TFG

Librerías

```
rm(list = ls())
library(pdftools)
library(tidyverse)
library(readxl)
library(zoo)
library(sf)
library(gt)
library(gtsummary)
library(ggpubr)
```

```
theme_tfg <- theme_minimal() +
  theme(axis.title.x = element_blank(),
        axis.text = element_text(color = "black"),
        axis.line.x.bottom = element_line(color = "black"),
        axis.line.y.left = element_line(color = "black"),
        axis.ticks.y  = element_line(color = "black"),
        panel.grid.major = element_blank(),
        panel.grid.minor = element_blank())
```

Carga de los Datos

Los datos se han obtenido de la Massachussets DESE, donde los institutos públicos de Massachusetts informaban de forma semanal el número de casos Covid-19 detectados entre el alumnado y el profesorado. Se ha descargado los reportes correspondientes a las 40 semanas del año escolar del curso 2021-2022, el último reporte analizado data del 16 de junio.

Los reportes constan de la siguiente estructura:

- La primera página se corresponde a un resumen de los resultados obtenidos.
- A partir de la segunda página se listan los distritos escolares junto al número de positivos entre el alumnado y el profesorado, así como el número de pruebas de grupo rutinarias, el número de positivos y su ratio.
- A continuación, se muestra una tabla con los casos registrados en las organizaciones educativas colaboradoras.
- Finalmente, se listan los casos registrados en los colegios aprobados de educación especial.

De este modo, el objetivo será extraer la información de las tablas correspondientes a la información de los distritos. Para ello, se ha implementado el siguiente código:

1. **Listado de los archivos.** Se lista el nombre de los archivos pdf contenidos en la carpeta data/reportes_covid.

```
archivos <- list.files("data/reportes_covid",pattern = ".pdf")
```

2. **Extracción de los datos.** Implementamos una función que permita extraer la información deseada.

La función recibe cómo parámetro un iterable con el nombre de los archivos y devuelve un dataframe con los datos correspondientes al código del distrito, nombre del distrito, número de casos covid-19 en alumnos, número de casos covid-19 en profesores, número de pruebas de grupo rutinarias, número de positivos, ratio positivos/pruebas y la fecha del reporte, ésta será extraída del nombre del archivo.

```
obt_data_distritos <- function(archivos){

  fechas <- str_extract(string = archivos,
                        pattern = "\\d{4}-\\d{1,2}-\\d{1,2}")

  df <- data.frame(Code = NA,
                   Name = NA,
                   Students = NA,
                   Staff = NA,
                   PT = NA,
                   PPT = NA,
                   PPR = NA,
                   Date = NA)

  for(i in 1:length(archivos)){

  df2 <- pdf_text(paste0("data/reportes_covid/",archivos[i]))
```

```r
p <- 2

fin <- FALSE

while(fin == FALSE){
  if(p == 2){
    aux <- df2[[p]] %>%
      str_split("\n") %>%
      as_tibble(.name_repair=make.names)
    aux <- aux %>%
      slice(7:nrow(aux)) %>%
      separate(X,
               into = c("Code",
                        "Name",
                        "Students",
                        "Staff",
                        "PT",
                        "PPT",
                        "PPR"),
               sep = "\\s{2,}")%>%
    filter(Code != "") %>%
      mutate(Date = fechas[i])

  }else{
    aux <- df2[[p]] %>%
    str_split("\n") %>%
    as_tibble(.name_repair=make.names) %>%
    separate(X, into = c("Code",
                         "Name",
                         "Students",
                         "Staff",
                         "PT",
                         "PPT",
                         "PPR"),
             sep = "\\s{2,}") %>%
    filter(Code != "") %>%
      mutate(Date = fechas[i])
  }
  df <- rbind(df,aux)

  p = p + 1
```

```
    fin <- grepl(pattern = "Education Collaboratives",df2[[p]])
  }

  }

  return(df)
}

df <- obt_data_distritos(archivos)
```

3. **Adecuación de las variables**. Se convierten al tipo adecuado las variables obtenidas y eliminamos las filas que contenga en la variable `Code` NAs.

```
df <- df %>%
  mutate(Students = as.numeric(Students),
         Staff = as.numeric(Staff),
         PT = as.numeric(PT),
         PPT = as.numeric(PPT),
         Date = as.Date(Date)) %>%
  filter(!is.na(Code))
```

