Experiment 2: Supplementary Analyses

Bethany Gardner

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Setup

Load data and select columns used in model. See data/exp2_data_about.txt for more details.

```
## 'data.frame': 9457 obs. of 8 variables:
## $ Participant : Factor w/ 1351 levels "R_06Tps0XX28Fe09j",..: 694 694 694 694 694 694 301 301 3
## $ SubjGender : Factor w/ 5 levels "female", "genderqueer",..: 3 3 3 3 3 3 1 1 1 ...
## $ Condition : Factor w/ 3 levels "first", "full",..: 1 1 1 1 1 1 1 1 1 1 ...
## $ GenderRating: num 5.59 4.22 2.12 6.73 3.61 4.73 1.21 6.24 4.39 2.61 ...
## $ Item : Factor w/ 105 levels "Ashley", "Ashley Cook",..: 51 91 18 60 87 55 63 1 47 29 ...
```

```
## $ Male : int 1 1 0 1 1 0 1 0 0 1 ...
## $ Female : int 0 0 1 0 0 1 0 1 1 0 ...
## $ Other : int 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.

```
## last vs first/full first vs full
## first 0.33 -0.5
## full 0.33 0.5
## last -0.66 0.0
```

Subset for gender rating effects (First and Full conditions only).

```
d.FF <- d %>% filter(Condition!="last")
d.FF$Condition <- droplevels(d.FF$Condition)
contrasts(d.FF$Condition) = cbind("first vs full"=c(-.5,.5)) #add contrast back
contrasts(d.FF$Condition)</pre>
```

```
## first vs full
## first -0.5
## full 0.5
```

Without OTHER responses

The first supplementary analysis tests if excluding OTHER responses (4.15% of total responses) affects the pattern of results.

```
o <- sum(d$0ther)
o

## [1] 392
o/length(d$0ther)</pre>
```

```
## [1] 0.04145078
```

Exclude OTHER responses.

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

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

Model 1: Condition w/o OTHER

Effect of Name Condition (first name, last name, full name) 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.cond_other <- glmer(Female ~ Condition + (1|Participant) + (1|Item),</pre>
                data=d.noOther, family=binomial)
summary(m.cond_other)
## Generalized linear mixed model fit by maximum likelihood (Laplace
     Approximation) [glmerMod]
   Family: binomial (logit)
## Formula: Female ~ Condition + (1 | Participant) + (1 | Item)
##
      Data: d.noOther
##
##
        AIC
                 BIC
                       logLik deviance df.resid
                      -4444.5
##
     8899.0
              8934.6
                                8889.0
                                            9060
##
## Scaled residuals:
##
       Min
                1Q Median
                                3Q
                                        Max
  -2.8742 -0.4709 -0.3084 0.5478 4.7464
##
## Random effects:
##
   Groups
                Name
                            Variance Std.Dev.
   Participant (Intercept) 0.100
                                     0.3163
                (Intercept) 1.789
                                     1.3376
## Number of obs: 9065, groups: Participant, 1321; Item, 105
##
## Fixed effects:
##
                               Estimate Std. Error z value Pr(>|z|)
## (Intercept)
                                -0.7936
                                             0.1509
                                                    -5.261 1.43e-07 ***
## Conditionlast vs first/full
                                 1.9098
                                             0.3430
                                                      5.567 2.59e-08 ***
## Conditionfirst vs full
                                -0.2023
                                             0.3451
                                                    -0.586
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
               (Intr) Cvfrs/
##
## Cndtnvfrst/ -0.170
## Cndtnfrstvf -0.362 -0.241
```

No differences.

Model 2: Condition * Name Gender w/o OTHER

Effects of Name Condition (first name, full name) and the first name's Gender Rating (centered, positive=more feminine) on the likelihood of a FEMALE response as opposed to a MALE response, with

