SPSSI 2023 Program Report

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Introduction

This program report is for Nicholas Zambrotta's SPSSI 2023 presentation held in Denver, CO from June 25th-27th. This research explores the role of LGBT closeness in improving support for marriage equality and general LGBT favorability in conservatives and religious people. Results show that LGBT closeness moderates the relationship between conservatism and support for marriage equality *and* religiosity and support for marriage equality. However, LGBT closeness only moderates the relationship between conservatism and LGBT favorability; it does not improve religious folks' views of LGBT persons.

Data Processing

```
library(dplyr)
library(readr)
library(tidyr)
library(Rfssa)
library(gridExtra)
library(ggplot2)
```

```
load_github_data("https://github.com/ndz2103/SPSSI2023/blob/main/SPSSI2023_Environ.RData")
```

Select columns of interest and rename them to easily understandable names.

```
# select variables of interest
spssi2023_raw <- select(spssi2023_raw, c(AGE_1A, SEX_1A, RACE_1A, SEXORNT_1A, ATTEND_1A, MARHOMO1_1A,
                                         POLVIEWS_1A, V202166, V202172, V202472a, V202472b, V202472c,
                                         V202472d, V202472e, V202474a, V202474b, V202474c, V202474d,
                                         V202474e))

# rename columns
spssi2023_raw <- dplyr::rename(spssi2023_raw, age = AGE_1A, sex = SEX_1A, race = RACE_1A, sexori = SEXO
                               ATTEND_1A, equal_mar = MARHOMO1_1A, poli = POLVIEWS_1A, feel_LGB = V2021
                               lgb_fam = V202472a, lgb_relate = V202472b, lgb_neigh = V202472c, lgb_cow
                               V202472e, trans_fam = V202474a, trans_relate = V202474b, trans_neigh = V
                               V202474d, trans_friend = V202474e)
```

Next, create `lgbt_close` variable that is derived from lgb_close and trans_close variables.

```
# revalue closeness according to "closeness" level
spssi2023_raw$lgb_fam <- ifelse(spssi2023_raw$lgb_fam == 1, 5, 0)
spssi2023_raw$lgb_relate <- ifelse(spssi2023_raw$lgb_relate == 1, 4, 0)
spssi2023_raw$lgb_friend <- ifelse(spssi2023_raw$lgb_friend == 1, 3, 0)
spssi2023_raw$lgb_neigh <- ifelse(spssi2023_raw$lgb_neigh == 1, 2, 0)
spssi2023_raw$lgb_cowork <- ifelse(spssi2023_raw$lgb_cowork == 1, 1, 0)
```

```r
# aggregate score of lgb closeness
spssi2023_raw$lgb_close <- (spssi2023_raw$lgb_fam + spssi2023_raw$lgb_relate +
                            spssi2023_raw$lgb_friend + spssi2023_raw$lgb_neigh +
                            spssi2023_raw$lgb_cowork)

# revalue closeness according to "closeness" level
spssi2023_raw$trans_fam <- ifelse(spssi2023_raw$trans_fam == 1, 5, 0)
spssi2023_raw$trans_relate <- ifelse(spssi2023_raw$trans_relate == 1, 4, 0)
spssi2023_raw$trans_friend <- ifelse(spssi2023_raw$trans_friend == 1, 3, 0)
spssi2023_raw$trans_neigh <- ifelse(spssi2023_raw$trans_neigh == 1, 2, 0)
spssi2023_raw$trans_cowork <- ifelse(spssi2023_raw$trans_cowork == 1, 1, 0)

# aggregate score of transgender closeness
spssi2023_raw$trans_close <- (spssi2023_raw$trans_fam + spssi2023_raw$trans_relate +
                              spssi2023_raw$trans_friend + spssi2023_raw$trans_neigh +
                              spssi2023_raw$trans_cowork)

# average score of lgb_close and trans_close
spssi2023_raw$lgbt_close <- rowMeans(spssi2023_raw[,20:21])
```