Selección de los distritos escolares

A partir de los informes importados, se obtiene que 400 distritos escolares han reportado casos de COVID-19 a DESE. Sin embargo, para el estudio se han excluido los distritos metropolitanos, vocacionales y técnicos y se ha restringido a los distritos escolares incluidos en Boston-Newton-Cambridge New England City y Town Area (NECTA), resultando en un total de 79 distritos. Adicionalmente, se han excluido 7 distritos escolares debido a la inconsistencia de los datos enviados.

```
selected_districts <- read_delim("data/selected_districts.csv",
    delim = ";", escape_double = FALSE, trim_ws = TRUE)
```

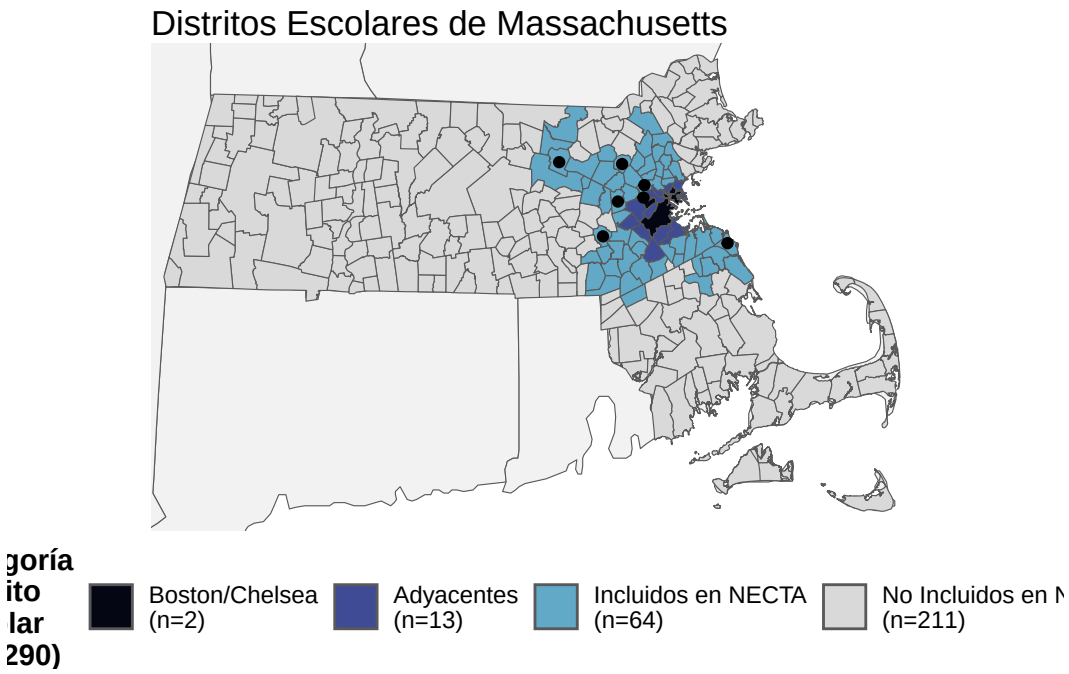
```
Rows: 79 Columns: 4
-- Column specification --------------------------------------------------------
Delimiter: ";"
chr (2): Name, Code
dbl (2): Week_lifted, Neighboring

i Use `spec()` to retrieve the full column specification for this data.
i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```r
selected_districts$Week_lifted <- as.factor(selected_districts$Week_lifted)

mapa_eeuu <- st_as_sf(maps::map("state",fill = TRUE, plot = FALSE))

mapa <- sf::st_read("data/schooldistricts/schooldistricts_poly.shp")
```

```
Reading layer `SCHOOLDISTRICTS_POLY' from data source
  `D:\Documentos\TFG-Mascarillas\Trabajo-Fin-Grado\data\schooldistricts\SCHOOLDISTRICTS_POLY
  using driver `ESRI Shapefile'
Simple feature collection with 296 features and 13 fields
Geometry type: MULTIPOLYGON
Dimension:     XY
Bounding box:  xmin: 33863.73 ymin: 777606.4 xmax: 330810.2 ymax: 959743
Projected CRS: NAD83 / Massachusetts Mainland
```

```r
mapa <- mapa %>% select(ORG8CODE,geometry)

mapa <- mapa %>%
  left_join(selected_districts %>% select(-Name),
            by = c("ORG8CODE"="Code"))
mapa$Neighboring[is.na(mapa$Neighboring)] <- 4
mapa$Neighboring <- as.factor(mapa$Neighboring)

selected_districts$Neighboring <- as.factor(selected_districts$Neighboring)
```

