

Wisconsin R script

2025-06-18

To start we read in the data and put the tidyverse and other packages in the library. Remember you must install each package once and only once on your machine.

```
# install.packages("tidyverse")
# install.packages("reshape")
# install.packages("RColorBrewer")
# install.packages("scales")

library(tidyverse)
library(reshape)
library(RColorBrewer)
library(scales)

# install.packages("sf")
library(sf)
```

Now read in the shape file and name it state.

```
state <- st_read("2012_to_2020_Election_Data_with_2020_Wards.shp")

View(state)
class(state)
```

First try making a map using ggplot and geom_sf.

```
# Make a map with geom_sf and fill by County name
ggplot(state) +
  geom_sf(aes(fill = CNTY_NAME), show.legend = F)
```

Now create smaller data frame to work with.

```
#let's select the columns we want and create new columns using mutate
# PREREP12 is number of Republican votes for President in 2012 by ward
# Note the inclusion of geometry

smlst <- select(state, CNTY_FIPS, CNTY_NAME, PREREP12, PREDEM12,
                 PREREP16, PREDEM16, PERSONS, geometry)
View(smlst)

# Now create new columns for proportion democrat votes in each ward
smlst <- mutate(smlst, PROPDEM12 = PREDEM12/(PREDEM12 + PREREP12),
                 PROPDEM16 = PREDEM16/(PREDEM16 + PREREP16))
```

Ok we are ready to make our maps of Democrat vote share in 2012 and 2016.

```
# Now create maps showing proportion of D voters in 2012 and 2016
p1 <- ggplot(smlst) +
  geom_sf(aes(fill = PROPDEM12), show.legend = T) +
  scale_fill_gradient2(low = "red", mid = "purple", high = "blue",
    midpoint = 0.5) +
  ggtitle("2012 Proportion of Democrat Voters")

p2 <- ggplot(smlst) +
  geom_sf(aes(fill = PROPDEM16), show.legend = T) +
  scale_fill_gradient2(low = "red", mid = "purple", high = "blue",
    midpoint = 0.5) +
  ggtitle("2016 Proportion of Democrat Voters")

p1
p2
```

Now for the county map we need to subset and aggregate our variables by county.

```
# let's try getting county data
cntygrp <- group_by(smlst, CNTY_NAME)
county <- summarize(cntygrp, predem12 = sum(PREDEM12, na.rm = TRUE),
  prerep12 = sum(PREREP12, na.rm = TRUE),
  predem16 = sum(PREDEM16, na.rm = TRUE),
  prerep16 = sum(PREREP16, na.rm = TRUE),
  persons = sum(PERSONS, na.rm = TRUE))

View(county)

#Perfect! We have all the counties!!! No NA's

# We can create new columns for the proportion of democrat votes and the change.

county <- mutate(county, PROPDEM12 = predem12/(predem12 + prerep12),
  PROPDEM16 = predem16/(predem16 + prerep16))
county <- mutate(county, PptDEMCHG = (PROPDEM16 - PROPDEM12)*100)
View(county)
```

The map is then easily made.

```
ggplot(county) +
  geom_sf(aes(fill = PptDEMCHG), show.legend = T) +
  scale_fill_gradient2(low = "red", mid = "purple", high = "blue",
    midpoint = 0) +
  ggtitle("Change in Proportion of Democrat Voters 2012-16")
```

To make the bubbles on the map first need centroids to use with `geom_point`.

```
#need centroids for long and lat
county$centroid <- st_centroid(county$geometry)

# to get x and y coord
```

```

county$centroid[[1]][1]
county$centroid[[1]][2]
county$centroid[[2]][1]
county$centroid[[2]][2]

for (j in 1:72) {
  county$long[j] <- county$centroid[[j]][1]
  county$lat[j] <- county$centroid[[j]][2]
}
View(county)

ggplot(county) +
  geom_sf(aes(fill = PptDEMCHG), show.legend = T) +
  scale_fill_gradient2(low = "red", mid = "purple", high = "blue",
    midpoint = 0) +
  geom_point(aes(long, lat, size = persons), alpha = 0.25) +
  scale_size_area(max_size = 15) +
  ggtitle("Change in Proportion of Democrat Voters 2012-16")

# Ha! Figured it out change fill to color :D
ggplot(county) +
  geom_sf() +
  geom_point(aes(long, lat, size = persons, color = PptDEMCHG)) +
  scale_size_area(max_size = 15) +
  scale_color_gradient2(low = "red", mid = "purple", high = "blue",
    midpoint = 0) +
  ggtitle("Change in Proportion of Democrat Voters 2012-16")

```

Lastly the scatterplot.

```

ggplot(county) + xlim(0.2,0.9) + ylim(0.2,0.9) +
  labs(x = "Proportion Democrat 2012", y = "Proportion Democrat 2016") +
  geom_point(aes(PPDEM12, PPDEM16, size = persons, color = PptDEMCHG),
    show.legend = FALSE) +
  scale_size_area(max_size = 15) +
  scale_color_gradient2(low = "red", mid = "purple", high = "blue",
    midpoint = 0) +
  geom_abline(aes(intercept = 0, slope = 1)) +
  annotate("text", x = 0.4, y = 0.7, label = "Got Bluer") +
  annotate("text", x = 0.8, y = 0.4, label = "Got Redder")

```

The End.