OTHER responses excluded. In Experiment 2, the Last Name condition does not include any instances of the gendered first name, so it is not included here. Participant and Item are again included as random intercepts.

```
m.namegender_other <- glmer(Female ~ Condition * GenderRatingCentered +</pre>
                            (1|Participant) + (1|Item),
                            data=d.FF.noOther, family=binomial)
summary(m.namegender other)
## Generalized linear mixed model fit by maximum likelihood (Laplace
     Approximation) [glmerMod]
  Family: binomial (logit)
## Formula: Female ~ Condition * GenderRatingCentered + (1 | Participant) +
##
       (1 | Item)
      Data: d.FF.noOther
##
##
##
        AIC
                       logLik deviance df.resid
##
     6559.7
              6600.1 -3273.9
                                6547.7
                                            6166
##
## Scaled residuals:
                1Q Median
                                3Q
##
       Min
                                       Max
  -2.8717 -0.5959 -0.2364 0.6050
##
##
## Random effects:
                            Variance Std.Dev.
##
  Groups
                Name
## Participant (Intercept) 0.0268
                                     0.1637
                (Intercept) 0.1459
                                     0.3819
## Number of obs: 6172, groups: Participant, 897; Item, 83
##
## Fixed effects:
##
                                                Estimate Std. Error z value
## (Intercept)
                                                            0.05860 - 2.348
                                                -0.13756
## Conditionfirst vs full
                                                -0.19127
                                                            0.11704 -1.634
## GenderRatingCentered
                                                 0.78486
                                                            0.03552 22.098
## Conditionfirst vs full:GenderRatingCentered -0.06500
                                                            0.06969 -0.933
##
                                                Pr(>|z|)
                                                  0.0189 *
## (Intercept)
## Conditionfirst vs full
                                                  0.1022
## GenderRatingCentered
                                                  <2e-16 ***
## Conditionfirst vs full:GenderRatingCentered
                                                  0.3509
## ---
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' 1
##
## Correlation of Fixed Effects:
##
               (Intr) Cndtvf GndrRC
## Cndtnfrstvf -0.348
## GndrRtngCnt -0.059 -0.012
## Cvfll:GndRC -0.010 -0.053 -0.299
```

Compared to the main analysis including OTHER responses, the intercept has a larger p-value, the difference between the First and Full Name conditions is no longer trending, and the Name Gender Rating is the same.

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

Model 3: Quadratic

No quadratic effects.

```
m.namegender_squared <- glmer(Female ~ Condition*GenderRatingCentered +
                              Condition*GenderRatingSquared +
                              (1|Participant) + (1|Item),
                              d.FF, family="binomial")
summary(m.namegender_squared)
## 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.FF
##
        AIC
##
                 BIC
                       logLik deviance df.resid
##
     6784.5
              6838.5
                     -3384.2
                                6768.5
                                           6313
##
## Scaled residuals:
##
              1Q Median
                                3Q
       Min
                                       Max
## -2.9223 -0.6307 -0.2334 0.6387 4.5272
##
## Random effects:
                Name
## Groups
                            Variance Std.Dev.
## Participant (Intercept) 0.1278
                                     0.3575
                (Intercept) 0.1503
                                     0.3877
## Number of obs: 6321, groups: Participant, 903; Item, 83
##
## Fixed effects:
##
                                               Estimate Std. Error z value
## (Intercept)
                                               -0.16962
                                                           0.08275 -2.050
## Conditionfirst vs full
                                               -0.25725
                                                            0.16551 -1.554
## GenderRatingCentered
                                                0.77974
                                                            0.03630 21.481
## GenderRatingSquared
                                                -0.01045
                                                            0.02004
                                                                    -0.521
## Conditionfirst vs full:GenderRatingCentered -0.06953
                                                            0.07121 -0.976
## Conditionfirst vs full:GenderRatingSquared
                                                            0.04004
                                                                     0.254
                                                0.01019
##
                                               Pr(>|z|)
## (Intercept)
                                                 0.0404 *
## Conditionfirst vs full
                                                  0.1201
## GenderRatingCentered
                                                  <2e-16 ***
                                                  0.6020
## GenderRatingSquared
```

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.