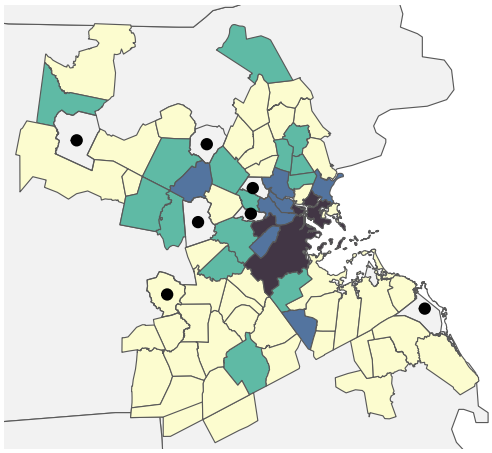
```r
ggplot() +
  geom_sf(data = mapa_eeuu, fill = "#f2f2f2") +
  geom_sf(data = mapa, aes(fill = Neighboring)) +
  stat_sf_coordinates(data = mapa %>% filter(Week_lifted == -1)) +
  scale_fill_manual(breaks = c(1,2,3,4),
                    values = c("#040613","#3f4b95","#62a9c7","#d9d9d9"),
                    labels = c("Boston/Chelsea\n(n=2)",
                               "Adyacentes\n(n=13)",
                               "Incluidos en NECTA\n(n=64)",
                               "No Incluidos en NECTA\n(n=211)")) +
  labs(title = "Distritos Escolares de Massachusetts",
       fill = "Categoría\nDistrito\nEscolar\n(N = 290)") +
  coord_sf(xlim = c(-73.4,-70), ylim = c(41.25,42.85)) +
  theme_void() +
  theme(legend.position = "bottom",
        legend.title = element_text(face="bold"))
```




```
ggplot() +
  geom_sf(data = mapa_eeuu, fill = "#f2f2f2") +
  geom_sf(data = mapa %>% filter(!is.na(Week_lifted) & Week_lifted != -1),
          aes(fill = Week_lifted)) +
  geom_sf(data = mapa %>% filter(Week_lifted == -1), fill = NA) +
  stat_sf_coordinates(data = mapa %>% filter(Week_lifted == -1)) +
  scale_fill_manual(breaks = c(1,2,3,4),
                    values = c("#fcfccf","#5fbaa5","#53749f","#423645"),
                    labels = c("03-Mar-22\n(n=46)",
                               "10-Mar-22\n(n=17)",
                               "17-Mar-22\n(n=7)",
                               "Mantienen\n(n=2)")) +
  labs(title = "Distritos Escolares por la Semana en el que se Eliminó\n
       la Restricción de las Mascarillas",
       fill = "Semana en el que la Restricción\n
       de las Mascarillas fue Eliminada") +
  coord_sf(xlim = c(-71.7,-70.6), ylim = c(42,42.7)) +
  theme_void() +
  theme(legend.position = "bottom",
        legend.title = element_text(face="bold"))
```

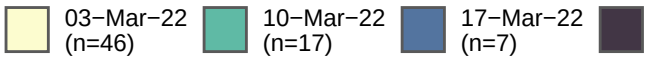
Distritos Escolares por la Semana en el que se Elin

la Restricción de las Mascarillas



en el que la Restricción

as Mascarillas fue Eliminada




```
df <- inner_join(df,selected_districts %>%
                   filter(Week_lifted != -1)
                 %>% select(-Name))
```

```
Joining with `by = join_by(Code)`
```

```
length(unique(df$Name))
```

```
[1] 72
```

```
df <- df %>% filter(!(Date >= as.Date("2022-06-02") & Name == "Brookline"))
```

Porcentaje de casos pre-Omicron, durante la ola Omicron BA.1, y después de la eliminación de la restricción de la mascarilla.

```
df_tabla <- df %>%
  mutate(All = Students + Staff,
         Week = round(as.numeric((Date - as.Date("2021-09-16"))/7+1)),
         Group_week = case_when(Week <= 10 ~ 1,
                                Week >= 11 & Week <= 25 ~ 2,
                                Week >= 26 ~ 3)) %>%
```

```
  select(-c(PT,PPT,PPR,Date,Name,Week)) %>%
  pivot_longer(c(Students,Staff,All), names_to = "names", values_to = "values")

df_tabla_aux <- df_tabla

df_tabla_aux <- df_tabla_aux %>% mutate(Week_lifted = "All")

df_tabla <- rbind(df_tabla, df_tabla_aux)

n_districts <- df_tabla %>%
  group_by(Week_lifted) %>%
  summarise(n = length(unique(Code)))

df_tabla <- df_tabla %>%
  group_by(Week_lifted, Group_week, names) %>%
  summarise(values = sum(values)) %>%
  left_join(n_districts) %>%
  mutate(Week_lifted = case_when(Week_lifted == "All" ~ "ALL",
                                 Week_lifted == 4 ~ "Did not lift",
                                 Week_lifted == 3 ~ "17-Mar-22",
                                 Week_lifted == 2 ~ "10-Mar-22",
                                 Week_lifted == 1 ~ "03-Mar-22"
                                 ),
         Group_week = case_when(Group_week == 1 ~ "Pre-Omicron\n(Weeks 1-10,\nn= 10 weeks)",
                                Group_week == 2 ~ "Omicron BA.1\n(Weeks 11-25,\nn= 15 weeks)"
                                Group_week == 3 ~ "Post-Lifting/\nOmicron BA.2+\n(Weeks 26-40
  pivot_wider(names_from = Group_week, values_from = values)
```

```
`summarise()` has grouped output by 'Week_lifted', 'Group_week'. You can
override using the `.groups` argument.
Joining with `by = join_by(Week_lifted)`
```

```
names(df_tabla)[1] <- "Week Masking\nRequirement\nLifted"
names(df_tabla)[3] <- "n\nDistricts"
```

```
df_tabla %>%
  gt(groupname_col = "names",
     caption = "Tabla 1. Percentage of cases occurring pre-Omicron,
     during the Omicron BA.1 wave, and after masking requirements were lifted ") %>%
  summary_rows(
    groups = TRUE
  )
```

