Data visualizations for 2014-2018 House, Senate and Presidential elections in the U.S for the proportion of Spanish ads

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```
knitr::opts_chunk$set(warning = FALSE, message = FALSE, echo = TRUE)
```

Loading libraries

```
library(haven)
library(dplyr)
library(ggplot2)
library(tidyverse)
library(rjson)
library(rgdal)
library(rgeos)
library(maptools)
```

Loading data

```
wmp_house_2014_v1_0 <- read_dta("wmp-house-2014-v1.0/wmp-house-2014-v1.0.dta")
wmp_senate_2014_v1_0 <- read_dta("wmp-senate-2014-v1.0/wmp-senate-2014-v1.0.dta")
```

Preparing map data

```
neil <- readOGR("nielsen-dma-master/nielsentopo.json", "nielsen_dma", stringsAsFactors=FALSE,
               verbose=FALSE)

neil <- SpatialPolygonsDataFrame(gBuffer(neil, byid=TRUE, width=0),
                                 data=neil@data)

neil_map <- fortify(neil, region="id")
neil_map <- neil_map %>%
  rename(dma = id)
neil_map$dma <- as.numeric(neil_map$dma)
```

Removing unnecessary data

```
rm(neil)
```

Preparing 2014 House election data

```
# Select only relevant columns
dma_and_spanish <- wmp_house_2014_v1_0 %>%
  select(dma, spanish, affiliation)

# Proportion per dma and party
dma_and_spanish <- dma_and_spanish %>%
  group_by(dma, affiliation) %>%
  summarise(prop_spanish = mean(spanish))
```

Merging map data and 2014 House election data

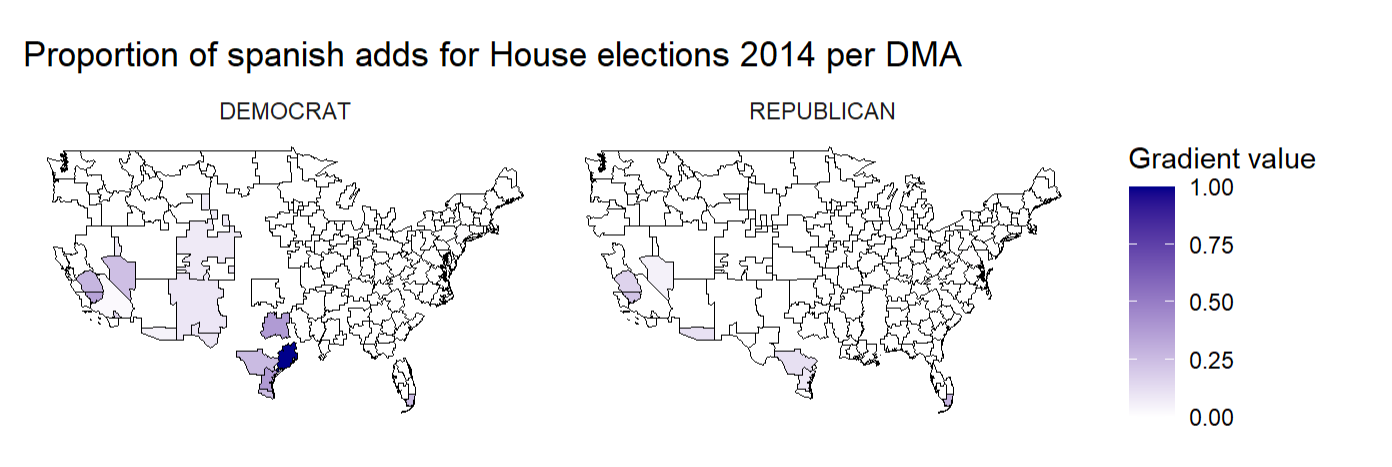
```
house_election_2014 <- left_join(neil_map, dma_and_spanish, by = "dma")

house_election_2014 <- house_election_2014 %>% filter(affiliation %in% c("DEMOCRAT", "REPUBLICAN"))
```

Removing data

