Draft Visualizations for Semester Project

# Loading the Data and Necessary Packages

library(dplyr)

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

library(tidyr)  
library(ggplot2)

## Warning: package 'ggplot2' was built under R version 3.5.1

health <- read.csv("mentalsurvey\_clean.csv")

# Section 1: Showing that Mental and Behavioral Health Issues Impact Workers

# Section 2: What are Other Companies Doing to Assist workers with Mental and Behavioral Health Policies

# Section 3: What are Factors that Might Limit the Impact of Behavioral Health Outreach

## Anonymity Policies

If employees feel that their anonymity is not protected, they may be less likely to reach out for help.

### Anonymity Policies by Company Size

#### Crosstab Table

#Put company size in order  
health$CompanySize = factor(health$How.many.employees.does.your.company.or.organization.have, levels=c("1-5", "6-25", "26-100", "100-500", "500-1000", "More than 1000"))  
#Create Cross-tab Table  
APbCS <- table(health$Is.your.anonymity.protected.if.you.choose.to.take.advantage.of.mental.health.or.substance.abuse.treatment.resources.provided.by.your.employer., health$CompanySize)  
head(APbCS)

##   
## 1-5 6-25 26-100 100-500 500-1000 More than 1000  
## I don't know 31 133 196 166 56 160  
## No 20 24 18 8 2 12  
## Yes 9 53 78 74 22 84

#### Proportions table

#Create a proportions table by Row  
prop.table(APbCS, 2)

##   
## 1-5 6-25 26-100 100-500 500-1000  
## I don't know 0.51666667 0.63333333 0.67123288 0.66935484 0.70000000  
## No 0.33333333 0.11428571 0.06164384 0.03225806 0.02500000  
## Yes 0.15000000 0.25238095 0.26712329 0.29838710 0.27500000  
##   
## More than 1000  
## I don't know 0.62500000  
## No 0.04687500  
## Yes 0.32812500

#### Chi-Squared Test

#Do a chi-squared test  
chisq.test(APbCS)

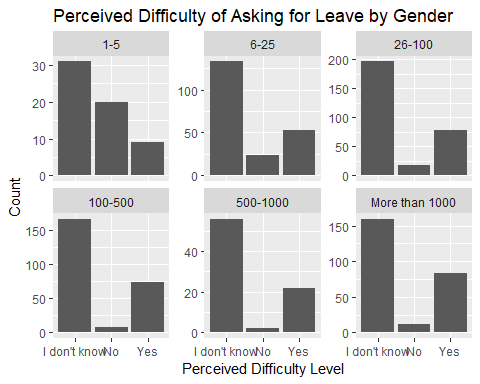
## Warning in chisq.test(APbCS): Chi-squared approximation may be incorrect

##   
## Pearson's Chi-squared test  
##   
## data: APbCS  
## X-squared = 80.824, df = 10, p-value = 3.461e-13

We get a warning that the approximation may be incorrect, likely because some of the values from the table are small. Therefore, we cannot draw and conclusions for this test about whether these two variables are related.

#### Visualization of Data

t0 <- ggplot(health, aes(x = health$Is.your.anonymity.protected.if.you.choose.to.take.advantage.of.mental.health.or.substance.abuse.treatment.resources.provided.by.your.employer.))+geom\_bar()+facet\_wrap(~health$CompanySize, scales="free\_y") + ggtitle("Perceived Difficulty of Asking for Leave by Gender") + xlab("Perceived Difficulty Level") + ylab("Count")   
t0



#### Interpretation of Results

The table and chart above show that across all company sizes, most respondents indicate that they do not know what their current company’s anonymity policy is towards those using mental health services. For companies of 1-5 employees, the next most common answer is “No” (anonymity is not protected). However, for companies larger than 5 employees, the results appear fairly consistent, with the majority of respondents (60-70 percent) indicating that they do not know anonymity policies, a sizable minority of respondents saying that anonymity is protected (25-32 percent), and less than 10 percent of respondents in each group saying anonymity is not protected. Based off of the chi-squared test, it is not clear if there is a statistically significant difference in anonymity policies of companies of different sizes. However, the fact that the majority of respondents across company sizes do not know their company’s anonymity policy is something that has to be addressed in any outreach program, as a study by Milne, et al (1994) has found that participants tended to be more confident in a company’s Employee Assistance Program if they felt it was confidential (p. 141). Therefore, any outreach must make the company’s anonymity policy clear.

### Anonymity Policies by Whether it is a Tech Company

#### Cross-tab Table

#Add labels to tech company org  
health$TLabel <- factor(health$Is.your.employer.primarily.a.tech.company.organization.,  
levels = c(0, 1),  
labels = c("Not primarily tech", "Primarily Tech"))

#Create a crosstab table  
APbT2 <- table(health$Is.your.anonymity.protected.if.you.choose.to.take.advantage.of.mental.health.or.substance.abuse.treatment.resources.provided.by.your.employer., health$TLabel)  
head(APbT2)

##   
## Not primarily tech Primarily Tech  
## I don't know 169 573  
## No 15 69  
## Yes 79 241

#### Proportions table

#Create a proportions table by Row  
prop.table(APbT2, 2)

##   
## Not primarily tech Primarily Tech  
## I don't know 0.64258555 0.64892412  
## No 0.05703422 0.07814270  
## Yes 0.30038023 0.27293318

#### Chi-Squared Test

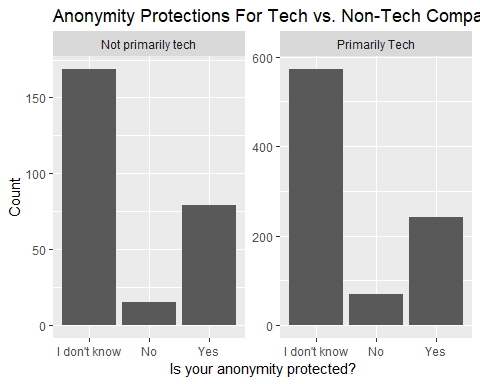
#Do a chi-squared test  
chisq.test(APbT2)

##   
## Pearson's Chi-squared test  
##   
## data: APbT2  
## X-squared = 1.7911, df = 2, p-value = 0.4084

This chi-squared test’s p value is very large. Therefore, there is likely not a relationship between these two variables.

#### Visualization of Data

#Create Visualization  
t1 <- ggplot(health, aes(x = health$Is.your.anonymity.protected.if.you.choose.to.take.advantage.of.mental.health.or.substance.abuse.treatment.resources.provided.by.your.employer.))+geom\_bar()+facet\_wrap(health$TLabel ~ ., scales="free\_y") + ggtitle("Anonymity Protections For Tech vs. Non-Tech Companies") + xlab("Is your anonymity protected?") + ylab("Count")   
t1



#### Interpretation of Results

The difference between primarily tech and non-primarily tech companies is not statistically significant in regards to anonymity policies for those seeking mental health services. However, this may be influenced by the fact that the majority of those surveyed work for primiarily tech-oriented companies, so we do not have a large sample of those working for non-tech companies. Furthermore, we do not know the industry that these non-tech companies are in, which means we cannot draw any firm conclusions here. Nevertheless, in both cases, the clear majority of those surveyed indicated that they do not know their current company’s anonymity policy is towards those using mental health services. In both cases, the next most common response to the question is that anonymity is protected for those using mental health services. As described above, the fact the majority of respondents do not know their company’s anonymity policy is something that has to be addressed.