Week Masking Requirement Lifted	n Districts	Pre-Omicron (Weeks 1-10, n= 10 weeks)	Omicron P
All			
03-Mar-22	46	2750	
10-Mar-22	17	1212	
17-Mar-22	7	525	
Did not lift	2	686	
ALL	72	5173	
Staff			
03-Mar-22	46	362	
10-Mar-22	17	159	
17-Mar-22	7	86	
Did not lift	2	161	
ALL	72	768	
Students			
03-Mar-22	46	2388	
10-Mar-22	17	1053	
17-Mar-22	7	439	
Did not lift	2	525	
ALL	72	4405	

Análisis Estadístico

```
enrollmentbygrade <- read_excel("data/enrollmentbygrade.xlsx",
    skip = 1)

enrollmentbygrade <- enrollmentbygrade %>%
  select(`District Name`, `District Code`, `Total`)
enrollmentbygrade <- enrollmentbygrade %>%
  mutate(Total = as.numeric(str_remove(Total,",")))

enrollmentbygrade <- enrollmentbygrade %>%
  inner_join(selected_districts %>%
               filter(Week_lifted != -1) %>%
               select(-Neighboring, -Name),
             by = c("District Code"="Code"))
```

Análisis Descriptivo

```
enrollmentbyracegender <- read_excel("data/enrollmentbyracegender.xlsx",
    skip = 1)

enrollmentbyracegender[,3:12] <- apply(enrollmentbyracegender[,3:12], 2,
                                       function(x){as.numeric(str_remove(x,","))})

glimpse(enrollmentbyracegender)
```

```
Rows: 401
Columns: 12
$ `District Name`                     <chr> "Abby Kelley Foster Charter Public~
$ `District Code`                     <chr> "04450000", "00010000", "04120000"~
$ `African American`                  <dbl> 54.6, 5.2, 61.0, 3.0, 1.2, 2.0, 2.~
$ Asian                               <dbl> 3.0, 2.7, 0.4, 33.4, 0.9, 14.4, 3.~
$ Hispanic                            <dbl> 20.5, 12.3, 30.0, 7.0, 4.4, 7.3, 1~
$ White                               <dbl> 16.0, 77.1, 6.9, 51.2, 89.7, 69.9,~
$ `Native American`                   <dbl> 0.5, 0.5, 0.0, 0.1, 0.2, 0.0, 0.1,~
$ `Native Hawaiian, Pacific Islander` <dbl> 0.1, 0.1, 0.2, 0.1, 0.0, 0.0, 0.0,~
$ `Multi-Race, Non-Hispanic`          <dbl> 5.3, 2.1, 1.6, 5.2, 3.6, 6.4, 3.1,~
$ Males                               <dbl> 46.1, 50.9, 52.0, 51.4, 53.0, 53.5~
$ Females                             <dbl> 53.9, 49.0, 48.0, 48.4, 47.0, 46.1~
$ `Non-Binary`                        <dbl> 0.0, 0.1, 0.0, 0.2, 0.0, 0.4, 0.1,~
```

```
enrollmentbyracegender <- enrollmentbyracegender %>%
  inner_join(selected_districts %>%
               filter(Week_lifted != -1) %>%
               select(Code,Week_lifted),
             by = c("District Code" = "Code"))
```