```
rm(dma_and_spanish, wmp_house_2014_v1_0)
```

Proportion of spanish adds for House elections 2014 per DMA

```
ggplot(house_election_2014, aes(x = long, y = lat, group=group)) +
  geom_polygon(aes(fill = prop_spanish), color = "black", size = 0.1) +
  scale_fill_gradient(name = "Gradient value", low = "white", high = "darkblue", na.value = "grey") +
  theme(axis.text.x = element_blank(),
        axis.text.y = element_blank(),
        axis.ticks = element_blank(),
        axis.title.x = element_blank(),
        axis.title.y = element_blank(),
        rect = element_blank()) +
  labs(title = "Proportion of spanish adds for House elections 2014 per DMA") +
  facet_wrap(~affiliation) +
  coord_fixed(1.3)
```



Removing unnecessary data

```
rm(house_election_2014)
```

Preparing for Senate data

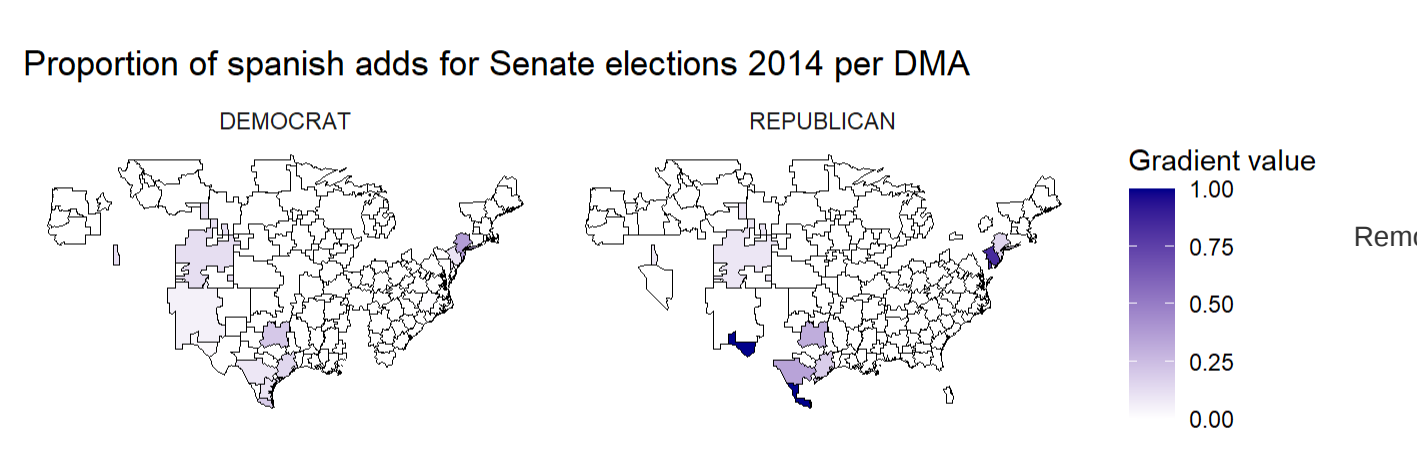
```
# Select only relevant columns
dma_and_spanish <- wmp_senate_2014_v1_0 %>%
  select(dma, spanish, affiliation)

# Proportion per dma and party
dma_and_spanish <- dma_and_spanish %>%
  group_by(dma, affiliation) %>%
  summarise(prop_spanish = mean(spanish))
```

Merging map data and 2014 Senate election data

```
senate_election_2014 <- left_join(neil_map, dma_and_spanish, by = "dma")

senate_election_2014 <- senate_election_2014 %>% filter(affiliation %in% c("DEMOCRAT", "REPUBLICAN"))
```

"Proportion of spanish adds for Senate elections 2014 per DMA"