## Ease of Asking for Leave For A Mental Health Issue

This is important because if employees feel that asking for time off from work for medical leave, they may be less likely to seek the help they need.

### Answers by Gender

#Modify Labels (ideal if we can get it to fit)  
health$pd2 <- factor(health$If.a.mental.health.issue.prompted.you.to.request.a.medical.leave.from.work..asking.for.that.leave.would.be.,  
levels = c("Very easy", "Somewhat easy", "Neither easy nor difficult","Somewhat difficult", "Very difficult", "I don't know"),  
labels = c("Very easy (VE)", "Somewhat Easy (SE)", "Neutral (N)", "Somewhat Hard (SH)", "Very Hard (VH)", "Don't Know (DK)"))  
#Modify Labels (if health$pd2 does not fit, use this as an alternate)  
health$pd3 <- factor(health$If.a.mental.health.issue.prompted.you.to.request.a.medical.leave.from.work..asking.for.that.leave.would.be.,  
levels = c("Very easy", "Somewhat easy", "Neither easy nor difficult","Somewhat difficult", "Very difficult", "I don't know"),  
labels = c("VE", "SE", "N", "SH", "VH", "DK"))

#Crosstab table  
ELDbG <- table(health$pd2, health$gender)  
ELDbG

##   
## Female Male Other  
## Very easy (VE) 48 168 4  
## Somewhat Easy (SE) 60 213 8  
## Neutral (N) 38 137 3  
## Somewhat Hard (SH) 58 136 5  
## Very Hard (VH) 39 76 3  
## Don't Know (DK) 28 117 5

prop.table(ELDbG, 2)

##   
## Female Male Other  
## Very easy (VE) 0.17712177 0.19834711 0.14285714  
## Somewhat Easy (SE) 0.22140221 0.25147580 0.28571429  
## Neutral (N) 0.14022140 0.16174734 0.10714286  
## Somewhat Hard (SH) 0.21402214 0.16056671 0.17857143  
## Very Hard (VH) 0.14391144 0.08972845 0.10714286  
## Don't Know (DK) 0.10332103 0.13813459 0.17857143

#### Chi-Squared

We get a warning that the approximation may be incorrect, likely because some of the values from the table are small. However, it potentially indicates that that the differences between genders may not be statistically significant (or we do not have enough information)

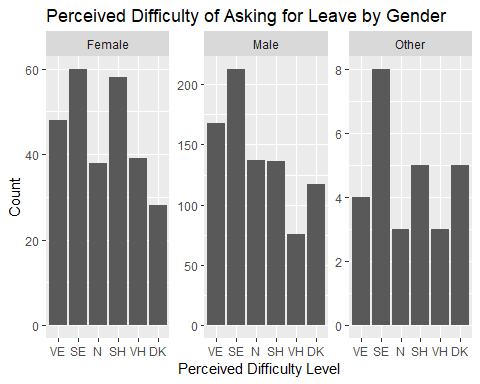
chisq.test(ELDbG)

## Warning in chisq.test(ELDbG): Chi-squared approximation may be incorrect

##   
## Pearson's Chi-squared test  
##   
## data: ELDbG  
## X-squared = 14.474, df = 10, p-value = 0.1524

#### Visualization of Data

#Create Visualization  
t2 <- ggplot(health, aes(x = health$pd3))+geom\_bar()+facet\_wrap(health$gender ~ ., scales="free\_y") + ggtitle("Perceived Difficulty of Asking for Leave by Gender") + xlab("Perceived Difficulty Level") + ylab("Count")   
t2

 NOTE: VE = Very Easy, SE = Somewhat Easy, N = Neutral (or Neither Easy nor Difficult), SH = Somewhat Hard, VH = Very Hard, DK = Don’t Know.

#### Interpretation of Results

Across all genders, the most common answer is “Somewhat Easy”. Interestingly, for women the second most common answer is “Somewhat Difficult”, while for men the second most common answer is “Very Easy.” For those indicating their gender falls into another category, an equal amount indicated that they felt asking for leave was very hard or provided a neutral response (“neither easy or hard”). Across all genders there is a significant group of people indicating they find it somewhat to very hard to ask for leave. That being said, there are fewer women and those from other genders participating in this survey (compared to men), which may impact our results. Furthermore, the chi-squared test indicated that the approximation may be incorrect, likely because some of the values from the table are small.

### Answers by Age Group

#Do the AgeGroup Variable  
labs <- c(paste(seq(17, 74, by = 20), seq(37, 80, by = 20),  
 sep = "-"))  
health$AgeGroup <- cut(health$age, breaks = c(seq(17, 74, by = 20), Inf), labels = labs, right = FALSE)

#Crosstab table  
ELDbA <- table(health$pd2, health$AgeGroup)  
ELDbA

##   
## 17-37 37-57 57-77  
## Very easy (VE) 157 62 1  
## Somewhat Easy (SE) 203 77 1  
## Neutral (N) 126 48 4  
## Somewhat Hard (SH) 134 63 2  
## Very Hard (VH) 82 33 3  
## Don't Know (DK) 105 44 1

#Proportions table  
prop.table(ELDbA)

##   
## 17-37 37-57 57-77  
## Very easy (VE) 0.1369982548 0.0541012216 0.0008726003  
## Somewhat Easy (SE) 0.1771378709 0.0671902269 0.0008726003  
## Neutral (N) 0.1099476440 0.0418848168 0.0034904014  
## Somewhat Hard (SH) 0.1169284468 0.0549738220 0.0017452007  
## Very Hard (VH) 0.0715532286 0.0287958115 0.0026178010  
## Don't Know (DK) 0.0916230366 0.0383944154 0.0008726003

#### Chi-Squared

chisq.test(ELDbA)

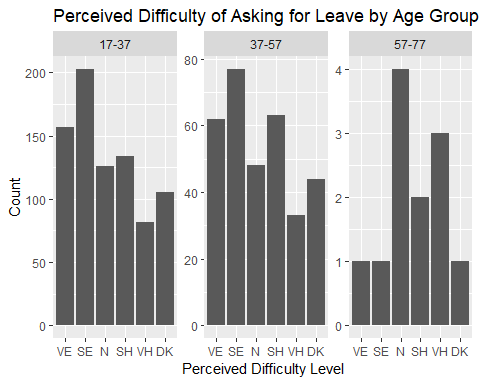
## Warning in chisq.test(ELDbA): Chi-squared approximation may be incorrect

##   
## Pearson's Chi-squared test  
##   
## data: ELDbA  
## X-squared = 8.6657, df = 10, p-value = 0.5641

We get a warning that the approximation may be incorrect, likely because some of the values from the table are small. However, it potentially indicates that that the differences between age groups may not be statistically significant (or we do not have enough information)

#### Visualization of Data

#Create Visualization  
t3 <- ggplot(health, aes(x = health$pd3))+geom\_bar()+facet\_wrap(health$AgeGroup ~ ., scales="free\_y") + ggtitle("Perceived Difficulty of Asking for Leave by Age Group") + xlab("Perceived Difficulty Level") + ylab("Count")   
t3

 NOTE: VE = Very Easy, SE = Somewhat Easy, N = Neutral (or Neither Easy nor Difficult), SH = Somewhat Hard, VH = Very Hard, DK = Don’t Know.