Last, reclassify and recode variables for ease of use (e.g., row means for outcome variables, reverse coding, etc.). The product of this process is the `spssi2023_clean.csv` found in the R environment.

```r
# class = numeric
spssi2023_raw[,1:22] <- lapply(spssi2023_raw[,1:22], as.numeric)

# reverse score equal_mar
spssi2023_raw$equal_mar <- (6-spssi2023_raw$equal_mar)

# only 18+ year old
spssi2023_raw$age[spssi2023_raw$age < 18] <- NA

# wrangle feel_LGB and feel_T, create aggregate score feel_LGBT
spssi2023_raw$feel_LGB[spssi2023_raw$feel_LGB < 0] <- NA
spssi2023_raw$feel_T[spssi2023_raw$feel_T < 0] <- NA
spssi2023_raw$feel_LGBT <- rowMeans(spssi2023_raw[,8:9])

spssi2023_raw <- dplyr::rename(spssi2023_raw, lgbt_feel = feel_LGBT)

# remove unnecessary or redundant columns; reorder columns
spssi2023_raw <- spssi2023_raw[,c(1:7, 22:23)]
spssi2023_clean <- select(spssi2023_raw, c(poli, relig_attend, lgbt_feel, equal_mar, lgbt_close, everyt
```

Correlation Matrix

Create new data frame called `cor` for correlation analysis. Rename variables for publication-ready correlation matrix using the custom function found in the R environmnet (link to code in GitHub README.md)

```r
# rename variables to full name
cor <- rename(spssi2023_clean, "Political Ideology" = poli, "Religiosity" = relig_attend,
                               "Pro-Marriage Equality" = equal_mar, "LGBT Favorability" = lgbt_feel,
                               "LGBT Closeness" = lgbt_close)

# select variables of interest
cor <- cor[,1:5]
```

```
# create publication-ready correlation matrix
cor.mat <- as.data.frame(correlation_matrix(cor), type="pearson", digits=3)
## pdf("~/Desktop/Research/SPSSI2023/cor_mat.pdf", height = 4, width = 12)
## grid.table(cor.mat)
## dev.off()
```

Next, conduct individualized correlation analysis of religiosity X political ideology, religiosity and political ideology X approval of marriage equality, and religiosity and political ideology X LGBT favorability.

```
attach(spssi2023_clean)

# religiosity x political ideology
cor.test(relig_attend, poli)
```

```
##
##  Pearson's product-moment correlation
##
## data:  relig_attend and poli
## t = 7.5697, df = 523, p-value = 1.702e-13
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.2349759 0.3893387
## sample estimates:
##       cor
## 0.3142327
```

```
# relig + poli x equal_mar
cor.test(relig_attend, equal_mar)
```

```
##
##  Pearson's product-moment correlation
##
## data:  relig_attend and equal_mar
## t = -9.7433, df = 346, p-value < 2.2e-16
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.5426608 -0.3772741
## sample estimates:
##       cor
## -0.4640013
```

```
cor.test(poli, equal_mar)
```

```
##
##  Pearson's product-moment correlation
##
## data:  poli and equal_mar
## t = -8.8483, df = 343, p-value < 2.2e-16
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.5133126 -0.3410248
## sample estimates:
##       cor
## -0.4310898
```

```r
# relig + poli x lgbt_feel
cor.test(relig_attend, lgbt_feel)
```

```
##
##  Pearson's product-moment correlation
##
## data:  relig_attend and lgbt_feel
## t = -3.5792, df = 513, p-value = 0.0003773
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.23926626 -0.07063984
## sample estimates:
##        cor
## -0.1560902
```

```r
cor.test(poli, lgbt_feel)
```

```
##
##  Pearson's product-moment correlation
##
## data:  poli and lgbt_feel
## t = -9.0831, df = 510, p-value < 2.2e-16
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  -0.4454080 -0.2960727
## sample estimates:
##        cor
## -0.3731548
```

Regression

First, create data frame `spssi2023_regression` which consists of complete cases only from `spssi2023_clean`.

```r
# use only complete cases
spssi2023_regression <- drop_na(spssi2023_clean)
```

Marriage equality linear regression models. The first model is the regular linear model examining relationships between outcome and `poli` and `relig_attend`. The second model is the moderation analysis examining the role of `lgbt_close` in improving support for marriage equality in conservatives and religious people.

Results for the first model show that religiosity and conservatism predict lower support for marriage equality when controlling for age, sex, race, and sexual orientation. This model has a R-sq value of .358 and a p-value $< .001$.