```
ggplot(senate_election_2014, aes(x = long, y = lat, group=group)) +
  geom_polygon(aes(fill = prop_spanish), color = "black", size = 0.1) +
  scale_fill_gradient(name = "Gradient value", low = "white", high = "darkblue", na.value = "grey") +
  theme(axis.text.x = element_blank(),
        axis.text.y = element_blank(),
        axis.ticks = element_blank(),
        axis.title.x = element_blank(),
        axis.title.y = element_blank(),
        rect = element_blank()) +
  labs(title = "Proportion of spanish adds for Senate elections 2014 per DMA") +
  facet_wrap(~affiliation) +
  coord_fixed(1.3)
```



Removing data

```
rm(dma_and_spanish, senate_election_2014, wmp_senate_2014_v1_0)
```

Loading 2016 (non presidential) election results

```
wmp_house_2016_v1_0 <- read_dta("../2016 election data (non presidential)/wmp-house-2016-v1.0/wmp-house-2016-v1.
0.dta")
wmp_senate_2016_v1_0 <- read_dta("../2016 election data (non presidential)/wmp-senate-2016-v1.0/wmp-senate-2016-v
1.0.dta")
```

Preparing for House data

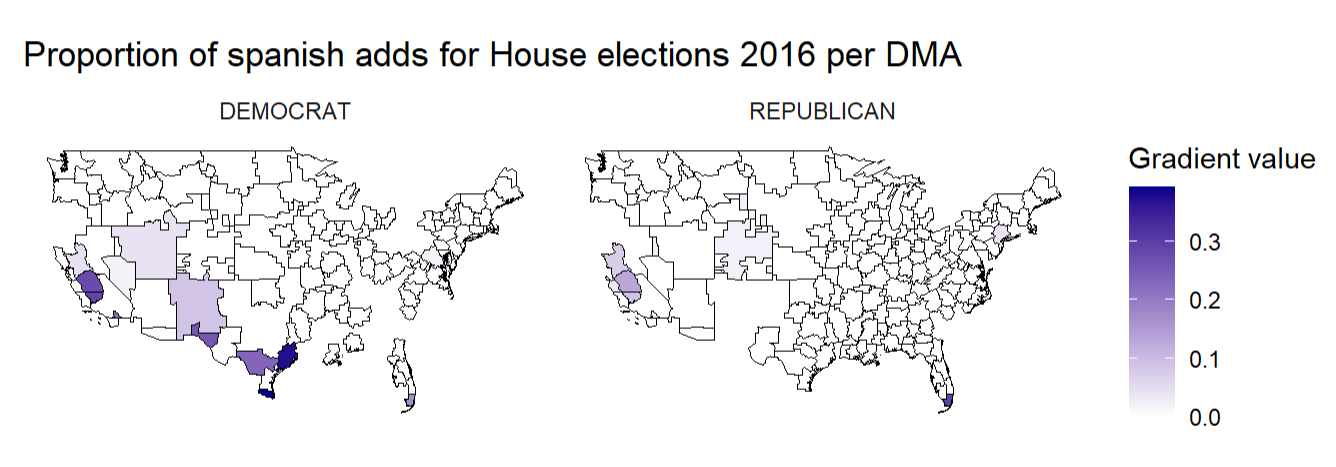
```
# Select only relevant columns
dma_and_spanish <- wmp_house_2016_v1_0 %>%
  select(dma, spanish, party)

# Proportion per dma and party
dma_and_spanish <- dma_and_spanish %>%
  group_by(dma, party) %>%
  summarise(prop_spanish = mean(spanish))
```

Merging map data and 2016 house election data

```
house_election_2016 <- left_join(neil_map, dma_and_spanish, by = "dma")

house_election_2016 <- house_election_2016 %>% filter(party %in% c("DEMOCRAT", "REPUBLICAN"))
```

Proportion of spanish adds for House elections 2016 per DMA