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2

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

4 N/A

5 non-binary

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")
print(d.gender.count_responses)
## # A tibble: 6 x 7
## # Groups:
               Condition [3]
     Condition ParticipantGender Female Male Other Female_MaleOther Female_Male
##
                                  <int> <int> <int>
     <fct>
                                                                <dbl>
                                                                             <dbl>
##
               <chr>
## 1 first
               Non-male
                                    684
                                           609
                                                                1.07
                                                                             1.12
## 2 first
               Male
                                                                0.902
                                                                             0.921
                                    780
                                           847
                                                  18
## 3 full
               Non-male
                                    595
                                          609
                                                  49
                                                                0.904
                                                                             0.977
## 4 full
               Male
                                    724 893
                                                  42
                                                                0.774
                                                                             0.811
## 5 last
               Non-male
                                    170 1145
                                                  92
                                                                0.137
                                                                             0.148
## 6 last
                                    210 1223
               Male
                                                 121
                                                                0.156
                                                                             0.172
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
Subset First and Full conditions.
d.FF.gender <- d.gender %>% filter(Condition!="last")
d.FF.gender$Condition <- droplevels(d.FF.gender$Condition)</pre>
contrasts(d.FF.gender$Condition) =
  cbind("first vs full"=c(-.5,.5)) #add contrast back
contrasts(d.FF.gender$Condition)
         first vs full
                  -0.5
## first
## full
                   0.5
```

Model 4: Condition * Participant Gender

Effect of Name Condition (first name, last name, full name) and Participant Gender (non-male vs male) on likelihood of a FEMALE response, as opposed to a MALE response or OTHER response. Participant and Item are again included as random intercepts.

```
m.cond_subjgender <- glmer(Female ~ Condition * SubjGenderMale +</pre>
            (1|Participant) + (1|Item),
            data=d.gender, family=binomial)
summary(m.cond_subjgender)
## Generalized linear mixed model fit by maximum likelihood (Laplace
     Approximation) [glmerMod]
##
   Family: binomial (logit)
  Formula: Female ~ Condition * SubjGenderMale + (1 | Participant) + (1 |
##
       Item)
      Data: d.gender
##
##
##
        AIC
                 BIC
                       logLik deviance df.resid
##
     8545.3
              8602.0 -4264.7
                                8529.3
                                            8833
##
## Scaled residuals:
##
       Min
                1Q Median
                                3Q
                                       Max
   -3.6710 -0.4651 -0.2896 0.5581
##
                                    4.7148
##
## Random effects:
  Groups
                Name
                            Variance Std.Dev.
   Participant (Intercept) 0.195
                                      0.4416
##
                (Intercept) 1.832
                                      1.3535
## Number of obs: 8841, groups: Participant, 1263; Item, 105
##
## Fixed effects:
##
                                                   Estimate Std. Error z value
## (Intercept)
                                                   -0.87078
                                                               0.15305 -5.689
## Conditionlast vs first/full
                                                    2.00537
                                                               0.34799
                                                                         5.763
## Conditionfirst vs full
                                                   -0.20540
                                                               0.35009
                                                                        -0.587
## SubjGenderMaleNM M
                                                               0.06240 -2.006
                                                   -0.12519
## Conditionlast vs first/full:SubjGenderMaleNM_M -0.39906
                                                               0.14326 - 2.786
## Conditionfirst vs full:SubjGenderMaleNM_M
                                                    0.06204
                                                               0.14105
                                                                         0.440
##
                                                   Pr(>|z|)
## (Intercept)
                                                   1.28e-08 ***
## Conditionlast vs first/full
                                                   8.28e-09 ***
## Conditionfirst vs full
                                                    0.55741
                                                    0.04482 *
## SubjGenderMaleNM_M
## Conditionlast vs first/full:SubjGenderMaleNM_M 0.00534 **
## Conditionfirst vs full:SubjGenderMaleNM_M
                                                    0.66002
## ---
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' ' 1
## Correlation of Fixed Effects:
               (Intr) Cvfrs/ Cndtvf SGMNM Cvf/:S
##
## Cndtnvfrst/ -0.169
## Cndtnfrstvf -0.359 -0.240
## SbjGndMNM_M -0.021 0.001 -0.001
```

```
## Cvf/:SGMNM_ 0.003 -0.022 -0.001 -0.194
## Cvf:SGMNM_M -0.002 -0.001 -0.024 -0.002 -0.001
```

- Male participants are less likely to recall the character as female overall, but this is not significant after correction for multiple comparisons.
- The interaction between Condition (Last vs. First + Full) and Participant Gender is significant.

Interaction

Dummy code to get the Participant Gender effect just for First and Full Name conditions.