#### Interpretation of Results

The most common response for those in the 17-27 and 37-57 age ranges is that asking for leave for a mental health issue was “Somewhat Easy” and the second most common isthat asking for leave “Very Easy”. However, there is a significant number in both age groups who provided a neutral answer (e.g., neither easy or difficult) or indicated that they felt asking for leave was hard/very hard. That being said, there are few people who are 57-77 participating in this survey and there are fewer people in the 37-57 age group than the 17-27 age group. Furthermore, the chi-squared test indicated that the approximation may be incorrect, likely because some of the values from the table are small (since few people fell into the 57-77 age range).

### Answers by Company Size

#Crosstab table  
ELDbCS <- table(health$pd2, health$CompanySize)  
ELDbCS

##   
## 1-5 6-25 26-100 100-500 500-1000 More than 1000  
## Very easy (VE) 16 42 59 48 15 40  
## Somewhat Easy (SE) 12 41 74 62 30 62  
## Neutral (N) 6 40 43 30 14 45  
## Somewhat Hard (SH) 11 45 46 48 6 43  
## Very Hard (VH) 13 16 36 15 5 33  
## Don't Know (DK) 2 26 34 45 10 33

prop.table(ELDbCS, 2)

##   
## 1-5 6-25 26-100 100-500  
## Very easy (VE) 0.26666667 0.20000000 0.20205479 0.19354839  
## Somewhat Easy (SE) 0.20000000 0.19523810 0.25342466 0.25000000  
## Neutral (N) 0.10000000 0.19047619 0.14726027 0.12096774  
## Somewhat Hard (SH) 0.18333333 0.21428571 0.15753425 0.19354839  
## Very Hard (VH) 0.21666667 0.07619048 0.12328767 0.06048387  
## Don't Know (DK) 0.03333333 0.12380952 0.11643836 0.18145161  
##   
## 500-1000 More than 1000  
## Very easy (VE) 0.18750000 0.15625000  
## Somewhat Easy (SE) 0.37500000 0.24218750  
## Neutral (N) 0.17500000 0.17578125  
## Somewhat Hard (SH) 0.07500000 0.16796875  
## Very Hard (VH) 0.06250000 0.12890625  
## Don't Know (DK) 0.12500000 0.12890625

#### Chi-Squared

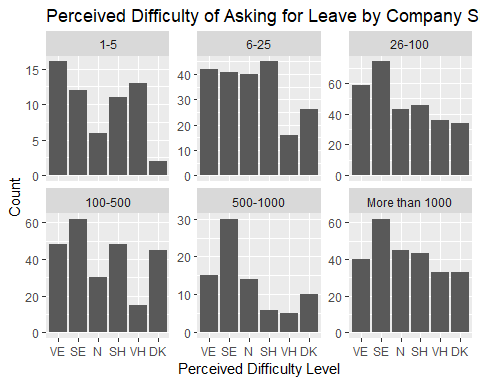
chisq.test(ELDbCS)

##   
## Pearson's Chi-squared test  
##   
## data: ELDbCS  
## X-squared = 52.482, df = 25, p-value = 0.001041

Because the p value is less than .01 we can reject the null and say that we think that there is a relationship between these two variables.

#### Visualization of Data

#Create Visualization  
t4 <- ggplot(health, aes(x = health$pd3))+geom\_bar()+facet\_wrap(health$CompanySize~ ., scales="free\_y") + ggtitle("Perceived Difficulty of Asking for Leave by Company Size") + xlab("Perceived Difficulty Level") + ylab("Count")  
t4

 NOTE: VE = Very Easy, SE = Somewhat Easy, N = Neutral (or Neither Easy nor Difficult), SH = Somewhat Hard, VH = Very Hard, DK = Don’t Know.

#### Interpretation of Results

For very small companies (1-5 employees), there seems to be a fairly even split between those who perceive taking leave for mental health to be easy and those who perceive it to be hard. For other small companies (6-25 employees), approximately the same number of people say that it is easy/somewhat easy or provide a neutral response. However, in this case, the most common answer is that they would perceive it as somehwat hard to ask for leave. For larger companies, the most common answer is that they perceive it to be somewhat easy to request leave for a mental illness. Therefore it appears that as the company size gets larger, it may be perceived as easier in most companies to request leave related to a mental illness. However, there is still sizable minority of employees who work for larger companies (over 25 employees) who do perceive it as hard or very hard to ask for leave. Therefore, a lot may vary by the company.

### Answers by Whether Current Company Provides Mental Health Benefits

#Modify Labels for mental health benefit provision  
health$mhb2 <- factor(health$Does.your.employer.provide.mental.health.benefits.as.part.of.healthcare.coverage.,  
levels = c("I don't know", "No", "Not eligible for coverage / N/A","Yes"),  
labels = c("Don't Know", "No", "Ineligible/NA", "Yes"))

#Crosstab Table  
ELDbMHB <- table(health$pd2, health$mhb2)  
ELDbMHB

##   
## Don't Know No Ineligible/NA Yes  
## Very easy (VE) 55 36 18 111  
## Somewhat Easy (SE) 81 46 17 137  
## Neutral (N) 52 29 16 81  
## Somewhat Hard (SH) 51 49 17 82  
## Very Hard (VH) 25 31 10 52  
## Don't Know (DK) 55 22 5 68

#### Chi-Squared

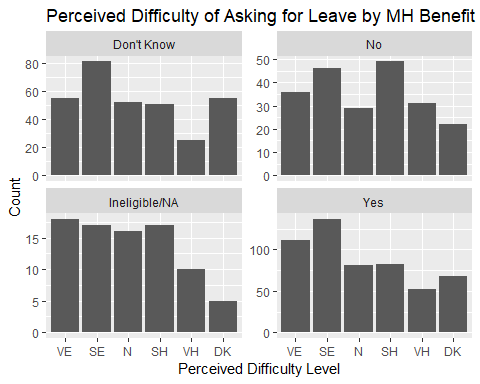
chisq.test(ELDbMHB)

##   
## Pearson's Chi-squared test  
##   
## data: ELDbMHB  
## X-squared = 25.93, df = 15, p-value = 0.03877

Because the p value is not less than .01 we cannot reject the null. The null hypothesis is that there is no relationship between these two variables.

#### Create Visualization

t5 <- ggplot(health, aes(x = health$pd3))+geom\_bar()+facet\_wrap(~ health$mhb2, scales="free\_y") + ggtitle("Perceived Difficulty of Asking for Leave by MH Benefit Provision") + xlab("Perceived Difficulty Level") + ylab("Count")  
t5

 NOTE: VE = Very Easy, SE = Somewhat Easy, N = Neutral (or Neither Easy nor Difficult), SH = Somewhat Hard, VH = Very Hard, DK = Don’t Know.

#### Interpretation of Results

For those who do not get mental health benefits, more participants responded that they perceive it as somewhat difficult to request leave for a mental health issue than any other response (with somewhat easy being the second most common). Among those who do get mental health benefits, most indicated they perceive it as very easy or somwhat easy to request leave for a mental health issue. Most of those who did not know if mental health benefits are offered inidicated they perceived it to be somewhat easy to request leave for a mental health issue. Those who are ineligible (or for whom it was not applicable) were evently split among the responses, although relatively few people selected this response compared to the others. However, the difference between the two variables does not appear to be statistically significant.