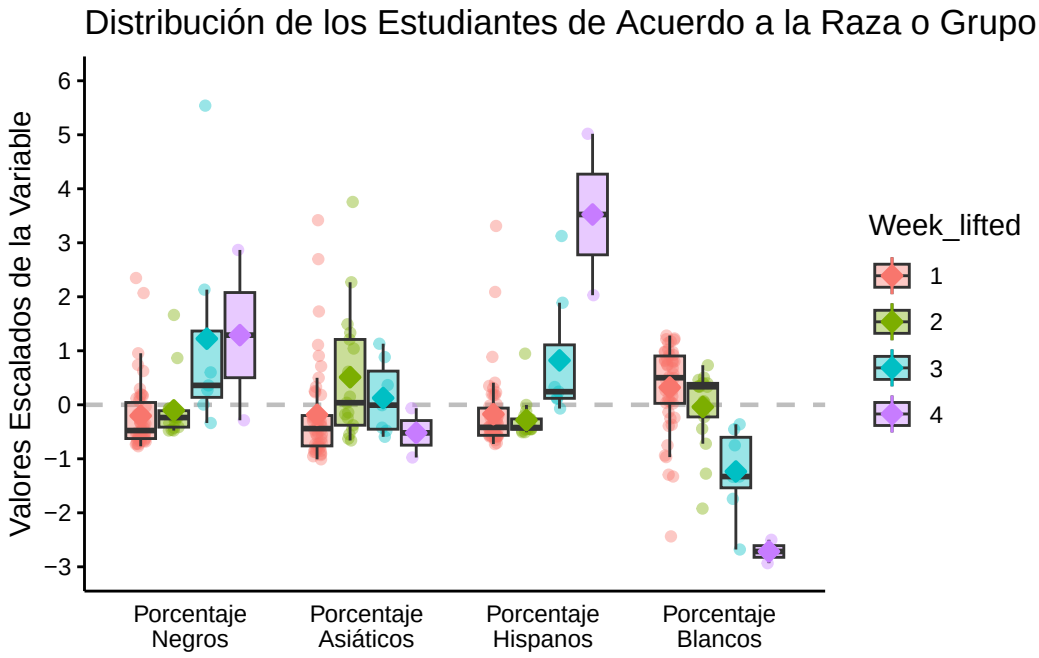
```
enrollmentbyracegender$african_scale <- scale(enrollmentbyracegender$`African American`)[,1]
enrollmentbyracegender$asian_scale <- scale(enrollmentbyracegender$`Asian`)[,1]
enrollmentbyracegender$hispanic_scale <- scale(enrollmentbyracegender$`Hispanic`)[,1]
enrollmentbyracegender$white_scale <- scale(enrollmentbyracegender$`White`)[,1]

enrollmentbyracegender <- enrollmentbyracegender %>%
  select(`District Code`,Week_lifted,african_scale,asian_scale,hispanic_scale,white_scale)

enrollmentbyracegender %>%
```

```r
  pivot_longer(3:6,names_to = "names",values_to = "values") %>%
  ggplot(aes(x = names, y = values, fill = Week_lifted)) +
  geom_hline(yintercept = 0, color = "grey", linetype = 2, size = 0.8) +
  geom_point(aes(color = Week_lifted), position = position_jitterdodge(jitter.width = 0.2), a
  geom_boxplot(outliers = FALSE, alpha = 0.4) +
  stat_summary(aes(color = Week_lifted), fun.y="mean", shape=23, position = position_jitterdo
  scale_y_continuous(breaks=seq(-3,6,1), limits = c(-3,6)) +
  scale_x_discrete(labels=c("african_scale" = "Porcentaje\nNegros",
                            "asian_scale" = "Porcentaje\nAsiáticos",
                            "hispanic_scale" = "Porcentaje\nHispanos",
                            "white_scale" = "Porcentaje\nBlancos")) +
  labs(y = "Valores Escalados de la Variable", title = "Distribución de los Estudiantes de Ac
  theme_tfg
```

```
Warning: Using `size` aesthetic for lines was deprecated in ggplot2 3.4.0.
i Please use `linewidth` instead.
```

```
Warning: The `fun.y` argument of `stat_summary()` is deprecated as of ggplot2 3.3.0.
i Please use the `fun` argument instead.
```

```
Warning: Removed 16 rows containing missing values or values outside the scale range
(`geom_segment()`).
```



```
selectedpopulations <- read_excel("data/selectedpopulations.xlsx",
    skip = 1)
```

```
New names:
* `High Needs #` -> `High Needs #...15`
* `High Needs #` -> `High Needs #...16`
```

```
selectedpopulations[,3:18] <- apply(selectedpopulations[,3:18], 2, function(x){as.numeric(st
glimpse(selectedpopulations)
```

```
Rows: 401
Columns: 18
$ `District Name`                <chr> "Abby Kelley Foster Charter Public (Dis~
$ `District Code`                <chr> "04450000", "00010000", "04120000", "06~
$ `First Language Not English #` <dbl> 965, 330, 160, 1095, 14, 233, 471, 438,~
$ `First Language Not English %` <dbl> 67.7, 15.3, 31.4, 21.1, 1.5, 24.1, 13.6~
$ `English Language Learner #`   <dbl> 221, 195, 46, 256, 4, 26, 171, 309, 29,~
$ `English Language Learner %`   <dbl> 15.5, 9.1, 9.0, 4.9, 0.4, 2.7, 4.9, 32.~
$ `Students With Disabilities #` <dbl> 189, 383, 133, 775, 136, 41, 596, 156, ~
$ `Students With Disabilities %` <dbl> 13.3, 17.5, 26.1, 14.7, 14.4, 4.2, 17.0~
$ `Low Income #`                 <dbl> 982, 847, 327, 566, 346, 142, 1522, 721~
$ `Low Income %`                 <dbl> 68.9, 39.3, 64.1, 10.9, 37.0, 14.7, 43.~
$ `Free Lunch #`                 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA,~
$ `Free Lunch %`                 <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA,~
$ `Reduced Lunch #`              <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA,~
$ `Reduced Lunch %`              <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA,~
$ `High Needs #...15`            <dbl> 1101, 1069, 384, 1513, 431, 248, 1889, ~
$ `High Needs #...16`            <dbl> 77.2, 48.8, 75.3, 28.8, 45.7, 25.7, 54.~
$ `Economically Disadvantaged #` <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA,~
$ `Economically Disadvantaged %` <dbl> NA, NA, NA, NA, NA, NA, NA, NA, NA, NA,~
```

