Depression Prevalence Code

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We are going to attempt to explore the geographic spread of prevalence of depression! Let's start with some libraries here

```
library(gganimate)
```

```
## Warning: package 'gganimate' was built under R version 4.0.5

## Loading required package: ggplot2

## Warning: package 'ggplot2' was built under R version 4.0.5
```

```
library(dplyr)
```

```
## Warning: package 'dplyr' was built under R version 4.0.5

##
## 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
```

Let's read in our dataset

```
m <- read.csv("mentalhealthdata.csv")
```

Some of our columns are not named intuitively. Let's change that.

```
m <- rename(m, PrevMale = X.VALUE.)
m <- rename(m, PrevFemale = X.VALUE..1)
```

Some basic graphical representations

```
pm<-ggplot(m, aes(Year, PrevMale)) + geom_point()
#with linreg
lm.m <- lm(PrevMale~Year, m)
pm + stat_smooth()
```

```
## `geom_smooth()` using method = 'gam' and formula 'y ~ s(x, bs = "cs")'
```

Not super helpful - it might be better for this interpretation to group all males from all countries together by the year...

Let's try that!

```
PrevMalebyYear <- m %>% group_by(Year) %>% summarise(mean(PrevMale), mean(PrevFemale))
PrevMalebyYear <- rename(PrevMalebyYear, Female = `mean(PrevFemale)`)
PrevMalebyYear <- rename(PrevMalebyYear, Male = `mean(PrevMale)`)
```

And perhaps likewise, let's find the average prevalence among males for all observations

```
PrevMaleOverall <- m%>% group_by(ï..Entity) %>% summarise(mean(PrevMale))
PrevMaleOverall <- rename(PrevMaleOverall, Country = ï..Entity)
PrevMaleOverall <- rename(PrevMaleOverall, Prev =`mean(PrevMale)`)
```

Let's now examine how these plots all run

```r
ggplot(PrevMalebyYear, aes(Year, Male)) + geom_point() + geom_smooth(method = "lm")
```

```
## `geom_smooth()` using formula 'y ~ x'
```

```r
#and a loess method if we so choose
ggplot(PrevMalebyYear, aes(Year, Male)) + geom_point() + geom_smooth(method = "loess")
```

```
## `geom_smooth()` using formula 'y ~ x'
```

I'd like to get a good shapefile representation. Let's load in the "rgdal" package for using shapefiles

```
library(rgdal)
```

```
## Warning: package 'rgdal' was built under R version 4.0.5

## Loading required package: sp

## Warning: package 'sp' was built under R version 4.0.5

## Please note that rgdal will be retired by the end of 2023,
## plan transition to sf/stars/terra functions using GDAL and PROJ
## at your earliest convenience.
##
## rgdal: version: 1.5-27, (SVN revision 1148)
## Geospatial Data Abstraction Library extensions to R successfully loaded
## Loaded GDAL runtime: GDAL 3.2.1, released 2020/12/29
## Path to GDAL shared files: C:/Users/seanm/OneDrive/Documents/R/win-library/4.0/rgdal/gdal
## GDAL binary built with GEOS: TRUE
## Loaded PROJ runtime: Rel. 7.2.1, January 1st, 2021, [PJ_VERSION: 721]
## Path to PROJ shared files: C:/Users/seanm/OneDrive/Documents/R/win-library/4.0/rgdal/proj
## PROJ CDN enabled: FALSE
## Linking to sp version:1.4-5
## To mute warnings of possible GDAL/OSR exportToProj4() degradation,
## use options("rgdal_show_exportToProj4_warnings"="none") before loading sp or rgdal.
## Overwritten PROJ_LIB was C:/Users/seanm/OneDrive/Documents/R/win-library/4.0/rgdal/proj
```

```
wd <- getwd()
my_spdf <- readOGR(
  dsn= "C:/Users/seanm/OneDrive/Desktop/Grad School Stuff/TM_WORLD_BORDERS_SIMPL-0.3",
  layer="TM_WORLD_BORDERS_SIMPL-0.3",
  verbose=FALSE
)
```

Let's see what this shapefile looks like!

```
plot(my_spdf, col="#f2f2f2", bg="skyblue", lwd=0.25, border=0 )
```

Let's merge our shapefile with our prevalence measures

```
world_merged <- merge(my_spdf, PrevMaleOverall, by.x = "NAME", by.y = "Country")
```