```
ggplot(house_election_2016, aes(x = long, y = lat, group=group)) +
  geom_polygon(aes(fill = prop_spanish), color = "black", size = 0.1) +
  scale_fill_gradient(name = "Gradient value", low = "white", high = "darkblue", na.value = "grey") +
  theme(axis.text.x = element_blank(),
        axis.text.y = element_blank(),
        axis.ticks = element_blank(),
        axis.title.x = element_blank(),
        axis.title.y = element_blank(),
        rect = element_blank()) +
  labs(title = "Proportion of spanish adds for House elections 2016 per DMA") +
  facet_wrap(~party) +
  coord_fixed(1.3)
```



Removing data

```
rm(dma_and_spanish, house_electio_2016, house_election_2016, wmp_house_2016_v1_0)
```

Preparing for House data

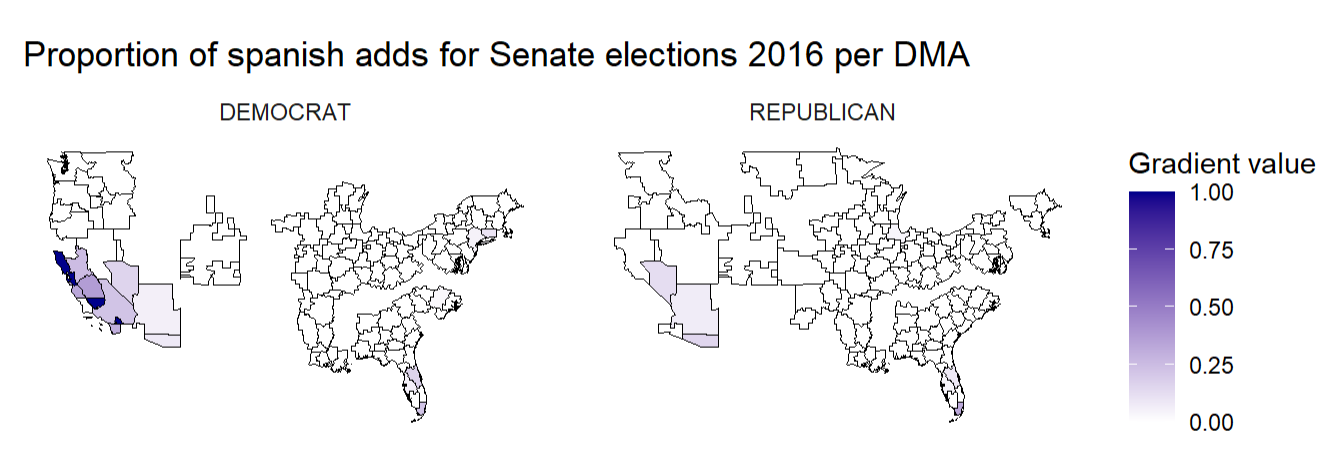
```
# Select only relevant columns
dma_and_spanish <- wmp_senate_2016_v1_0 %>%
  select(dma, spanish, party)

# Proportion per dma and party
dma_and_spanish <- dma_and_spanish %>%
  group_by(dma, party) %>%
  summarise(prop_spanish = mean(spanish))
```

Merging map data and 2016 house election data

```
senate_election_2016 <- left_join(neil_map, dma_and_spanish, by = "dma")

senate_election_2016 <- senate_election_2016 %>% filter(party %in% c("DEMOCRAT", "REPUBLICAN"))
```

Proportion of spanish adds for Senate elections 2016 per DMA

```
ggplot(senate_election_2016, aes(x = long, y = lat, group=group)) +
  geom_polygon(aes(fill = prop_spanish), color = "black", size = 0.1) +
  scale_fill_gradient(name = "Gradient value", low = "white", high = "darkblue", na.value = "grey") +
  theme(axis.text.x = element_blank(),
        axis.text.y = element_blank(),
        axis.ticks = element_blank(),
        axis.title.x = element_blank(),
        axis.title.y = element_blank(),
        rect = element_blank()) +
  labs(title = "Proportion of spanish adds for Senate elections 2016 per DMA") +
  facet_wrap(~party) +
  coord_fixed(1.3)
```



Removing data

