Experiment 2: Main Analysis

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Contents

Setup

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

```
d <- read.csv("../data/exp2_data.csv", stringsAsFactors=TRUE) %>%
  rename("Participant"="SubjID", "Item"="NameShown") %>%
  select(Participant, Condition, GenderRating, Item, Male, Female, Other)
str(d)
```

```
## 'data.frame':    9457 obs. of  7 variables:
##  $ Participant : Factor w/ 1351 levels "R_06Tps0XX28Fe09j",..: 694 694 694 694 694 694 694 301 301 3
##  $ 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 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.

```
contrasts(d$Condition) = cbind("last vs first/full"=c(.33,.33,-0.66),
                               "first vs full"=c(-.5,.5,0))
contrasts(d$Condition)
```

```
##       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)
```

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

Data Summary

Responses by condition.

```
d %<>% mutate(ResponseAll=case_when(
              Male==1 ~ "Male",
              Female==1 ~ "Female",
              Other==1 ~ "Other"))

d.count_responses <- d %>% group_by(Condition, ResponseAll) %>%
  summarise(n=n()) %>%
  pivot_wider(names_from=ResponseAll,
              values_from=n) %>%
  mutate(Female_MaleOther = Female / (Male+Other),
         Female_Male = Female / Male)

kable(d.count_responses, digits=3)
```

Condition	Female	Male	Other	Female_MaleOther	Female_Male
first	1566	1543	48	0.984	1.015
full	1430	1633	101	0.825	0.876
last	403	2490	243	0.147	0.162

- First name condition has most *female* responses
- Full name condition has second-most *female* responses
- Last name condition has fewest *female* responses

Model 1: Condition

Effect of Condition (first name, last name, full name) on likelihood of a *female* response, as opposed to a *male* or *other* response. Participant and Item are included as random intercepts, with items defined as the unique first, last and first + last name combinations. Because the condition manipulations were fully between-subject and between-item, fitting a random slope model was not possible.

```
m.cond <- glmer(Female ~ Condition + (1|Participant) + (1|Item),
            data=d, family=binomial)
m.cond_tidy <- tidy(m.cond)
summary(m.cond)
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
## Formula: Female ~ Condition + (1 | Participant) + (1 | Item)
##    Data: d
##
##      AIC      BIC   logLik deviance df.resid
##   9177.5   9213.3  -4583.7   9167.5     9452
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.9637 -0.4651 -0.2936  0.5472  4.8560
##
## Random effects:
##  Groups      Name        Variance Std.Dev.
##  Participant (Intercept) 0.2077   0.4557
##  Item        (Intercept) 1.7857   1.3363
## Number of obs: 9457, groups:  Participant, 1351; Item, 105
##
## Fixed effects:
##                              Estimate Std. Error z value Pr(>|z|)
## (Intercept)                   -0.8800     0.1509  -5.831 5.52e-09 ***
## Conditionlast vs first/full    1.9863     0.3430   5.791 7.00e-09 ***
## Conditionfirst vs full        -0.2355     0.3452  -0.682    0.495
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) Cvfrs/
## Cndtnvfrst/ -0.170
## Cndtnfrstvf -0.360 -0.241
```

- Less likely overall to recall character as female.
- Less likely to recall character as female in the Last Name condition as compared to the First and Full Name conditions.

Convert to Odds Ratios

Intercept

```
m.cond_intercept <- m.cond_tidy %>%
  filter(term=="(Intercept)") %>%
  select(estimate) %>% as.numeric()

exp(m.cond_intercept)
```

```
## [1] 0.4147892
```

```
exp(-m.cond_intercept)
```

```
## [1] 2.410863
```

0.41x less likely to recall as female overall. Easier to interpret: 2.41x more likely to recall as male/other overall.

Condition: Last vs First+Full

```
m.cond_LFF <- m.cond_tidy %>%
  filter(term=="Conditionlast vs first/full") %>%
  select(estimate) %>% as.numeric()
exp(m.cond_LFF)
```

```
## [1] 7.288822
```

7.29x more likely to recall as female in First + Full compared to Last. –> 7.29 more likely to recall as male in Last than in First + Full.

Condition: Last Only

Dummy code with Last Name as 0, so that intercept is the Last Name condition only.