### Answers by Whether Current Company Has Ever Formally Discussed Mental Health

ELDbEDM <- table(health$pd2, health$Has.your.employer.ever.formally.discussed.mental.health..for.example..as.part.of.a.wellness.campaign.or.other.official.communication..)  
ELDbEDM

##   
## I don't know No Yes  
## Very easy (VE) 23 129 68  
## Somewhat Easy (SE) 25 183 73  
## Neutral (N) 20 126 32  
## Somewhat Hard (SH) 13 161 25  
## Very Hard (VH) 3 105 10  
## Don't Know (DK) 19 109 22

#### Chi-Squared

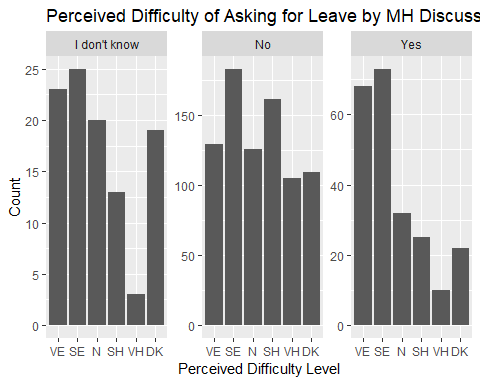
chisq.test(ELDbEDM)

##   
## Pearson's Chi-squared test  
##   
## data: ELDbEDM  
## X-squared = 58.706, df = 10, p-value = 6.364e-09

Because the p value is less than .01 we can reject the null and say that we think that there is a relationship between these two variables.

#### Create Visualization

t6 <- ggplot(health, aes(x = health$pd3))+geom\_bar()+facet\_wrap( health$Has.your.employer.ever.formally.discussed.mental.health..for.example..as.part.of.a.wellness.campaign.or.other.official.communication.. ~., scales="free\_y") + ggtitle("Perceived Difficulty of Asking for Leave by MH Discussion by Employer") + xlab("Perceived Difficulty Level") + ylab("Count")  
t6

 NOTE: VE = Very Easy, SE = Somewhat Easy, N = Neutral (or Neither Easy nor Difficult), SH = Somewhat Hard, VH = Very Hard, DK = Don’t Know.

#### Interpretation of Results

Across all categories (e.g., yes they have discussed, no they haven’t, don’t know), the most common response is that most recipients think it would be somewhat easy to request leave. Interestingly, for those who did not know if there has been a discussion, a large contingent also indicated they don’t know how hard it would be to request leave. For those where there has been a discussion, far fewer people say it would be hard to request leave to handle a mental illness than those who say it would be easy to very easy. For those where there has not been a discussion (which is the majority of respondents), the second most common answer is that it would be somewhat hard to request leave to hanlde a mental illness.

### Answers by Whether Current Company Offers Other Resources

ELDbEOR <- table(health$pd2, health$Does.your.employer.offer.resources.to.learn.more.about.mental.health.concerns.and.options.for.seeking.help.)  
ELDbEOR

##   
## I don't know No Yes  
## Very easy (VE) 59 84 77  
## Somewhat Easy (SE) 80 123 78  
## Neutral (N) 49 80 49  
## Somewhat Hard (SH) 52 110 37  
## Very Hard (VH) 30 74 14  
## Don't Know (DK) 50 60 40

#### Chi-Squared

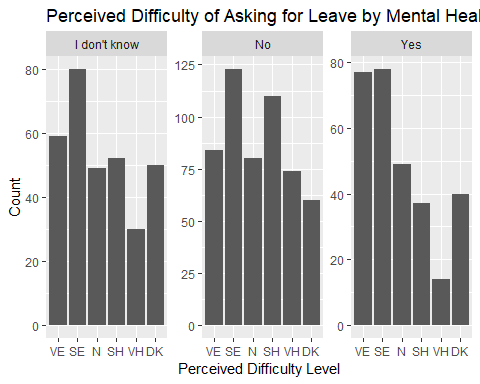
Because the p value is less than .01 we can reject the null and say that we think that there are differences between categories.

chisq.test(ELDbEOR)

##   
## Pearson's Chi-squared test  
##   
## data: ELDbEOR  
## X-squared = 38.212, df = 10, p-value = 3.486e-05

#### Create Visualization

t7 <- ggplot(health, aes(x = health$pd3))+geom\_bar()+facet\_wrap( health$Does.your.employer.offer.resources.to.learn.more.about.mental.health.concerns.and.options.for.seeking.help. ~., scales="free\_y") + ggtitle("Perceived Difficulty of Asking for Leave by Mental Health Resource Provision") + xlab("Perceived Difficulty Level") + ylab("Count")  
t7

 NOTE: VE = Very Easy, SE = Somewhat Easy, N = Neutral (or Neither Easy nor Difficult), SH = Somewhat Hard, VH = Very Hard, DK = Don’t Know.

#### Interpretation of Results

Across all categories (e.g., yes there are resources, no they aren’t, don’t know), the most common response is that most recipients think it would be somewhat easy to request leave. Similarly to the results provided above, in companies where there are other resources provided, fewer people say it would be hard to request leave to handle a mental illness than those who say it would be easy to very easy. For those where there are not additional resources offered related to mental health (the majority of respondents), the second most common answer is that it would be somewhat hard to request leave to hanlde a mental illness.

### Answers by If They Ever Saw A Poor Response to Mental Health Issue

ELDbPR <- table(health$pd2, health$Have.you.observed.or.experienced.an.unsupportive.or.badly.handled.response.to.a.mental.health.issue.in.your.current.or.previous.workplace.)  
ELDbPR

##   
## Maybe/Not sure N/A No Yes, I experienced  
## Very easy (VE) 34 7 136 17  
## Somewhat Easy (SE) 58 14 126 35  
## Neutral (N) 46 10 70 18  
## Somewhat Hard (SH) 60 10 66 32  
## Very Hard (VH) 38 3 24 20  
## Don't Know (DK) 42 8 69 10  
##   
## Yes, I observed  
## Very easy (VE) 26  
## Somewhat Easy (SE) 48  
## Neutral (N) 34  
## Somewhat Hard (SH) 31  
## Very Hard (VH) 33  
## Don't Know (DK) 21

prop.table(ELDbPR, 2)

##   
## Maybe/Not sure N/A No  
## Very easy (VE) 0.12230216 0.13461538 0.27698574  
## Somewhat Easy (SE) 0.20863309 0.26923077 0.25661914  
## Neutral (N) 0.16546763 0.19230769 0.14256619  
## Somewhat Hard (SH) 0.21582734 0.19230769 0.13441955  
## Very Hard (VH) 0.13669065 0.05769231 0.04887984  
## Don't Know (DK) 0.15107914 0.15384615 0.14052953  
##   
## Yes, I experienced Yes, I observed  
## Very easy (VE) 0.12878788 0.13471503  
## Somewhat Easy (SE) 0.26515152 0.24870466  
## Neutral (N) 0.13636364 0.17616580  
## Somewhat Hard (SH) 0.24242424 0.16062176  
## Very Hard (VH) 0.15151515 0.17098446  
## Don't Know (DK) 0.07575758 0.10880829

# Revise Labels

#Modify Labels for unsupportive response to make them shorter  
health$epr <- factor(health$Have.you.observed.or.experienced.an.unsupportive.or.badly.handled.response.to.a.mental.health.issue.in.your.current.or.previous.workplace.,  
levels = c("Maybe/Not sure", "N/A", "No","Yes, I experienced", "Yes, I observed"),  
labels = c("Don't Know", "N/A", "No", "Yes, experienced", "Yes, observed"))  
table(health$pd2, health$epr)