```
rm(dma_and_spanish, wmp_senate_2016_v1_0, senate_election_2016)
```

Loading 2016 (presidential) election results

```
wmp_pres_2016_v1_1 <- read_dta("../2016 election data (presidential)/wmp-pres-2016-v1.1/wmp-pres-2016-v1.1.dta")
```

Preparing for presidential 2016 data

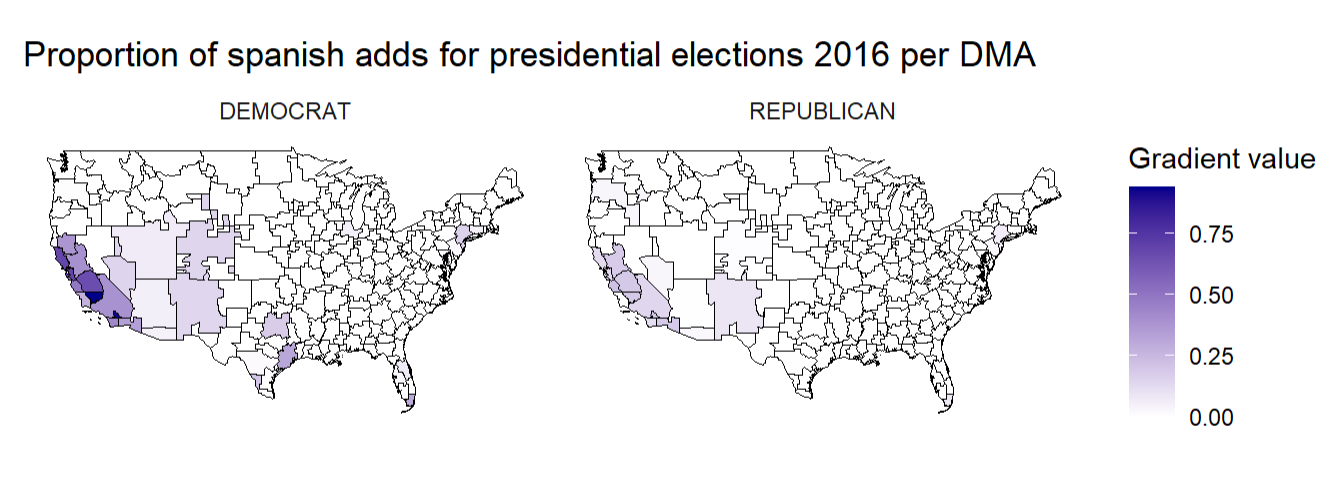
```
# Select only relevant columns
dma_and_spanish <- wmp_pres_2016_v1_1 %>%
  select(dma, spanish, party)

# Proportion per dma and party
dma_and_spanish <- dma_and_spanish %>%
  group_by(dma, party) %>%
  summarise(prop_spanish = mean(spanish))
```

Merging map data and 2016 presidential election data

```
presidential_election_2016 <- left_join(neil_map, dma_and_spanish, by = "dma")

presidential_election_2016 <- presidential_election_2016 %>% filter(party %in% c("DEMOCRAT", "REPUBLICAN"))
```

Proportion of spanish adds for presidential elections 2016 per DMA

```
ggplot(presidential_election_2016, aes(x = long, y = lat, group=group)) +
  geom_polygon(aes(fill = prop_spanish), color = "black", size = 0.1) +
  scale_fill_gradient(name = "Gradient value", low = "white", high = "darkblue", na.value = "grey") +
  theme(axis.text.x = element_blank(),
        axis.text.y = element_blank(),
        axis.ticks = element_blank(),
        axis.title.x = element_blank(),
        axis.title.y = element_blank(),
        rect = element_blank()) +
  labs(title = "Proportion of spanish adds for presidential elections 2016 per DMA") +
  facet_wrap(~party) +
  coord_fixed(1.3)
```



Remove data

