

# Baruch College Undergrads Respond to Extension of Social Greek Life Ban

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## Introduction

On Tuesday May 8, 2018, Provost and Senior Vice President for Academic Affairs at Baruch College, David P. Christy, and Vice President for Student Affairs & Dean of Students at Baruch College, Art King, have issued an extension of the moratorium regarding social Greek organizations at Baruch College. The analysis of the following data (using statistical computing language, R) seeks to measure students' response to this and determine conclusions from the data.

## Data

The data was collected through an online survey created through Google Forms, intended for Baruch College undergraduate students to respond. The survey started at 3:30pm EST on Wednesday, May 09, 2018 and ended at 9:15am on Friday, May 11, 2018. Baruch College has an undergraduate population of 15,254 and 69/70 of those surveyed identified as Baruch College undergraduate students.

Specific questions of interest include:

- 1) Is gender associated with supporting the extension?
- 2) Does gender play a role with wanting to join a social Greek organization?
- 3) Which year(s) support/do not support the extension the most?
- 4) Who considered joining social Greek life if the ban was lifted?

One consideration to make: the freshman sub-population may be underrepresented, since only 7 freshmen (10.1% of the sample population) were surveyed.

## Variables

Variable	Description
is.Baruch	<i>C</i> Are you a Baruch undergraduate student? - Y or N.
student.Gender	<i>C</i> What is your gender? - Female, Male, Non-binary/third gender
student.Year	<i>C</i> What is your year? - Freshman, Sophomore, Junior, Senior
student.Status	<i>C</i> Academic Status per semester. - Full-time, Part-time

Variable	Description
student.Opinion	C Do you support the extension? - Y or N.
student.Join	C Would you have considered joining a social Greek organization if the ban was lifted? - Y or N?