Results for the moderation model show that LGBT-closeness increases support for marriage equality in conservatives (b = .041, $p < .05$) and religious people (b = .022, p = .064). This model has a R-sq value of .39 and a p-value <.001, suggesting that `lgbt_close` provides roughly 3% additional information about the variance in `equal_mar`

The anova test shows that there is a significant difference between model 1 and model 2 (df = 182, F = 3.097, $p < .05$), suggesting that LGBT closeness significantly improves support for marriage equality.

```r
# marriage equality
me1 <- lm(equal_mar ~ relig_attend + poli + age + sex + race + sexori, spssi2023_regression)
summary(me1)
```

```
##
```

```
## Call:
## lm(formula = equal_mar ~ relig_attend + poli + age + sex + race +
##     sexori, data = spssi2023_regression)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -3.9505 -0.4788  0.0864  0.6105  1.9616
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   6.26615    0.57009  10.991  < 2e-16 ***
## relig_attend -0.16410    0.03075  -5.336  2.8e-07 ***
## poli         -0.25894    0.05686  -4.554  9.6e-06 ***
## age          -0.01798    0.00522  -3.445  0.00071 ***
## sex           0.29890    0.15824   1.889  0.06049 .
## race         -0.14126    0.15055  -0.938  0.34932
## sexori       -0.06086    0.16524  -0.368  0.71308
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.031 on 182 degrees of freedom
## Multiple R-squared:  0.3583, Adjusted R-squared:  0.3372
## F-statistic: 16.94 on 6 and 182 DF,  p-value: 1.668e-15
```

```
me2 <- lm(equal_mar ~ relig_attend*lgbt_close + poli*lgbt_close + age + sex + race + sexori, spssi2023_
summary(me2)
```

```
##
## Call:
## lm(formula = equal_mar ~ relig_attend * lgbt_close + poli * lgbt_close +
##     age + sex + race + sexori, data = spssi2023_regression)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -4.1442 -0.4250  0.1526  0.5830  2.0847
##
## Coefficients:
##                           Estimate Std. Error t value Pr(>|t|)
## (Intercept)               6.411540   0.620305  10.336  < 2e-16 ***
## relig_attend             -0.186731   0.037495  -4.980 1.49e-06 ***
## lgbt_close               -0.161245   0.081498  -1.979 0.049403 *
## poli                     -0.321896   0.074119  -4.343 2.35e-05 ***
## age                      -0.018294   0.005136  -3.562 0.000472 ***
## sex                       0.276515   0.155836   1.774 0.077697 .
## race                     -0.132940   0.148680  -0.894 0.372449
## sexori                   -0.003950   0.165253  -0.024 0.980957
## relig_attend:lgbt_close   0.022327   0.011992   1.862 0.064277 .
## lgbt_close:poli           0.040508   0.018265   2.218 0.027830 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 1.014 on 179 degrees of freedom
## Multiple R-squared:   0.39,  Adjusted R-squared:  0.3593
## F-statistic: 12.72 on 9 and 179 DF,  p-value: 1.535e-15
```

```r
# anova test
anova(me1, me2)
```

```
## Analysis of Variance Table
##
## Model 1: equal_mar ~ relig_attend + poli + age + sex + race + sexori
## Model 2: equal_mar ~ relig_attend * lgbt_close + poli * lgbt_close + age +
##     sex + race + sexori
##   Res.Df    RSS Df Sum of Sq      F Pr(>F)
## 1    182 193.57
## 2    179 184.02  3    9.5516 3.0971 0.0282 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

LGBT favorability linear regression models. The first model is the regular linear model examining relationships between outcome and `poli` and `relig_attend`. The second model is the moderation analysis examining the role of `lgbt_close` in improving LGBT favorability in conservatives and religious people.

Results for the first model show that conservatism predicts lower LGBT favorability, but not religiosity, when controlling for age, sex, race, and sexual orientation. This model has a R-sq value of .24 and a p-value $< .001$.

Results for the moderation model show that LGBT closeness increases LGBT favorability in conservatives (b = 1.14, $p < .01$), but not religious people (b = -.028, p = .912). This model has a R-sq value of .319 and a p-value $< .001$, suggesting that `lgbt_close` provides roughly 7% additional information about the variance in `lgbt_feel`.

The anova test shows that there is a significant difference between model 1 and model 2 (df = 182, F = 6.91, $p < .001$), suggesting that LGBT closeness significantly improves LGBT favorability, but only for conservatives.