```
rm(presidential_election_2016, wmp_pres_2016_v1_1, dma_and_spanish)
```

Loading 2018 election results

```
wmp_house_2018_v1_0 <- read_dta("../2018 election data/wmp-house-2018-v1.0/wmp-house-2018-v1.0.dta")
wmp_senate_2018_v1_0 <- read_dta("../2018 election data/wmp-senate-2018-v1.0/wmp-senate-2018-v1.0.dta")
```

Preparing for House 2018 data

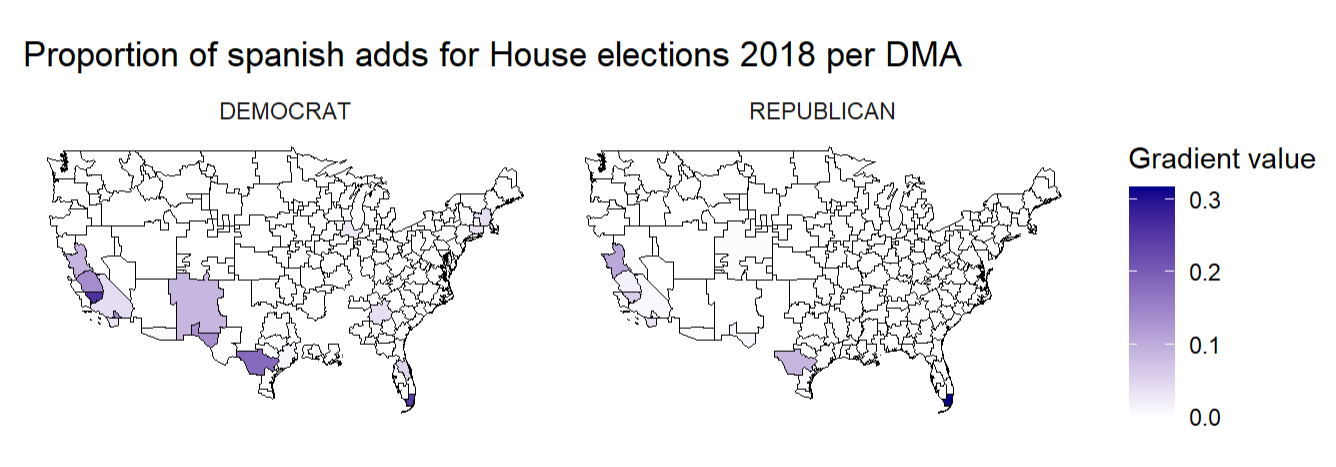
```
# Select only relevant columns
dma_and_spanish <- wmp_house_2018_v1_0 %>%
  select(dma, spanish, party) %>%
  filter(party %in% c("DEMOCRAT", "REPUBLICAN"))

# Proportion per dma and party
dma_and_spanish <- dma_and_spanish %>%
  group_by(dma, party) %>%
  summarise(prop_spanish = mean(spanish))
```

Merging map data and 2018 House election data

```
house_election_2018 <- left_join(neil_map, dma_and_spanish, by = "dma")

house_election_2018 <- house_election_2018 %>% na.omit()
```

Proportion of spanish adds for House elections 2018 per DMA

```
ggplot(house_election_2018, aes(x = long, y = lat, group=group)) +
  geom_polygon(aes(fill = prop_spanish), color = "black", size = 0.1) +
  scale_fill_gradient(name = "Gradient value", low = "white", high = "darkblue", na.value = "grey") +
  theme(axis.text.x = element_blank(),
        axis.text.y = element_blank(),
        axis.ticks = element_blank(),
        axis.title.x = element_blank(),
        axis.title.y = element_blank(),
        rect = element_blank()) +
  labs(title = "Proportion of spanish adds for House elections 2018 per DMA") +
  facet_wrap(~party) +
  coord_fixed(1.3)
```



Removing data