```
d.gender$FFdummy = as.numeric(d.gender$Condition)
d.gender$FFdummy[d.gender$FFdummy == 1] <- 0</pre>
d.gender$FFdummy[d.gender$FFdummy == 2] <- 0</pre>
d.gender$FFdummy[d.gender$FFdummy == 3] <- 1</pre>
with(d.gender, tapply(FFdummy, list(Condition), mean))
## first full last
##
      Λ
            Ω
m.cond_subjgender_FF <- glmer(Female ~</pre>
   FFdummy*SubjGenderMale + (1|Participant) + (1|Item),
    data=d.gender, family=binomial)
summary(m.cond_subjgender_FF)
## Generalized linear mixed model fit by maximum likelihood (Laplace
##
     Approximation) [glmerMod]
  Family: binomial (logit)
## Formula: Female ~ FFdummy * SubjGenderMale + (1 | Participant) + (1 |
##
      Item)
##
      Data: d.gender
##
##
        AIC
                BIC
                      logLik deviance df.resid
             8584.4 -4264.9
                               8529.9
##
     8541.9
                                          8835
##
## Scaled residuals:
##
      Min
             1Q Median
                               3Q
                                      Max
## -3.7121 -0.4647 -0.2896 0.5561 4.7190
##
## Random effects:
## Groups
                           Variance Std.Dev.
               Name
## Participant (Intercept) 0.1953
                                    0.4419
                                    1.3557
               (Intercept) 1.8379
## Number of obs: 8841, groups: Participant, 1263; Item, 105
##
## Fixed effects:
##
                             Estimate Std. Error z value Pr(>|z|)
## (Intercept)
                             ## FFdummy
                             -1.93803
                                         0.33481 -5.788 7.11e-09 ***
## SubjGenderMaleNM M
                             -0.25700
                                         0.07058 -3.641 0.000271 ***
## FFdummy:SubjGenderMaleNM_M 0.39519
                                         0.14182 2.787 0.005326 **
```

```
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
## Correlation of Fixed Effects:
               (Intr) FFdmmy SGMNM_
               -0.461
## FFdummy
## SbjGndMNM M -0.028 0.015
## FFd:SGMNM_M 0.014 -0.023 -0.498
Then dummy code to get the participant gender effect just for Last Name condition.
d.gender$Ldummy = as.numeric(d.gender$Condition)
d.gender$Ldummy[d.gender$Ldummy == 1] <- 1</pre>
d.gender$Ldummy[d.gender$Ldummy == 2] <- 1</pre>
d.gender$Ldummy[d.gender$Ldummy == 3] <- 0</pre>
with(d.gender, tapply(Ldummy, list(Condition), mean))
## first full last
       1
             1
m.cond_subjgender_L <- glmer(Female ~</pre>
   Ldummy*SubjGenderMale + (1|Participant) + (1|Item),
    data=d.gender, family=binomial)
summary(m.cond_subjgender_L)
## Generalized linear mixed model fit by maximum likelihood (Laplace
     Approximation) [glmerMod]
## Family: binomial (logit)
## Formula: Female ~ Ldummy * SubjGenderMale + (1 | Participant) + (1 | Item)
##
     Data: d.gender
##
##
                      logLik deviance df.resid
        ATC
                 BIC
##
     8541.9
              8584.4 -4264.9
                              8529.9
                                           8835
##
## Scaled residuals:
##
       Min
                1Q Median
                                3Q
                                       Max
## -3.7121 -0.4647 -0.2896 0.5561 4.7190
##
## Random effects:
## Groups
                Name
                            Variance Std.Dev.
## Participant (Intercept) 0.1953
                                     0.4419
                                     1.3557
                (Intercept) 1.8379
## Number of obs: 8841, groups: Participant, 1263; Item, 105
##
## Fixed effects:
##
                             Estimate Std. Error z value Pr(>|z|)
## (Intercept)
                              -2.1944
                                          0.2970 -7.388 1.49e-13 ***
## Ldummy
                               1.9380
                                          0.3347
                                                   5.791 7.02e-09 ***
## SubjGenderMaleNM_M
                                          0.1230
                                                   1.124 0.26120
                               0.1382
## Ldummy:SubjGenderMaleNM_M -0.3952
                                          0.1418 -2.787 0.00532 **
## ---
## Signif. codes: 0 '***' 0.001 '**' 0.05 '.' 0.1 ' ' 1
```

-> Male participants were less likely to recall the referent as female than non-male participants in the First and Full Name conditions. No participant gender difference in the Last Name condition.

Model 5: 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. In Experiment 2, the Last Name condition does not include any instances of the gendered first name, so it is not included here.