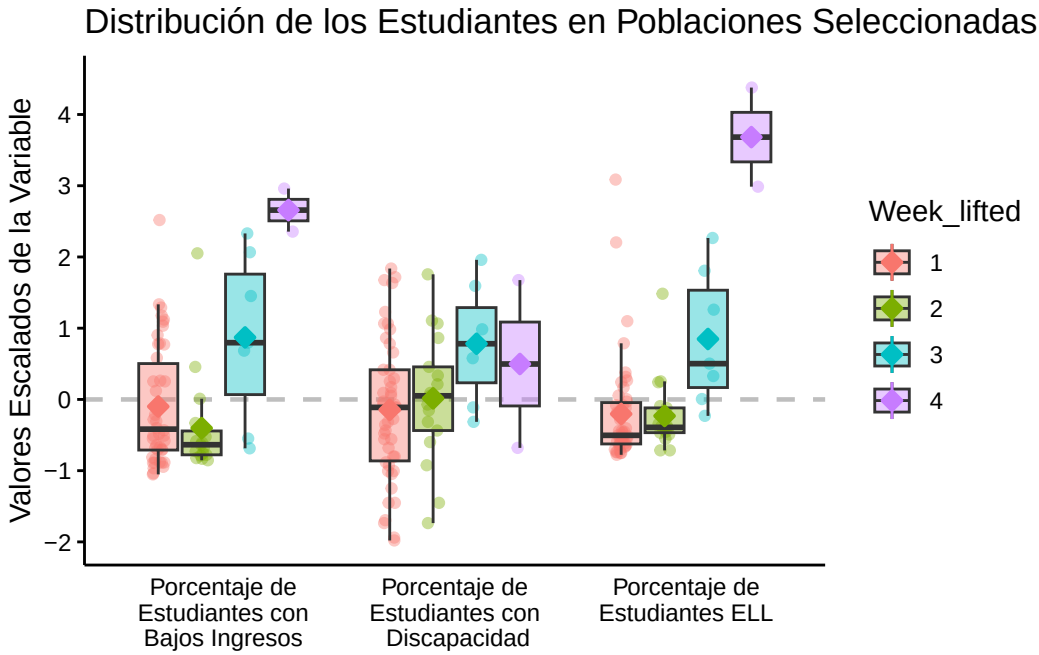
```
selectedpopulations <- selectedpopulations %>%
  select(`District Code`, `English Language Learner %`, `Students With Disabilities %`, `Low

selectedpopulations <- selectedpopulations %>% inner_join(selected_districts %>% filter(Week_

glimpse(selectedpopulations)
```

```
Rows: 72
Columns: 5
```

```
$ `District Code`                <chr> "06000000", "00090000", "06160000", "00~
$ `English Language Learner %`   <dbl> 4.9, 3.0, 3.6, 8.3, 30.4, 6.8, 9.0, 6.1~
$ `Students With Disabilities %` <dbl> 14.7, 19.9, 20.5, 13.5, 21.9, 20.8, 17.~
$ `Low Income %`                 <dbl> 10.9, 12.3, 33.8, 11.5, 71.2, 30.0, 14.~
$ Week_lifted                    <fct> 1, 2, 2, 2, 4, 1, 3, 1, 3, 1, 1, 4, 1, ~
```

```
selectedpopulations$lis_scale <- scale(selectedpopulations$`Low Income %`)[,1]
selectedpopulations$sd_scale <- scale(selectedpopulations$`Students With Disabilities %`)[,1]
selectedpopulations$ell_scale <- scale(selectedpopulations$`English Language Learner %`)[,1]
```

```
selectedpopulations <- selectedpopulations %>%
  select(`District Code`,Week_lifted,lis_scale,sd_scale,ell_scale)

selectedpopulations %>%
  pivot_longer(3:5,names_to = "names",values_to = "values") %>%
  ggplot(aes(x = names, y = values, fill = Week_lifted)) +
  geom_hline(yintercept = 0, color = "grey", linetype = 2, size = 0.8) +
  geom_point(aes(color = Week_lifted), position = position_jitterdodge(jitter.width = 0.2), a
  geom_boxplot(outliers = FALSE, alpha = 0.4) +
  stat_summary(aes(color = Week_lifted), fun.y="mean", shape=23, position = position_jitterdo
  scale_y_continuous(breaks=seq(-2,4,1), limits = c(-2,4.5)) +
  scale_x_discrete(limits = c("lis_scale","sd_scale","ell_scale"),
                   labels=c("lis_scale" = "Porcentaje de\nEstudiantes con\nBajos Ingresos",
                            "sd_scale" = "Porcentaje de\nEstudiantes con\n Discapacidad",
                            "ell_scale" = "Porcentaje de\nEstudiantes ELL")) +
  labs(y = "Valores Escalados de la Variable", title = "Distribución de los Estudiantes en Po
  theme_tfg
```




```
staffracegender <- read_excel("data/staffracegender.xlsx",
    skip = 1)

staffracegender[,3:12] <- apply(staffracegender[,3:12], 2, function(x){as.numeric(str_remove
glimpse(staffracegender)
```