##   
## Don't Know N/A No Yes, experienced Yes, observed  
## Very easy (VE) 34 7 136 17 26  
## Somewhat Easy (SE) 58 14 126 35 48  
## Neutral (N) 46 10 70 18 34  
## Somewhat Hard (SH) 60 10 66 32 31  
## Very Hard (VH) 38 3 24 20 33  
## Don't Know (DK) 42 8 69 10 21

#### Chi-Squared

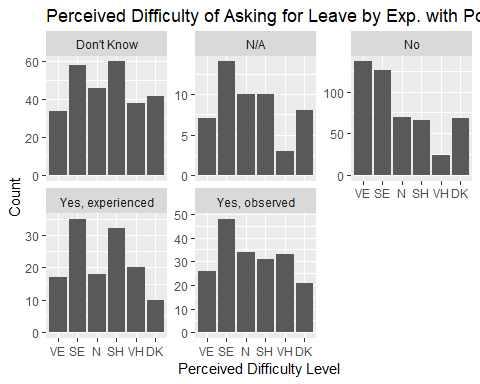
chisq.test(ELDbPR)

##   
## Pearson's Chi-squared test  
##   
## data: ELDbPR  
## X-squared = 82.616, df = 20, p-value = 1.406e-09

Because the p value is less than .01 we can reject the null and say that we think that there are differences between categories.

#### Create Visualization

t8 <- ggplot(health, aes(x = health$pd3))+geom\_bar()+facet\_wrap(health$epr ~., scales="free\_y") + ggtitle("Perceived Difficulty of Asking for Leave by Exp. with Poor MH Response") + xlab("Perceived Difficulty Level") + ylab("Count")  
t8

 NOTE: E = Very Easy, S = Somewhat Easy, N = Neutral (or Neither Easy nor Difficult), SH = Somewhat Hard, H = Very Hard, D = Don’t Know.

#### Interpretation of Results

Most people surveyed indicate that they have never had an experience with an unsupportive or badly handled response to mental health in the workplace. Among those who selected this response, the vast majority indicate they think that it would be very or somewhat easy to request leave to handle a mental illness. For those who have observed a badly handled response, the most common response is that they would find it somewhat easy to request leave, but the second most common is that it they would find it somewhat difficult. For those who have experienced a poorly handled response, the most common response is that they would find it somewhat easy to request leave, but a significant amount said they would find it hard or very hard to request leave (or provided a neutral response saying it would be neither easy or difficult). Therefore, it is possible that experience with a poorly handled response may have an impact on perceived ease of requesting leave.

## Comfort with talking to Supervisor About Mental Health

This is important because if an employee has a mental health issue, they should ideally be comfortable discussing it with a supervisor in case they need additional assistance. In addition, we may want to consider training supervisors on how to handle instances where employees reach out to them about mental health.

### Answers by Gender

MHbG <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s.., health$gender)  
MHbG

##   
## Female Male Other  
## Maybe 87 286 9  
## No 84 245 7  
## Yes 100 316 12

prop.table(MHbG, 2)

##   
## Female Male Other  
## Maybe 0.3210332 0.3376623 0.3214286  
## No 0.3099631 0.2892562 0.2500000  
## Yes 0.3690037 0.3730815 0.4285714

#### Chi-Squared

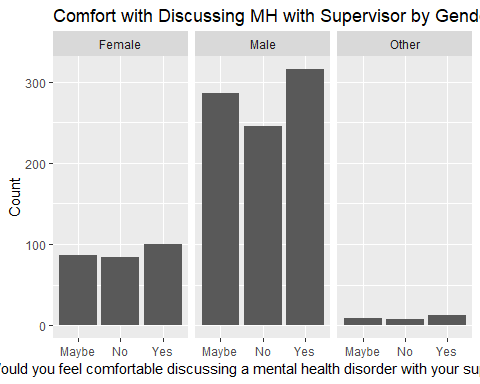
chisq.test(MHbG)

##   
## Pearson's Chi-squared test  
##   
## data: MHbG  
## X-squared = 0.90786, df = 4, p-value = 0.9234

The p value is very large. Therefore, we cannot reject the null hypothesis. The null hypothesis is that these two variables are indepdendent (no relationship between them)

#### Create Visualization

t9 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s..))+geom\_bar()+facet\_grid(~ health$gender) + ggtitle("Comfort with Discussing MH with Supervisor by Gender") + xlab("Would you feel comfortable discussing a mental health disorder with your supervisor?") + ylab("Count")  
t9



#### Interpretation of Results

Most respondents across genders indicate that they would be comfortable discussing a mental health disorder with their supervisors. With male employees, a lower proportion indicate that they would not be comfortable discussing a mental health disorder with their supervisors. Meanwhile, with female and employees of other genders, the results are slightly more evenly split among the three options. However, the difference is not statistically significant.

### Answers by Age Group

MHbA <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s.., health$AgeGroup)  
MHbA

##   
## 17-37 37-57 57-77  
## Maybe 265 114 3  
## No 236 96 4  
## Yes 306 117 5

prop.table(MHbA, 2)

##   
## 17-37 37-57 57-77  
## Maybe 0.3283767 0.3486239 0.2500000  
## No 0.2924411 0.2935780 0.3333333  
## Yes 0.3791822 0.3577982 0.4166667

#### Chi-Squared

chisq.test(MHbA)

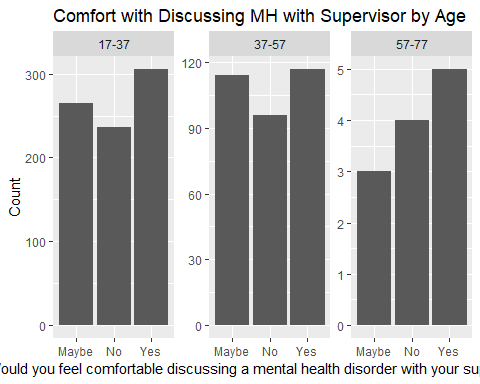
## Warning in chisq.test(MHbA): Chi-squared approximation may be incorrect

##   
## Pearson's Chi-squared test  
##   
## data: MHbA  
## X-squared = 0.95201, df = 4, p-value = 0.917

We get a warning that the approximation may be incorrect, likely because some of the values from the table are small. However, it potentially indicates that that the differences between age groups may not be statistically significant (or we do not have enough information).

#### Create Visualization

t10 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s..))+geom\_bar()+facet\_wrap(health$AgeGroup ~., scales="free\_y") + ggtitle("Comfort with Discussing MH with Supervisor by Age") + xlab("Would you feel comfortable discussing a mental health disorder with your supervisor?") + ylab("Count")  
t10



#### Interpretation of Results

The majority of respondents in the 17-37 and 37-57 age groups responded that they would feel comfortable discussing a mental health disorder with their supervisor. The next most common response is that they might, and no received the least amount of responses from the 17-37 and 37-57 age groups. However, in both cases over a quarter of participants in both age groups answered that they would not feel comfortable. The 57-77 range has a low number of responses, although in that case “No” is the second most common reponse. Given the chi-squared test results and the visualization, it does not appear that age has much of an impact on comfort level in discussing a mental health disorder with a supervisor. However, the fact that there are fewer responses from the 37-57 and especially the 57-77 age groups may impact our results.

