	0.8324607	0.8995757
last	Non-male	568	639	39	0.8377581	0.8888889
last	Male	634	792	44	0.7583732	0.8005051

Participant gender is mean centered effects coded, comparing non-male participants to male participants.

```
d.gender$SubjGenderMale %<>% as.factor()
contrasts(d.gender$SubjGenderMale)=cbind("NM_M"=c(-.5,.5))
contrasts(d.gender$SubjGenderMale)
```

```
##   NM_M
## 0 -0.5
## 1  0.5
```

## Model: Condition \* Name Gender \* Participant Gender

Effects of Name Condition (first name, full name), the first name's Gender Rating (centered, positive=more feminine), and Participant Gender (non-male vs. male) on the likelihood of a *female* response as opposed to *male* or *other* responses.

```
m.subjgender <- glmer(Female ~
  Condition * GenderRatingCentered * SubjGenderMale +
  (1|Participant) + (1|Item),
  data=d.gender, family=binomial)
summary(m.subjgender)
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: binomial ( logit )
## Formula: Female ~ Condition * GenderRatingCentered * SubjGenderMale +
## (1 | Participant) + (1 | Item)
## Data: d.gender
##
##      AIC      BIC    logLik deviance df.resid
## 8483.6   8581.6 -4227.8   8455.6     8120
##
## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -3.4061 -0.5731 -0.2626  0.5799  4.8537
##
## Random effects:
##  Groups      Name      Variance Std.Dev.
## Participant (Intercept) 0.1825   0.4272
## Item          (Intercept) 0.3673   0.6060
## Number of obs: 8134, groups: Participant, 1162; Item, 63
##
## Fixed effects:
##
##                                     Estimate Std. Error z value
```

```

## (Intercept) -0.25022 0.08272 -3.025
## Condition1 0.15037 0.06379 2.357
## Condition2 0.07764 0.07464 1.040
## GenderRatingCentered 0.76492 0.04662 16.409
## SubjGenderMaleNM_M -0.19870 0.06077 -3.270
## Condition1:GenderRatingCentered 0.09637 0.03620 2.662
## Condition2:GenderRatingCentered -0.09858 0.04345 -2.269
## Condition1:SubjGenderMaleNM_M -0.02392 0.12794 -0.187
## Condition2:SubjGenderMaleNM_M -0.14448 0.14940 -0.967
## GenderRatingCentered:SubjGenderMaleNM_M -0.01992 0.03494 -0.570
## Condition1:GenderRatingCentered:SubjGenderMaleNM_M 0.04097 0.07261 0.564
## Condition2:GenderRatingCentered:SubjGenderMaleNM_M -0.05269 0.08694 -0.606
## Pr(>|z|)
## (Intercept) 0.00249 **
## Condition1 0.01841 *
## Condition2 0.29824
## GenderRatingCentered < 2e-16 ***
## SubjGenderMaleNM_M 0.00108 **
## Condition1:GenderRatingCentered 0.00777 **
## Condition2:GenderRatingCentered 0.02329 *
## Condition1:SubjGenderMaleNM_M 0.85170
## Condition2:SubjGenderMaleNM_M 0.33350
## GenderRatingCentered:SubjGenderMaleNM_M 0.56862
## Condition1:GenderRatingCentered:SubjGenderMaleNM_M 0.57257
## Condition2:GenderRatingCentered:SubjGenderMaleNM_M 0.54450
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
## (Intr) Cndtn1 Cndtn2 GndrRC SGMNM_ Cn1:GRC Cn2:GRC C1:SGM C2:SGM
## Condition1 0.009
## Condition2 -0.007 -0.007
## GndrRtngCnt -0.029 0.007 0.012
## SbjGndMNM_M -0.011 0.039 -0.042 -0.018
## Cndtn1:GnRC 0.005 -0.122 0.017 0.025 -0.017
## Cndtn2:GnRC 0.012 0.017 -0.104 -0.024 0.000 -0.035
## Cn1:SGMNM_M 0.013 -0.063 -0.028 -0.003 0.020 -0.019 0.000
## Cn2:SGMNM_M -0.014 -0.031 -0.005 -0.002 -0.011 0.000 -0.041 -0.007
## GRC:SGMNM_M -0.015 -0.018 0.001 -0.012 -0.112 0.057 -0.052 0.009 0.024
## C1:GRC:SGMN -0.004 -0.020 0.000 0.016 0.010 -0.082 -0.036 -0.123 0.018
## C2:GRC:SGMN -0.001 0.000 -0.041 -0.018 0.024 -0.038 0.002 0.017 -0.103
## GRC:SG C1:GRC:
## Condition1
## Condition2
## GndrRtngCnt
## SbjGndMNM_M
## Cndtn1:GnRC
## Cndtn2:GnRC
## Cn1:SGMNM_M
## Cn2:SGMNM_M
## GRC:SGMNM_M
## C1:GRC:SGMN 0.057
## C2:GRC:SGMN -0.050 -0.034

```

- Male participants less likely to recall character as female than non-male participants overall.
- No other interactions with participant gender significant.