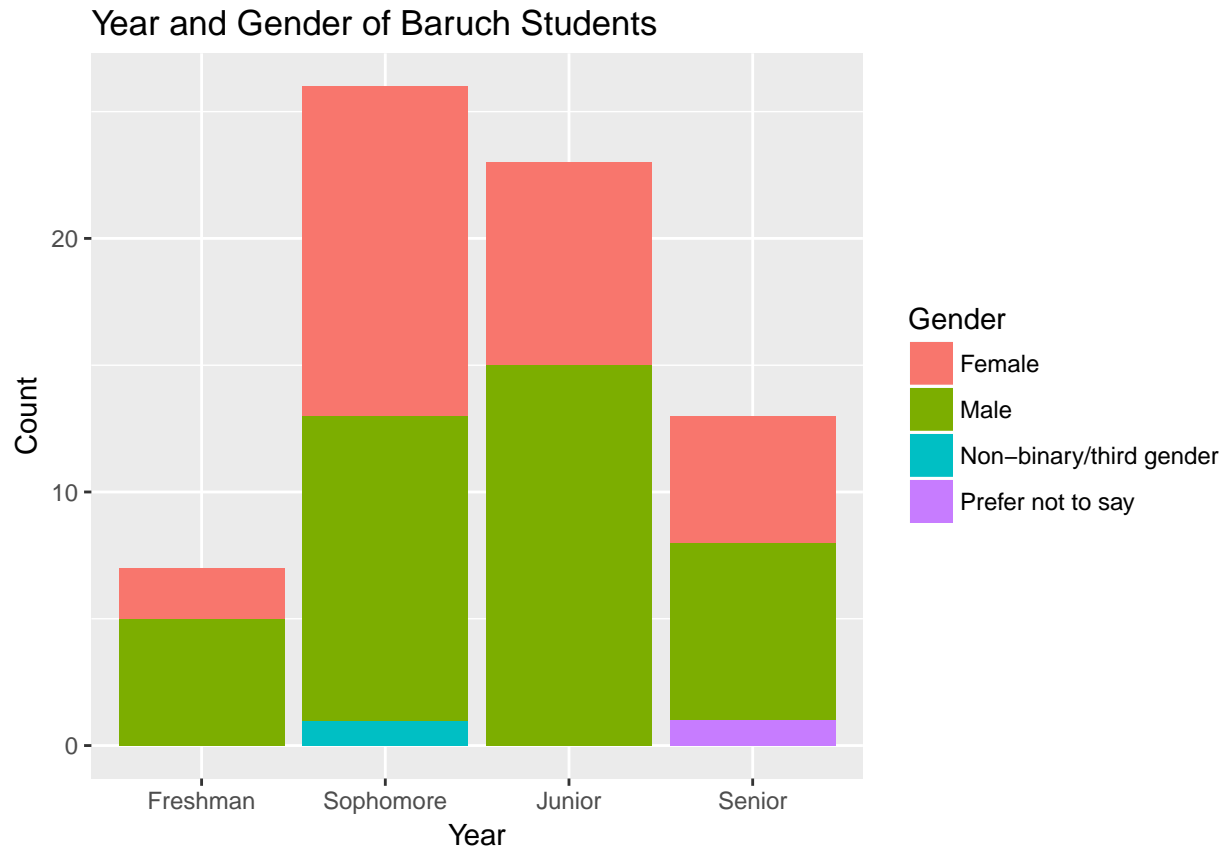
C - Categorical

## Exploratory Data Analysis (EDA) and Statistical Inference

```
# Sorting data by students' academic year sort is a temp
# variable
sort = rep(0, nrow(surveyData))
sort[with(surveyData, studentYear == "Freshman")] = 1
sort[with(surveyData, studentYear == "Sophomore")] = 2
sort[with(surveyData, studentYear == "Junior")] = 3
sort[with(surveyData, studentYear == "Senior")] = 4
surveyData$studentYear = with(surveyData, reorder(studentYear,
  sort))
# Deleting sort
rm(sort)
# Display table of all students' gender and academic year
with(surveyData, table(studentGender, studentYear))
```

```
##               studentYear
## studentGender  Freshman Sophomore Junior Senior
##   Female              2         13      8      5
##   Male              5         12     15      7
##   Non-binary/third gender  0          1      0      0
##   Prefer not to say      0          0      0      1
```

```
# Plot the data
ggplot(surveyData, aes(x = studentYear, fill = studentGender)) +
  geom_bar() + labs(fill = "Gender", x = "Year", y = "Count",
  title = "Year and Gender of Baruch Students")
```



```
#Create table of gender proportions in the sample population
genderTable = with(surveyData, table(student.Gender))
#Proportions of gender
genderTable/sum(genderTable)
```

```
## student.Gender
##               Female               Male Non-binary/third gender
##               0.40579710             0.56521739             0.01449275
##       Prefer not to say
##               0.01449275
```

Proportion of females:

$$\hat{p}_F = 0.41$$

Proportion of males:

$$\hat{p}_M = 0.57$$

Proportion of non-binary/third gender individuals:

$$\hat{p}_{NB} = 0.01$$

Proportion of individuals who did not prefer to say:

$$\hat{p}_N = 0.01$$

```
#Create table of academic year proportions in the sample population
yearTable = with(surveyData, table(student.Year))
#Proportions of academic year
yearTable/sum(yearTable)
```

```
## student.Year
## Freshman Junior Senior Sophomore
## 0.1014493 0.3333333 0.1884058 0.3768116
```

Proportion of freshmen:

$$\hat{p}_{fresh} = 0.10$$

Proportion of sophomores:

$$\hat{p}_{soph} = 0.33$$

Proportion of juniors:

$$\hat{p}_{jun} = 0.19$$

Proportion of seniors:

$$\hat{p}_{sen} = 0.38$$

```
#Create table of proportions for academic status in the sample population
statusTable = with(surveyData, table(student.Status))
#Proportions of academic status
statusTable/sum(statusTable)
```

```
## student.Status
## Full-time student (12 or more credits)
## 0.92753623
## Part-time student (Less than 12 credits)
## 0.07246377
```

Proportion of full-time students:

$$\hat{p}_{ft} = 0.93$$

Proportion of part-time students:

$$\hat{p}_{pt} = 0.07$$

```
#Create table of student opinion of extension proportions in the sample population
supportTable = with(surveyData, table(student.Opinion))
#Proportions of student opinion of extension
supportTable/sum(supportTable)
```

```
## student.Opinion
## No Yes
## 0.6376812 0.3623188
```

Proportion of those who support the extension:

$$\hat{p}_{sup} = 0.36$$

Proportion of those who do not support the extension:

$$\hat{p}_{nsup} = 0.64$$

```
#Create table of proportions for those considering/not considering joining a social Greek organization
joinTable = with(surveyData, table(student.Join))
#Proportions of those considering/not considering
joinTable/sum(joinTable)
```

```
## student.Join
## No Yes
## 0.5942029 0.4057971
```

Proportion of those who would consider joining a social Greek organization:

$$\hat{p}_c = 0.41$$

Proportion of those who would not consider joining a social Greek organization:

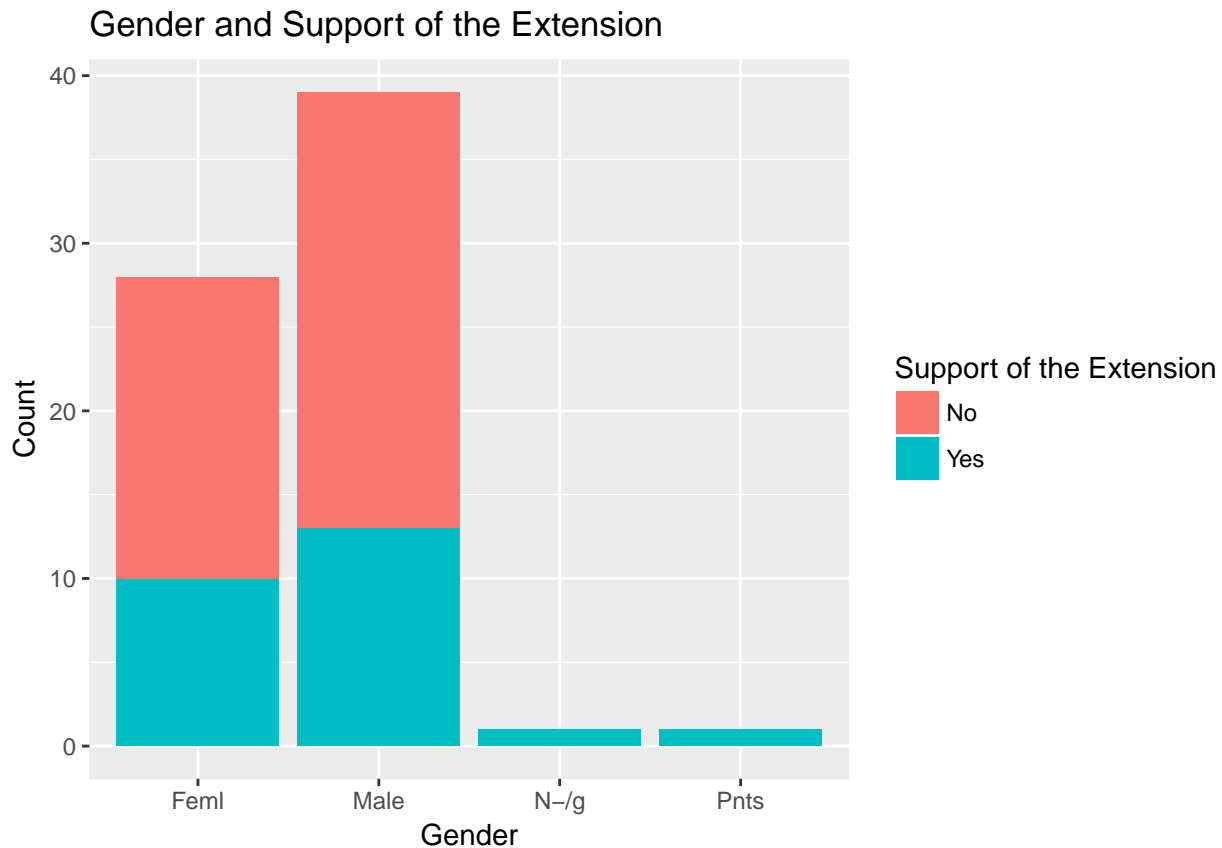
$$\hat{p}_{nc} = 0.59$$

### 1. Is gender associated with supporting the extension?

$H_o$ : Gender and support of the extension are independent.

$H_a$ : Gender and support of the extension are dependent.

```
# Plot the data
p0 <- ggplot(surveyData, aes(x = studentGender, fill = studentOpinion)) +
  geom_bar() + labs(fill = "Support of the Extension", x = "Gender",
    y = "Count", title = "Gender and Support of the Extension")
# Abbreviate x-axis labels
p0 + scale_x_discrete(labels = abbreviate)
```



```
totalFemales = length(which(student.Gender == "Female"))
# Number of females who do not support the extension
fem_noSup = length(which(student.Gender == "Female" & student.Opinion ==
  "No"))
# Number of females who do support the extension
fem_Sup = length(which(student.Gender == "Female" & student.Opinion ==
  "Yes"))
```

```

totalMales = length(which(student.Gender == "Male"))
# Number of males who do not support the extension
male_noSup = length(which(student.Gender == "Male" & student.Opinion ==
  "No"))
# Number of males who do support the extension
male_Sup = length(which(student.Gender == "Male" & student.Opinion ==
  "Yes"))
# Entering data into vectors
females = c(fem_noSup, fem_Sup)
males = c(male_noSup, male_Sup)
# Combining the row vectors in matrices, then converting the
# matrix into a data frame
supportSubset = as.data.frame(rbind(females, males))
# Assigning column names to this data frame
names(supportSubset) = c("Do not support", "Support")
chisq.test(supportSubset, correct = FALSE)

##
## Pearson's Chi-squared test
##
## data: supportSubset
## X-squared = 0.040984, df = 1, p-value = 0.8396
# Proportions of females who support the extension
fem_Sup/totalFemales

## [1] 0.3571429
# Proportions of males who support the extension
male_Sup/totalMales

## [1] 0.3333333

```

### Comments

Since  $p = 0.8396 > 0.05$ , we accept the null hypothesis and conclude that gender (female and male) and support of extension are independent. Additionally, it was found that 38% of females support the extension, while 33% of males support the extension.