```
## 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.FF.gender
##
##
        AIC
                 BIC
                       logLik deviance df.resid
##
     6261.5
              6328.3 -3120.7
                                6241.5
                                            5870
##
## Scaled residuals:
                1Q Median
                                3Q
##
  -3.3535 -0.6348 -0.2316 0.6346
                                    4.4956
##
##
## Random effects:
  Groups
                            Variance Std.Dev.
                Name
##
   Participant (Intercept) 0.1147
                                      0.3387
                                      0.3987
                (Intercept) 0.1590
## Number of obs: 5880, groups: Participant, 840; Item, 83
##
## Fixed effects:
                                                                    Estimate
## (Intercept)
                                                                    -0.18617
## Conditionfirst vs full
                                                                    -0.20509
## GenderRatingCentered
                                                                     0.80851
## SubjGenderMaleNM M
                                                                    -0.21835
```

```
## Conditionfirst vs full:GenderRatingCentered
                                                                  -0.06485
## Conditionfirst vs full:SubjGenderMaleNM_M
                                                                   0.10276
## GenderRatingCentered:SubjGenderMaleNM M
                                                                  -0.15373
## Conditionfirst vs full:GenderRatingCentered:SubjGenderMaleNM_M -0.12900
                                                                  Std. Error
## (Intercept)
                                                                     0.06211
## Conditionfirst vs full
                                                                     0.12411
## GenderRatingCentered
                                                                     0.03749
## SubjGenderMaleNM M
                                                                     0.06894
## Conditionfirst vs full:GenderRatingCentered
                                                                     0.07337
## Conditionfirst vs full:SubjGenderMaleNM_M
                                                                     0.13780
## GenderRatingCentered:SubjGenderMaleNM_M
                                                                     0.04501
## Conditionfirst vs full:GenderRatingCentered:SubjGenderMaleNM_M
                                                                     0.08998
                                                                  z value Pr(>|z|)
##
## (Intercept)
                                                                   -2.997 0.002724
## Conditionfirst vs full
                                                                   -1.652 0.098450
## GenderRatingCentered
                                                                   21.566 < 2e-16
## SubjGenderMaleNM M
                                                                   -3.167 0.001539
## Conditionfirst vs full:GenderRatingCentered
                                                                   -0.884 0.376742
## Conditionfirst vs full:SubjGenderMaleNM M
                                                                    0.746 0.455840
## GenderRatingCentered:SubjGenderMaleNM_M
                                                                   -3.415 0.000637
## Conditionfirst vs full:GenderRatingCentered:SubjGenderMaleNM_M -1.434 0.151669
##
## (Intercept)
                                                                  **
## Conditionfirst vs full
## GenderRatingCentered
                                                                   ***
## SubjGenderMaleNM_M
                                                                   **
## Conditionfirst vs full:GenderRatingCentered
## Conditionfirst vs full:SubjGenderMaleNM_M
## GenderRatingCentered:SubjGenderMaleNM_M
## Conditionfirst vs full:GenderRatingCentered:SubjGenderMaleNM_M
## ---
## Signif. codes: 0 '*** 0.001 '** 0.01 '* 0.05 '.' 0.1 ' 1
## Correlation of Fixed Effects:
               (Intr) Cndtvf GndrRC SGMNM Cvfl:GRC Cvf:SG GRC:SG
## Cndtnfrstvf -0.334
## GndrRtngCnt -0.064 -0.013
## SbjGndMNM_M -0.090 -0.018 -0.006
## Cvfll:GndRC -0.010 -0.057 -0.283 0.020
## Cvf:SGMNM M -0.019 -0.092 0.021 0.010 0.001
## GRC:SGMNM M -0.007 0.023 -0.145 -0.133 -0.035
                                                    -0.034
## Cvf:GRC:SGM 0.023 -0.008 -0.036 -0.034 -0.142
                                                    -0.134 -0.004
```

- Male participants are less likely to recall the character as female overall. This matches the results of the interaction in the condition-only model.
- The interaction between participant gender and first name gender rating is significant. Smaller effect of name gender rating in male participants.
- Interaction with Condition, three-way interaction with Name Gender and Condition n.s.