```
rm(wmp_house_2018_v1_0, house_election_2018, dma_and_spanish)
```

Preparing for Senate 2018 data

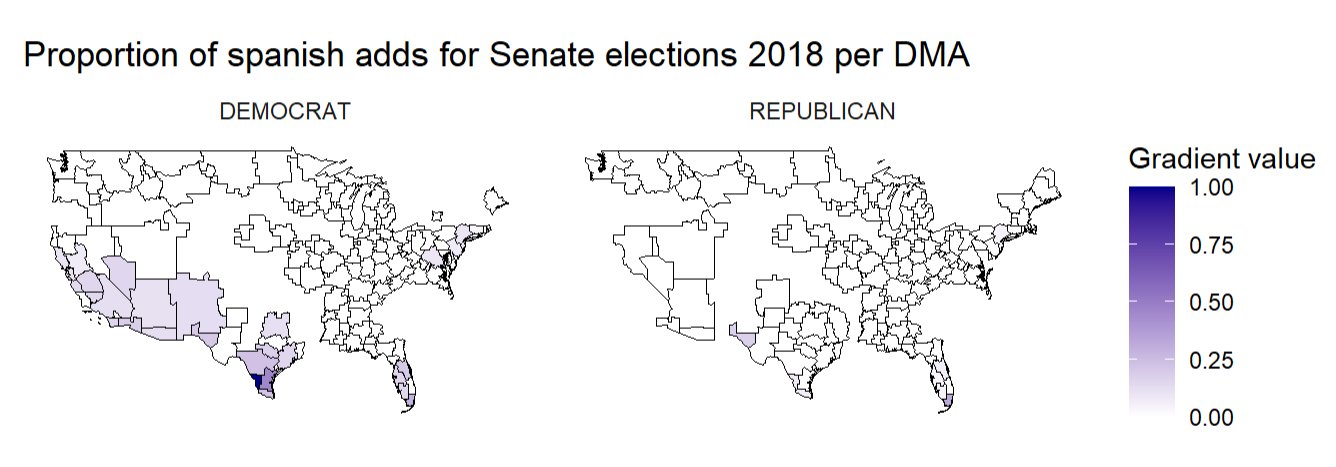
```
# Select only relevant columns
dma_and_spanish <- wmp_senate_2018_v1_0 %>%
  select(dma, spanish, party) %>%
  filter(party %in% c("DEMOCRAT", "REPUBLICAN"))

# Proportion per dma and party
dma_and_spanish <- dma_and_spanish %>%
  group_by(dma, party) %>%
  summarise(prop_spanish = mean(spanish))
```

Merging map data and 2018 Senate election data

```
senate_election_2018 <- left_join(neil_map, dma_and_spanish, by = "dma")

senate_election_2018 <- senate_election_2018 %>% na.omit()
```

Proportion of spanish adds for Senate elections 2018 per DMA

```
ggplot(senate_election_2018, aes(x = long, y = lat, group=group)) +
  geom_polygon(aes(fill = prop_spanish), color = "black", size = 0.1) +
  scale_fill_gradient(name = "Gradient value", low = "white", high = "darkblue", na.value = "grey") +
  theme(axis.text.x = element_blank(),
        axis.text.y = element_blank(),
        axis.ticks = element_blank(),
        axis.title.x = element_blank(),
        axis.title.y = element_blank(),
        rect = element_blank()) +
  labs(title = "Proportion of spanish adds for Senate elections 2018 per DMA") +
  facet_wrap(~party) +
  coord_fixed(1.3)
```



Removing data

```
rm(wmp_senate_2018_v1_0, senate_election_2018, dma_and_spanish)
```