```
d %<>% mutate(Condition_Last=case_when(
  Condition=="first" ~ 1,
  Condition=="full" ~ 1,
  Condition=="last" ~ 0))
d$Condition_Last %<>% as.factor()
```

```
m.last <- glmer(Female ~ Condition_Last + (1|Participant) + (1|Item),
          data=d, family=binomial)
m.last_tidy <- tidy(m.last)
```

```
m.cond_last <- m.last_tidy %>%
  filter(term=="(Intercept)") %>%
  select(estimate) %>% as.numeric()

exp(m.cond_last)
```

```
## [1] 0.1118068
```

```
exp(-m.cond_last)
```

```
## [1] 8.943996
```

0.11x times less likely to recall as female in the Last Name condition –> 8.94x more likely to recall as male in the Last Name condition.

Condition: First and Full Only

Dummy code with First and Full Name as 0, so that intercept is average for these two conditions.

```
d %<>% mutate(Condition_FF=case_when(
  Condition=="first" ~ 0,
  Condition=="full" ~ 0,
  Condition=="last" ~ 1))
d$Condition_FF %<>% as.factor()
```

```
m.ff <- glmer(Female ~ Condition_FF + (1|Participant) + (1|Item),
          data=d, family=binomial)
m.ff_tidy <- tidy(m.ff)
```

```
m.cond_ff <- m.ff_tidy %>%
  filter(term=="(Intercept)") %>%
  select(estimate) %>% as.numeric()

exp(m.cond_ff)
```

```
## [1] 0.7555928
```

```
exp(-m.cond_ff)
```

```
## [1] 1.323464
```

0.75x times less likely to recall characters as female in the First and Full Name conditions –> 1.32x more likely to use recall characters as male in the First and Full Name conditions.

Model 2: Condition * Name Gender

Effects of 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* or *other* response. 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 <- glmer(Female ~ Condition * GenderRatingCentered +
            (1|Participant) + (1|Item),
            data=d.FF, family=binomial)
m.namegender_tidy <- tidy(m.namegender)
summary(m.namegender)
```

```
## 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
##
##      AIC      BIC   logLik deviance df.resid
##   6780.8   6821.3  -3384.4   6768.8     6315
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.9540 -0.6305 -0.2378  0.6395  4.4449
##
## Random effects:
##  Groups      Name        Variance Std.Dev.
##  Participant (Intercept) 0.1278   0.3575
##  Item        (Intercept) 0.1506   0.3880
## Number of obs: 6321, groups:  Participant, 903; Item, 83
##
## Fixed effects:
##                                             Estimate Std. Error z value
## (Intercept)                                 -0.19949    0.06001  -3.325
## Conditionfirst vs full                      -0.22603    0.11986  -1.886
## GenderRatingCentered                         0.78314    0.03574  21.909
## Conditionfirst vs full:GenderRatingCentered -0.07369    0.07000  -1.053
##                                             Pr(>|z|)
## (Intercept)                                 0.000886 ***
## Conditionfirst vs full                      0.059331 .
## GenderRatingCentered                         < 2e-16 ***
## Conditionfirst vs full:GenderRatingCentered 0.292442
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##             (Intr) Cndtvf GndrRC
## Cndtnfrstvf -0.342
## GndrRtngCnt -0.065 -0.013
## Cvfll:GndRC -0.010 -0.057 -0.304
```

- Less likely overall to recall character as female in the First and Full Name conditions.
- Somewhat more likely to recall the character as female in the First Name condition as compared to the Full Name condition (trending).
- More likely to recall character as female as first name becomes more feminine.
- No interaction between name condition and first name gender rating.