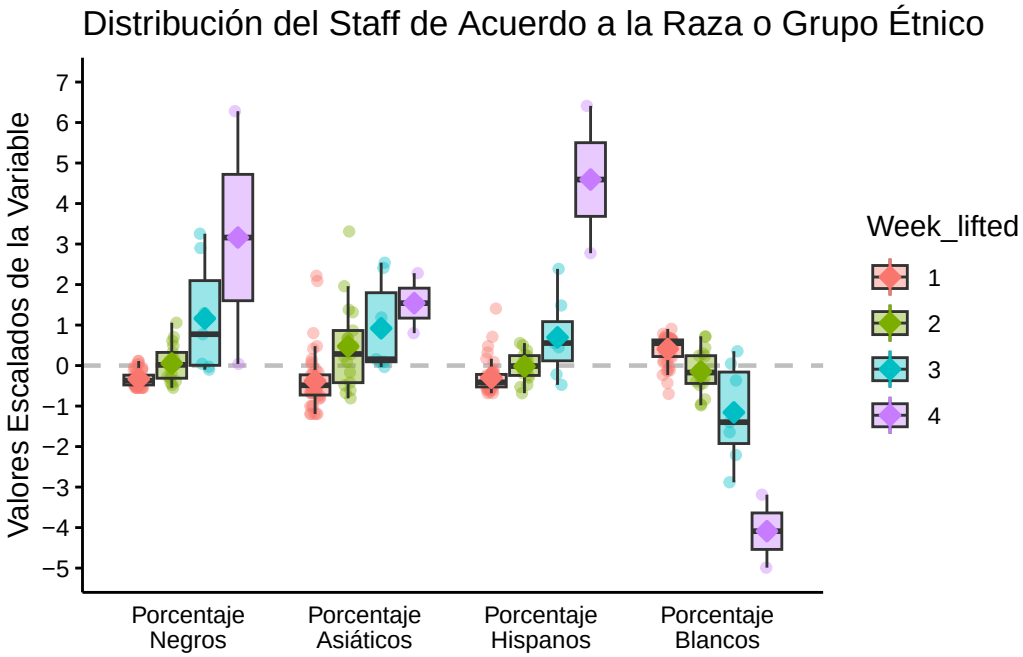
```
Rows: 401
Columns: 12
$ `District/School Name`                    <chr> "Abby Kelley Foster Charter Pu~
$ `District/School Code`                    <chr> "04450000", "00010000", "04120~
$ `African American (%)`                    <dbl> 4.5, 0.7, 27.9, 0.6, 0.8, 0.6,~
$ `Asian (%)`                               <dbl> 0.5, 0.7, 8.6, 5.3, 0.0, 4.9, ~
$ `Hispanic (%)`                            <dbl> 4.1, 3.4, 9.5, 1.9, 0.0, 1.4, ~
$ `White (%)`                               <dbl> 89.3, 94.9, 52.9, 91.5, 99.2, ~
$ `Native American (%)`                     <dbl> 0.0, 0.0, 0.0, 0.1, 0.0, 0.0, ~
$ `Native Hawaiian, Pacific Islander (%)`   <dbl> 0.5, 0.0, 0.0, 0.0, 0.0, 0.0, ~
$ `Multi-Race,Non-Hispanic (%)`             <dbl> 1.0, 0.4, 1.1, 0.6, 0.0, 2.4, ~
$ `Females (%)`                             <dbl> 78.9, 83.8, 66.3, 86.4, 84.5, ~
$ `Males (%)`                               <dbl> 21.1, 15.9, 33.7, 13.6, 15.5, ~
$ `FTE Count`                               <dbl> 194.2, 280.6, 94.9, 785.1, 121~
```

```r
staffracegender <- staffracegender %>%
  select(`District/School Code`, `African American (%)`, `Asian (%)`, `Hispanic (%)`, `White

staffracegender <- staffracegender %>% inner_join(selected_districts %>% filter(Week_lifted

glimpse(staffracegender)
```

```
Rows: 72
Columns: 6
$ `District/School Code` <chr> "06000000", "00090000", "06160000", "00260000",~
$ `African American (%)` <dbl> 0.6, 0.5, 0.7, 2.4, 28.9, 1.1, 7.8, 0.9, 14.6, ~
$ `Asian (%)`            <dbl> 5.3, 3.9, 0.9, 2.9, 5.4, 1.2, 5.6, 2.1, 5.8, 0.~
$ `Hispanic (%)`         <dbl> 1.9, 3.1, 1.5, 2.4, 13.4, 0.5, 4.4, 1.9, 8.4, 1~
$ `White (%)`            <dbl> 91.5, 91.6, 96.1, 90.1, 51.8, 96.6, 81.1, 94.7,~