### Answers by Company Size

MHbCS <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s.., health$CompanySize)  
MHbCS

##   
## 1-5 6-25 26-100 100-500 500-1000 More than 1000  
## Maybe 14 69 105 87 32 75  
## No 21 61 74 66 17 97  
## Yes 25 80 113 95 31 84

prop.table(MHbCS, 2)

##   
## 1-5 6-25 26-100 100-500 500-1000 More than 1000  
## Maybe 0.2333333 0.3285714 0.3595890 0.3508065 0.4000000 0.2929688  
## No 0.3500000 0.2904762 0.2534247 0.2661290 0.2125000 0.3789062  
## Yes 0.4166667 0.3809524 0.3869863 0.3830645 0.3875000 0.3281250

#### Chi-Squared

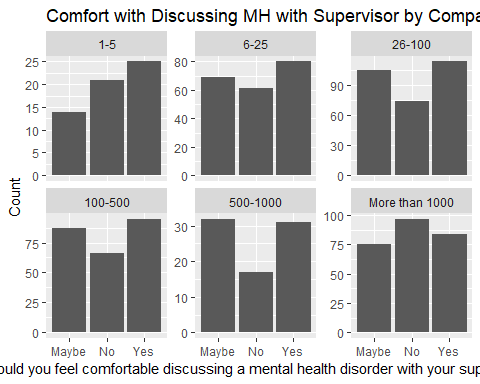
chisq.test(MHbCS)

##   
## Pearson's Chi-squared test  
##   
## data: MHbCS  
## X-squared = 18.002, df = 10, p-value = 0.05493

Because the p value is not less than .01 we cannot reject the null. The null hypothesis is that there is no relationship between these two variables.

#### Create Visualization

t11 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s..))+geom\_bar()+facet\_wrap(health$CompanySize ~., scales="free\_y") + ggtitle("Comfort with Discussing MH with Supervisor by Company Size") + xlab("Would you feel comfortable discussing a mental health disorder with your supervisor?") + ylab("Count")  
t11



#### Interpretation of Results

The pattern that we see in the data visualization is interesting. For companies in the 26-100, 100-500, and 500-1000 groups (and to a lesser extent in the 6-25 group), fewer respondents indicate they would not feel comfortable discussing a mental health disorder with their supervisor than selecting the “Maybe” or “Yes” options. However, in the “More than 1000” group, most respondents indicated they would not feel comfortable (although a significant amount answered “Maybe” or “Yes”). It is possible that for larger companies people may feel less comfortable discussing these issues with supervisors because it the organization is more bureaucratic or there are employee/supervisor relationships that are less personal. However, it is also possible that these results indicate that the results are depedendent on the company as well as other factors. Because the null is larger than .01, we fail to reject the null that there is a significant relationship between the two variables.

### Answers by If They Ever Saw A Poor Response to Mental Health Issue

MHbPR <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s.., health$Have.you.observed.or.experienced.an.unsupportive.or.badly.handled.response.to.a.mental.health.issue.in.your.current.or.previous.workplace.)  
MHbPR

##   
## Maybe/Not sure N/A No Yes, I experienced Yes, I observed  
## Maybe 97 12 161 48 64  
## No 101 24 109 35 67  
## Yes 80 16 221 49 62

prop.table(MHbPR, 2)

##   
## Maybe/Not sure N/A No Yes, I experienced  
## Maybe 0.3489209 0.2307692 0.3279022 0.3636364  
## No 0.3633094 0.4615385 0.2219959 0.2651515  
## Yes 0.2877698 0.3076923 0.4501018 0.3712121  
##   
## Yes, I observed  
## Maybe 0.3316062  
## No 0.3471503  
## Yes 0.3212435

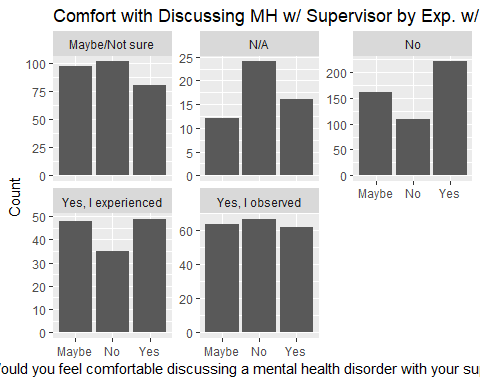
#### Chi-Squared

chisq.test(MHbPR)

##   
## Pearson's Chi-squared test  
##   
## data: MHbPR  
## X-squared = 37.901, df = 8, p-value = 7.852e-06

#### Create Visualization

t17 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s..))+geom\_bar()+facet\_wrap(health$Have.you.observed.or.experienced.an.unsupportive.or.badly.handled.response.to.a.mental.health.issue.in.your.current.or.previous.workplace. ~., scales="free\_y") + ggtitle("Comfort with Discussing MH w/ Supervisor by Exp. w/ Poor Workplace Response") + xlab("Would you feel comfortable discussing a mental health disorder with your supervisor?") + ylab("Count")  
t17



#### Interpret Results

When asked about experience with a poorly handled response to mental health, respondents who were not sure if they expereinced it were evenly split between answering that they maybe comfortable discussing a mental health disorder with supervisors or not comfortable (there was also a large group that said they would be comfortable). For those who answered that they did not have experience with a poor response, they also answered yes more often than maybe and no when also asked about their comfort with discussing a mental health disorder with a supervisor. Interestingly, those who stated “Yes, I observed” a poor response to mental health in the workplace were evenly split selected maybe the most often when also asked if they would feel comfortable discussing a mental health disorder with coworkers (and “yes” was the second most common response). However, those who stated that they experienced a poorly handled response were evenly split between the yes, no, and maybe answers when asked about comfort level discussing mental health with a supervisor.

### Answers by If They Think Discussing a Mental Health Disorder with Employer Would Have Negative Consequences

MHbVN <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s.., health$Do.you.think.that.discussing.a.mental.health.disorder.with.your.employer.would.have.negative.consequences.)  
MHbVN

##   
## Maybe No Yes  
## Maybe 218 115 49  
## No 164 24 148  
## Yes 105 299 24

#### Chi-Squared

chisq.test(MHbVN)

##   
## Pearson's Chi-squared test  
##   
## data: MHbVN  
## X-squared = 414.95, df = 4, p-value < 2.2e-16

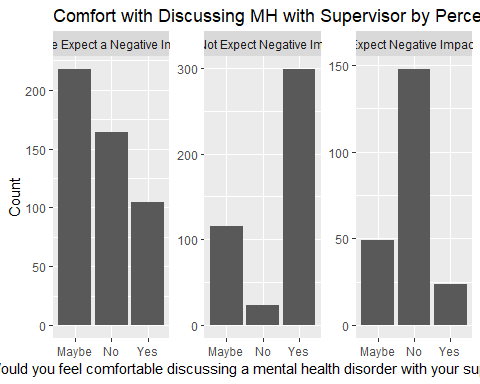
Because the p value is less than .01 we can reject the null and say that we think that there is a statistically significant relationship between these two categories.