Due to a small size of non-binary/third gender and those who did not prefer to say (sample population of 1 each), their proportions should not be considered due to statistical insignificance.

## 2. Does gender play a role with wanting to join a social Greek organization?

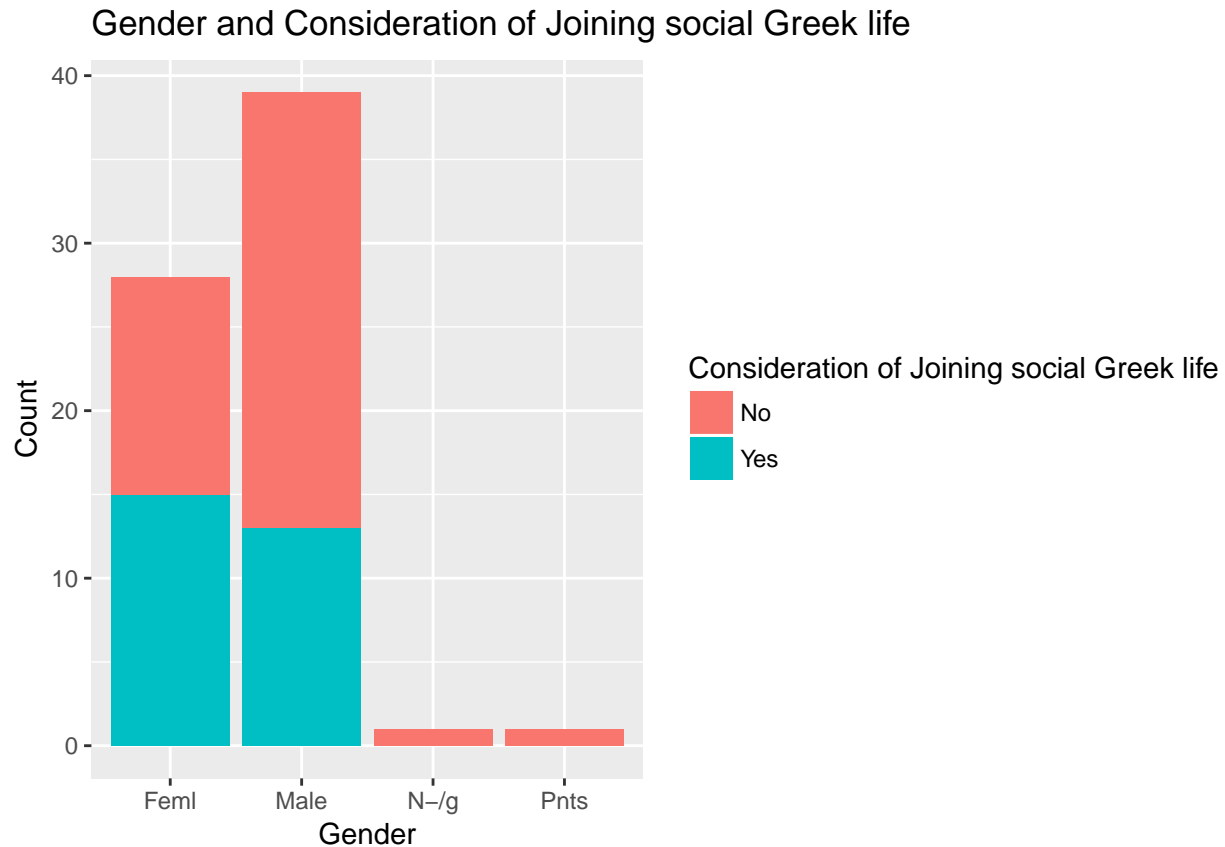
$H_o$ : Gender and wanting to join a social Greek organization, if the ban was lifted are independent.

$H_a$ : Gender and wanting to join a social Greek organization, if the ban was lifted are dependent.

```

# Plot the data
p1 <- ggplot(surveyData, aes(x = studentGender, fill = studentJoin)) +
  geom_bar() + labs(fill = "Consideration of Joining social Greek life",
  x = "Gender", y = "Count", title = "Gender and Consideration of Joining social Greek life")
# Abbreviate x-axis labels
p1 + scale_x_discrete(labels = abbreviate)