```r
# lgbt favorability
fvr1 <- lm(lgbt_feel ~ relig_attend + poli + age + sex + race + sexori, spssi2023_regression)
summary(fvr1)
```

```
##
## Call:
## lm(formula = lgbt_feel ~ relig_attend + poli + age + sex + race +
##     sexori, data = spssi2023_regression)
##
## Residuals:
##    Min     1Q Median     3Q    Max
## -72.42 -14.47   0.48  15.90  46.14
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  116.3756    12.3984   9.386  < 2e-16 ***
## relig_attend   0.1142     0.6688   0.171  0.86459
## poli          -6.6989     1.2365  -5.418 1.89e-07 ***
## age           -0.2945     0.1135  -2.594  0.01027 *
## sex           10.7580     3.4414   3.126  0.00206 **
## race          -7.3660     3.2742  -2.250  0.02566 *
## sexori        -7.1962     3.5937  -2.002  0.04672 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 22.43 on 182 degrees of freedom
## Multiple R-squared:  0.2398, Adjusted R-squared:  0.2147
## F-statistic: 9.566 on 6 and 182 DF,  p-value: 3.867e-09
```

```r
fvr2 <- lm(lgbt_feel ~ relig_attend*lgbt_close + poli*lgbt_close + age + sex + race + sexori, spssi2023
summary(fvr2)
```

```
##
## Call:
## lm(formula = lgbt_feel ~ relig_attend * lgbt_close + poli * lgbt_close +
##     age + sex + race + sexori, data = spssi2023_regression)
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -65.557 -12.912   1.828  16.782  42.358
##
## Coefficients:
##                           Estimate Std. Error t value Pr(>|t|)
## (Intercept)             107.31802   13.09840   8.193 4.70e-14 ***
## relig_attend              0.70579    0.79176   0.891  0.37390
## lgbt_close               -1.07436    1.72091  -0.624  0.53323
## poli                     -8.12489    1.56511  -5.191 5.63e-07 ***
## age                      -0.29568    0.10845  -2.726  0.00704 **
## sex                       9.99289    3.29064   3.037  0.00275 **
## race                     -6.35049    3.13953  -2.023  0.04459 *
## sexori                   -4.37981    3.48948  -1.255  0.21106
## relig_attend:lgbt_close  -0.02815    0.25323  -0.111  0.91162
## lgbt_close:poli           1.14038    0.38569   2.957  0.00353 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 21.41 on 179 degrees of freedom
## Multiple R-squared:  0.3187, Adjusted R-squared:  0.2844
## F-statistic: 9.302 on 9 and 179 DF,  p-value: 1.54e-11
```

```r
# anova test
anova(fvr1, fvr2)
```

```
## Analysis of Variance Table
##
## Model 1: lgbt_feel ~ relig_attend + poli + age + sex + race + sexori
## Model 2: lgbt_feel ~ relig_attend * lgbt_close + poli * lgbt_close + age +
##     sex + race + sexori
##   Res.Df   RSS Df Sum of Sq      F    Pr(>F)
## 1    182 91553
## 2    179 82050  3    9502.6 6.9103 0.0001987 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

Visualization

Due to an issue with the `predict()` function, I manually created functions derived from the regression outputs of the models above.

```r
# predict values
## marriage equality model
me1 <- function(a, b, c, d, f, g) {
  6.266 - .164*a - .259*b - .018*c + .299*d - .141*f - .061*g
}
```

```
## marriage equality moderation
me2 <- function(a, b, c, d, f, g, h, i, j) {
  6.412 - .187*a - .161*b - .322*c - .018*d + .277*f - .133*g - .004*h + .022*i + .041*j
}

## lgbt favorability model
fvr1 <- function(a, b, c, d, f, g) {
  116.376 + .114*a - 6.699*b - .204*c + 10.758*d - 7.366*f - 7.196*g
}

## lgbt favorability moderation
fvr2 <- function(a, b, c, d, f, g, h, i, j) {
  107.318 + 0.706*a - 1.074*b - 8.125*c - .296*d + 9.993*f - 6.35*g - 4.38*h - .028*i + 1.14*j
}
```