$ Week_lifted            <fct> 1, 2, 2, 2, 4, 1, 3, 1, 3, 1, 1, 4, 1, 2, 2, 1,~
```

```r
staffracegender$african_scale <- scale(staffracegender$`African American (%)`)[,1]
staffracegender$asian_scale <- scale(staffracegender$`Asian (%)`)[,1]
staffracegender$hispanic_scale <- scale(staffracegender$`Hispanic (%)`)[,1]
staffracegender$white_scale <- scale(staffracegender$`White (%)`)[,1]

staffracegender <- staffracegender %>%
  select(`District/School Code`,Week_lifted,african_scale,asian_scale,hispanic_scale,white_sc

staffracegender %>%
  pivot_longer(3:6,names_to = "names",values_to = "values") %>%
  ggplot(aes(x = names, y = values, fill = Week_lifted)) +
  geom_hline(yintercept = 0, color = "grey", linetype = 2, size = 0.8) +
  geom_point(aes(color = Week_lifted), position = position_jitterdodge(jitter.width = 0.2), a
  geom_boxplot(outliers = FALSE, alpha = 0.4) +
  stat_summary(aes(color = Week_lifted), fun.y="mean", shape=23, position = position_jitterdo
  scale_y_continuous(breaks=seq(-5,7,1), limits = c(-5,7)) +
  scale_x_discrete(labels=c("african_scale" = "Porcentaje\nNegros",
                            "asian_scale" = "Porcentaje\nAsiáticos",
                            "hispanic_scale" = "Porcentaje\nHispanos",
                            "white_scale" = "Porcentaje\nBlancos")) +
  labs(y = "Valores Escalados de la Variable", title = "Distribución del Staff de Acuerdo a l
  theme_tfg
```

```
Warning: Removed 16 rows containing missing values or values outside the scale range
(`geom_segment()`).
```


Distribución del Staff de Acuerdo a la Raza o Grupo Étnico
Valores Escalados de la Variable
7
6
5
4
3
2
1
0
−1
−2
−3
−4
−5
Porcentaje Negros
Porcentaje Asiáticos
Porcentaje Hispanos
Porcentaje Blancos
Week_lifted
1
2
3
4