```



```

# Number of females who would not have considered joining a
# social Greek organization
fem_nCon = length(which(student.Gender == "Female" & student.Join ==
  "No"))
# Number of females who would have considered joining a
# social Greek organization
fem_con = length(which(student.Gender == "Female" & student.Join ==
  "Yes"))
# Number of males who would not have considered joining a
# social Greek organization
male_nCon = length(which(student.Gender == "Male" & student.Join ==
  "No"))
# Number of males who would have considered joining a social
# Greek organization
male_con = length(which(student.Gender == "Male" & student.Join ==
  "Yes"))
# Entering data into vectors
females_c = c(fem_nCon, fem_con)
males_c = c(male_nCon, male_con)
# Combining the row vectors in matrices, then converting the
# matrix into a data frame
joinSubset = as.data.frame(rbind(females_c, males_c))
# Assigning column names to this data frame
names(joinSubset) = c("Do not support", "Support")
chisq.test(joinSubset, correct = FALSE)

```

```
##
```

```
## Pearson's Chi-squared test
##
## data:  joinSubset
## X-squared = 2.7442, df = 1, p-value = 0.09761
# Proportion of females who would have considered joining a
# social Greek organization
fem_con/totalFemales

## [1] 0.5357143
# Proportion of males who would have considered joining a
# social Greek organization
male_con/totalMales

## [1] 0.3333333
```

### Comments

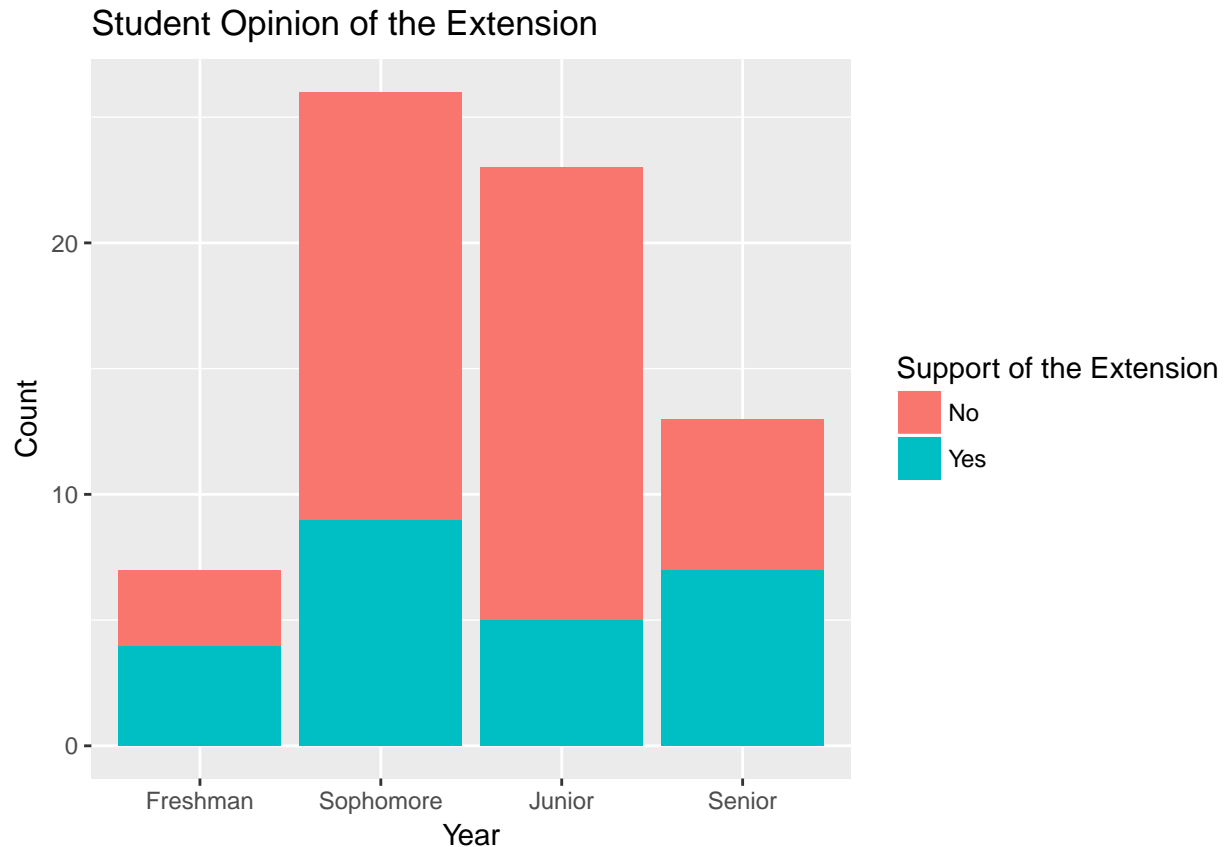
Since  $p = 0.10 > 0.05$ , we accept the null hypothesis and conclude that gender and wanting to join a social Greek organization, if the ban was lifted are independent. It was found that 54% of females would have considered joining a social Greek organization, while 33% of males would have considered joining a social Greek organization.

Due to a small size of non-binary/third gender and those who did not prefer to say (sample population of 1 each), their proportions should not be considered due to statistical insignificance.