Alright, let's make it pretty and see how it looks!

```
# Palette of 30 colors
library(RColorBrewer)
my_colors <- brewer.pal(9, "Reds")
my_colors <- colorRampPalette(my_colors)(30)

# Attribute the appropriate color to each country
class_of_country <- cut(world_merged@data$Prev, 30)
my_colors <- my_colors[as.numeric(class_of_country)]
```

```r
# Make the plot
plot(world_merged , ylim=c(0,40), col=my_colors ,  bg = "#A6CAE0")
```

```r
#legend(-119, 31.5, legend = levels(cut(world_merged@data$Prev, 30)), fill = my_colors, cex = 0.8, titl
```

Let's examine america specifically by referencing some regions

```r
newdf <- merge(my_spdf@data, PrevMaleOverall, by.x = "NAME", by.y = "Country")
```

```r
Americas <- newdf[newdf$REGION == 19, ]
plot(Americas, col = my_colors, xlim = c(-50, 0))
```

Now again for SE Asia and the Middle East

```
SEAsiaMiddleEast <- world_merged[world_merged@data$REGION == 142, ]
plot(SEAsiaMiddleEast, col = my_colors)
```

```
RussiaEurope <- world_merged[world_merged@data$REGION == 150, ]
plot(RussiaEurope, col = my_colors, xlim = c(0, 100))
```

Lets make another dataframe using the data from our SPDF

And let's visualize

```
worldplot <- ggplot() +

  geom_polygon(data = Americas, aes(fill = Prev,
                                    x= LON,
                                    y = LAT,
                                    )) + coord_map()

worldplot
```

Now let's get fun! Time to make some animations.

```
p <- ggplot(m,
            aes(x = m$PrevFemale, y = m$PrevMale, size = m$Population)) +
  geom_point(show.legend = FALSE, alpha = 0.7) +
  scale_color_viridis_d() +
  scale_size(range = c(2, 12)) +
  labs(x = "Females", y = "Males")

p
```

```
## Warning: Use of `m$PrevFemale` is discouraged. Use `PrevFemale` instead.

## Warning: Use of `m$PrevMale` is discouraged. Use `PrevMale` instead.

## Warning: Use of `m$Population` is discouraged. Use `Population` instead.
```

Adding animation over the year variable

```
p +transition_time(m$Year) + labs(title = "Year: {frame_time}")
```

```
## Warning: Use of ‘m$PrevFemale‘ is discouraged. Use ‘PrevFemale‘ instead.

## Warning: Use of ‘m$PrevMale‘ is discouraged. Use ‘PrevMale‘ instead.

## Warning: Use of ‘m$Population‘ is discouraged. Use ‘Population‘ instead.
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Now let's add some tails to better see changes

```
pwithtails<-p + transition_time(m$Year) + labs(title = "Year: {frame_time}") +
  shadow_wake(wake_length = 0.1, alpha = FALSE)

pwithtails
```

```
## Warning: Use of `m$PrevFemale` is discouraged. Use `PrevFemale` instead.

## Warning: Use of `m$PrevMale` is discouraged. Use `PrevMale` instead.

## Warning: Use of `m$Population` is discouraged. Use `Population` instead.
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```
#anim_save(file = "bycountry", animation = pwithtails, path = "C:/Users/seanm/OneDrive/Desktop/Grad Sch
```

Maybe map this as females vs. Males?

```
poverall <- ggplot(PrevMalebyYear,
            aes(x = Male , y = Female, size = 2)) +
  geom_point(show.legend = FALSE, alpha = 0.7) +
  scale_color_viridis_d() +
  scale_size(range = c(2, 12)) +
  labs(x = "Females", y = "Males")

poverall
```

And make it an anim and save it!

```
#overall<-poverall + transition_time(PrevMalebyYear$Year) + labs(title = "Year: {frame_time}") +
 # shadow_wake(wake_length = 0.2, alpha = FALSE)

#anim_save(file = "overall", animation = overall, path = "C:/Users/seanm/OneDrive/Desktop/Grad School S
```

Let's try one more dataset which better illustrates region differences

```
finalmerged <- merge(PrevMalebyYear, my_spdf)
```

And renaming it!

```
m <- rename(m, Country = ï..Entity)
```

```
#fullspdf <- merge(my_spdf, m, by.x = "NAME", by.y = "Country", all.x = TRUE)
```