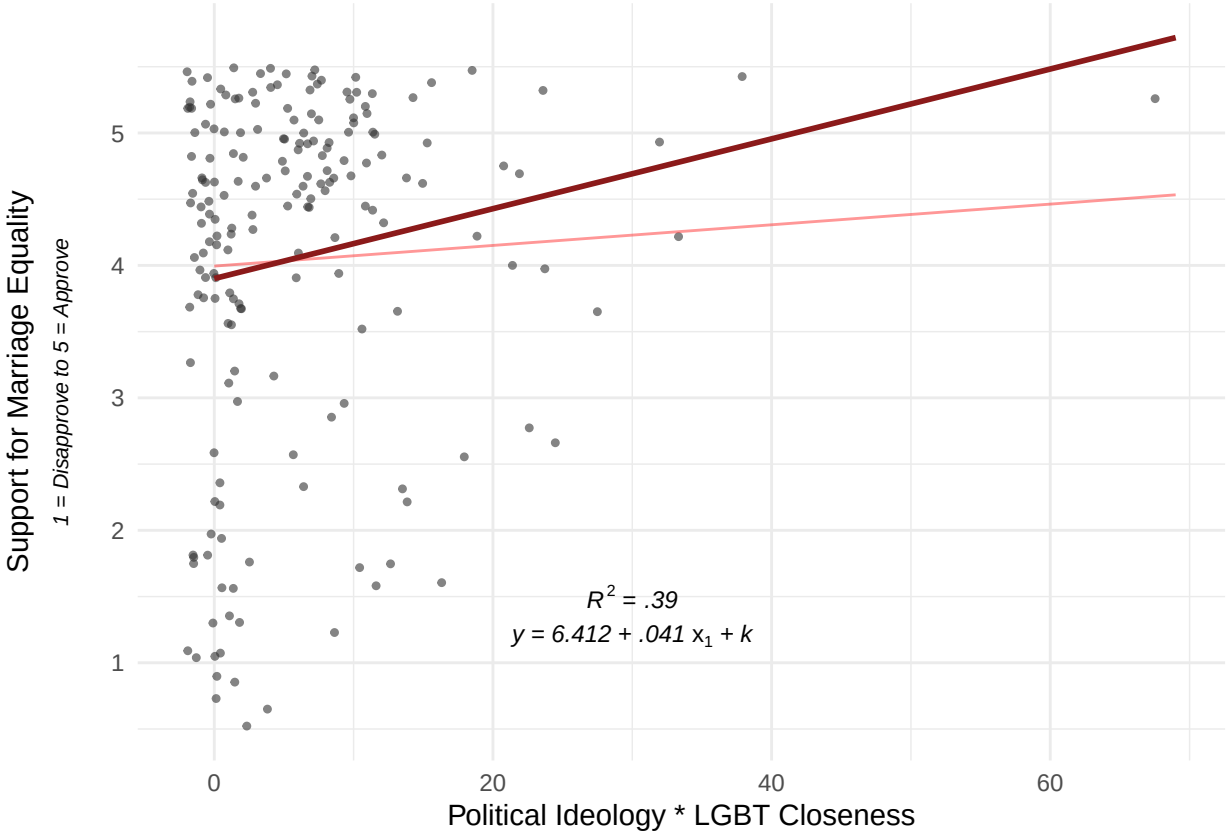
Using the defined equations, create columns predicting respondent support for marriage equality and LGBT favorability.

```
attach(spssi2023_regression)

spssi2023_regression$me1 <- me1(relig_attend, poli, age, sex, race, sexori)
spssi2023_regression$me2 <- me2(relig_attend, lgbt_close, poli, age, sex, race, sexori, relig_attend*lgb

spssi2023_regression$fvr1 <- fvr1(relig_attend, poli, age, sex, race, sexori)
spssi2023_regression$fvr2 <- fvr2(relig_attend, lgbt_close, poli, age, sex, race, sexori, relig_attend*l
```

Marriage Equality



LGBT Favorability