### 3. Which year(s) support/not support the extension the most?

```
# Plot the data
ggplot(surveyData, aes(x = studentYear, fill = studentOpinion)) +
  geom_bar() + labs(fill = "Support of the Extension", x = "Year",
    y = "Count", title = "Student Opinion of the Extension")
```





```

totalFresh = length(which(student.Year == "Freshman"))
# Number of freshman who do not support the extension
fresh_noSup = length(which(student.Year == "Freshman" & student.Opinion ==
  "No"))
# Number of freshman support the extension
fresh_Sup = length(which(student.Year == "Freshman" & student.Opinion ==
  "Yes"))

totalSoph = length(which(student.Year == "Sophomore"))
# Number of sophomores who do not support the extension
soph_noSup = length(which(student.Year == "Sophomore" & student.Opinion ==
  "No"))
# Number of sophomores support the extension
soph_Sup = length(which(student.Year == "Sophomore" & student.Opinion ==
  "Yes"))
# Number of juniors who do not support the extension

totalJun = length(which(student.Year == "Junior"))
jun_noSup = length(which(student.Year == "Junior" & student.Opinion ==
  "No"))
# Number of juniors support the extension
jun_Sup = length(which(student.Year == "Junior" & student.Opinion ==
  "Yes"))
# Number of seniors who do not support the extension

totalSen = length(which(student.Year == "Senior"))
sen_noSup = length(which(student.Year == "Senior" & student.Opinion ==

```

```

    "No"))
# Number of juniors support the extension
sen_Sup = length(which(student.Year == "Senior" & student.Opinion ==
    "Yes"))

#Proportion of freshmen who support the extension
pFreshSup = fresh_Sup/totalFresh
pFreshSup

## [1] 0.5714286

#Proportion of freshmen who do not support the extension
pFreshNoSup =fresh_noSup/totalFresh
pFreshNoSup

## [1] 0.4285714

#Proportion of sophomores who support the extension
pSophSup = soph_Sup/totalSoph
pSophSup

## [1] 0.3461538

#Proportion of sophomores who do not support the extension
pSophNoSup = soph_noSup/totalSoph
pSophNoSup

## [1] 0.6538462

#Proportion of juniors who support the extension
pJunSup = jun_Sup/totalJun
pJunSup

## [1] 0.2173913

#Proportion of juniors who do not support the extension
pJunNoSup = jun_noSup/totalJun
pJunNoSup

## [1] 0.7826087

#Proportion of seniors who support the extension
pSenSup = sen_Sup/totalSen
pSenSup

## [1] 0.5384615

#Proportion of seniors who do not support the extension
pSenNoSup = sen_noSup/totalSen
pSenNoSup

## [1] 0.4615385

#Return year of highest support and its proportion
supportSet_Year = c(pFreshSup, pSophSup, pJunSup, pSenSup)
maxNum = max(supportSet_Year)
maxName <- c("Freshman", "Sophomore", "Junior", "Senior")[which.max(supportSet_Year)]
print(maxName)

## [1] "Freshman"