#### Create Visualization

#Modify Labels for perception of mental health disclosure impact  
health$negimp <- factor(health$Do.you.think.that.discussing.a.mental.health.disorder.with.your.employer.would.have.negative.consequences.,  
levels = c("Maybe", "No", "Yes"),  
labels = c("Maybe Expect a Negative Impact", "Do Not Expect Negative Impact", "Expect Negative Impact"))  
#Check Results  
table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s.., health$negimp)

##   
## Maybe Expect a Negative Impact Do Not Expect Negative Impact  
## Maybe 218 115  
## No 164 24  
## Yes 105 299  
##   
## Expect Negative Impact  
## Maybe 49  
## No 148  
## Yes 24

t12 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.direct.supervisor.s..))+geom\_bar()+facet\_wrap(health$negimp ~., scales="free\_y") + ggtitle("Comfort with Discussing MH with Supervisor by Perception of Negative Impact") + xlab("Would you feel comfortable discussing a mental health disorder with your supervisor?") + ylab("Count")  
t12



#### Interpret Results

The results here are fairly clear. Most people who responded that they feel that discussing a mental health disorder would have a negative impact also are not comfortable discussing a mental health issue with a supervisor. The reverse is also true, most people who responded that they do not feel that discussing a mental health disorder would have a negative impact also indicate that they would be comfortable discussing a mental health issue with their supervisor. For those who responded that there maybe a negative impact, most also answered that they may be comfortable discussing a mental health disorder with their supervisor (with “no” being the second most common response for that group). Therefore, any outreach that we do or program that we plan needs to keep this in mind.

## Comfort with taking to Coworkers About Mental Health

This is important because if an employee has a mental health issue, they should ideally be comfortable discussing it with a coworkers in case they need additional assistance. In addition, we may want to consider training employees on how to handle instances where coworkers reach out to them about mental health.

### Answers by Gender

MHCbG <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers., health$gender)  
MHCbG

##   
## Female Male Other  
## Maybe 107 360 12  
## No 99 287 6  
## Yes 65 200 10

prop.table(MHCbG, 2)

##   
## Female Male Other  
## Maybe 0.3948339 0.4250295 0.4285714  
## No 0.3653137 0.3388430 0.2142857  
## Yes 0.2398524 0.2361275 0.3571429

#### Chi-Squared

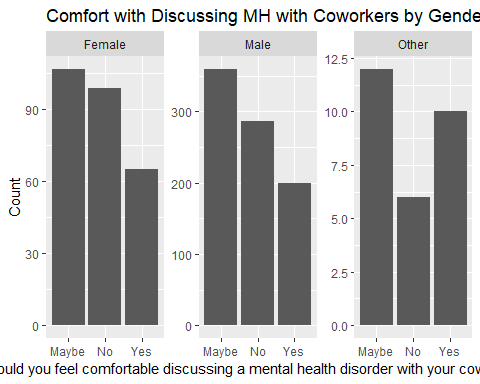
chisq.test(MHCbG)

##   
## Pearson's Chi-squared test  
##   
## data: MHCbG  
## X-squared = 3.9002, df = 4, p-value = 0.4197

The chi-squared is very large. Therefore, we cannot reject the null hypothesis that these categories are independent.

#### Create Visualization

t13 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers.))+geom\_bar()+facet\_wrap(health$gender ~., scales="free\_y") + ggtitle("Comfort with Discussing MH with Coworkers by Gender") + xlab("Would you feel comfortable discussing a mental health disorder with your coworkers?") + ylab("Count")  
t13



#### Interpret Results

The chi-squared test appears to indicate that there is not a significant relationship between gender and comfort with discussing mental health with coworkers. However, these results may be impacted by the fact that there are fewer respondents who are female or another gender than men. However, a higher proportion of female respondents indicate that they do not feel comfortable discussing a mental health disorder with coworkers. However, across all genders the most common response is “maybe.” This indicates that a lot may depend on their relationships with individual coworkers (e.g., they may feel comfortable with discussing with a specific coworker). Interestingly, as stated above, most respondents across genders indicated that they would be comfortable discussing a mental health disorder with their supervisors.

### Answers by Age Group

MHCbA <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers., health$AgeGroup)  
MHCbA

##   
## 17-37 37-57 57-77  
## Maybe 338 139 2  
## No 272 116 4  
## Yes 197 72 6

#Proportions (as column percentages)  
prop.table(MHCbA, 2)

##   
## 17-37 37-57 57-77  
## Maybe 0.4188352 0.4250765 0.1666667  
## No 0.3370508 0.3547401 0.3333333  
## Yes 0.2441140 0.2201835 0.5000000

#### Chi-Squared

chisq.test(MHCbA)

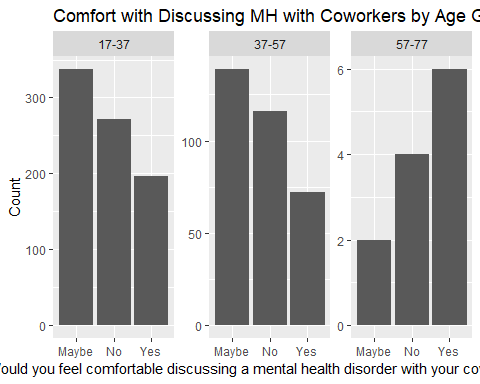
## Warning in chisq.test(MHCbA): Chi-squared approximation may be incorrect

##   
## Pearson's Chi-squared test  
##   
## data: MHCbA  
## X-squared = 6.0422, df = 4, p-value = 0.196

We get a warning that the approximation may be incorrect, likely because some of the values from the table are small. However, it potentially indicates that that the differences between age groups is not statistically significant.

#### Create Visualization

t14 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers.))+geom\_bar()+facet\_wrap(health$AgeGroup ~., scales="free\_y") + ggtitle("Comfort with Discussing MH with Coworkers by Age Group") + xlab("Would you feel comfortable discussing a mental health disorder with your coworkers?") + ylab("Count")  
t14



#### Interpret Results

Members of the 17-37 and 37-57 age group have a similar pattern. The majority of respondents indicated that they might feel comfortable discussing a mental health disorder with coworkers, with the second most common response being that they would not. When I looked at the comfort level of discussing a mental health disorder with supervisors, the results were different. Interestingly, as stated above, the majority of respondents in the 17-37 and 37-57 age groups responded that they would feel comfortable discussing a mental health disorder with their supervisor. Therefore, there may be a higher comfort level discussing mental health disorders with supervisors than other coworkers (or respondents’ comfort level may vary by the coworker).

### Answers by Company Size

MHCbCS <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers., health$CompanySize)  
MHCbCS

##   
## 1-5 6-25 26-100 100-500 500-1000 More than 1000  
## Maybe 20 83 140 110 32 94  
## No 19 75 84 79 21 114  
## Yes 21 52 68 59 27 48

#Proportions (as column percentages)  
prop.table(MHCbCS, 2)

##   
## 1-5 6-25 26-100 100-500 500-1000 More than 1000  
## Maybe 0.3333333 0.3952381 0.4794521 0.4435484 0.4000000 0.3671875  
## No 0.3166667 0.3571429 0.2876712 0.3185484 0.2625000 0.4453125  
## Yes 0.3500000 0.2476190 0.2328767 0.2379032 0.3375000 0.1875000

#### Chi-Squared

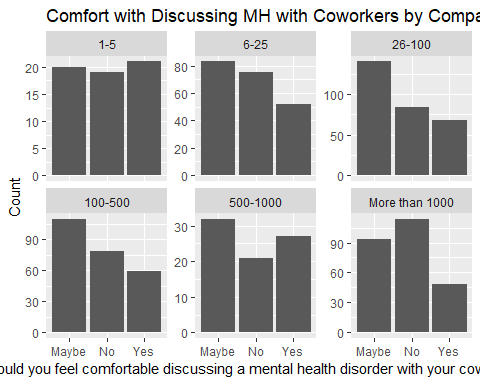
#Chi-Squared (the p value is small)  
chisq.test(MHCbCS)

##   
## Pearson's Chi-squared test  
##   
## data: MHCbCS  
## X-squared = 27.848, df = 10, p-value = 0.001909

The chi-squared test shows a p value that is less than 0.01. Therefore, we can reject the null hypothesis (that there is no relationship between these variables). This indicates that there may be a relationship between company size and comfort level with talking to coworkers about a mental health issue.