```

```
print(maxNum)

## [1] 0.5714286
#Return year of highest not support and its proportion
noSupportSet_Year = c(pFreshNoSup, pSophNoSup, pJunNoSup, pSenNoSup)
maxNum_1 = max(noSupportSet_Year)
maxName_1 <- c("Freshman", "Sophomore", "Junior", "Senior")[which.max(noSupportSet_Year)]
print(maxName_1)

## [1] "Junior"
print(maxNum_1)

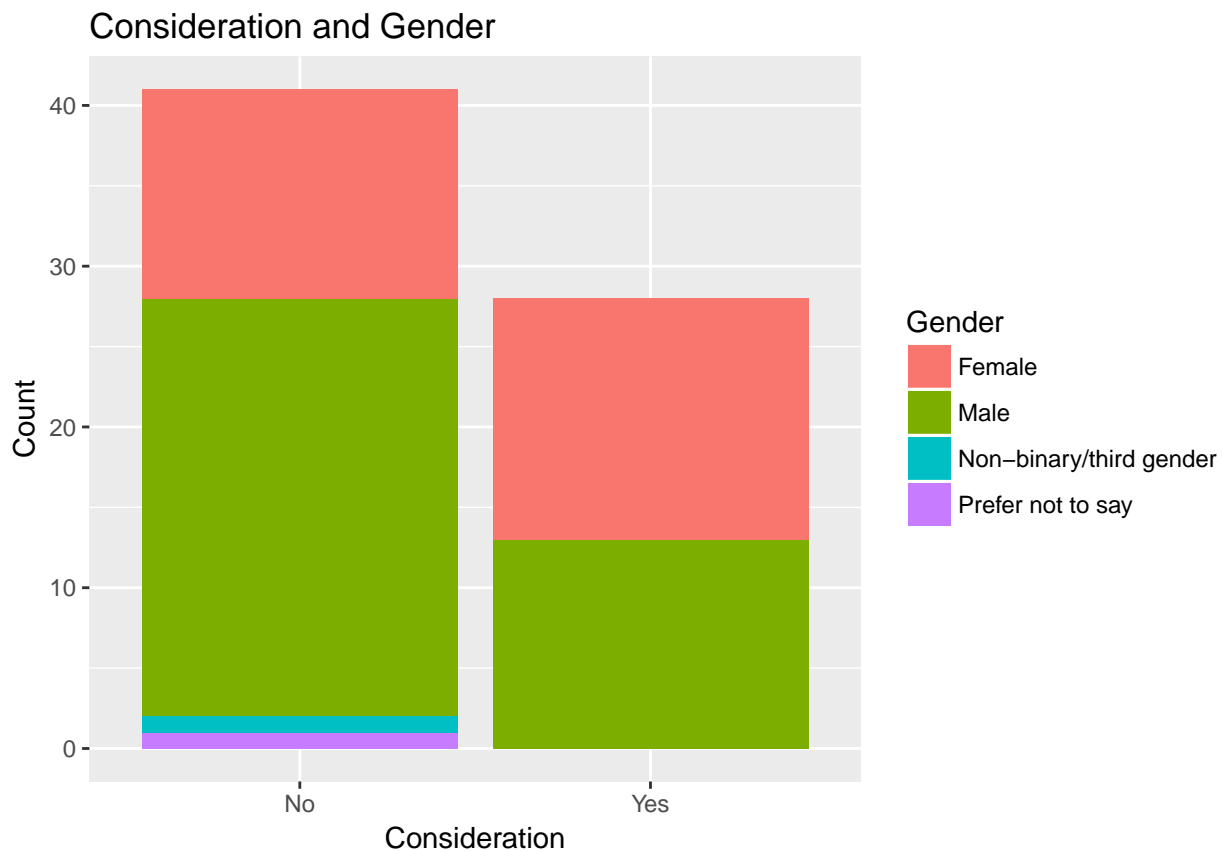
## [1] 0.7826087
```

### Comments

The highest proportion of supporters of the extension is 57% of freshmen, while the highest proportion of non-supporters is 78% of juniors.

#### 4) Who, in particular, considered joining social Greek life if the ban was lifted?

```
ggplot(surveyData, aes(x = studentJoin, fill = studentGender)) +
  geom_bar() + labs(fill = "Gender", x = "Consideration", y = "Count",
    title = "Consideration and Gender")
```



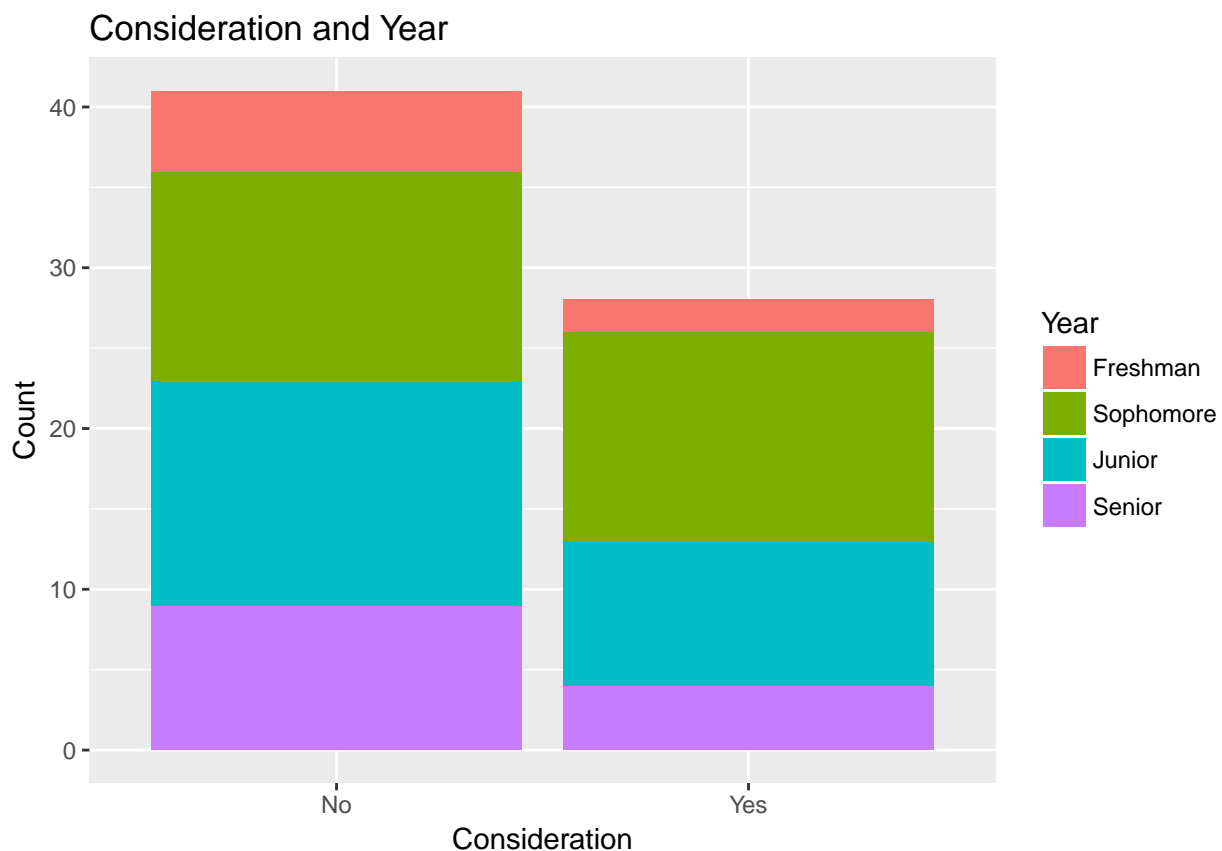
```
totalJoin = length(which(student.Join == "Yes"))
# Proportions of females who would consider joining a social
# Greek organization
fem_con/totalJoin
```

```
## [1] 0.5357143
```

```
# Proportions of males who would consider joining a social
# Greek organization
male_con/totalJoin
```

```
## [1] 0.4642857
```

```
ggplot(surveyData, aes(x = student.Join, fill = student.Year)) +
  geom_bar() + labs(fill = "Year", x = "Consideration", y = "Count",
  title = "Consideration and Year")
```



```
freshJoin = length(which(student.Join == "Yes" & student.Year ==
  "Freshman"))
sophJoin = length(which(student.Join == "Yes" & student.Year ==
  "Sophomore"))
junJoin = length(which(student.Join == "Yes" & student.Year ==
  "Junior"))
senJoin = length(which(student.Join == "Yes" & student.Year ==
  "Senior"))
# Proportions of freshmen who would consider joining a social
# Greek organization
freshJoin/totalJoin
```

```
## [1] 0.07142857
```

```
# Proportions of sophomores who would consider joining a  
# social Greek organization  
sophJoin/totalJoin
```

```
## [1] 0.4642857
```

```
# Proportions of juniors who would consider joining a social  
# Greek organization  
junJoin/totalJoin
```

```
## [1] 0.3214286
```

```
# Proportions of seniors who would consider joining a social  
# Greek organization  
senJoin/totalJoin
```

```
## [1] 0.1428571
```

## Comments

Of those who said yes, 54% were male and 46% were female.

Of those who said yes, 7.14% were freshmen, 46.42% were sophomores, 32.14% were juniors, and 14.29% were seniors.

## Conclusion/findings

The proportion of those who support the extension is 0.36.

The proportion of those who do not support the extension is 0.64

The proportion of those would consider joining a social Greek organization is 0.41

The proportion of those would not consider joining a social Greek organization is 0.59

- 1) Gender and support of the extension are independent variables. The Chi-Square test for these two variables strongly suggest that males and females have similar preferences for the support of the extension. It was found that 38% of females support the extension, while 35% of males support the extension.
- 2) Gender and consideration of joining social Greek life are independent variables.

```
length(which(student.Gender == "Female"))
```

```
## [1] 28
```

```
length(which(student.Gender == "Male"))
```

```
## [1] 39
```

There were 28 females surveyed, while 39 males were surveyed. The difference in sample populations must be considered and is accounted for in the Chi-Square test. It may appear that there is a higher preference for females to join Greek life, but one has to consider the sub-populations of females and males. The Chi-Square for these two variables strongly suggest that males and females have similar preferences for considering whether to join social Greek life. It was found that 54% of females would have considered joining a social Greek organization, while 33% of males would have considered joining a social Greek organization.

- 3) It was found that the highest proportion, across years, of supporters of the extension were freshman (57%). The lowest proportion, across years, of those who do not support the extension were juniors (78%)

- 4) Of those who said they would consider joining a social Greek organization, 54% were female and 46% were male. Within this statistic (those who would consider joining a social Greek organization), 7.14% were freshmen, 46.42% were sophomores, 32.14% were juniors, and 14.29% were seniors.

### **Shortcomings/Considerations**

Potential sources of bias/error in the data collection include: small randomness, response bias, and the sample not matching the population very well (undercoverage).

The freshman sub-population may be underrepresented, since only 7 freshmen (10.1% of the sample population) were surveyed.