#### Create Visualization

t15 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers.))+geom\_bar()+facet\_wrap(health$CompanySize ~., scales="free\_y") + ggtitle("Comfort with Discussing MH with Coworkers by Company Size") + xlab("Would you feel comfortable discussing a mental health disorder with your coworkers?") + ylab("Count")  
t15



#### Interpret Results

Respondents from companies with 1-5 employees are roughly evenly split among the three responses (yes, no, maybe) when asked if they would feel comfortable discussing a mental health disorder with coworkers. Results are similar with companies for 6-25 employees, but a lower proportion of employees in that category indicate they would be comfortable. For the 26-100 and 100-500 employee companies, most indicate that they may be comfortable with “no” being the second most common response. Respondents from companies with 500-1000 employees also select maybe the most often, but “yes” is the second most common response. Finally, respondents from companies with more than 1000 employees select the “no” answer the most often, with maybe being the second most common. The results indicate that there may be a relationship between company size and willingness to talk to coworkers about mental illness. However, the variation in responses also indicates that the reasons for the comfort, discomfort, or uncertainty may vary by company.

### Answers by If They Ever Saw A Poor Response to Mental Health Issue

MHCbPR <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers., health$Have.you.observed.or.experienced.an.unsupportive.or.badly.handled.response.to.a.mental.health.issue.in.your.current.or.previous.workplace.)  
MHCbPR

##   
## Maybe/Not sure N/A No Yes, I experienced Yes, I observed  
## Maybe 132 19 195 58 75  
## No 105 22 150 39 76  
## Yes 41 11 146 35 42

#### Chi-Squared

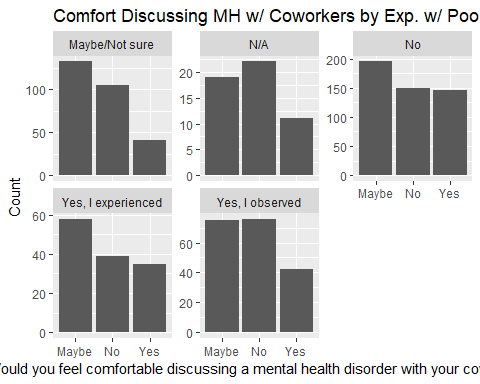
chisq.test(MHCbPR)

##   
## Pearson's Chi-squared test  
##   
## data: MHCbPR  
## X-squared = 27.416, df = 8, p-value = 0.0005991

The chi-squared test shows a p value that is less than 0.01. Therefore, we can reject the null hypothesis (that there is no relationship between these variables). This indicates that there may be a relationship between experience with a poor response to a mental health issue with talking to coworkers about a mental health issue.

#### Create Visualization

t16 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers.))+geom\_bar()+facet\_wrap(health$Have.you.observed.or.experienced.an.unsupportive.or.badly.handled.response.to.a.mental.health.issue.in.your.current.or.previous.workplace. ~., scales="free\_y") + ggtitle("Comfort Discussing MH w/ Coworkers by Exp. w/ Poor Workplace MH Response") + xlab("Would you feel comfortable discussing a mental health disorder with your coworkers?") + ylab("Count")  
t16



#### Interpret Results

When asked about experience with a poorly handled response to mental health, respondents across all categories except for “N/A” (which had relatively few respondents), also answered that they maybe comfortable discussing a mental health disorder with coworkers. Interestingly, those who stated “Yes, I observed” a poor response to mental health in the workplace were evenly split between the maybe and no answers when also asked if they would feel comfortable discussing a mental health disorder with coworkers. However, those who stated that they experienced a poorly handled response selected “Maybe” most often when also asked if they would feel comfortable discussing a mental health disorder with coworkers. The remainder were about evenly split between the “no” and “yes” answers. This may indicate that observing a poorly handled response to a mental health issue in the workplace may have a greater negative effect on willingness to discuss with coworkers than those experiencing it.

### Answers by If They Think Coworkers Would View Them Negatively If They Knew You Suffered From a Mental Health Issue

MHCbCN <- table(health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers., health$Do.you.think.that.team.members.co.workers.would.view.you.more.negatively.if.they.knew.you.suffered.from.a.mental.health.issue.)  
MHCbCN

##   
## Maybe No, I don't think they would No, they do not  
## Maybe 234 137 7  
## No 127 51 1  
## Yes 100 115 36  
##   
## Yes, I think they would Yes, they do  
## Maybe 87 14  
## No 201 12  
## Yes 20 4

#### Chi-Squared

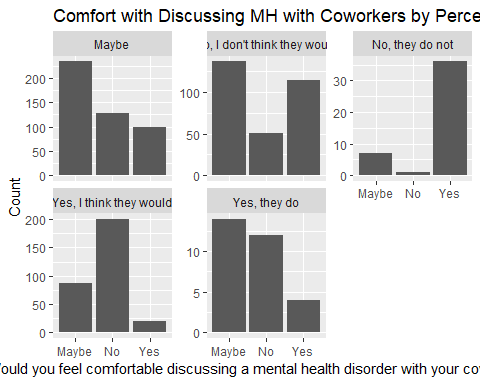
chisq.test(MHCbCN)

##   
## Pearson's Chi-squared test  
##   
## data: MHCbCN  
## X-squared = 291.08, df = 8, p-value < 2.2e-16

The chi-squared is less than .01. Therefore, we can reject the null and say that there is a relationship between these two variables.

#### Creating the Visualization

t17 <- ggplot(health, aes(x = health$Would.you.feel.comfortable.discussing.a.mental.health.disorder.with.your.coworkers.))+geom\_bar()+facet\_wrap(health$Do.you.think.that.team.members.co.workers.would.view.you.more.negatively.if.they.knew.you.suffered.from.a.mental.health.issue. ~., scales="free\_y") + ggtitle("Comfort with Discussing MH with Coworkers by Perceived Negative Impact") + xlab("Would you feel comfortable discussing a mental health disorder with your coworkers?") + ylab("Count")  
t17



#### Interpretation of Results

In this visualization we see that perceived impact of discussing a mental health disorder with coworkers has a potentially significant impact on comfort level with discussing a mental health disorder with coworkers. For those who feel that they would be viewed negatively by coworkers if they knew the respondent had a mental health issue, they frequently answer that they would not feel comfortable discussing a mental health disorder with coworkers. For those who feel like they are negatively viewed by coworkers because of a mental health issue, appear to be evenly split between maybe being comfortable and not being comfortable. Meanwhile, for those who feel that they are not viewed more negatively because of a mental health disorder, they most frequently say they would be comfortable discussing mental health with coworkers. For those who did not think they would be viewed negatively, they most frequently select that they may be comfortable discussing a mental health disorder with other coworkers, with yes being the second most common response from that group. This indicates that we may want to consider providing training to employees about mental illness in the workplace.

# Works Cited

Milne, S. H., Blum, T. C., & Roman, P. M. (1994). Factors Influencing Employees’ Propensity to Use an Employee Assistance Program. Personnel Psychology, 47(1), 123–145. Retrieved October 24, 2018 from <http://search.ebscohost.com.proxy-um.researchport.umd.edu/login.aspx?direct=true&db=bth&AN=9411113184&site=ehost-live>